Mass Housing for New Moscow

by

Peter Markin

A thesis

presented to the University of Waterloo

in fulfillment of the

thesis requirement for the degree of

Master of Architecture

Waterloo, Ontario, Canada, 2019

AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any final required revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

This thesis explores the highrise housing development industry within Moscow's recently expanded borders, where a large volume of what is commonly understood to be an outdated Soviet-era product continues to be built. The work investigates the reasons why this mass housing typology continues to represent well over half of new housing construction in the country, and seeks to offer viable recommendations for improving the status quo in this particular context and marketplace. It is found that a high prevalence of prefabrication and strict solar penetration requirements greatly hinder, however do not entirely preclude, the diversification of the housing stock. Despite strong evidence that the population prefers more western models of low-rise housing, long-standing traditions continue to normalize the highrise typology. With high demand for housing and limitations of the housing market, most homebuyers have no choice but to settle for this form of housing. Furthermore, the oligopolistic tendencies of the development industry result in a market with limited competition and *low price elasticity of supply*. In other words, demand for better housing, as well as ample capital from rising incomes and housing subsidies, result in limited improvement in the new housing stock. Without incentives and only obstacles to change, the development industry continues to build a substandard product. It is concluded that a profit motive is a prerequisite for any improvement and diversification of the new housing stock. Therefore, this thesis seeks to propose an alternate mass housing typology that better reflects housing aspirations of the population, while being viable due to improved profitability and marketability.

ACKNOWLEDGEMENTS

I would like to thank my supervisor Elizabeth English and my committee member Rick Haldenby for their guidance and support in completing this thesis. I would also like to thank Val Rynnimeri, my internal reader, and Leo Rothenburg my external reader. Thank you also to my family for their encouragement and wealth of knowledge.

DEDICATION

To Ludmila Gerasimenko, as promised.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

INTRODUCTION

Today's housing industry in New Moscow territories is controlled by a handful of large developers, who operate in a market conjuncture that perpetuates the same mass housing typology that has typified the post-WWII landscape of the Soviet Bloc (Figure 1). With a seemingly endless demand for cheap housing and few incentives to change, these players continue to copy/paste highrise slab tower districts on Moscow's periphery with limited regard for local specificities and the rural landscape. This typology continues to represent over half of new housing construction in the entire country (Kosareva, Polidin and Puzanov 2012). However, developers are not entirely to blame for this phenomenon.

Figure 1: Aerial view over a typical Soviet-era residential district (Lianozovo) in Moscow, by Vladimir Solntsev

A complex web of factors hinders the diversification of the housing stock since reintroduction of private property and the transplant of American housing policies in the 90s. Historic inertia of the construction industry in the form of mass-produced and prefabricated building systems continues to flood the market with building materials that are most suitable for highrise slab towers. The building code, with strict insolation (solar penetration) requirements, greatly limits the types of building forms that can achieve desired densities. Furthermore, inexhaustible demand for fast and cheap housing fuels the construction industry, while long-establish housing traditions continue to normalize the outdated housing typology. High interest rates and slow adoption of mortgage credit also hinder market liquidity and perpetuate unjust inequality, which in turn necessitates continued state intervention in the housing sector. Furthermore, the oligopolistic structure of the development industry with limited competition results in *low price elasticity of supply*, whereby high demand for quality housing and ample capital from subsidies do not result in improvements of the new housing stock that is being built. Ever-larger Soviet-era estates with wide expanses of open space continue to be built, perpetuating familiar notions that the public realm is everyone's and therefore no one's (Figure 2). While there is great room for improvement, it is concluded that a profit motive for the development industry is a prerequisite for any improvements in the new housing stock contemplated in this document.

Figure 2: Typical new development (Blizhnee Peredelkino) in New Moscow, by Absolut Real Estate

In spite of these setbacks, there is growing demand and institutional push for low and mid-rise suburban housing, and a cooling market, which can improve quality through intensifying competition between developers (Papov 2018). The immense gap between people's housing aspirations and the reality of the housing stock is closing (Ahmirova 2018, Trushin 2017). In response, a new variation of the slab tower typology is gaining prominence. Increasingly, slab towers are arranged into perimeter blocks with car-free courtyards and variegated façades

(Figure 3). These clever innovations help to successfully market new projects, while yielding same densities as are customary for local developers (Indicatori Rinka Nedvizhimosti 2014). This is certainly an improvement, however there is a risk that such a facelift of an otherwise outdated model can lead to further entrenchment of the status quo. This scenario poses an architectural challenge: can a better high-density model of suburban greenfield development be proposed, that more closely reflects housing aspirations of the population, while remaining viable from the perspective of New Moscow's development industry?

Figure 3: Buninskiye Luga, an example of a new perimeter block typology with car-free courtyards, by PIK Group

The approach to addressing the above scenario in New Moscow was determined through review of reference material at varying scales. At the urban scale, a comparison of New Moscow's construction trends to texts regarding edge vs. edgeless cities established that the inevitability of decentralized and unplanned growth is to be acknowledged in the proposed design intervention. A new model of urban fabric, and more specifically a city block, is selected as the appropriate medium for the proposal offered in this document. It was determined that a successful proposal for a replicable urban block typology needs to be able to integrate seamlessly with a range of continuously evolving landscapes and contextual conditions. Review of precedents of *fine grain* block typologies and essays regarding the crucial role of the built environment in fostering community and stewardship suggests that a successful proposition needs to integrate a diversity of development parcel sizes, low and mid-rise typologies, private yards and a hierarchy of open spaces. Promotion of a sense of private ownership and local stewardship is adopted as the means to foster community, which is instrumental for housing satisfaction. A shadow study and a rapid prototyping exercise are performed to optimize the proposed block configuration. The result is an alternate urban block typology with a number of mitigative measures, a diversity of housing types, and a range of public and private spaces that are more reflective of housing aspirations of the population. For the proposal to be viable, such measures are proposed while

retaining density and servicing efficiency, while also improving marketability, thereby suggesting ways to incentivize the development industry to build better communities.

To generate a viable and relevant proposal for New Moscow, this thesis first (in Chapter 1) provides a brief history of Moscow's growth and the recent annexation of New Moscow territories. This chapter also provides a snapshot of New Moscow's housing development industry today and introduces wider issues faced by New Moscow due to rapid urbanization. Chapter 2 analyzes the historical context that has resulted in today's entrenchment of the slab tower typology. This chapter also describes the web of factors that continue to perpetuate the slab tower typology today. Chapter 3 details the rationale by which the methodology for addressing New Moscow's status quo was determined, and also features precedents to direct the design intervention. Chapter 4 of this document summarizes the urban design criteria distilled from previous chapters, and through three design exercises provides a preliminary proposal as a starting point for further design work. A conclusion offers a summary of the findings and takeaways that can be applied to future work, as well as the limitations of this thesis.

CHAPTER 1: BACKGROUND

The purpose of this first chapter is to provide a snapshot of today's development industry in New Moscow. As well, a historical context is provided that establishes today's development trends as a significant departure from Moscow's historic patterns of growth. A problem statement is provided, including a summary of key issues that are being faced due to the rapid urbanization of greenfield lands on Moscow's periphery. First, a brief history of Moscow's growth and recent expansion into New Moscow territories are provided.

1.1. Historic Patterns of Growth and New Moscow

Urban growth and development trends that are observed on Moscow's periphery today are a significant departure from the city's historical patterns of growth. As well, the expansion of Moscow's borders in the southwest direction in 2012 is a radical change from the city's tradition of radial-concentric growth. Like many other European cities, Moscow has been shaped by cycles of planned decentralization, working against the tendencies of functions to gravitate toward the inner-city (Revzin, et al. 2016). In the example of Moscow, with the Kremlin at the very centre (physically, symbolically and politically), there appears to be a particularly strong and resilient monocentric proclivity. From its very conception, Moscow expanded outward from the Kremlin through layers of consecutive fortifications and transportation rings (Figure 4). In the 1820s, both the Bulvarnoye (translated "Boulevard") and Sadovoye (translated "Garden") ring roads replaced historic fortifications, which were deemed obsolete after the French Invasion and the Fire of Moscow in 1812 (Sytin 1948). In the 20th century, a series of official plans (*genplan*) have been adopted under Soviet jurisdiction that continued this concentric tradition, while also aiming to take industry out of the city. Inevitably, these functions gravitated back to the city centre and the areas between the city and the industrial periphery were filled in with housing (Revzin, et al. 2016). The genplan of 1925 (Figure 5) was a long-term strategy that directed the transfer of industrial functions and the population out of the overcrowded city of Moscow to existing towns that formed two rings of 100km and 200km in diameter. This plan also proposed to continue the strong radial-concentric structure of the city with four new ring roads, an

industrial ring and a garden ring, with new residential districts between them. The *genplan* of 1935 (Figure 6) focused more closely on the immediate future, and proposed to eliminate development of large industry in the city. This plan expanded the area of Moscow by 315,000m^2 and defined suburbs with a forest-park belt. In 1960-61, Moscow further expanded to include five cities and nearby suburbs up to the newly constructed MKAD ring road (translated "Moscow Circular Auto Road"). A formal plan for these new territories was finally established in the 1971 *genplan* (Figure 7), which envisioned large-scale removal of residential functions outside the city center into self-sufficient sectors, interspersed with vast open space reserves. These districts were meant to function independently from the city center, with their own social, cultural and industrial uses. Similarly, new satellite cities were established around Moscow, with the intent of creating a decentralized network of self-sufficient communities independent of Moscow city center. However too often, and especially after the fall of the Soviet Union and the transition to a market economy, these communities lost their industrial function, and turned into bedroom communities, with the majority of commuters travelling to central Moscow instead of laterally along the ring roads (Makhrova, Nefedova and Treivish 2013). Despite prolonged efforts to decentralize the city, its monocentric structure has always prevailed.

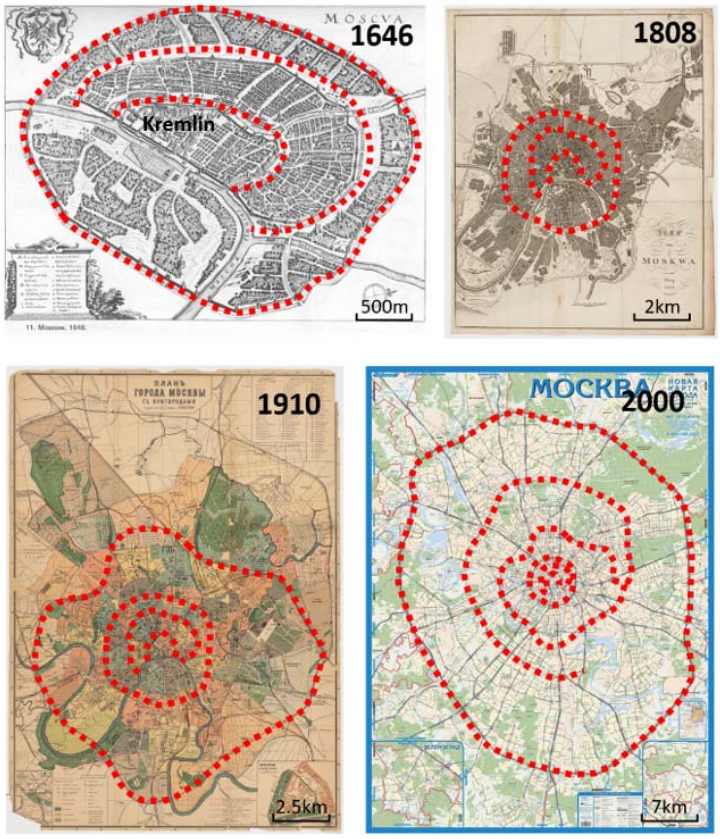

Figure 4: Moscow's historic growth with layers of transportation rings

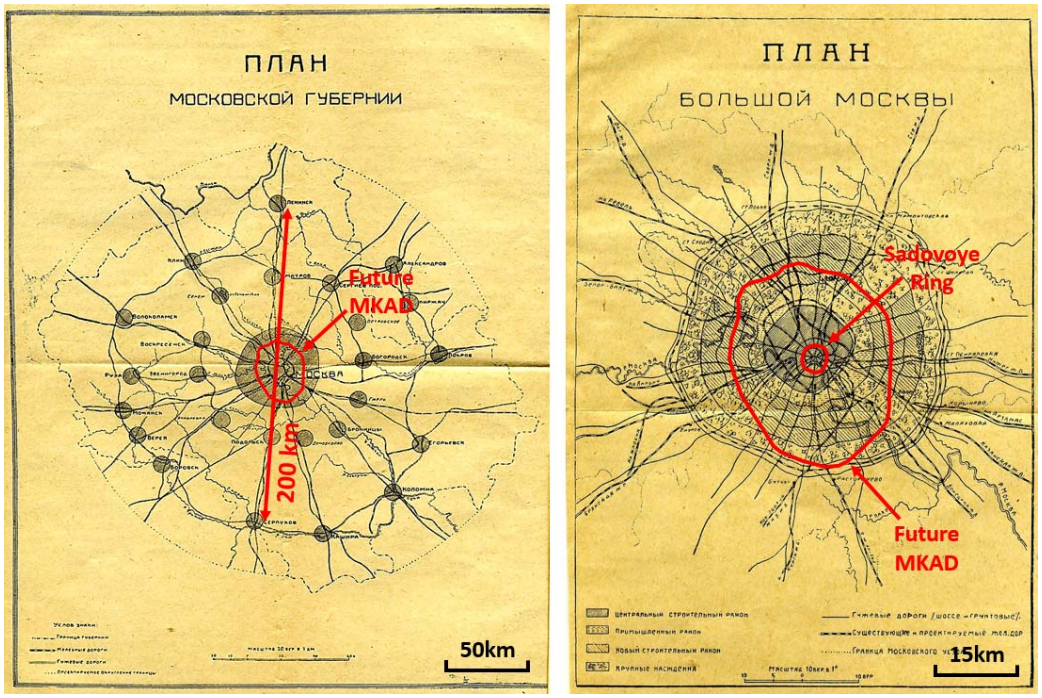

Figure 5: Moscow genplan of 1925 with a focus on decentralizing Moscow's industry and addition of new rings

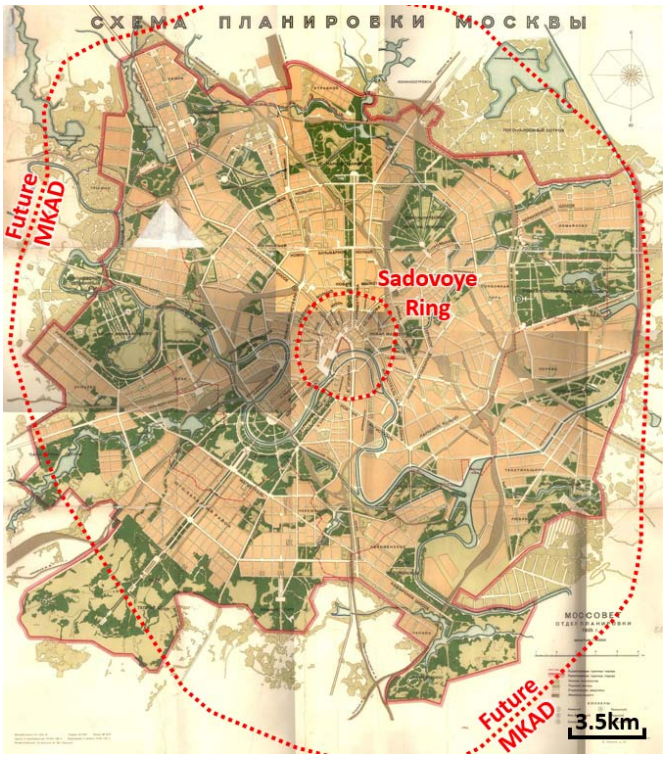

Figure 6: Moscow genplan of 1935

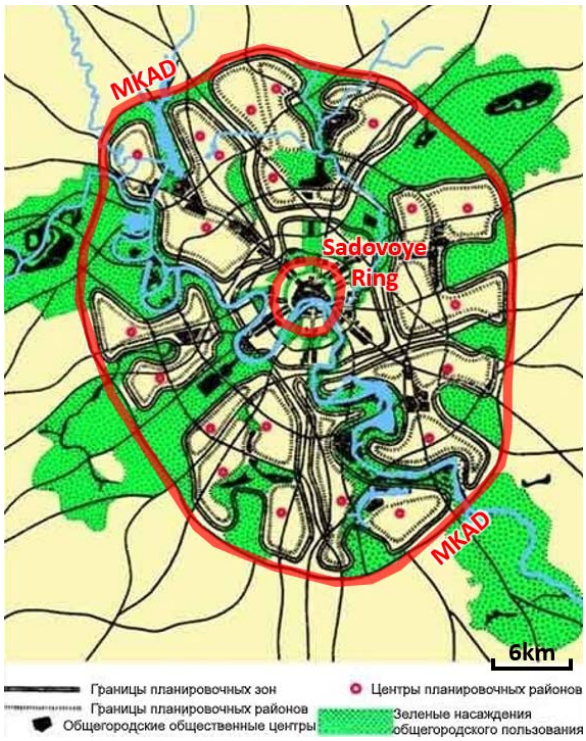

Figure 7: Moscow genplan of 1971 with a focus on new self-sufficient districts around the existing city

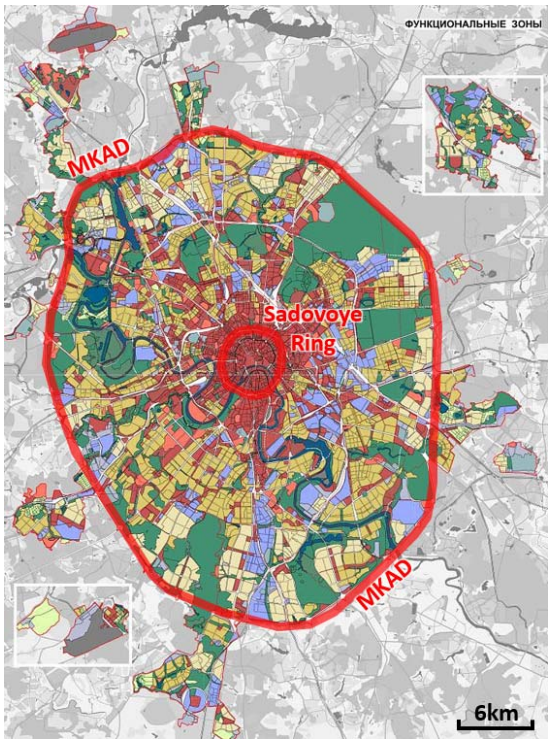

Figure 8: Moscow genplan of 2010 with a number of edge and satellite cities outside the MKAD

After extensive privatization of the economy in the early 90s, newly established enterprises centralized in Moscow's core, leaving a vacuum of employment functions in bedroom communities and thereby creating some of the worst traffic congestion in the world. This was further exacerbated by Moscow's explosive population growth due to an influx of migrants, as is expected during times of economic instability (Makhrova, Nefedova and Treivish 2013). To provide a steady supply of land for Moscow's highrise construction complex, a program was established to continue expanding Moscow's borders with new edge and satellite bedroom communities (Figure 8) (Revzin, et al. 2016). As this further worsened congestion, an international competition was held to generate a strategy for the decentralization of Moscow. The winning entry by OMA proposed focusing future growth around four employment clusters adjacent to Moscow's four airports on the periphery (Figure 9). However, competition results were not binding, and due to an underlying political rationale and against the recommendations and opposition of prominent experts, Medvedev's presidential decree in 2012 ordered the expansion of Moscow's area by 150% over the least developed part of Moscow Region in the southwest direction (Figure 10). No explanation for why the expansion differed from OMA's proposal was offered by neither President Medvedev, nor Mayor Sobyanin and Governor Gromov, who were given only two months to develop the plan (Argenbright 2018).

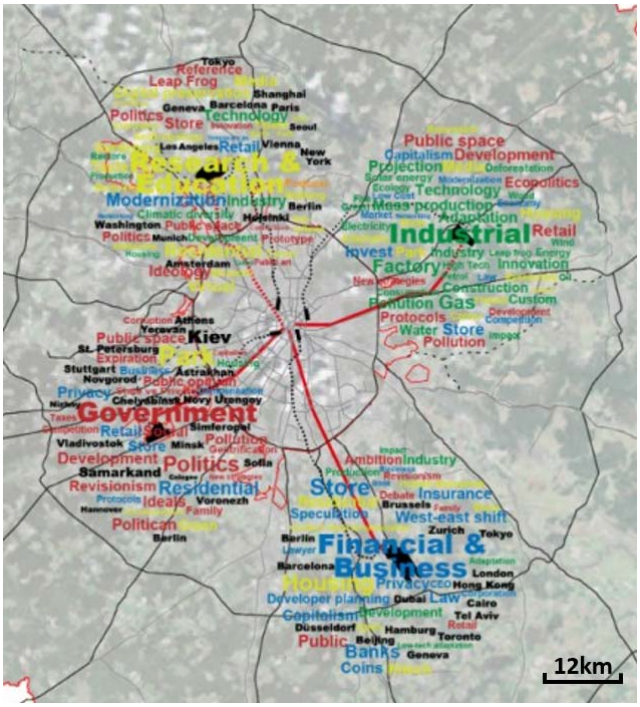

Figure 9: OMA's winning concept for decentralization of Moscow, focusing growth around four existing airports

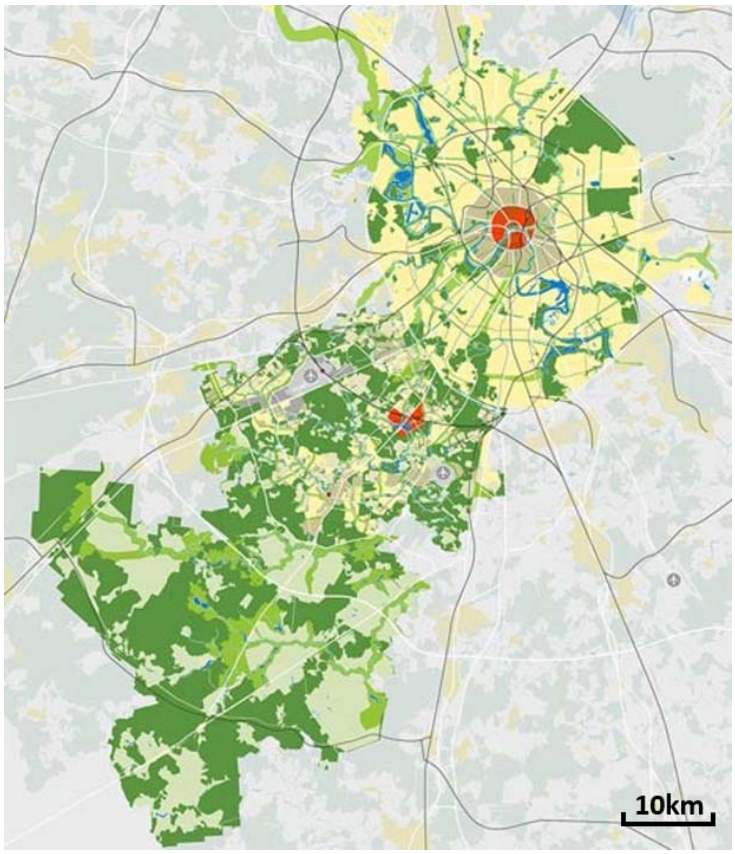

Figure 10: 2012 expansion of Moscow city limits to the southwest

The 2012 expansion of Moscow is a radical departure from the city's radial-concentric form, reminiscent of Nikolai Ladovsky's 1932 scheme for restructuring the city of Moscow. Ladovsky argued that by opening the circular structure of the monocentric city to make a parabola, a linear axis is created along which the city centre can expand in perpetuity (Figure 11 and Figure 12). According to Ladovsky's plan, the "Old Moscow" historic centre could be preserved as the focal point of the parabola, while accommodating unrestricted growth along a linear axis in "New Moscow". Similarly, Medvedev's expansion of 2012 envisioned the relocation of key city functions to a modern city-park along radial transportation corridors outside the MKAD (Figure 13), thereby preserving Moscow's historic center for cultural activity and tourism (Khan-Magomedov 1987). This strategy included the relocation of the federal government and a number of ministries to a new administrative center outside the MKAD, as well as the creation of 1 million jobs in twelve employment clusters specializing in innovation, healthcare, academics etc., all supported by a massive program of infrastructure investments. Unfortunately for New Moscow, plans to relocate federal functions were quickly abandoned due to low traction among the elites, and plans to create jobs mainly focused on construction of office space, instead of creation of businesses. Furthermore, prior to the transition of jurisdiction over these lands to

Moscow's municipal government, plans for introduction of low and mid-rise housing were thwarted by a last-minute rush and the subsequent granting of building permits by regional authorities for tens of millions of square meters of highrise housing. Simply put, New Moscow as a project is failing. Furthermore, with construction of new transportation rings inside the MKAD, Moscow's monocentric form appears to be prevailing. As will be discussed further, despite the new municipal boundaries after the expansion, the logic of the radial-concentric city is being largely maintained. Commercial and institutional functions are not leaving Moscow's core, while immense volumes of housing are being developed along Moscow's radial arterial roads in every direction. New Moscow does have a higher concentration of housing construction, but without a clear vision and identity, these territories are rapidly developing into a vast highrise bedroom community. As a result, Medvedev's 2012 vision for a new modern city with a diversified housing stock is giving way to further entrenchment of the Soviet-era housing typology on a colossal scale (Kuricheva 2013, Papov 2018, Argenbright 2018, Revzin, et al. 2016).

Figure 11: Ladovsky's concept for the expanding city, 1930

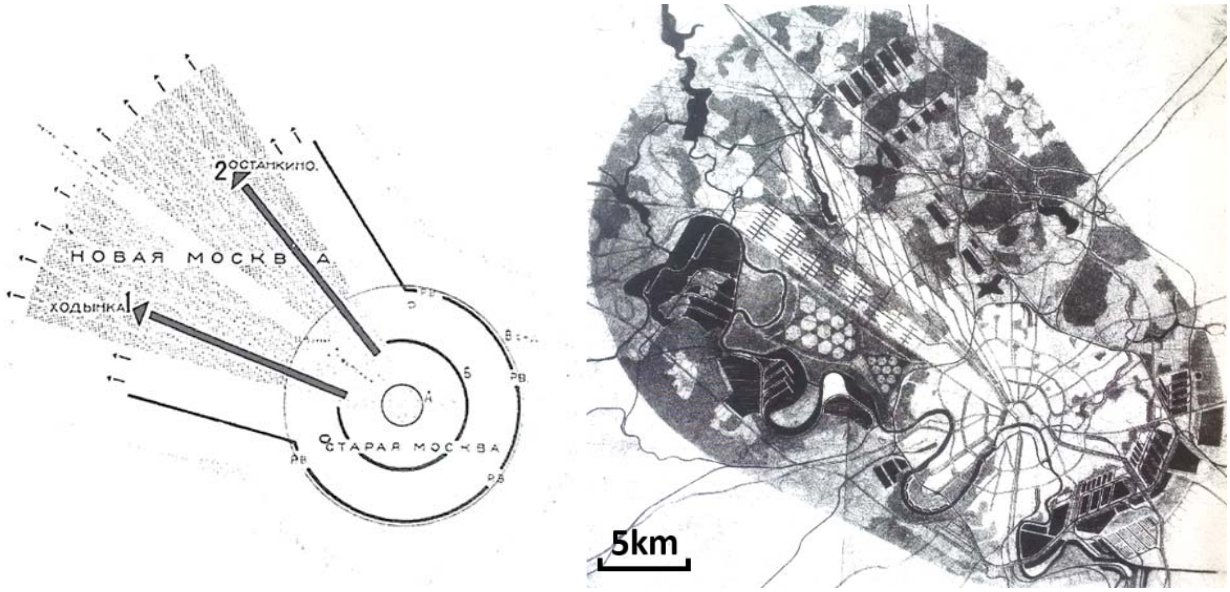

Figure 12: Ladovsky's plan for expansion of Moscow, 1932

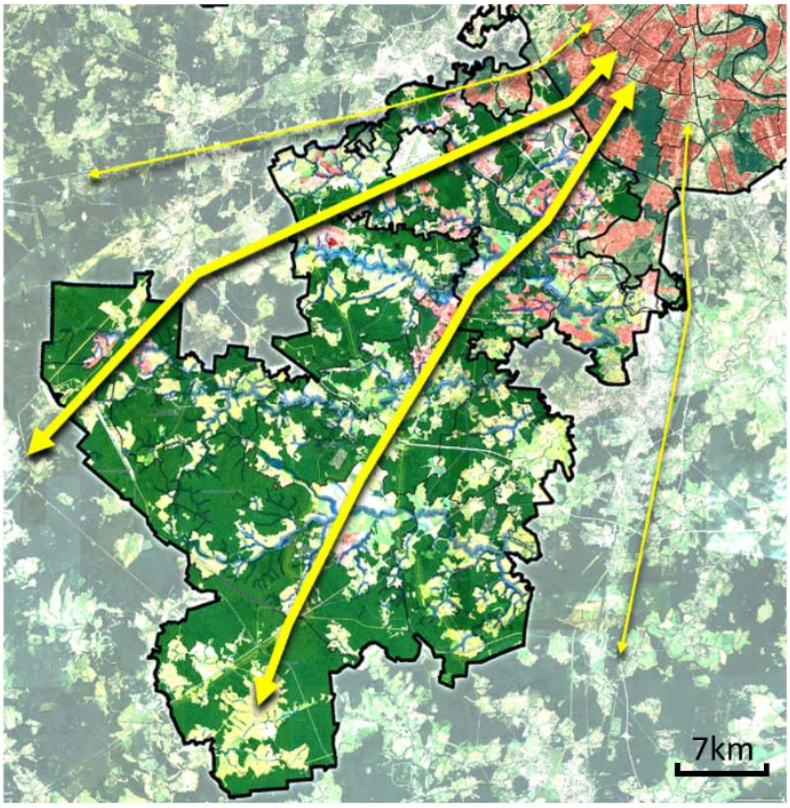

Figure 13: Moscow's 2012 expansion along major transportation corridors into the least developed area of Moscow Region

The result of the failures of New Moscow as a political project has resulted in what Strelka KB (the consulting arm of Moscow's Strelka Institute of Media, Architecture and Design) in their *How to Build New Moscow* report describes as massive "colonization" of Moscow Region's rural landscape by Moscow's construction complex. Established landscapes and communities are being disrupted by the construction of large highrise districts, as well as transportation and other infrastructure capital projects that bisect New Moscow's historic landscape (Figure 14 and Figure 15) (Revzin, et al. 2016). The scale of this transformation is clearly visible on Google Satellite imagery of New Moscow (Figure 16), where highrise districts, highways and malls are being built all at once adjacent to rural communities. This rapid transformation results in a shock to the established environments, such as pollution and riverine erosion, with limited mitigative measures being implemented to lessen the impact of development (Bityukova 2018). Even more pronounced is the disruption of the way of life in rural settlements. Demonstrations and opposition to such rapid growth at public meetings continuously falls on deaf ears, especially considering the weak position of local authorities in relation to development interests (Kuricheva 2013, Nefedova 2018). There is an evident need for mitigative measures to be considered as part of new development proposals, however the viability of mitigation is greatly challenged by the oligopolistic nature of the development industry.

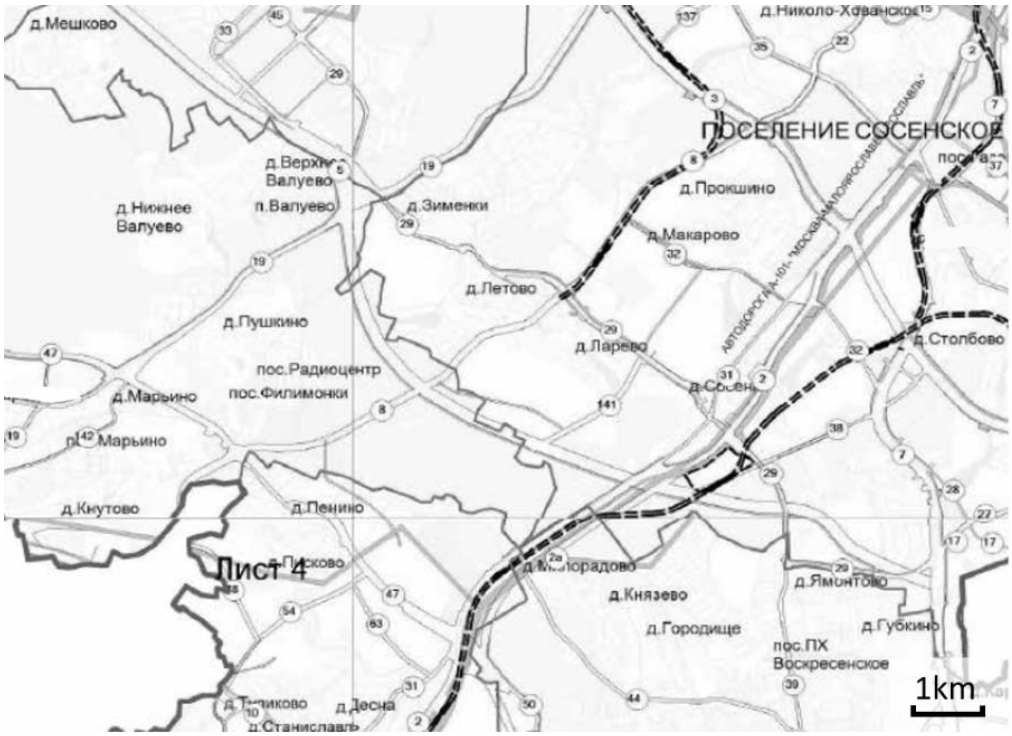

Figure 14: Excerpt of mapping showing immense expenditure on capital projects in New Moscow, each line representing new or major reconstruction of infrastructure, by Committee for Architecture and Urban Planning of Moscow

Figure 15: Excerpt of New Moscow mapping showing a patchwork of existing rural and proposed highrise (in red) communities

Figure 16: Satellite image of New Moscow showing simultaneous construction of highrise housing, a mall and a subway line adjacent to a rural settlement and forest

1.2. A Snapshot of Housing Development in New Moscow Today

A mapping of highrise, low-rise and rural *dacha* (cottage) settlements around Moscow today is presented in Figure 18 below. The most striking aspect of this mapping is the fact that almost all housing inside Moscow boundaries is multi-storey, with only one small area of single-detached housing inside the MKAD ring road. This is not surprising, considering the entire area, with the exception of lands inside the central Sadovoye ring road, have been developed during the Soviet ban on private property. First, a limited supply of Stalin-era housing was built around the inner core of the city, mostly consisting of unique 5-10 storey apartment buildings for the elites, often arranged into perimeter blocks in a traditional street grid (Bocharov and Gulyanitskiy 1987). In the 1950s, a wave of rapid industrialization necessitated a new industrial approach to mass housing for a growing urban population. The solution came in the form of large-scale master planned districts, called *mikrorayon*, which offered significant advantages through economies of scale. Here, orientation of buildings was optimized for solar exposure, which often resulted in buildings being arranged into rows rather than the traditional perimeter block configuration (Bocharov and Gulyanitskiy 1987). From the initial 1950s groupings of several 5-storey buildings at a time, successive districts around Moscow grew in size and height to extreme proportions, with some of the latest iterations housing hundreds of thousands of inhabitants (Figure 17). Today, in a market economy, this growth pattern continues on Moscow's outskirts. As a result, Moscow is a city that gets taller towards the periphery, with the tallest new buildings increasingly occupying the rural landscape around Moscow.

Figure 17: District of South Butovo, built in the early 2000s

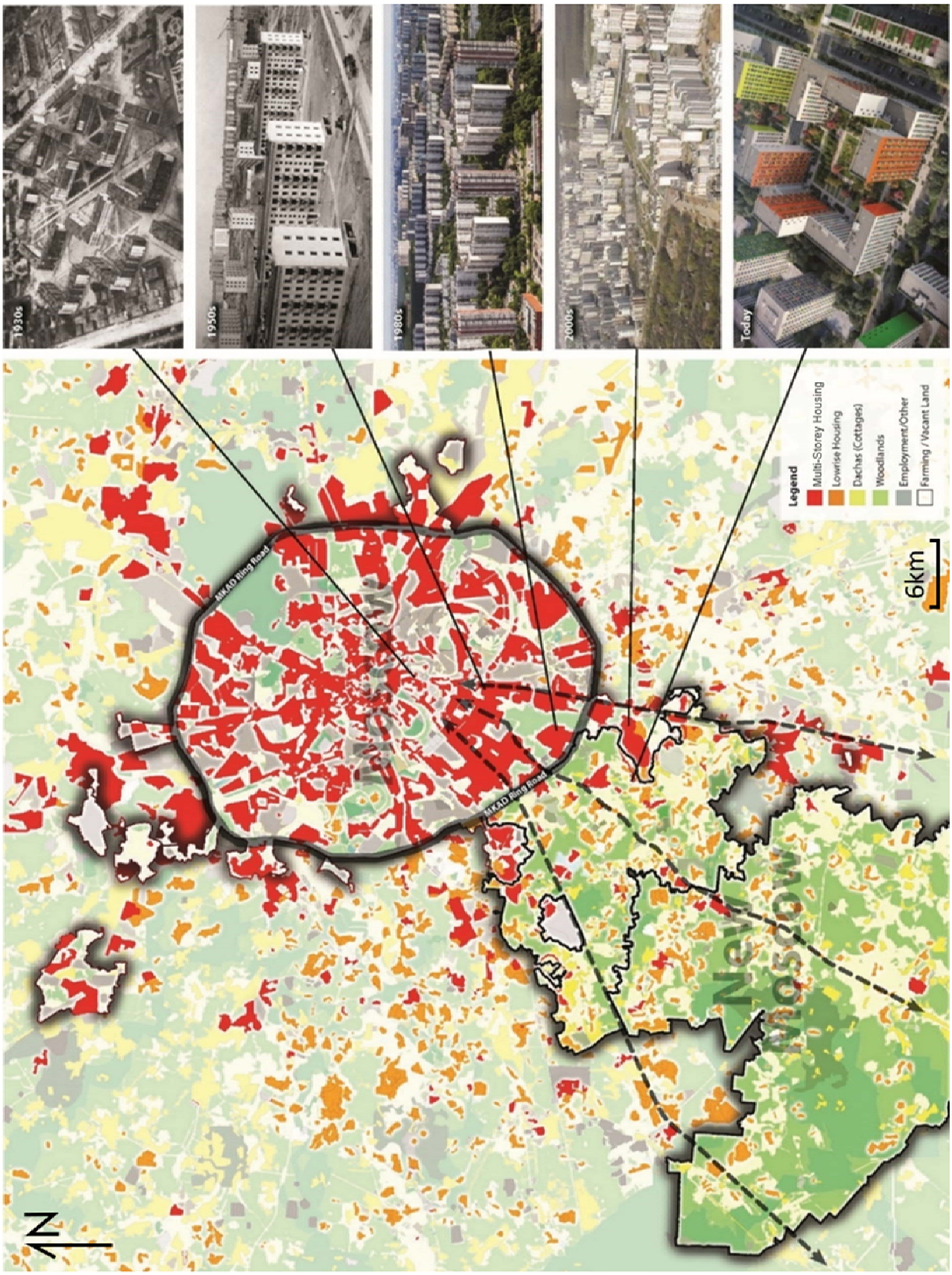

Figure 18: Map of multi-storey vs. low-rise housing in old and New Moscow (base data by OMA)

A notable aspect of today's development industry in Moscow Region is the very large volume of construction, the majority of which is highrise. Between 2010 and 2016, 62,500,000m^2 of housing have been built in Moscow and Moscow Region, which is on par with construction volumes at the height of the Soviet housing program (Karlin 2018). Figure 19, which shows all significant development projects as of September 2014, demonstrates that most development is happening on Moscow's periphery. This area is dominated by projects over 50,000m^2, while the area inside the MKAD ring road is populated by mostly smaller projects (Kuricheva and Popov 2013). This is further reiterated by the graph in Figure 20, which shows volumes of construction relative to the center of Moscow. A sharp spike is apparent at approximately 16km from the city center (approximately same distance as the MKAD ring road) and continues until approximately 27km from the center. In other words, there is a band of approximately 11km around the outside of MKAD which is dominated by the largest projects in Moscow Region (Kurichev and Kuricheva 2018). Furthermore, Figure 21 shows that of the largest twenty one developments in Moscow Region, twenty are outside MKAD, and nineteen are highrise (Kuricheva 2013). These are signs that the city is rapidly expanding outward, and judging by the distribution of projects throughout the Region, it is clear that development is not proceeding outward in a sequential manner, but happening everywhere simultaneously. Also, the fact that the largest projects are almost all highrise and on the periphery would be considered unusual by western standards.

Even though construction has slowed since the latest economic downturn in 2016, construction volumes in New Moscow remain high (Papov 2018). In this respect, Moscow's new boundaries do exert some magnetic pull over housing development outside the MKAD ring road. Between 2014 and 2017, New Moscow saw the sale of almost 5,000,000m^2 of apartments, by far the highest amount in the region, as demonstrated in Figure 22. This phenomenon is partly due to massive volumes of building permits being filed by developers prior to annexation of these territories as protection against the uncertainty of Moscow administration's plans for these lands. As well, heavy investment in new infrastructure in this area continues to spur development (Papov 2018). The largest projects being built in New Moscow are mapped out in Figure 23, with names and images of these projects provided in Figure 24 and Figure 25. It is clear that the market is dominated by standard highrise districts, with only a few mid- and low-rise projects appearing farther away from the MKAD ring road. What is also apparent in these images is that each one of these projects features only one building typology that is replicated across the site at a uniform height.

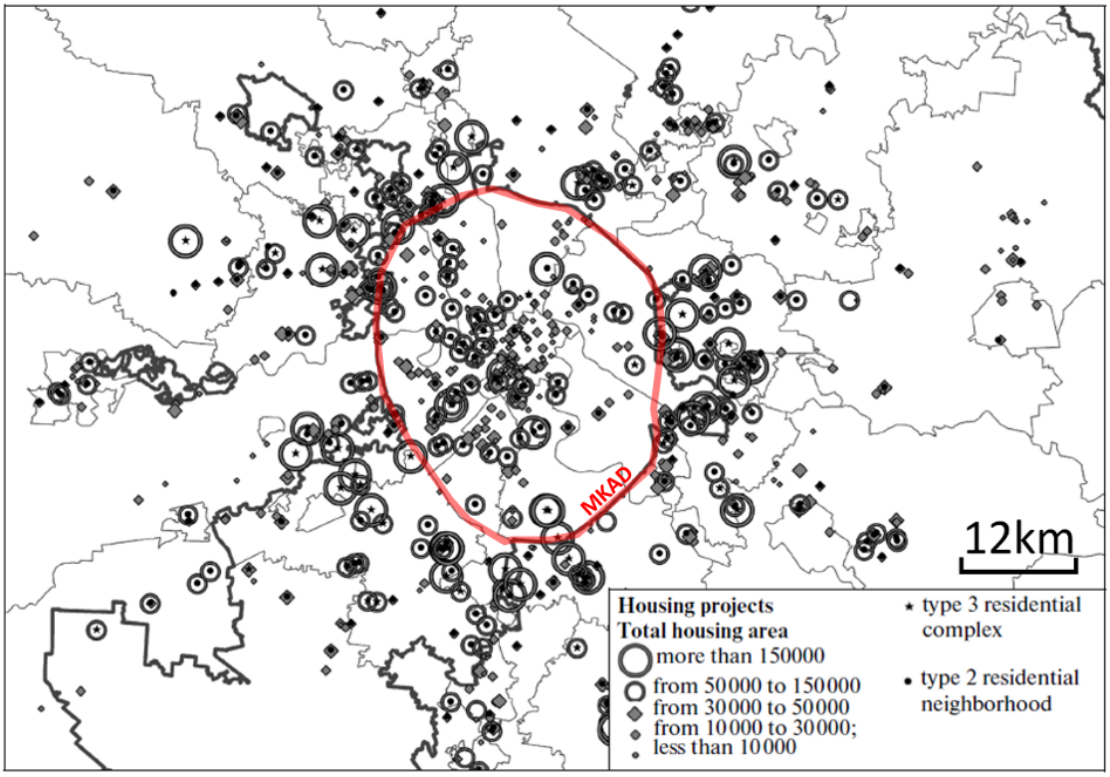

Figure 19: Sizes and types of development projects around Moscow, with the largest projects on the periphery (Kuricheva and Popov 2013)

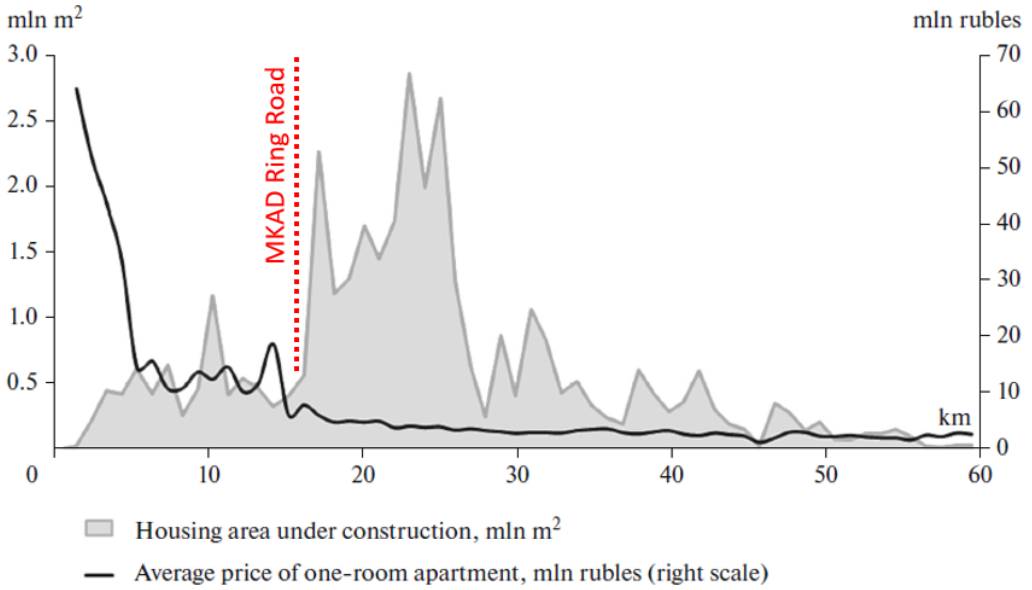

Figure 20: A graph of new housing supply and average price by distance from center of Moscow, indicating there is a spike of construction right outside the MKAD ring road (Kurichev and Kuricheva 2018).

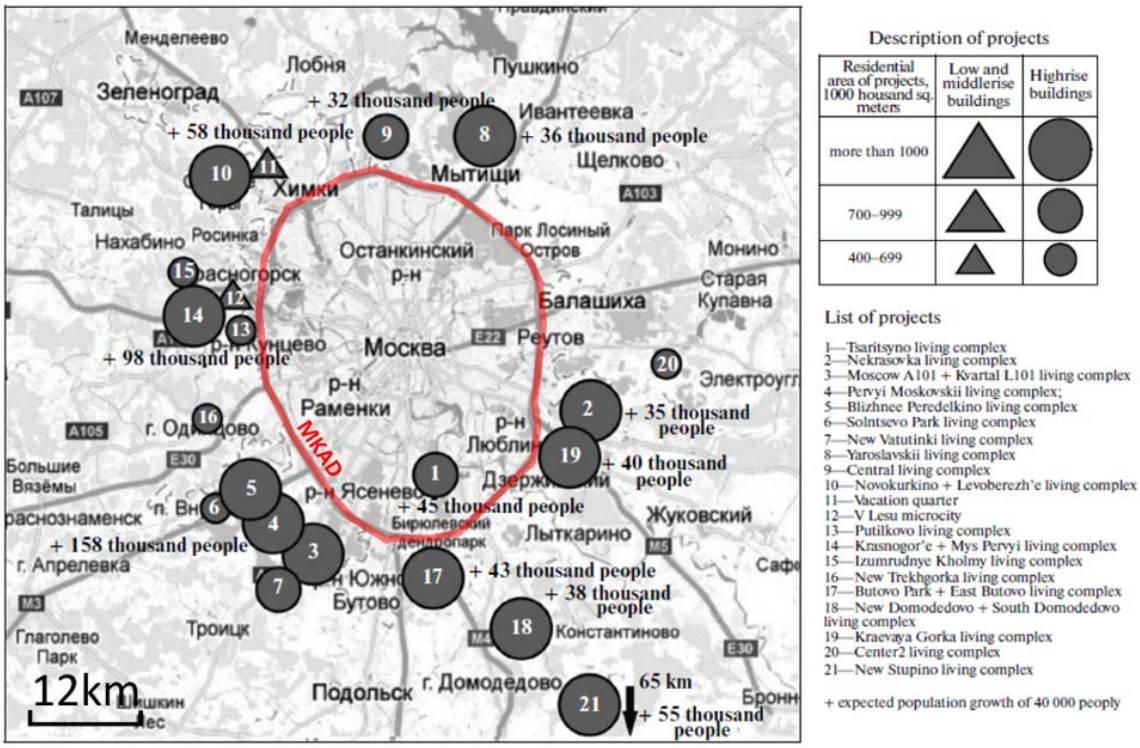

Figure 21: Twenty one of the largest development projects in Moscow Region with all except two being highrise (Kuricheva 2013)

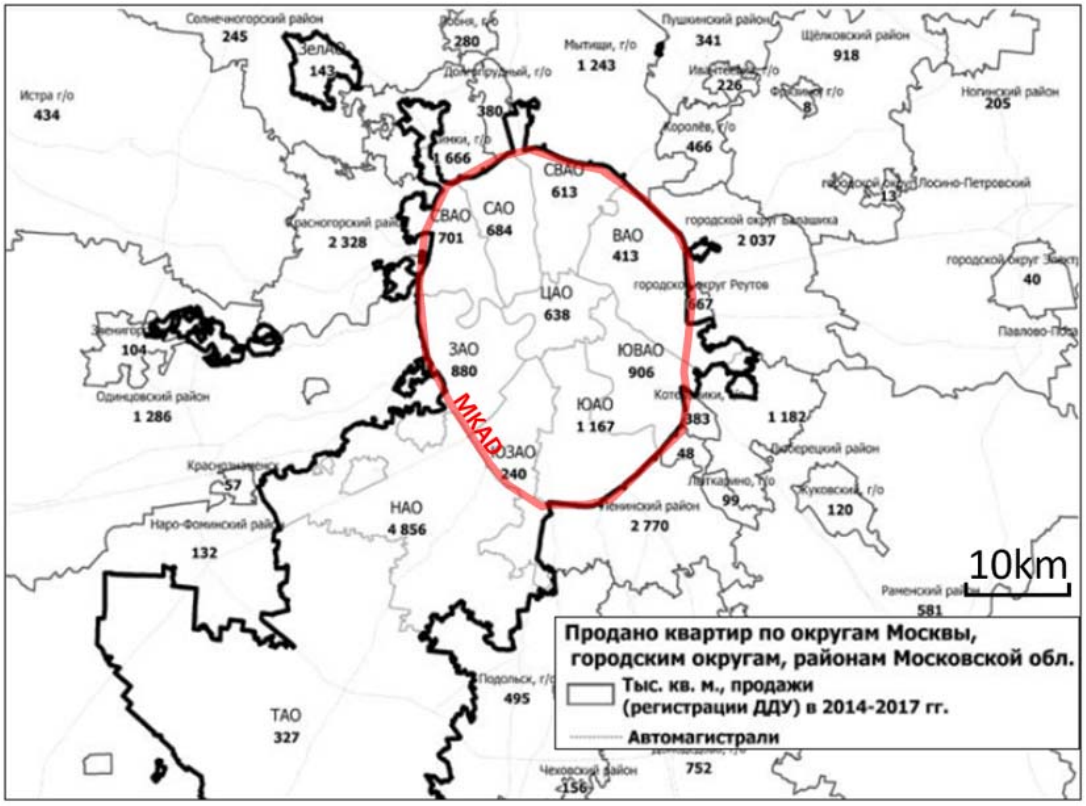

Figure 22: Volumes of new apartment sales by district in thousands of m^2, with New Moscow having by far the highest amount (Papov 2018)

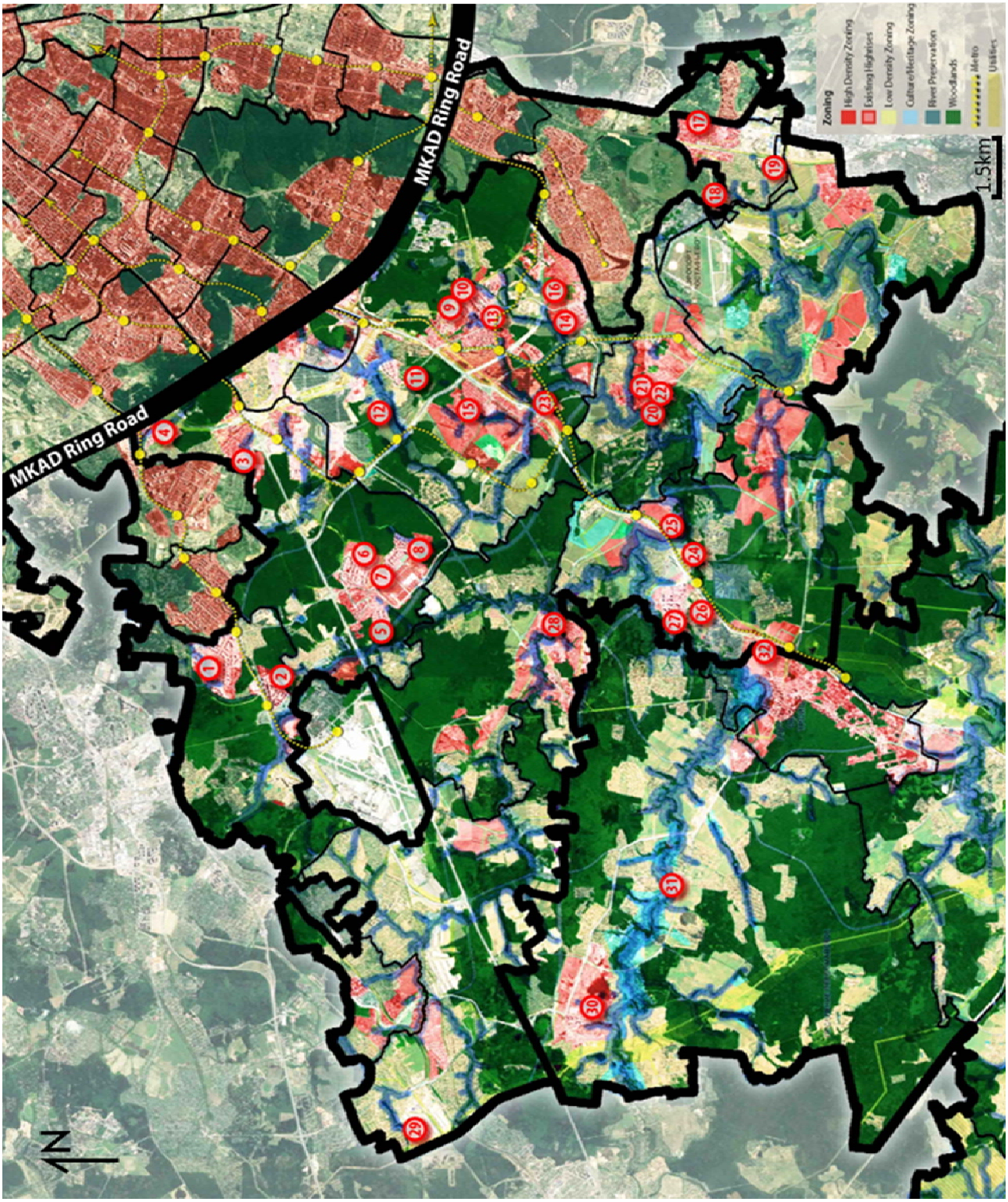

Figure 23: Rural landscape and current developments in New Moscow (images on the following two pages), by author

Figure 24: Largest housing projects in New Moscow (#1-#16)

Figure 25: Largest housing projects in New Moscow (#17-#32)

The largest housing project in New Moscow is the *Perviy Moskovskiy* district, which alone consists of 1,500,000m^2 of residential space. This project exemplifies the standard of mass housing development in New Moscow (Figure 26 and #6 in Figure 23 and Figure 24). Buildings are placed around a central open space, which is almost entirely dedicated to children's play areas, schools and kindergartens. Landscaping is very minimal, mostly consisting of pathways, green lawns and sparsely planted trees. Parking is accommodated either along internal driveways or at centralized parking structures, which are constructed five to ten years after, when demand arises (Mironov 2015). In some districts, especially those outside of Moscow's administrative jurisdiction, this results in much of the open space being occupied by parked cars (Figure 27). It also must be noted that such projects don't have any private yards or private entrances off the street, thereby resulting in a complete absence of any semblances of private ownership of urban space. While many such projects closely resemble the traditional Soviet-era *mikrorayon*, a newer typology is growing in popularity within the development industry, which is discussed further.

The *Buninskiye Luga* project (Figure 28 and project #14 in Figure 24) stands out as a typical example of the new perimeter block typology with car-free courtyards that is gaining momentum around Moscow. Such projects are a significant improvement of the standard Soviet-era typology, as they are often designed by western architects, with variegated facades, detailed landscaping and at-grade retail. As well, these projects continue the tradition of subdividing large buildings into 24m-40m sections with their own entrances, thereby creating small corridors on every floor, which promotes familiarity amongst neighbours. In car-free blocks, these entrances also provide residents with direct access to the central courtyard. As will be demonstrated later, the perimeter block is one of the most efficient block configurations, while also offering ample open space and producing a traditional street grid that is promoted by urbanists today (Revzin, et al. 2016). For these reasons, this new typology is quickly catching on and is being replicated in many projects around Moscow. Such projects present a much-desired appearance of fresh and innovative design, while also sticking closely to the old model of housing that has proven to be reliably profitable. In many respects, as will become evident in the following chapters, this typology is very much optimized for this particular marketplace. This poses a question of whether a better mass housing model than the *Buninskiye Luga* example is even possible within the New Moscow context.

Figure 26: Perviy Moskovskiy, the largest new development in New Moscow (1,500,000m^2), by Absolut Real Estate

Figure 27: Cars parked on lawns in new districts; kiosks satisfy retail needs, by author

Despite the large market share of multi-storey housing estates, the number of low-rise and townhouse projects around Moscow is gradually increasing to reflect the demand for western models of housing (BlockStroi.ru 2018). As demonstrated in Figure 29, townhouse projects often feature facades that resemble European vernacular styles and utilize front yards largely for parking. Low-rise single-detached communities, however, rarely have a uniform style due to most homes being individually built on serviced lots (Kosareva, Polidin and Puzanov 2012). Even though mostly in gated communities, such districts see most homes encircled by a fence, including the front yard, with very minimal landscaping and infrastructure in the street (Figure 30). Such communities represent over 20% of the market share of new housing construction in the country (Kosareva, Polidin and Puzanov 2012). Furthermore, surveys of housing preferences of the population indicate that there is strong preference for this form of housing over the traditional highrise typology, even though it remains too cost prohibitive for the majority (Alekseevsky 2017). The success and growing numbers of low-rise and townhouse communities are a hopeful sign that there is a gradual shift towards housing typologies that are more reflective of housing aspirations of the population.

In summary, the housing market on Moscow's periphery, and more specifically in New Moscow, is dominated by a handful of large development firms which continue to build highrise mega-districts in the tradition of the Soviet-era *mikrorayon*. This typology represents the majority of new housing construction, which is not reflective of housing aspirations of the population. A new perimeter block typology with car-free courtyards, exemplified by the *Buninskiye Luga* development, is gaining momentum. With higher quality facades and landscaping, this model is a significant improvement on the traditional highrise estates. However, more than anything, such projects still resemble what is commonly understood to be an outdated model of housing, featuring just enough surface improvements to market this product (Schukin 2013). There is growing demand for more western models of low-rise housing, as reflected in new townhouse developments and popularity of serviced lots for individual construction (Revzin, et al. 2016). However, such housing is too cost-prohibitive for the majority of homebuyers, who are forced to settle for traditional highrise housing due to the limitations of the market. This snapshot of New Moscow's housing market poses a question: can an improved housing typology be proposed for New Moscow, that better reflects housing aspiration of the population, while remaining viable from the perspective of the housing industry? The following chapters seek to answer this question.

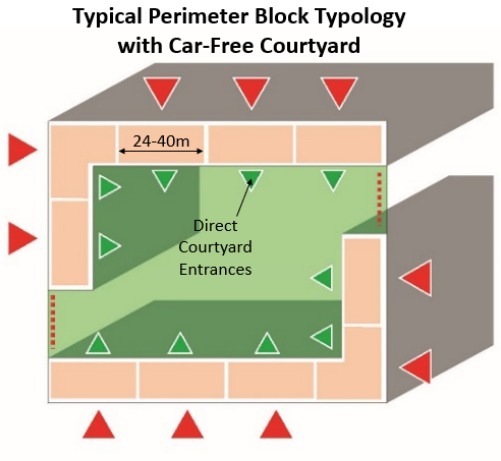

Figure 28: Buninskiye Luga development, a typical example of the new car-free block typology that is growing in popularity, by PIK Group, top right diagram by author

Figure 29: Townhouse developments in New Moscow

Figure 30: Example of a typical low-rise subdivision being populated outside of Moscow

CHAPTER 2: PERPETUATION OF THE STATUS QUO

In order to propose a viable alternative to the dominant slab tower typology observed in New Moscow, first a thorough understanding is required of the rationale by which this typology is perpetuated. This typology has long been abandoned by developers and urban planners in the western world after emblematic failures such as Pruitt Igoe in St. Louis, Missouri. Yet, as witnessed in New Moscow, multi-storey housing continues to represent over half of all newly constructed dwellings in the entire country. Furthermore, highrise buildings over 12 storeys account for 43% of all new residential construction by developers (Kosareva, Polidin and Puzanov 2012). This proportion is slowly declining with adoption of other low-rise typologies since the transition to a market economy in the 1990s, but diversification of the housing stock continues to be hindered by a number of factors. The following discussion offers a number of explanations for this phenomenon, as well as the conclusions that can be drawn from them.

The first explanation traces the evolution of the prefabrication industry and its persistence today despite opposition from the highest levels of government. The second explanation discusses the strict solar penetration requirements of the local building code, which result in large distances between buildings, thereby requiring them to be taller to compensate for lack of site coverage. High demand for this form of housing is explored in the third explanation. This section also delves into the long-established housing customs by which this typology continues to be normalized. The fourth explanation explores the lingering legacy of the soviet welfare state and the complications from continued government involvement and subsidization of the housing market. The fifth explanation describes the oligopolistic nature of the housing development industry in New Moscow and the resultant lack of planning controls. This section also summarizes the above predicament with a term borrowed from economics – *low price elasticity of supply* – which describes the act of fluctuations in demand having little influence on the resulting supply. In other words, due to the structure of the housing market in New Moscow, rising incomes and aspirations for better housing of the consumers result in minimal improvement or diversification of the housing stock being built. By this logic, development firms continue to produce what is deemed to be an outdated product with little incentive to change.

Therefore, it can be concluded that in the context of New Moscow, a profit motive is a prerequisite for change. This understanding forms a key tenet for the further proposal for an improved housing typology in New Moscow: to be viable, above all else, it must be more attractive to the development industry than the status quo, in both marketability and profitability.

2.1. Inertia of the Construction Industry

Perpetuation of the same outdated housing typology in areas as New Moscow is often explained by the historic inertia of the Russian construction complex, with its post-WWII Soviet roots (Schukin 2013, Kosareva, Polidin and Puzanov 2012). While many elements constitute an entire construction industry, the industry of the Soviet Union has most notably been shaped by widespread mass-production of identical prefabricated building systems. Designs of schools, hospitals, housing have all been standardized into precast building kits that were assigned a seven-digit code and replicated across the state (Zhuravlev and Naumova 1975). For this reason, identical buildings, districts and near-identical cities can be found across all CIS countries. This phenomenon is most notably satirized in the 1976 film *Irony of Fate, or Enjoy Your Bath!,* where the protagonist, after having too many drinks with his colleagues at a sauna in Moscow, mistakenly gets put on a flight to Leningrad and wakes up in an airport believing that he is still in Moscow (Figure 31). He takes a taxi to what he believes to be his building on his street, goes up to what he believes to be his apartment on his floor, and manages to get inside with his key. He is not phased by the interior, as it is also entirely familiar. Only when a strange woman comes home and confronts him does he realize that he is mistaken, after which an existential drama ensues. In a rare critique of the Soviet state, this film epitomizes the extent to which the built environment has been, and continues to be standardized. This large share of prefabrication and mass-production in the housing industry is likely to continue into the foreseeable future.

Figure 31: Screenshots from the 1976 film Irony of Fate, or Enjoy Your Bath, by Eldar Ryazanov

This phenomenon was started in 1956 as part of Khrushchev's housing program, which pledged to provide the entire population of the Soviet Union with their own apartment within twelve years (Attwood 2010). This program was a direct response to the housing crisis created by Stalin-era housing policy, which housed residents in communal apartments (*kommunalki*) while failing to build new housing for an increasingly urban population (Figure 32). The urban population tripled between 1920 and 1940, while housing provision stagnated at $7m^2$ per person (Makhrova, Nefedova and Treivish 2013). A state-wide response was in order. Modernist mass-produced housing experiments with open blocks in the tradition of Walter Gropius and Le Corbusier resonated with Khrushchev's housing program, which had to social-engineer its way around the contradiction of providing private housing units in a communist state. The compromise was the implementation of small private units in five-storey housing estates, with expanses of communal open space for "rejuvenating the collective spirit." The rational and functional modernist aesthetic devoid of bourgeois décor also aligned with Khrushchev's belief that the population, brought up to appreciate "truth and expediency" would take to the "simple, logical and elegant form" of the new housing model (Attwood 2010).

Figure 32: Typical communal apartment

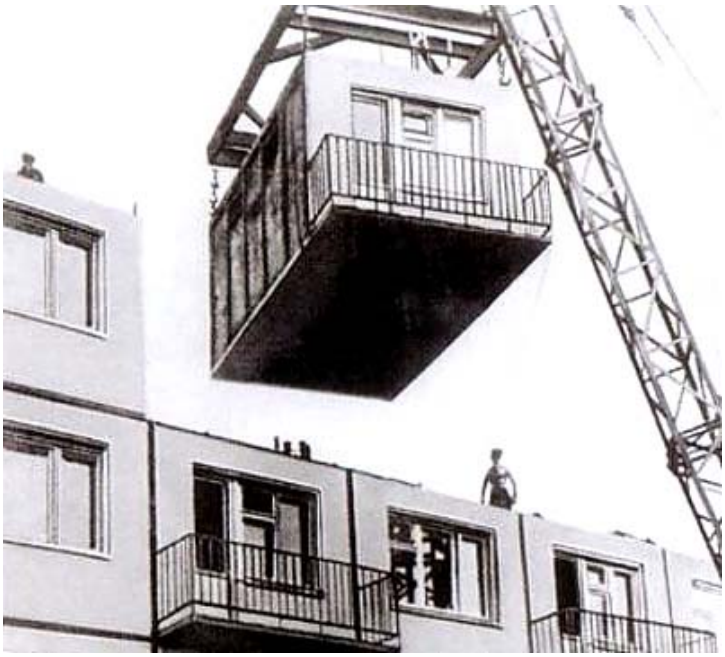

Figure 33: Example of prefabricated housing being assembled on site

Figure 34: Typical 5-storey khrushchevka housing district

Figure 35: Typical floor plan for a 5-storey khrushchevka structure

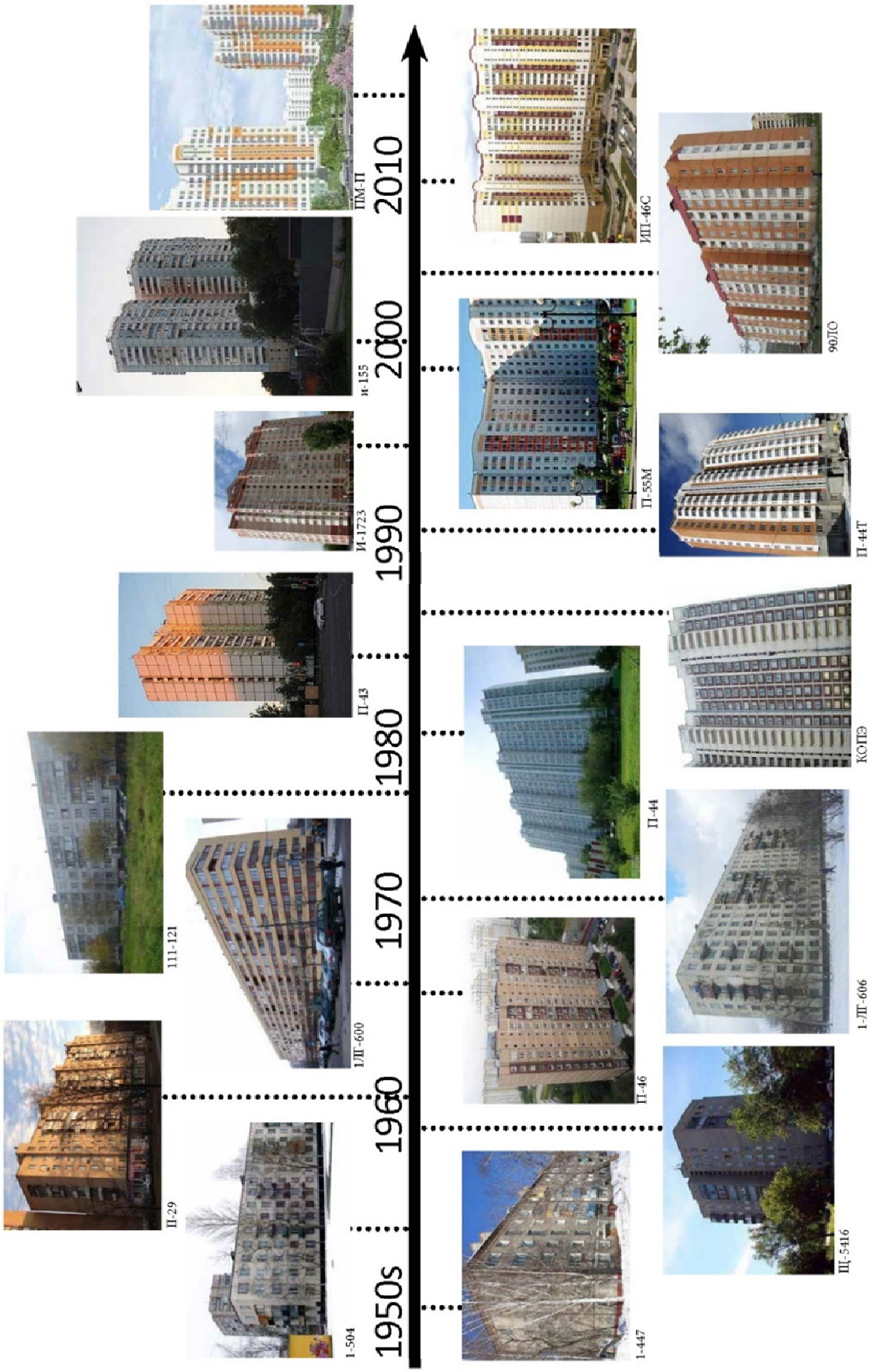

Figure 36: Evolution of panel housing models

With the state assuming the responsibility of housing provision, centralization of housing design naturally led to the industrialization of the method of construction. Factory-produced elements allowed for rapid and cost-effective provision of housing. At the time, this was the most ambitious governmental housing program in history, with more residential construction than anywhere else in the world. The program doubled the housing stock and rehoused 127million residents between 1955 and 1970 (Attwood 2010). First, a one-size-fits-all approach was taken with the introduction of a standard 4 or 5 storey building model, now known as *khrushchevka* (Figure 33, Figure 34 and Figure 35). These structures accommodated only 2-3 apartment designs for the idealized Soviet family and did not contain corridors in order to prevent further subdivision into multiple units (Attwood 2010). Soon after, 9-13 storey blocks were introduced with prefabricated rooms or entire apartments, as these were more cost-effective. These models were promoted by the Ogonek magazine as a remedy for the monotony of the 5 storey structures, as buildings could now have mass-produced decorative elements and could be arranged "like letters in the alphabet to make different words" (Attwood 2010). As demonstrated in Figure 36, this logic continued to evolve over the decades into an increasingly wide range of prefabricated models, which only varied slightly by their aesthetical and technical specifications, meanwhile replicating the same housing typology. Districts being built around Moscow today continue in this tradition of prefabricated slab towers, but with some newer models starting to adopt colourful facades and buildings arranged into more western perimeter car-free blocks.

The ability of the prefabrication industry to evolve to suit newer block configurations and façade designs suggests that the act of prefabrication alone does not hinder the diversification of the housing stock. Yes, prefabrication is most suitable for highrise buildings as this typology takes better advantage of the materials' structural capabilities. However, prefabrication does not predetermine the form of a highrise structure. The *Prima Park* project demonstrates that slender towers can be built, and that there is ample aesthetic flexibility (Figure 37 and #18 in Figure 23 and Figure 25). Furthermore, the *Pozitiv* project demonstrates that curtain wall elements can be integrated into these structures (Figure 38 and #3 in Figure 23 and Figure 24). Theoretically, towers clad entirely in curtain wall are possible with a prefabricated system, although it may not be as economical. It can be argued that the prefabrication industry lends itself to replication of identical slab towers, however it does not hinder the diversification of the built environment and can be adopted to a variety of massing forms. The wide market share of this building technology does mean that it will continue to be used throughout the foreseeable future, and therefore should be incorporated into any viable mass housing proposal for New Moscow.

Figure 37: Prima Park development, by KORTROS

Figure 38: Pozitiv development, by Capital Group

2.2. Stringent Insolation Requirements

Alongside the evolution of the prefabrication industry, a building code has been established in the 1960s with strict insolation criteria, which required solar penetration into every unit for 1-3 hours per day. This reasonable requirement was first implemented in the 1920's to prevent the spread of tuberculosis and bacterial infections. Now, however, this requirement is often cited as the main cause of the perpetuation of the same slab tower typology throughout the country. Furthermore, other building regulations greatly limit the flexibility of the built environment by requiring minimum distances between buildings and large setbacks from streets. Such massing criteria of the building code are inevitably oriented toward the creation of the all-familiar Soviet era estates with wide expanses of unprogrammed space and highrises to compensate for the lack of site coverage.

Insolation alone greatly limits the density which can be achieved with low and mid-rise structures. For comparison, West 8's Amsterdam docks achieve 100 units per hectare with three storey structures, which can only be achieved in Moscow with 10-14 storey slab towers due to insolation requirements (Schukin 2013). Every municipality publishes insolation requirements, which in the example of Moscow have recently been relaxed by requiring given sun exposure periods in the months of May and August instead of April and September. Today, all new housing built outside central Moscow requires a minimum of 1.5 hours of insolation per day, with longer periods depending on window orientation (Government of Moscow 1997). Positioning of buildings is determined by insolation charts, which identify heights and distances of obstructing buildings that would cast a shadow on a given window (Figure 39). Only 5% of units are exempt from such insolation requirements. The laborious process of calculating insolation periods for all units in a structure, with the consideration of all adjacent and even far-away buildings, must alone greatly hinder the creative process of urban design, thereby resulting in repetition of proven typologies. Bart Goldhoorn in his architectural journal *Project Russia* describes the frustrating process by which all new ideas fall apart due to such building regulations. A developer can hire an architect from Holland to design a mid-rise modern district. The architect proposes a grid of small dense perimeter blocks, and forwards it to a Russian architect for adoption to the local building code. Buildings are moved apart for insolation, blocks grow in size, and buildings get taller to compensate for lack of coverage. The end product no longer resembles anything European, and ends up as always – a highrise district with expanses of unprogrammed open space (Schukin 2013).

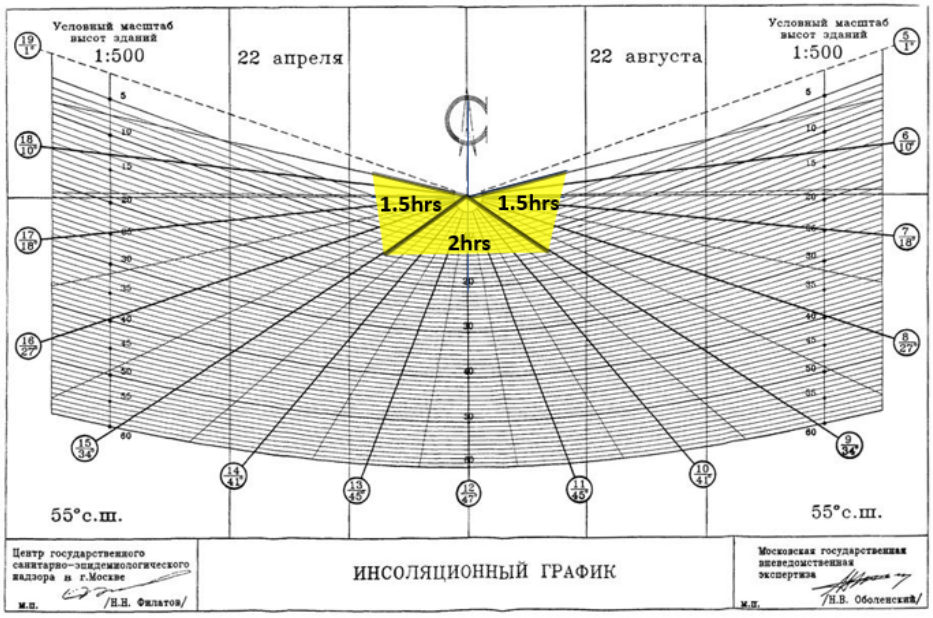

Figure 39: Insolation chart for calculating periods of shadow exposure for a given point relative to distance and height of obstructing objects

Despite the limitation of the building code, there are ways of achieving alternative massing forms than the standard Soviet district. A commonly cited example is the *Gorki-Gorod* skiing village in Sochi (Figure 40 and Figure 41), designed by Mikhail Fillipov and modelled after a European town aesthetic (Schukin 2013). This project, and others in the Sochi region, appear to be a far departure from the process described by Goldhoorn. This may be due to a sacrifice in density, or deeper building floor plates. As well, a significant portion of these buildings may be hotels or *apartments* (i.e. temporary residences) or retail, which do not need to conform to insolation requirements. Lastly, these buildings are at the south-most point in Russia, with warmer temperatures and statistically less cloud cover (Gorbunov 2017). This, of course, is not to say that the same cannot be achieved in New Moscow's housing projects. A competition for a new block typology for the A101 development in New Moscow generated a wide range of submissions that all had to comply with insolation requirements (Figure 42). A number of the solutions are far from the standard slab tower typology. However, they may not be able to achieve the density that is customary for MASSHTAB, the largest developer in New Moscow, for whom the competition was conducted.

Figure 40: Gorki Gorod ski village near Sochi

Figure 41: Google Satellite view of Gorki Gorod

Figure 42: Proposed schemes for the A101 development urban block competition

All of these projects and proposals both demonstrate the stringent nature of the building code, while also providing creative ways to achieve density despite these limitations. The chief architect of Moscow, Sergey Kuznetsov, argues that three-storey development can achieve densities as high as 20,000m^2 per hectare, which is higher than the density of the center of Moscow. Goldhoorn's *Project Russia* magazine also argues that this density, typical for a P44T model district with 17-22 storey structures, such as the district of Konkovo, can be achieved on the same area but with six perimeter blocks of nine storey buildings. There are ways of achieving alternate massing forms, but the incentive to do so for developers and architects does not appear to be there (Schukin 2013). Notable evidence for this is what MASSHTAB identified as the winning entries for their block typology competition for the A101 development. All winning entries are very similar to the new perimeter block typology that is already being widely replicated around Moscow. The distinction of these entries is the method of generating a variety of building heights and public spaces within the framework of the perimeter block (Archi.ru 2010). These findings pose an architectural challenge: can a better housing typology be proposed within the confines of the local building code?

2.3. High Demand

Based on the first two explanations, it appears that prefabrication and a stringent building code pose obstacles, however do not entirely preclude the diversification of the new housing stock. It appears that the development industry is not incentivised to change, as change requires unnecessary risk, investment or sacrifice. There is a common understanding among developers and industry professionals that highrise panel slab towers are an eyesore, however units continue to be sold, so there is little interest to change, especially given the discussed obstacles (Schukin 2013). Attempts were even made at the highest levels of government to transition away from the prefabricated slab tower typology. Yuri Luzhkov, the mayor of Moscow through the 1990s and 2000s, attempted to diversify the new housing stock. As well, president Medvedev planned to ban this type of construction and propose a new model of low and mid-rise suburban development for New Moscow with the help of international experts (Revzin, et al. 2016). Both men's visions so far are failing to materialize due to the unrelenting demand for cheap and fast housing.

The seemingly inexhaustible demand for this type of housing originates from a number of sources. Despite the successes of Khrushchev's housing program over the decades, housing shortages continue to plague the nation. In 2009, only one third of urban Russians age 21-40 lived in homes of their own. By the age of 40, when most have children, only one half have their own home. This is while 86% of those aged 18-35 want their own home, which is a primary objective in order to attain autonomy from the extended family, security of property and the right to customize their own living space (Zavisca 2012). This means that less than half of young families' housing needs are being satisfied by the housing market. The same problems plague other age groups as well. In cities like Moscow, housing shortages and prices are further exacerbated by large numbers of economic migrants from other regions and CIS countries (Papov 2018, Argenbright 2018, Makhrova, Nefedova and Treivish 2013).

Despite the state's attempts to withdraw from its role as provider of housing through the privatization of the housing industry in the 1990s, continued taxpayer spending is required to address the crumbling state of a large proportion of the housing stock. In 2006, 41% of the country's population was living in housing built before 1970. In 2001, 9% of the housing stock in the country was deemed beyond repair, and needed to be demolished and rebuilt at the cost of the taxpayers. 5% of housing required repair every year, while only 0.3% was repaired (UNECE 2004, Zavisca 2012). While individual housing units were privatized by a large proportion of residents, thereby assuming the responsibility and cost of maintenance, most housing associations simply could not and did not want to be responsible for major repairs. After decades of housing maintenance being the responsibility of the state, it was simply unconscionable for housing repair to be placed in the hands of residents (Zavisca 2012). On top

of replacement housing as described above, the state was also responsible for continued provision of housing for millions of families on waiting lists, veterans and other groups requiring state assistance. With budgets exhausted from crippling maintenance costs, only the bare minimum funds remain for provision of a large volume of new housing by the state.

It isn't just the state that had very limited funds allocated for housing. Despite the transition to a market economy and privatization of the housing industry, payment for housing is a notion that was very slowly adopted by the population. Historically, housing provision, even though very minimal, was considered a right that is guaranteed by law, rather than a privilege. But citizens did not have the freedom to choose their homes, as housing was controlled and assigned through the workplace. As *Ogonek* and *Rabotnitsa* magazines described it, people did not have homes but only living space assigned without choice, to which residents were expected to "smile with gratitude" (Attwood 2010). The result is a lingering attitude, whereby overcrowded housing is normalized, and any chance at one's own separate apartment, irrespective of quality and location, is considered a great improvement. Consequently, there is high demand for new housing, however of the cheapest kind and therefore with the least developed amenities and infrastructure, often the bare minimum that is permissible by the building code and by municipalities (Schukin 2013). This factor alone contributes heavily to the perpetuation of prefabricated slab tower districts in areas as New Moscow.

Another important consideration is that the Soviet slab tower typology is seen as a familiar, customary and dignified form of housing. It is the place where most were born and raised, and if lucky, where they were granted their own home. Often, such districts are complete with the required amenities and access to transit. As opposed to western Europe where this housing typology is stigmatized, life in such districts in CIS countries is considered the norm, including for those of higher socioeconomic status (Demszky von der Hagen 2006, Haase 2010). As a result, there is little evidence of the phenomenon of segregation and *residualization*, whereby wealthier residents move away and leave behind increasingly marginalized communities. Established housing estates continue to be occupied by a full spectrum or residents, and are unlikely to become the slums of the future (Haase 2010). This, of course, is not to say that there are no standards at all, or that residents are not aware of issues. The oldest *khrushchevka* buildings are considered the least desirable due to small rooms, poor sound insulation and their dilapidated condition (Alekseevsky 2017) In general, newness is a highly sought-after quality, especially when it comes to brand new districts. Here, there is an opportunity to customize one's own space. There are no fears of anyone having died there. Furthermore, fresh looking facades, convenient apartment layouts, new infrastructure and a lack of delinquency make new construction a very attractive option (Alekseevsky 2017, Kurichev and Kuricheva 2018).

Historically, attitudes towards housing estates were reinforced through Soviet media, such as the *Ogonek* magazine that portrayed these buildings as close-knit communities (Attwood 2010). Art of the day, such as Yuri Pimenov's painting *Trendsetters of the New District*, depicted the optimism of such new districts (Figure 43). Today, this cultural norm continues to be perpetuated through advertisement in order to market new highrise districts in areas as New Moscow. Such advertisements cleverly summon up familiar images of a fresh new start in one's own home. Young couples, mothers with strollers and children playing are the most common characters in marketing campaigns (Figure 44 and Figure 45). Remote location is marketed as fresh air and access to nature. Fears of undeveloped infrastructure are appeased by assurances of ample playgrounds, kindergartens and schools, which often occupy all the open space inside housing blocks. Jane Zavisca, in *Housing the New Russia*, summarizes the phenomenon perfectly:

> Advertising panders to pre-existing dispositions in order to better exploit them and has poetic effects that evoke lived experience by mobilizing words or images capable of summoning up the experiences associated with houses… [which] are shared in as much as they owe something to cultural traditions, and, in particular, to inherited cognitive structures. (Zavisca 2012)

Cultural tradition, as Zavisca defines it, is one of the key forces that perpetuates the demand for, and thereby the supply of the same slab tower typology in areas as New Moscow.

Figure 43: Yuri Pimenov's painting Trendsetters of the New District, 1961

Figure 44: Screenshots from a marketing video by Glavstroy

Figure 45: Rimskogo-Korsakovo 11 development marketing image by PIK development group

Interestingly, however, numerous surveys continue to conclude that most respondents of all demographic groups identify the *cottage* (i.e. single detached home in the suburbs) as the preferred housing typology. Only 22% of the highly educated and 27% of the less educated demographics prefer apartments. The *cottage* typology features the most elements that respondents aspire to: space, convenient layout, aesthetic exterior, ability to customize the interior and land that can be fenced in (Figure 46). Land, especially land that can be fenced in for privacy, is of particular importance, as it is both an antidote to decades of forced neighbourliness

in Soviet era buildings, while also conjuring up images of the *dacha*. *Dachas* are countryside allotments that were given to many city dwellers in order to decompress and grow one's own food (Figure 47). Such properties are valued for being "close to nature", and their ability to accommodate gardens, a *banya* (sauna), a gazebo and flowers (Alekseevsky 2017). Such housing aspirations are a far cry from the reality of the built environment for a great majority of residents. Suburban housing models as *cottages* and townhouses, and even low-rise apartment buildings are becoming more economically viable for a growing share of the population as seen in New Moscow, however they remain inaccessible to most.

Figure 46: Typical cottage development outside Moscow

Figure 47: Typical dacha (cottage) settlement

This wide gap between housing aspirations of the population and the housing stock being built is a result of the dominance of pragmatism in housing choice (Haase 2010), and the compromise between housing preferences, financial abilities and the limitations of the housing market. As sociologist and urbanist Olga Vendina describes it, housing decisions are made with everyday needs in competition with the ideal (Alekseevsky 2017). Building type is often not a crucial component of decision-making, with functions as transport, schools, services, shopping and recreation being the deciding factors (Haase 2010). For many, a home in the suburbs is not possible due to commute lengths. As well, highrise districts are often adjacent to the metro and all required services and amenities. Above all, housing price is the deciding factor, which predicates the quality of housing and environment that is attainable. And, as discussed, in the context of New Moscow, it often leads to prioritization of living space in a new housing estate, at the cost of transport, infrastructure and amenities.

It can be argued that in New Moscow, consumers are simply getting what they are willing to pay for, and that perpetuation of the slab tower typology is a reflection of high demand for a low quality product. On the other hand, it is clear that despite being familiar and a cultural norm, housing estates do not reflect housing aspirations of the population, but instead merely satisfy their functional needs at the highest price they are able to afford. This discrepancy is therefore the limitation of the housing market, and the failure of the housing market to accurately match demand with supply. This is explored further in the rest of this chapter. If a conclusion can be drawn from these findings, it is that there is a great need for diversification of the housing stock, which is to be a key attribute of the design proposal offered in the fourth chapter.

2.4. Welfare State Legacy

Despite privatization of the housing stock and the transition to a market economy since the early 90s, there remains an ever-present legacy of the Soviet welfare state that perpetuates construction of substandard housing. A functioning housing market was slow to emerge and was marred by unexpected complications. Slow adoption of mortgage credit hindered market liquidity, thereby resulting in unjust inequality in housing distribution. Furthermore, high interest rates continue to hinder the purchasing power of homebuyers, which alone greatly impacts the affordability and quality of housing (Filatova 2013). This phenomenon necessitates continued government intervention in the housing market in the form of vouchers, mortgage subsidies, and tax breaks for the construction industry (Zhuk and Boykova 2019, Schukin 2013). This in turn perpetuates welfare state notions that the state is responsible for housing provision and maintenance. Similar to Khrushchev's housing program, housing quotas are established and satisfied through subsidization of low-quality housing (Zavisca 2012). In regard to urban space, communities that lack any semblance of private ownership continue to be built, thereby

perpetuating the notion that the public real is everyone's and therefore no one's. This was not the vision that leaders had in mind while pursuing privatization of the housing sector.

Privatization of housing is widely regarded as a way to rectify prolonged welfare state issues and offer a number of benefits: benefits to public finance, improved housing standards, benefits to neighborhoods and communities, benefits to the stability of the economy and society, as well as political benefits from voting behaviour. Furthermore, homeownership is regarded as a way to induce stewardship of the citizenry, stabilize society through greater commitment of borrowers to their jobs and improve the environment for family formation and childrearing (Whitehead 1998, Rohe, van Zandt and McCarthy 2001, Dietz and Haurin 2003, DiPasquale and Glaeser 1999, Ronald and Elsinga 2012). From the perspective of the housing industry, privatization is regarded as a way to provide more capital for construction, improve housing choice and relieve workplaces, municipalities and the state of the responsibility over housing (Attwood 2010). For the above stated reasons, privatization of the housing industry was one of the key objectives undertaken as part of a series of radical reforms of the early 1990s, which eventually culminated in the recognition of Russia as having a market economy (Zavisca 2012).

The reforms were first initiated in 1985 by Gorbachev's *perestroika*, an attempt to resolve the contradictions of Soviet society by introducing elements of market relations. This was necessitated after improved journalistic freedoms exposed deplorable conditions, especially in sectors as housing. One quarter of all families in the union were on decades-long waiting lists to receive housing, and 17% of the population still lived in communal housing (Attwood 2010). Participants in focus groups commissioned by the government "described the nation's housing situation as critical, catastrophic and hopeless" (FOM 2006, Zavisca 2012). As well, with control of housing distribution in the hands of very few authorities, corruption was commonplace. (Attwood 2010). Furthermore, individuals were only allowed to trade apartments, which resulted in absurdly complex swapping schemes involving numerous families through black market brokers. Similar issues were apparent in other sectors of society, and the role of the state as employer of 72.9% of the working population, as well as provider of housing, was simply unsustainable. The Soviet economic system was moving into crisis, and increasingly radical reforms were the only pragmatic option to slow the decline (Cox 1996).

Reforms were initiated through collective privatisation of state enterprises, by offering employees stocks to make enterprises more self-reliant for survival (Cox 1996). After seeing the benefits of such reforms, and due to the sheer necessity of the declining economy, Gorbachev's *perestroika* quickly gave way to full blown restoration of capitalism. In February of 1990, the Soviet party's "guiding role" over society, known as Article 6, was repealed, and by September, a program to transition to a market economy was initiated. 1991 saw the dissolution of the Soviet Union, with a radical shift toward a neoliberal policy climate (Cox 1996). Rapid privatization

plans were drawn up, and by 1992, the Law on the Fundamentals of Housing Policy gave residents the right to privatize their apartments for free. But, despite the new economic freedoms offered by the reforms, privatization did not immediately result in functioning markets. In fact, there was little evidence that firms were operating according to criteria of capitalist profitability, and relations between enterprises and the state continued to resemble those of the Soviet system (Cox 1996). The same applied to the housing market, which was more of a regime of property without a market, stagnant and illiquid without access to credit.

To kick-start the housing market, in 1992, the Russian government signed an agreement with the United States Agency for International Development (USAID) to implement the Housing Sector Reform Project (HSRP). This project, funded by the US Freedom for Russian and Emerging Eurasian Democracies and Open Markets (FREEDOM) Support Act, effectively installed the Urban Institute, an American NGO, as the project manager of the Russian housing market (Zavisca 2012). The HSRP program shared tenets of the "Washington Consensus," which was a set of standard policies embraced by American political and financial institutions (Williamson 1990) and encouraged privatization of state assets, deregulation of business, liberalization of finance and limiting of public expenditures (Zavisca 2012). Such policies were also in agreement with those of the World Bank, however went further by seeking to maximize homeownership (which helps explain the lack of rental options in Russia), and attempting to create "a Russian copy of the American secondary mortgage market system" (Dubel, Brzeski and Hamilton 2006, Mints 2000, Zavisca 2012). Such measures were embraced by president Yeltsin and his advisors, who saw these measures as a way to achieve three objectives: diminish the state's role in housing provision, establish a functioning housing market and legitimize the housing market as efficient and fair (Zavisca 2012). These goals, however, proved to be much more problematic than the promise that was offered by the HSRP.

First, a program of "shock therapy" was implemented to destroy impediments to market creation by cutting financing for housing construction and maintenance. State share of construction financing dropped from 80% to 20% between 1990 and 2000, and the maintenance budget was dropped by 80%. Second, mortgage lending was institutionalized, and a Certified Mortgage Lending Program was started with consultation from Fannie Mae in 1996 to train bankers in housing mortgages. Thirdly, a secondary mortgage market was initiated in 1997 through the establishment of the Agency for Home Mortgage Lending (AHML), a joint stock company similar to Fannie Mae, with the government as the major shareholder guaranteeing AHML debt (Zavisca 2012). This was meant to accelerate market liquidity by removing loans from lenders' balance sheets, thereby improving access and affordability of loans. These strategies, however, did not work out as planned, which helps shed light on the lingering legacy of the Soviet welfare state.

The concept of a mortgage as a means to acquire property proved to be entirely unfamiliar and unpopular. After decades of housing being provided at no cost, and at least minimal housing being guaranteed as a legal right, notions of payment for housing, as well as the risk of losing one's home to a foreclosure, inhibited acceptance of this mechanism as a form of ownership. Furthermore, by 2000, 70% of respondents to surveys were not aware of mortgages. By 2007, 76% of respondents were aware, but only 22% said they would even consider a mortgage, and only 3% had a home loan. Most importantly, most respondents thought mortgages were a variation of installment loans, with monthly payments based on construction costs and incomes, with limits on profits and a government guarantee against loss of property. Charging interest on housing was simply objectionable to Russians (Zelizer 2005, Chan 2009, Zavisca 2012). Furthermore, interest rates as high as 20%, dropping to 8% in 2018, alone pose a significant impediment to affordability and quality of housing (Zavisca 2012). Lastly, unlike in the American mortgage system, where loans were insured by the Federal Housing Authority, in Russia, all risk was transferred to consumers, leaving borrowers vulnerable. Borrowers had to purchase insurance against loss of life or ability to work, there were no delays on foreclosure and no liability limitations, meaning a home could be lost unexpectedly, and the bank could take possession of other assets (Zavisca 2012, Ronald and Elsinga 2012). As a result, mortgages were not an attractive product.

Resistance to the mortgage system and the consequent lack of liquidity resulted in continuing failure of the housing market. Housing distribution continued to be dictated by familial relations and inheritance, being especially unfair for young adults. The mismatch between income and housing wealth was a key indicator of market failure, with a UN report concluding that "cost-free privatization has resulted in many property owners who are actually poor… It is therefore possible in Russia … to find a relatively comfortable 'tenant' living next to an indigent 'owner'. It will take decades to eliminate the mismatch between economic circumstance and housing tenure" (UNECE 2004, Zavisca 2012). Zavisca describes this phenomenon as "unjust inequality", whereby one's ability to improve one's housing is hindered by factors outside of their control. The inevitable consequence of this situation perpetuated the widespread belief that the housing system is unjust and that government intervention is required to control the market and compensate for this injustice (Zavisca 2012). Against recommendations of the Washington Consensus, this necessitated government action to stimulate the housing market through a more central role of government-controlled banks in mortgage lending, as well as mortgage subsidies. Government banks' share of issued mortgages grew from 47% to 68% in 2009, with estimates as high as 80%. As well, 30% down payments and low-interest loans were given out through the Young Families Program. Furthermore, $10,000 vouchers were given to mothers as part of the Maternity Capital program, in order to stimulate the housing market and the birthrate. Maintenance continued to be heavily subsidized, with residents paying as little as 1% of the

actual cost of maintenance (Struyk, Puzanov and Lee 1997, Zavisca 2012). Only through such measures was the mortgage market finally able to gain momentum.

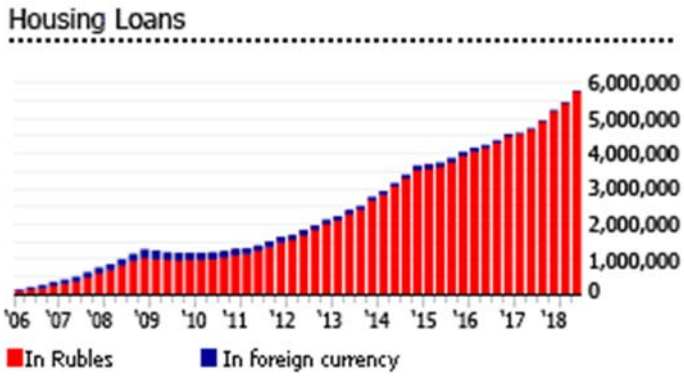

Figure 48: Growth in the number of active mortgages, by Bank of Russia, Global Property Guide

In 2007, in response to growth of mortgage lending (Figure 48), president Medvedev optimistically declared that "Russia is on the verge of a construction boom" and that this is evidence that housing will become more affordable. This, however, is the opposite of what happened. Promotion of homeownership and mortgage growth did stimulate the construction industry, however, this resulted in a sharp increase in housing prices, at twice the rate of rising incomes (Kosareva, Polidin and Puzanov 2012). Between 2004 and 2008, prices grew by 91%, while incomes by 48%. This effect, described further, made housing even less affordable, thereby putting those who entered the market later on in a vulnerable position (Ronald and Elsinga 2012). This further entrenched the government's role in the housing industry, with further subsidies being introduced as part of the Affordable and Comfortable Housing for the Citizen of Russia program under the Priority National Projects initiative. This initiative, on top of heavy subsidies for mortgages and tax incentives for builders and manufacturers of construction materials, also established targets to build $1m^2$ per capita per year. Such objectives, which sound similar to Khrushchev's housing program of 1956, have again secured the state's central role in provision of housing. The net result of these complications is that affordability continues to impact the quality of housing that is being built, thereby necessitating further subsidies of the housing market. As will be discussed further, these subsidies, while improving access to housing for the population, provides the most benefits for the development industry.

2.5. Low Price Elasticity of Supply

It has been concluded above that prefabrication and insolation requirements hinder, but do not entirely limit the diversification of the housing stock, and that there is demand for new housing typologies, with a booming construction industry fueled by state subsidization of both supply and demand. It would appear that the right conditions are present for improvements in housing to materialize. However, due to the nature of the development industry, it is the developers

that reap the majority of the benefits from these conditions, with only marginal improvements being offered to the homebuyers. This phenomenon, termed *low price elasticity of supply*, results in minimal improvements in the new housing being supplied to the market, despite high demand for a better product and ample capital. This economic term is a central reason for the perpetuation of the outdated slab tower typology in areas as New Moscow. The cause of *low price elasticity of supply* is the oligopolistic structure of the development industry, which is a result of limited competition due to barriers to entry, centralization of activity in the hands of large firms and an absence of effective regulation of the industry. In the absence of reliable regulatory mechanisms, as will be further demonstrated, it can be concluded that it is the development industry that holds the keys to the diversification of the housing stock. But, without a profit motive to change, and barriers to change that have been previously discussed, the industry continues producing and successfully marketing an outdated product. As a result, it can be concluded that a viable proposal for a new housing typology for New Moscow must include a profit motive for the development industry.

There are several issues associated with the oligopolistic structure of the development industry. The first is limited competition, which is created by barriers to entry for new or smaller firms. There are a number of barriers to entry and one of the main ones is access to serviced land, which seems odd for the world's largest country. However, it is not the shortage of land, but the administrative barriers to obtaining and servicing land that is the problem. Most land for residential construction is publicly owned, and requires public auctions in order to be sold. Such auctions are often subject to corrupt practices, as officials can limit the number of buyers, omit technical information and misrepresent costs and barriers to servicing. Furthermore, opaque transactions between land auctioneers and developers lead to land being sold significantly below market value, as was found in 37 of 66 analyzed auctions in 23 municipalities. Furthermore, utilities that monopolize access to services are notoriously unpredictable and underfunded. In response, developers often enter into costly, unregulated and undisclosed agreements with utilities, and cooperate among key players to protect their investments (Kosareva, Polidin and Puzanov 2012). The resulting exclusive environment eliminates the possibility of competition from third parties.

Such an exclusive environment is not much different than what James Lorimer observed in American and Canadian cities in the 1970s. There too, through limited competition and acquisitions, the land development industry evolved to be dominated by a handful of large firms with large land banks. These firms would only compete on a city-wide level, while usually holding a monopoly over a particular district. Furthermore, through the process of what Lorimer calls "squeeze play", developers would focus only on the most profitable products (Lorimer 1978). The same can be observed in Moscow. Five of the largest developers in 2008 accounted for 62.7% of all new residential construction. In New Moscow, the largest developer,

MASSHTAB, controls 13,000ha of almost contiguous land, thereby ensuring a steady supply of developable land without competition for the foreseeable future (Kuricheva 2013). It is difficult for smaller or new development firms to compete against such behemoths. This is further exacerbated by high interest rates, which impose a strict time constraint on projects, thereby making it impossible for smaller developers to survive interruptions in sales due to regular economic downturns. The result is the concentration of new development after the 2000s into ever-larger residential mega-projects as *Perviy Moskovskiy* in Figure 49 below (Makhrova, Nefedova and Treivish 2013).

Figure 49: Perviy Moskovskiy development with 1,500,000m^2 of residential space, by OOO Sovhoz Moskovskiy+

Municipal and Regional governments also do not help in these circumstances in a number of ways. As mentioned, municipalities control the release of public land to the market, which is often done through preferential treatment of particular firms. Meanwhile, local governments do not have a financial incentive to service lands for residential development, as taxes are collected at places of work, rather than being tied to places of residence (Kurichev and Kuricheva 2018). Consequently, municipalities are not incentivized to make local improvements that would raise tax revenue through higher property values (Kuricheva 2013). Instead, approvals are achieved through lobbying by large landowners who are eager to unlock their lands for development. This results in significant influence of developers over planning authorities, who are not sufficiently organized to withstand pressure from business interests (Kuricheva 2013). In the example of New Moscow, this is further exacerbated by the April 2013 Federal Law no. 43 *On Seizure of Land in the Territory of New Moscow*, which allows developers to circumvent numerous high-level regulations as the Urban Planning, Land and Civil Code of the Russian Federation. This law

allows for expropriation and development of land without public hearings, and diminishes the significance of the recently implemented General Plan for New Moscow. (Kuricheva 2013).

The culmination of the above factors is that the development industry is operating in conditions of limited competition, with little oversight from local authorities, who are often complicit in the subversion of their own authority. High demand for better quality housing, along with an abundance of capital from mortgage and tax subsidies is having little influence on the type of product that is being built around cities like Moscow. Without competition, even the volume of construction does not appear to be impacted by the high demand, thereby only resulting in rising prices of real estate (Kosareva, Polidin and Puzanov 2012). This *low price elasticity of supply* is typical for rapidly developing places. An analysis of price elasticity of supply in 61 regions of Russia measured indices between 0 and 3, indicating that change in demand does not impact supply. For comparison, out of 45 US cities surveyed, indices were measured between 0 and 30, with 31 of the cities having an index over 3 (Green, Malpezzi and Mayo 2005, Kosareva, Polidin and Puzanov 2012). It will therefore take a significant amount of time for the Russian housing market to attain elasticity indices that would result in consumer demands being realized in the new housing stock. But, a cooling market in Moscow is resulting in heightening competition between developers, which offers hope for improved housing standards. This is how the new "comfort class" of apartments with finished interiors became popularized after the 2008 housing crisis (Papov 2018). This was a small improvement, but a step in the right direction. In the meantime, it can be concluded that development of new districts of traditional prefabricated slab towers, whether arranged as Soviet-era estates or newer perimeter blocks, will continue into the foreseeable future. Without a profit motive to change and with the discussed barriers that hinder change, the industry will continue along its current trajectory, until a change in circumstances will precipitate a new profit motive. It is for these reasons that this thesis posits that any proposal for a new housing typology for New Moscow, in order to be viable, must first and foremost offer a profit motive to the development industry.

The following conclusions can be drawn from the preceding explanations. The large share of prefabrication in the construction industry is likely to continue for the foreseeable future. This perpetuates construction of slab tower estates, however does not hinder the introduction of alternative housing forms. The building code and insolation requirements hinder the viability of alternate massing forms, however do not entirely preclude the diversification of the housing stock. Due to housing shortages and long-established housing customs, there is high demand for new housing space, which is often at the expense of housing quality, infrastructure and amenities. Despite this, most aspire to alternative housing forms, such as the *cottage* typology, which is a sign of the failure of the housing market to match demand with supply. The lingering legacy of the Soviet welfare state necessitates continued government intervention in the housing market in the form of subsidization of demand and supply through voucher programs,

mortgage subsidies and tax breaks for the construction industry. Such programs stimulate housing construction; however, this does not result in the diversification of the housing stock. The oligopolistic structure of the development industry, due to limited competition, barriers to entry, administrative opaqueness and corruption, results in *low price elasticity of supply*, whereby high demand for better housing does not result in the diversification of the housing stock. As a result, the industry continues to build a sub-standard and outdated product, with no profit motive to change, as well as the abovementioned barriers that hinder change. There is great interest in new forms of housing, however the new perimeter block typology with car-free courtyards is proving to be the preferred alternative in the development industry due to its optimized balance between marketability and profitability in this particular marketplace. This again poses an architectural challenge of whether an improved housing typology can be proposed for New Moscow, that better reflects housing aspirations of the population, while offering a profit motive for the development industry.

CHAPTER 3: APPROACH TO ADDRESSING THE STATUS QUO

The first two chapters of this document have established the reality of New Moscow's housing development industry, and explained why it continues to yield the same outdated product that does not reflect the housing aspirations of prospective homeowners. It has been established that inertia of the prefabrication industry, stringent insolation requirements and entrenched housing customs will continue to hinder, but not entirely preclude the diversification of the housing stock. Heavy subsidization of both the demand and supply of housing will continue to fuel the construction industry, while also perpetuating welfare state attitudes that housing provision and maintenance are the responsibility of the state. The oligopolistic structure of the industry and the resultant *low price elasticity of supply* will prolong the disconnect between housing demand and supply. With the cards stacked in favour of the development industry, which has little motive and only obstacles to change, inhospitable Soviet-era housing estates continue to be built. The overarching conclusion from these findings is that any proposed improvements in the quality of housing and urban environment, in order to be viable, must be able to be presented as a byproduct of improved profitability. The goal of this chapter is to establish an appropriate methodology for addressing this predicament, which will inform the intervention that is proposed in the next chapter. A summary of this chapter is as follows.

First, to contextualize any potential proposal, today's patterns of urban growth of Moscow and its expansion into New Moscow territories are analyzed. Rather than sequential outward expansion of the urban boundary, "edgeless" growth patterns are observed. Instead of focused development around planned nodes per the recently established General Plan, large-scale development projects are scattered throughout the rural landscape according to random competition between developers over access to services. This pattern of growth results in sharp juxtaposition between long-established rural communities and new high-density districts, as well as pollution and degradation of the natural environment. Due to the oligopolistic nature of the industry, this thesis posits that this pattern of growth will persist for the foreseeable future, and that its negative impacts should be remedied to the extent possible in the contemplated intervention without compromising profitability. To achieve this, examples of landscape and built form interventions are compared, and it is concluded that the most effective intervention should focus on the built form, however it should also be able to integrate seamlessly with any landscape condition. Wide use of prefabrication and the presence of strict insolation requirements further support the requirement for a systematic and universal built form solution,

that could be replicated like the new model of car-free perimeter blocks is being replicated today. Recent attention to the subject of urban blocks in local academia, publications and competitions further identified the urban block as the most appropriate medium for improving the current standard and offering a tangible alternative for developers looking to gain an edge over heightening competition. With projects such as redevelopment of industrial lands and reconstruction of 5,000 *khrushchevka* buildings in central Moscow gaining traction, the significance of greenfield rural lands for Moscow's future growth is beginning to wane. As a result, there is growing interest from large landowning developers on Moscow's periphery in new development models that can maintain marketability, and therefore the value, of their assets.

In response to the growing interest in alternative solutions, diversification of the new housing stock through a mix of typologies and densities is explored as the solution that can better satisfy aspirations of homebuyers while improving marketability. Furthermore, subdivision of land into small development parcels and introduction of mid-rise and low-rise typologies with private yards is proposed as the means to create distinct and small-scale communities as a remedy to historically large-scale and antisocial housing estates. Community formation is determined to be the primary factor that results in housing satisfaction, and is therefore adopted as the central objective of the proposed intervention. Lastly, the burden of high maintenance costs, the prevalence of gated and segregated communities and the lingering welfare state attitude that the public realm is owned by nobody are proposed to be remedied with measures that promote community stewardship, distilled from texts regarding privately managed and gated communities. The chapter concludes with a summary of the guiding principles that are to inform the contemplated intervention in the following chapter.

3.1. Inevitability of Edgeless Growth

The first criterion established for the proposed intervention described in the following chapter is the notion that any proposal for greenfield development in New Moscow must acknowledge the patterns of edgeless growth that are occurring today. Due to the oligopolistic nature of the development industry and the power of the development lobby over local municipalities and planning controls, this thesis posits that pockets of high-density development in sharp juxtaposition to established rural communities will continue for the foreseeable future. The proposed intervention of the following chapter accepts this reality as a given condition, while aiming to remedy the negative consequences of such growth to the extent possible.

The history of Moscow's growth over the 20th century, discussed in Chapter 1, is consistent with planning concepts established by Ebenezer Howard's 1898 treatise *Tomorrow: A Peaceful Path to Real Reform*. This work has been instrumental in shaping western urban planning policy,

arguing for defined boundaries that would limit urban expansion into the countryside, and the creation of planned satellite communities in harmony with nature, such as Howard's Garden City concept (Figure 50) (Sieverts 2003). Howard's work was translated into Russian in 1911, and several years later, satellite communities started appearing around cities as Moscow, Riga and Ostankina. It is clear that growth of Moscow in the 20th century resembles Howard's concepts, but whether this work directly influenced Moscow's planned growth under Soviet jurisdiction is a contested topic worth further exploration (Panait 2013, Buder 1990). Furthermore, it should be noted that both the Bulvanoye and Sadovoye ring roads, which bear a strong resemblance to Howard's Garden City concept in Figure 50 below, were constructed in the 1820s, approximately eighty years before Howard's treatise (Sytin 1948). At the turn of the 20th century, Howard's theories were being challenged by H.G. Wells, who in the chapter on "The Probable Diffusion of Cities" in his 1902 work *Anticipations* predicted the disappearance of urban boundaries and the dispersion of cities due to improved transportation. As correct as H.G. Wells may have been in predicting the reality of urban growth, it is Howard's concepts that ended up shaping urban planning policy, also being particularly fitting for a planned economy such as that of the Soviet Union. After the transition to a market economy in the 90s, Moscow's growth was continued in this tradition, expanding Moscow's borders with numerous annexations outside the MKAD ring road to provide a steady supply of land for Moscow's construction industry (Revzin, et al. 2016). This is consistent with the concepts described by Joel Garreau in his book titled *Edge City* (Figure 51). Garreau argues that unlike cities of the 19th century which grew around a single downtown, growth of cities in the 20th century has focused around commercial centres on the periphery, which themselves evolve into cities (Figure 52) (Garreau 1992). The same pattern of growth that has been endorsed by Moscow's urban planners for decades (even though the city's monocentric nature has always prevailed). More recently, however, due to crippling demand from Moscow's rapid population influx, development has not been expanding sequentially outward from the MKAD ring road, but exploding into the surround periphery with random and unplanned competition among developers for access to land, transportation and utilities (Kuricheva 2013).

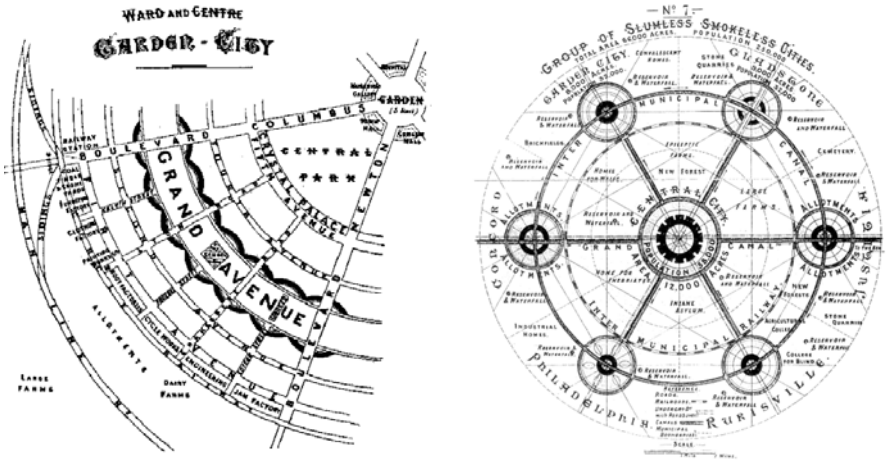

Figure 50: Ebenezer Howard's concept for the Garden City, 1898

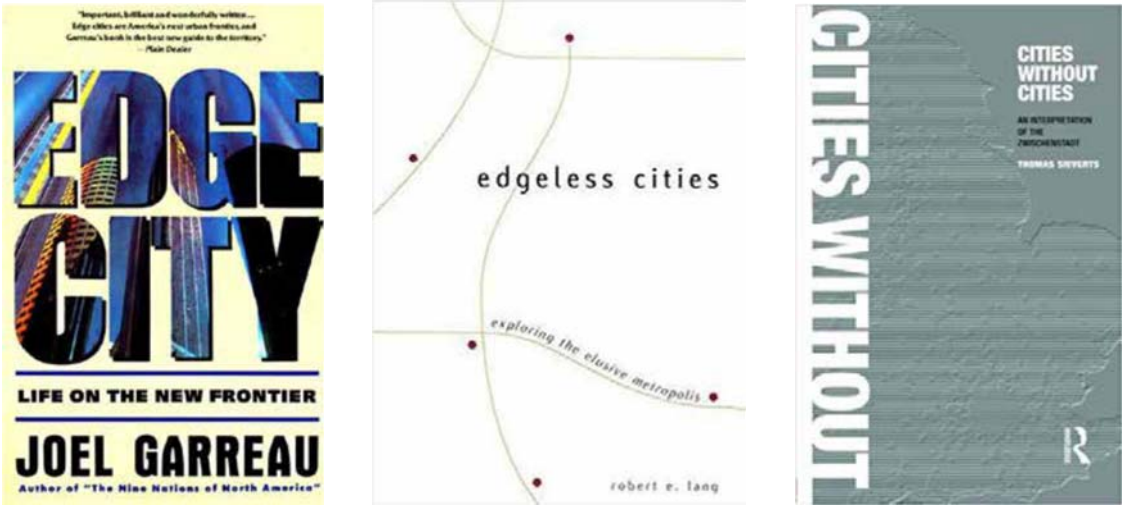

Figure 51: Three books regarding pattern of urban growth

Figure 52: Tysons, Virginia, an example of an edge city outside of Washington DC

Figure 53: Example of edgeless growth outside of Stuttgart

This edgeless model of growth is described by Thomas Sieverts in *Cities Without Cities* and Robert E. Lang's *Edgeless Cities*. As proposed by H.G. Wells in 1902, these authors argue that geographic allocation becomes increasingly irrelevant due to improvements in transportation and communication infrastructures, thereby resulting in post-polycentric urbanism with scattered functions and no form (Figure 53). This is not to say that there are no organizing principles. An edgeless city, or the *zwischenstadt* (translated "in-between city") as Sieverts calls it, is a complex fractal web of networks and nodes, distributed throughout the peri-urban landscape without constraints of place. It is not conducive to walkability, and tends towards larger, monofunctional and specialized centers with insulated internal worlds (Sieverts 2003). Lang provides an economic explanation for this phenomenon, as his findings show that office space gravitates either towards the edgeless periphery due to access to cheap land, or to downtowns that foster innovation and higher order specialized employment. Planned edge cities, on the other hand, are limited by their defined boundaries, thereby imposing a cost constraint on developable land (Lang 2003). The same economic argument can apply to distribution of residential uses, which tend to centralize around urban cores while also decentralizing over less expensive land as observed in New Moscow. This, however, does not mean that Moscow authorities exert no influence over growth.

Per the transportation master plan for New Moscow, an imposition of a grid can be observed over the historic patchwork of roadways and forests (Figure 54). This is a rational product of urban planning that seeks to establish what E.C. Ralph in *The Modern Urban Landscape* calls a "planned place" to make cities function "as efficiently as factories" (Ralph 1987). As well, a recently issued General Plan for New Moscow counters edgeless tendencies by identifying high-density nodes through zoning that are most suitable for future growth. Strategic planning is indeed what is required to mitigate the unplanned *colonization* of New Moscow's rural communities and environments by Moscow's housing industry. Strelka KB also recommends controlling building heights and densities and restricting boundless growth by directing it towards appropriate nodes (Revzin, et al. 2016). Such measures are a continuation of urban planning in the tradition of Ebenezer Howard's planned communities in harmony with nature (Sieverts 2003). The 2012 winning proposal for the Kommunarka administrative hub of New Moscow by Capital Cities Planning Group (Figure 55) is an example of this approach, which envisions a new mid-rise mixed-use district on greenfield lands, flanked by linear lakes that are formed by the damming of a river (Revzin, et al. 2016). The expansion plan for New Moscow also envisions employment clusters, as well as a network of planned metro stations that can foster transit-oriented edge/satellite communities (Revzin, et al. 2016). Such measures can be an effective tool for managing growth, as they provide clarity for prospective developers and facilitate fast-tracking of approvals that comply with the endorsed plan (DIALOG 2018). However, whether such measure can work in New Moscow is yet to be seen.

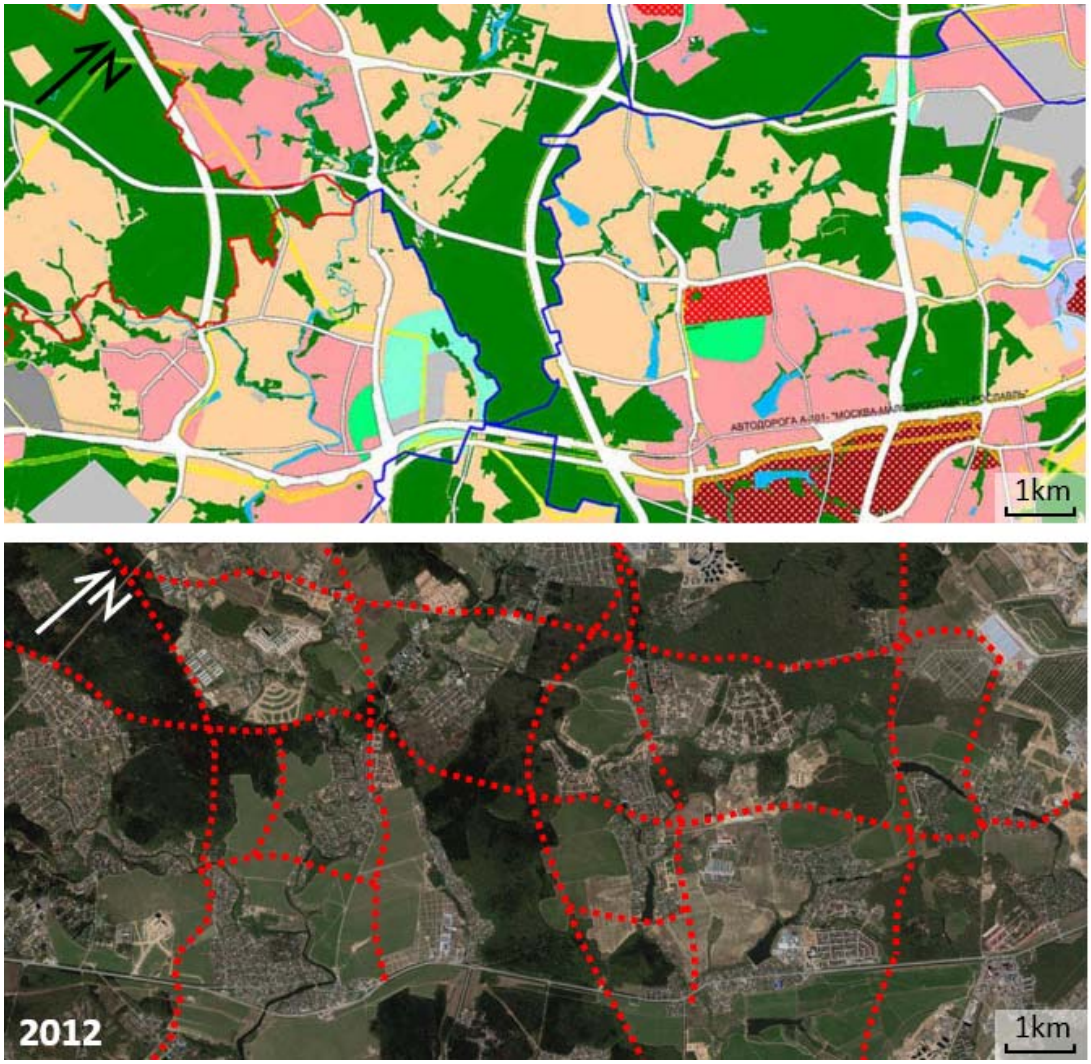

Figure 54: Comparison of New Moscow zoning map and 2012 satellite imagery, showing the imposition of an infrastructure grid over New Moscow's rural landscape (dotted red lines), by Moscow Genplan Institute and by author

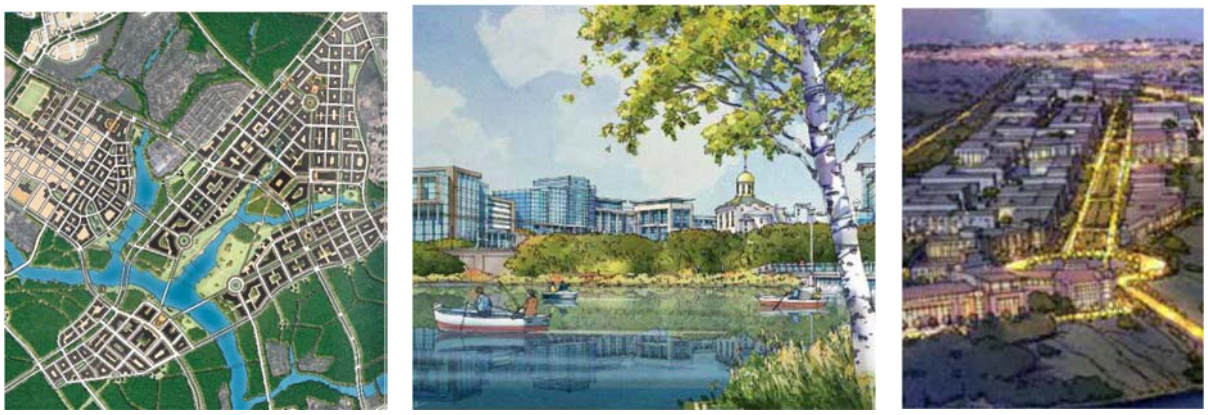

Figure 55: Excerpts from Capital Cities Planning Group vision for the Kommunarka administrative centre in New Moscow

Despite plans for controlled growth of New Moscow, the oligopolistic structure of the industry and the presence of a strong pro-development lobby challenge the efficacy of these plans (Kuricheva 2013). Furthermore, such plans are only applicable to development in New Moscow territories to the southwest of the MKAD ring road, thereby leaving the remainder of Moscow's periphery outside of the jurisdiction of Moscow's planning controls. Strict development controls in New Moscow could also limit the availability of land for high-density construction, thereby pushing this typology into areas outside of Moscow's jurisdiction. Since New Moscow's planning policies have not been replicated around the entirety of Moscow's periphery, this thesis posits that edgeless growth will continue in New Moscow for the foreseeable future, with the exception of walkable nodes established along metro and light rail corridors. By this logic, New Moscow's growth may more closely resemble Frank Lloyd Wright's vison for Broadacre City (Figure 56), with decentralized functions in an automotive rural-suburban landscape, rather than Garreau's edge city (Sieverts 2003). It is for these reasons that this thesis posits that decentralized greenfield development is a reality that will persist for the foreseeable future. It should be noted that this is not necessarily a negative quality. Sieverts argues that "instead of talking dismissively about urban sprawl [and] criticizing the lack of urban-ness, we could perceive a decentralized cultural diversity [and the] emergence of a new model of order more akin to our pluralistic and democratic society than the old model of centres" (Sieverts 2003). Sievert's argument offers the possibility of a design intervention that does not need to adhere to traditional edge-city and transit-oriented placemaking, and can instead focus on integrating seamlessly into the existing rural fabric.

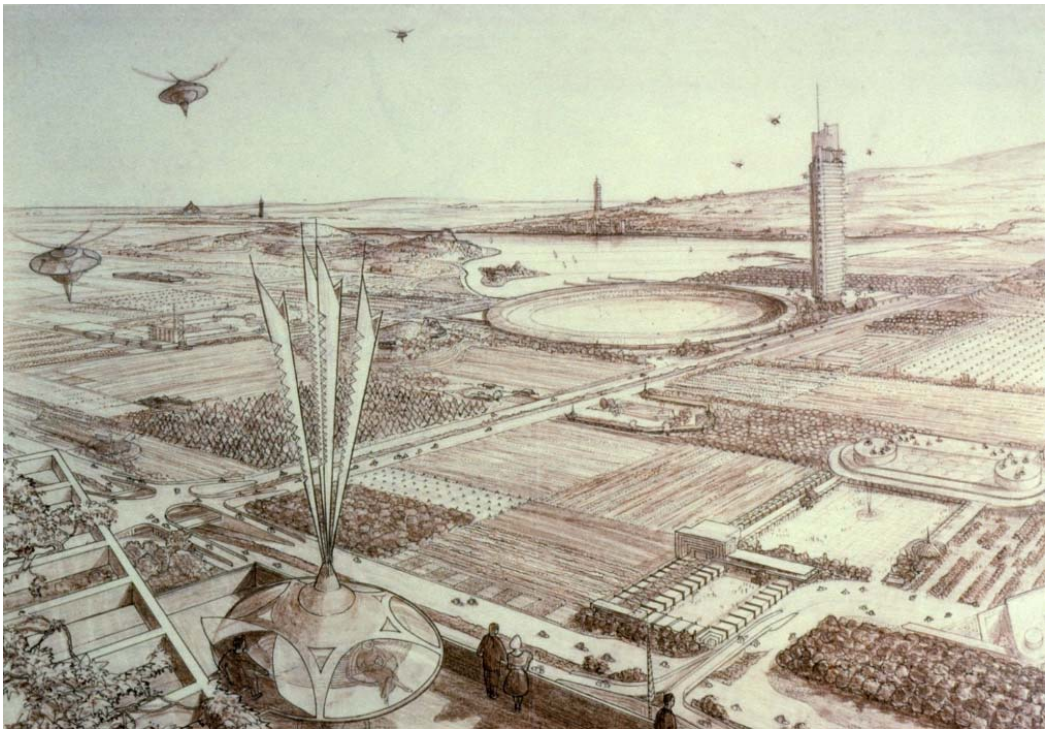

Figure 56: Frank Lloyd Wright's vision for Broadacre City

Regarding density, this thesis posits that in order for the design proposal of the next chapter to be considered viable, it requires a density that is similar to the typical slab tower districts that are being built in New Moscow today. This is despite numerous examples and a growing trend toward single-detached and townhouse communities, which are a positive sign that slab tower estates are being slowly phased out. Furthermore, two competing urban growth strategies are providing an alternative to greenfield development on the periphery. One such strategy is the redevelopment of decommissioned industrial zones inside old Moscow boundaries (Figure 57). This strategy has been endorsed by the Urban Land Institute, and is considered to be the best program to address the congestion of Moscow through transit-oriented development around a newly established railway ring (Argenbright 2018, Babkin 2018). The second strategy is the recently announced program to demolish and redevelop 5,000 5-storey *khrushchevka* buildings (Figure 58). This strategy, however, requires a tripling of density of these areas in order to be economically viable, which poses obstacles. Despite this challenge, this is a federally funded program that is moving ahead, at the very least to address the crumbling state of these structures. Another proposal by Strelka KB suggests that existing bedroom communities should be densified and infused with function and purpose (Revzin, et al. 2016). This recommendation is consistent with a proposal that was submitted to Strelka's earlier *What Moscow Wants* ideas competition (Markin 2014). This proposal sought to intensify underutilized boulevards with mid-rise office buildings, while using the proceeds from the sale of this land to build much-needed underground garages (Figure 59). This proposal was ranked as the runner-up by industry professionals at the Moscow Urban Forum, and suggests that there is wide agreement that existing communities have significant potential to accommodate future growth. Such strategies are able to provide tens of millions of square meters of new housing to accommodate all of Moscow's growth for the foreseeable future (Babkin 2018, Revzin, et al. 2016). This notion diminishes the marketability and profitability of continued greenfield development, and offers a solution to the *colonization* of New Moscow's rural lands. However, there is an economic reality that remains – highrise developers own vast land banks as large as 13,000ha in New Moscow. As well, these are often the same developers that will redevelop the industrial lands, and lands currently occupied by *khrushchevka* buildings (Novostroy 2019). Consequently, these developers can be expected to continue to lobby local governments in order to develop their vast greenfield landholdings (Kuricheva 2013). Development of Moscow's periphery may happen at a slower pace; however, this development is inevitable, and it will likely resemble the projects that are being implemented today. For this reason, this thesis assumes that decentralized high-density greenfield construction will persist in New Moscow, and therefore this is the density that is most appropriate for a design intervention in order to be considered viable from the perspective of the development industry. This, however, is not to say that new low and mid-rise typologies cannot be introduced, while offering same densities as are customary for local developers.

Figure 57: Mapping of industrial lands that are most suitable for residential redevelopment, as well as a newly completed commuter railway ring in red (Babkin 2018)

Figure 58: Demolition and reconstruction of 5,000 5-storey khrushchevka buildings in Moscow

Figure 59: Proposal for Strelka's What Moscow Wants competition, ranked #2 by attendees of the Moscow Urban Forum (Markin 2014)

In summary, given the oligopolistic nature of the development industry and the power of the development lobby over local authorities, this thesis posits that edgeless expansion and colonization of New Moscow's rural communities will continue into the foreseeable future. As a worst-case scenario, it should be assumed that the proposal offered in the following chapter could be located in sharp juxtaposition to an established rural community and landscape, similar to the *Rasskazovo* development in Figure 60 below. As well, as is typical in the New Moscow context, the proposal could be located away from existing transit hubs, thereby acting as a self-contained island that is to establish a sense of place from its own inner structure and its surrounding rural context. The proposal should offer mitigative measures that can address the negative consequences of such development patterns, however to remain viable, such measures cannot be at the cost of profitability. Furthermore, this thesis posits that large landowning developers in New Moscow will continue to maximize their returns with high density development, and therefore any viable proposal must also assume high density as a baseline. Such requirements pose a unique architectural challenge for the proposal in the following chapter.

Figure 60: Rasskazovo development in New Moscow in a forest and adjacent to a rural community, Google Satellite

3.2. Built Fabric

With the reality of Moscow's edgeless growth acknowledged, the second criterion that is established is the decision to focus on the built fabric as the medium for the design proposal in the following chapter. The following text outlines the need for a systemic solution, and more specifically the need to develop a new urban block typology as a viable response to the prevalence of prefabrication and stringent insolation requirements which perpetuate the construction of Soviet era estates on Moscow's periphery.

Initial discussions regarding the medium for the intervention of this thesis suggested that a landscape approach could be adopted similar to that of OMA's proposal for the Melun Senart master plan (Figure 61). OMA's proposal claimed that the "chaos" of the urban fabric that would be built by private developers is outside of the designer's control, and that only the remaining public spaces can be influenced in any way (Koolhaas 1994). This approach is in line with the theory of Landscape Urbanism, which argues that cities are to be organized with the city's landscape, instead of the built form (Waldheim 2006). Such an approach offers the possibility of a landscape intervention that could rectify the *chaos* of New Moscow's built environment, without proposing any alternatives to the housing typology itself. This would be a reasonable

method of addressing New Moscow's built environment, especially given the inertia of Moscow's construction industry and *low price elasticity of supply* which hinder change. However, a landscape approach is limited in that it can only apply to a particular site and its geographic and functional specificities. Furthermore, this approach would not address the most evident problem of New Moscow's urban environment, which is the perpetuation of the outdated slab tower typology itself. An example that clearly demonstrates this point is the *Tatyanin Park* development in New Moscow, which created a rigorously programmed pedestrian spine through an otherwise typical highrise district (Figure 62 and #4 in Figure 23 and Figure 24). This project is surely an improvement on the current standard, and it can be argued that it effectively addresses the most cited concerns with Soviet-era estates – those of the quality of the public realm (Gershman 2016). A similar approach can be observed in the majority of new estate developments, which advertise the abundance of playgrounds, sports facilities and gardens offered in the open spaces between buildings. In other words, the landscape approach proposed by OMA is already being widely implemented, and is only resulting in improved marketability of an otherwise outdated housing typology. This conclusion offers the possibility of adopting an approach that is opposite to that of OMA's proposal for Melun Senart. Instead of assuming that the *chaos* of the built environment is a given that is outside of the scope of the proposal, it can be assumed that the *chaos* of the local landscape and context is what cannot be sufficiently addressed in more than one specific instance. In other words, the proposal could focus solely on a replicable built fabric, which could be inserted into the *chaos* of any context. There is an obvious issue with such an approach: it is by focusing solely on built form factors as prefabrication efficiency and insolation that Soviet-era housing estates evolved to neglect quality of open space to an extraordinary degree. It can therefore be concluded that a hybrid solution is required, which considers both the built form and its imposition over the landscape and context.

Figure 61:Excerpt of Master Plan for Melun Senart by OMA

Figure 62: Tatyanin park development with rigorously planned landscape corridor, by Mits. Development

The theory of Landscape Urbanism provides guidance on how the built form can be respectful of and responsive to environmental processes and changing ecologies (Figure 63) (Waldheim 2006). In line with this theory, a proposal by Strelka KB contemplates recognizing New Moscow territories as a rural landscape, as opposed to an extension of Moscow that is to be colonized. Strelka's *How to Build New Moscow* guidelines propose an organic growth approach, whereby individual parts are not harmed through the development of the whole. One example cited in this report is the adoption of historic routes from the 1860s, which more closely reflect the landscape and networks between established settlements (Revzin, et al. 2016). This example offers a vision in which new communities, despite being established haphazardly throughout the rural landscape, can be tied into an existing rural framework. Alternatively, photographs of the evacuated and overgrown city of Pripyat, next to the Chernobyl reactor, suggest that the mere possibility of the built environment being overtaken by a forest may be enough to integrate seamlessly with the New Moscow context (see Figure 65 below). Not only in Pripyat, but many older neighbourhoods with 5-storey khrushchevka buildings throughout CIS countries resemble naturalized forests that are populated by buildings (see Figure 66 below). This phenomenon challenges the notion that any intervention is required at all, as this solution seamlessly addresses the inhospitable quality and lack of programming of spaces between buildings (Gershman 2016). Indeed, proximity to nature is a highly sought-after quality in housing preference surveys, and this solution offers nature right at the doorstep (Alekseevsky 2017). Of course, this concept is an unrealistic abstraction that ignores requirements such as infrastructure and parking, however it does point towards possible integration of the built form into a naturalized landscape. This concept can be further elaborated through introduction of green-blue infrastructure (Figure 64), allowing the built form to incorporate ecological corridors and

stormwater management systems (Ramboll Foundation 2016). Lastly, the concept of Low Impact Development can help mitigate the negative consequences of New Moscow colonization through on-site retention and purification of stormwater discharge while maintaining pre-development hydrology (Credit Valley Conservation). Such examples offer the opportunity to create an urban fabric for New Moscow that can become an integral part of the existing landscape, as opposed to treating it as tabula rasa for greenfield development.

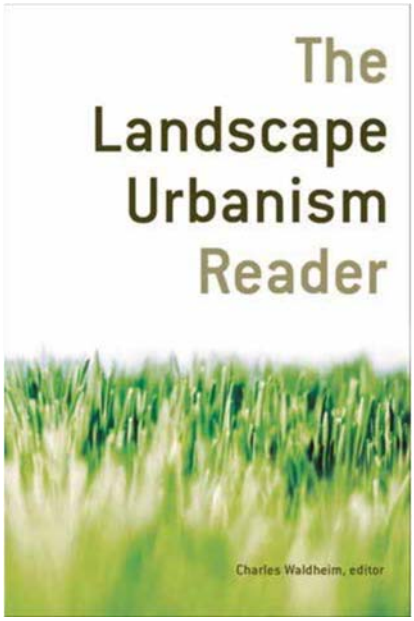

Figure 63: Landscape Urbanism Reader by Charles Waldheim

Figure 64: Example of green-blue stormwater management infrastructure, by ZGF ARCHITECTS LLP

Figure 65: Evacuated and overgrown city of Pripyat next to the Chernobyl reactor, by alexphoto.ua

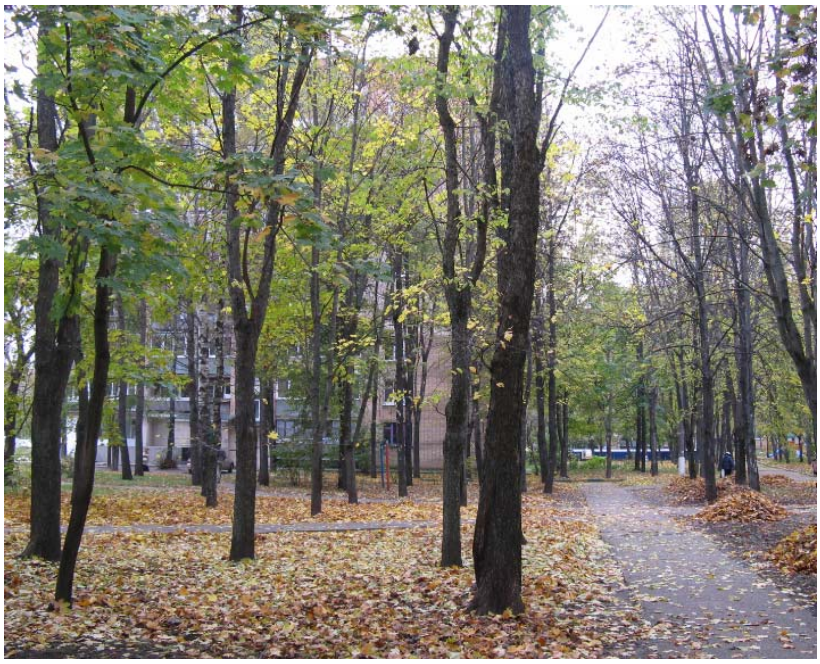

Figure 66: Typical mature neighbourhood overgrown by trees, by author

While above strategies offer the possibility of large-scale solutions, the medium for the proposed intervention of the following chapter was further narrowed down to the urban block. This was prompted by the overall traction that the subject of urban blocks is garnering in local academia and media, and more specifically, in two recent competitions that were held in Moscow for the design of a city block. The Strelka Institute hosted a competition that called for proposals for imaginary idealized blocks. Winning submissions stood out due to the urban environment and lifestyle that they envisioned, without necessarily having to comply with the economic realities of housing development and the building code (Figure 67) (Zolotoev 2018). The second competition was applied to a real 200ha development called A101 in New Moscow, and asked

that a viable block typology be developed that can be replicated throughout the development. The winning entries generated a variety of configurations of the standard, albeit mid-rise version of the perimeter block that is typical in newer housing districts, and rigorously programmed the supporting spaces and uses (Figure 68 and Figure 69) (Archi.ru 2010). These competitions reveal that there is a heightened interest in Moscow towards reconceptualizing the status quo, while simultaneously indicating that the new perimeter block typology with car-free courtyards is preferred by the industry. Increasing entrenchment of this new typology raises the question of whether a better block typology can even be proposed. This question poses an architectural challenge that is examined in the following chapter. Further review of works as *Urban Forms; The Death and Life of the Urban Block* by Philippe Panerai et al, as well as *The Plot* by Jonathan Tarbatt confirm the importance of the city block and its internal structure of private and public space as the fundamental building block for a desirable urban environment (Panerai, et al. 2004, Tarbatt 2012). Consequently, this thesis adopts the urban block unit as a medium for addressing the legacy of Soviet era housing estates and proposing an alternative to the highrise perimeter block typology that is gaining momentum around New Moscow.

Figure 67: Winning entries to Strelka's Urban Block competition

Figure 68: Winning entry to MASSHTAB development group's urban block competition for the A101 development, by EDDEA

Figure 69: One of top entries to MASSHTAB development group's urban block competition for the A101 development, by de architekten cie. and SVESMI

3.3. Diversification

As has been discussed earlier, the structure of demand and supply, the oligopolistic nature of the development industry and the resultant *low price elasticity of supply* hinder improvements of the new housing stock despite high demand for alternative low-rise and mid-rise products. There is a vast gap between homebuyers' aspirations and the type of housing that most have to settle for, which is a significant failure of the housing market to match demand with supply. There is an obvious need for the diversification of the housing stock, both in the variety of dwelling types and architectural styles that could better match housing preferences of individuals. It must be noted that a wide variety of alternative products are already available, however these housing typologies are grouped into uniform districts and remain largely inaccessible to the masses. Consequently, a challenge of the proposal in the following chapter is to generate a built fabric that offers a diverse mix of housing typologies that better reflects the aspirations of homebuyers without sacrificing density and profitability.

First, as has been touched on, it must be noted that the dominance of prefabrication in housing construction does not entirely hinder the diversification of the housing stock. Prefabrication maximizes construction efficiency, especially in taller structures where a single foundation with

services has a high number of repetitive floors stacked on top. However, prefabrication technologies are now entering the low and mid-rise markets, which are dominated by outdated construction methods (Modern Building Services 2018). Great evidence of this is the flood of funding going to startups such as Katerra, which offers developers the ability to customize and order entire low-rise buildings online, and then assemble them on site to full completion within ninety days (Figure 70 and Figure 71). Similar to the highrise structures that are being replicated around Moscow, all of Katerra's parts are built in an assembly line and quickly erected on site (Brown 2019). This example demonstrates that Moscow's prefabrication industry can evolve to produce a diversity of housing types while still minimizing construction costs and time.

Figure 70: Katerra's prefabricated Martingale development

Figure 71: Katerra's prefabrication and construction process

The Plot by Jonathan Tarbatt (Figure 72) offers ways of generating diversity in the built environment through subdivision of land within urban blocks and the creation of small plots to facilitate a "fine grained" and variegated urban environment. The central premise of this work is

that small development parcels in an urban block tend to generate variety through the fact that a number of smaller buildings occupy what would otherwise be one large structure. This work cites examples as Sluseholmen in Copenhagen (Figure 73 and Figure 74), where mid-rise townhouses and small apartment buildings are arranged into perimeter blocks with a shared private yard in the middle. However, upon closer look, it appears that many buildings in Sluseholmen have a consistent structure, with only the facades changing from building to building (Figure 75). This example demonstrated that even if developed by one developer, large buildings can be subdivided into smaller ones with a number of entrances and different facades to generated diversity and at least the appearance of a *fine grain*. Even larger master plans built by one developer as Vathorst in the Netherlands (Figure 76) can develop a number of façade options, perhaps even by different architects, in order to avoid *large grain* structures that are typical for the slab tower typology (Tarbatt 2012). Such concepts are not new to Moscow. Architect Sergey Tchoban in his concept for a tower estate development named *V Lesu* (translated "In a Forest"), sought to create a *fine grain* urban fabric by inviting other architects to design distinct sections of buildings that are arranged into perimeter blocks (Figure 77). The result is one of the most unique slab tower districts in Moscow, one of the first to arrange slab towers into rectangular city blocks with car-free courtyards (Varlamov 2017).

Figure 72: The Plot by Jonathan Tarbatt

Figure 73: Google aerial view of the Sluseholmen district in Copenhagen, Denmark

Figure 74: Interior courtyard in the Sluseholmen district in Copenhagen, Denmark, by Arkitema Architects and Sjoerd Soeters

Figure 75: Fine grain variegated facades in the Sluseholmen district, Copenhagen,, by Arkitema Architects and Sjoerd Soeters

Figure 76: Variegated facades in a development built by a single developer in Vathorst, Netherlands, by West 8

Figure 77: Variegated facades in the V Lesu development near Moscow, by Sergey Tchoban

Tchoban's attempt to transplant urban design best practices from the west is both commendable and discouraging. Elements of Tchoban's concept are evident in numerous developments around Moscow's periphery, which are a significant improvement on the typical Soviet-era estates. However, V Lesu, despite its great marketing success, also demonstrates clearly how urban design concepts fall apart when adapted to the local building code. As previously discussed, buildings are spaced apart for insolation, and are therefore taller to compensate for the lack of site coverage (Schukin 2013). The result is the all-familiar slab tower configuration, but this time with a variety of colours and shapes on the façade. This type of product has been simplified and adopted widely by the development industry, and now represents the majority of the top selling projects around Moscow (Novostroy-M 2019). Some of these examples are a far cry from *fine grain* examples offered in Tarbatt's *The Plot* (Figure 78). While succeeding to a degree in generating visual interest, the vast majority of such projects in New Moscow fail to integrate more than a single housing typology, thereby creating uniform communities that lack diversity.

Figure 78: Etalon development outside of Moscow with semblances of the V Lesu development, by Gruppa Etalon

A possible strategy to counteract the uniformity of new developments is offered by OMA's master plan for the Homeruskwartier community in Almere, Netherlands (Figure 79). This district is planned entirely for sale of serviced lots to individuals or co-ops, who subsequently have to procure their own buildings with their own forces and funds. This method generates the largest diversity of designs and building types as every home, except for prefabricated kit homes, is built to suit highly specific preferences (Figure 80). Moreover, co-ops are able to build mid-size buildings for those wishing to live in apartments. Furthermore, this planning approach promotes a sense of community among likeminded individuals who are more likely to be stewards of their community due to initial heavy investment of time into their homes (Tarbatt 2012). The result is a self-reliant and resilient community in which the diversified housing stock is a direct reflection of individuals' housing aspirations (Portschy 2016). It must be noted that this type of community cannot be replicated everywhere, as it requires a special breed of individuals who have the time and resources to procure their own homes. While this is a niche market in the west, in Russia, as much as 26% of new dwellings are being built by individuals (Kosareva, Polidin and Puzanov 2012). Building one's own *dacha* (cottage) on government-issued allotments is a long-established tradition, so the concept of building one's own home as an alternative to living in cramped apartments is not a far stretch of the imagination. While informally planned *cottage* communities have long existed in the countryside, this type of housing has evolved into more formally planned subdivisions due to the past few financial downturns (Figure 81). In an attempt to minimize their financial risks, developers of single-

detached communities started marketing serviced lots instead of building and selling homes (Dom i Uchastok 2012, Pravda.ru 2018). The result is a growing trend whereby communities similar to Almere are being created around Moscow, however on a smaller scale with fewer amenities, and often gated with every lot also encircled by a 2m tall fence. Despite the drawbacks of people receding into the privacy of their fenced homes, and the subsequent urban sprawl, this phenomenon is a significant improvement on the reality of all residents being forced into Soviet-era estates. Furthermore, this typology gives residents the opportunity to create their own unique homes according to their preferences, where they can enjoy the privacy that they have been previously denied.

Figure 79: OMA's Homeruskwartier district in Almere, Netherlands, created for sale of serviced lots to individuals or co-ops

Figure 80: Example of individually built homes in Homeruskwartier district in Almere, Netherlands, by OMA

Figure 81: Pevcheye subdivision in New Moscow selling serviced lots for individual construction, by Absolut Real Estate

There are signs that the gap between housing aspirations of the population and the quality of the new housing supply is closing at an accelerating pace (Geraschenko 2017, GdeEtotDom.RU 2017). Given the oligopolistic tendencies of the development industry and the resulting *low price elasticity of supply*, this transition will take many years. Despite this, diversification of the housing stock is the clear path toward improving the current predicament. While many new housing estates now feature decorated facades to alleviate the monotony of such large-scale structures, there are very few examples where a *fine grain* environment with a variety of building sizes is created. Many individuals instead chose to build their own home in one of the many gated communities cropping up around Moscow, however these too do not include any other building typology than the single detached home. For these reasons, a key objective of the proposal offered in the following chapter is to create a *fine grain* block typology that includes a diversity of housing types.

3.4. Stewardship

The above discussion regarding individually constructed dwellings precipitates the last and perhaps the most pressing criterion that is to be explored in the proposal of the following chapter – that of stewardship. As has been described, there is a lingering welfare state attitude that the state is responsible for housing provision and that the public realm is everyone's, and therefore no one's. This is reflected in the heavy burden of subsidies and maintenance costs that municipalities and the state continue to shoulder. Furthermore, this continues to be manifested in the old and new highrise housing stock, where all land between buildings is landscaped as public space, with a complete absence of private or even semi-private space over which residents can identify a sense of ownership (Gershman 2016). It is not surprising that a growing number of homeowners chose to escape to gated communities in which they install a

fence even around their front yards. Such examples are a far cry from the example of the community of Homeruskwartier in Almere, Netherlands, which is self-governed by residents who through heavy investment of time and resources in their self-built homes become stewards of their own environment (Portschy 2016). There is research that demonstrates that in such neighbourhoods, the resulting close ties to the community end up being more important for housing satisfaction than the physical quality of the built environment (Halpern 1995, 113, Thomson 2008). Consequently, as will be explained below, this thesis adopts promotion of private ownership and stewardship over both private and semi-private spaces as a means to foster community, which in turn results in improved housing satisfaction.

Historically, the Soviet state intended to promote socialist values by first forcing residents to live in communal apartments. Once this proved to be highly undesirable, the state offered a compromise by housing families in small private apartments, which would encourage them to spend their time in the wide expanses of communal public space. Effectively, communal apartments were replaced with communal apartment blocks. *Trud* magazine promoted close-knit ties between neighbours, urging them to spend one or two hours per week interacting and helping each other. Unfortunately, according to studies, such measures did not result in neighborliness or a genuine sense of community, but instead caused citizens to seek out as much privacy as possible (Attwood 2010). After liberalization of the housing market in the 90s, this pursuit of privacy continued to be manifested in the growing popularity of gated communities (Makhrova, Nefedova and Treivish 2013). Gated communities are a product of the perceived need of the population to secede from society, and in the post-Soviet context it is natural that individuals would seek to escape from decades of forced neighborliness in cramped housing estates. According to the Happy Planet Index, avoidance of gated and economically segregated communities is important to establishing social equity, which is a prerequisite for happier communities (Desai and Blake 2008, Thompson, et al. 2007). But on the other hand, it could be argued that improvements in transportation and communication technologies allow social networks to exist without reliance on a particular place, thereby diminishing the importance of the urban environment in community formation (Hutchinson 2010). Community formation can be fostered with technology, as in the case of Celebration, a community built by Disney that used information databases to connect people with common interests (Foglesong 2001, Frantz and Collins 1999, Ross 1999, McKenzie 2011). This is a particularly resonant notion in New Moscow's edgeless urban environment. Such concepts tend to negate the need for a quality built environment altogether. However, surveys have demonstrated that attachment to one's physical neighbourhood are more important predictors of residential satisfaction than the quality of their dwellings. Furthermore, the quality of one's dwelling only becomes an important measure of residential satisfaction if there is no frequent social contact with neighbours (Halpern 1995, Thomson 2008). Consequently, promotion of local community ties and voluntary

neighbourly interaction is of utmost importance for cultivating residential satisfaction. As demonstrated further, this is not possible without an appropriate built environment.

There is overwhelming research indicating that some built environments greatly hinder community formation. Tamsie Thomson, in an essay titled "Can Urban Topologies Promote Happiness?" argues that natural human instincts to embellish and adorn our physical surroundings speak to the value that such physical messages and meanings convey. Thomson argues that the physical environment affects our beliefs and psyche, and that humans are instinctively affected by architecture, even though this is sometimes difficult to prove. Numerous studies by Gillis in 1977, Edwards in 1982 and Bryne in 1986 indicate that by symbolism alone, buildings and urban environments can impact mental health (Halpern 1995, Thomson 2008, Gillis 1977, Edwards, Booth and Edwards 1982, Byrne 1986). Buildings can be stigmatized, such as highrise slab towers in the case of Pruitt Igoe. Alternatively, buildings can become symbols of hope and happiness for a community, such as the example that Thomson cites of a hydro-electric dam in Kaunas, Lithuania (Gutschow 2000, Thomson 2008). Another great example is the BedZed development in London, England, which has a reportedly high level of social interaction among residents and no vandalism (Figure 82 and Figure 83). This phenomenon is attributed to the notable quality of this being a zero-energy community, as well as its distinct architectural style that gives it a distinct sense of place (Wernick 2008). According to Alice Coleman's 1990 study of 100,000 dwellings in the UK for the prevalence of "social malaise" (e.g. graffiti) around various built form typologies, there is a direct correlation of such malaise with building size, number of dwellings sharing an entrance, number of storeys in the block, number of blocks in a site and the lack of delineation of public and private space. These descriptions match the predominant Soviet-era housing estates, and to a lesser degree the new typology of highrise perimeter blocks being build today (Wernick 2008). As well, Rank in 1983, Lefebvre in 1984 and Willmot in 1963 have all found that the larger the number of dwellings there are in a development, the lower is the number of neighbours that are known to each resident and the lower is the level of attachment one has to the community (Desai and Blake 2008). The common thread in such studies is that community affiliation and stewardship tend to diminish with the perceived rise in anonymity in larger built complexes that lack tangible delineation of shared versus private or semi-private space over which a sense of ownership and community relations can develop. As Thomson describes it, "human behavior tends to deteriorate under the stress of inappropriate habitats" (Thomson 2008). These are important considerations to carry into the proposal of the following chapter.

Figure 82: View over an internal walkway at the BedZed development in London, England

Figure 83: Community association in the BedZed development in London, England

There is a common understanding that lack of democratic control and management of communities, more particularly housing estates, is often the cause of their decline (Yancey 1971). This is a particular challenge in the Moscow context, where there is a lingering welfare state notion that housing provision and maintenance is the responsibility of the state. Despite a considerable amount of time passing since privatization of the housing stock in the 1990s, as well as the program of shock therapy that was meant to cut the population's reliance on subsidies, there is still a prevailing attitude that the realm outside one's private apartment is everyone's, and therefore no one's (Schukin 2013). This is not helped by the often unclear ownership of apartment buildings, a significant portion of which remain under municipal ownership despite being comprised of privately owned apartments (Realty Urist 2019, O ZhKH 2019). This situation hinders the transfer of responsibility for maintenance and repairs to homeowners, thereby placing the fate of such structures in the hands of local authorities and hindering the legitimacy of condo and neighbourhood associations (Zavisca 2012, Cox 1996). Even though there is little evidence that housing estates in CIS countries are experiencing marginalization, the potential benefits that could come from grassroots stewardship are not being taken advantage of in this context. There is strong evidence that elements of private

management and the creation of private and semi-private open spaces result in deeper community ties, which in turn lead to greater residential satisfaction. Such evidence is presented in a number of examples.

In his book *Beyond Privatopia* (Figure 84), Evan McKenzie describes both the benefits and words of caution for privately managed communities in the United States, which have been on the rise since neoliberal restructuring of local governance in the 1970s (Brenner and Theodore 2002, Hackworth 2006, D. Harvey 2007, McKenzie 2011). Gated communities, which fall into this category, typically garner negative opinions, however McKenzie argues that despite their drawbacks, these developments help lift the maintenance burden off local governments, promote efficient use of open space and resources and are conducive to fostering community by virtue of gathering likeminded individuals over shared resources (Nelson 2005, McKenzie 2011). Entirely privately managed communities do run the risk of corruption and monopolizing control over its members, however these are also all too familiar concerns from the Soviet past where control over housing was monopolized by the state. McKenzie recommends the establishment of a continuum between private communities and municipal authorities in order to secure the accountability and stability of such housing associations, meanwhile reaping the benefits of local community stewardship. A great example of such a community is again the example of Homeruskwartier in Almere, Netherlands, where a district is entirely planned for individually built homes. The heavy investment of time and funds that is required to procure one's own home fosters local stewardship, participation in the neighborhood association and therefore social interaction among community members (Portschy 2016). Individual home construction is particularly fitting for the Moscow context, as this housing method has existed for decades as the only alternative to housing estates. In some Soviet towns, as much as one third of all homes were procured in this manner, and this method continues to grow in popularity around Moscow due to improving affordability (Attwood 2010). While many homeowners in such gated communities chose to fence in their properties entirely (Figure 85), there are more examples appearing where front yards are left open to the street (Revzin, et al. 2016). This is a positive sign that future communities around Moscow could reap the benefits described by McKenzie. For the proposal of the following chapter, these concepts lead to the conclusion that local stewardship could be promoted by arranging privately owned buildings into self-contained community units, where open space would be perceived as a semi-private shared resource. Furthermore, to the extent possible, small lots could be allocated for individuals, co-ops and small developers to build unique structures that would foster community ties and local stewardship.

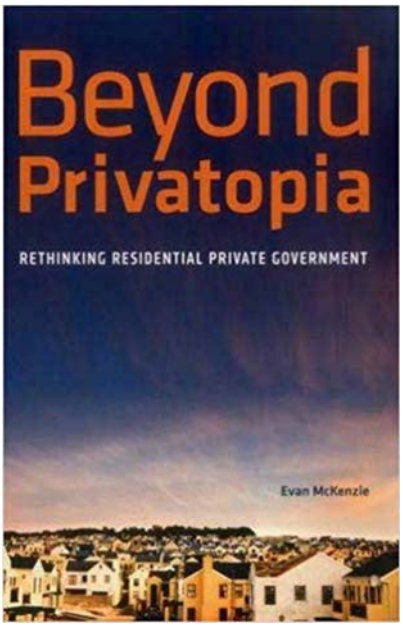

Figure 84: Beyond Privatopia by Evan McKenzie

Figure 85: Example of a gated community in New Moscow with fenced yards

There are several other small measures that can encourage voluntary neighborliness and small-scale stewardship. Strelka's proposal to discourage tall fences around front yards is an important consideration that could be implemented through zoning and subdivision agreements (Revzin, et al. 2016). This alone would greatly multiply the possibility of accidental interactions between neighbours, without unreasonably compromising homeowners' desire for privacy. According to Jane Jacobs, this would encourage familiarity with one's neighbours, thereby improving the level of trust within the community, as "sidewalk contacts are the small change from which a city's wealth of public life may grow" (Jacobs 1961). Psychology Professor Richard Stevens also argues in his televised experiment *Making Slough Happy* that first and foremost, one should "plant something and nurture it," and that private patios and backyards should be promoted (Desai and

Blake 2008). This notion resonates well in the Russian context, as private yards similar to those of the *dacha* are highly sought after, despite their inaccessibility to a large sector of the population due to high cost (Alekseevsky 2017). A successful combination of such elements can be found in the idyllic town of Seaside, Florida, which was featured in *The Truman Show* with Jim Carrey (Figure 86). Here, waist-high picket fences delineate front and back yards, and the streets are simplified to resemble private driveways that create a sense of intimacy. The beach is treated as the main organizing element and shared resource of the community, with sandy walkways between all backyards tying each property directly to the beach, as well as more directly to their backyard neighbours (Figure 87) (Sexton 1995). Such techniques offer the possibility of creating a new urban block typology that can foster a sense of local ownership and stewardship, community affiliation and therefore improved residential satisfaction.

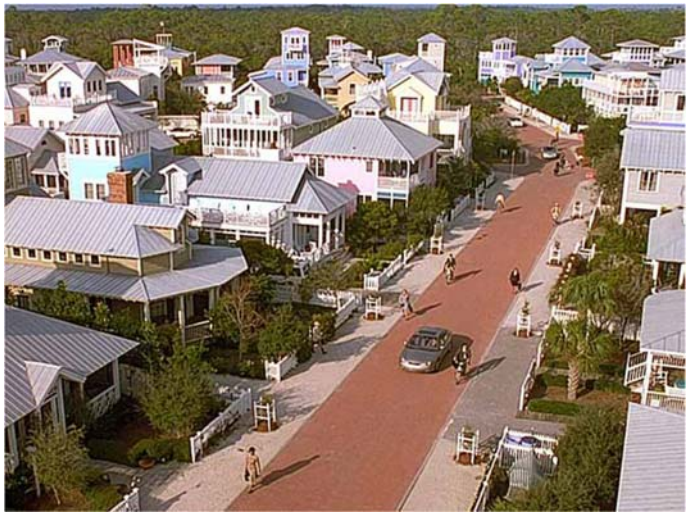

Figure 86: Seaside, Florida depicted in The Truman Show

Figure 87: Pathways between backyards in Seaside, Florida

The measures discussed above suggest small ways in which the lingering legacy of the Soviet welfare state can be phased out, and the transfer of ownership and control of urban space to local residents can be encouraged. By promoting housing typologies that are conducive to a sense of private ownership, residents can be expected to evolve into stewards of their local environments and neighbourhood associations. Furthermore, inclusion of private front and back yards and arrangement of buildings around semi-private shared spaces would help generate community ties around these resources. Opportunities for accidental and voluntary interaction between neighbours should be encouraged as a means to foster a sense of community. As well, to the extent possible, sizes of buildings, number of dwellings per building and sizes of blocks should be minimized to encourage a sense of intimacy and avoid anonymity. Such measures are instrumental for promoting a sense of private ownership and local stewardship, fostering community and as a result creating neighbourhoods with high rates of residential satisfaction that are reflective of housing aspirations of the population.

3.5. Summary

So far, the first chapter of this thesis has identified the current standard of housing development in New Moscow, and the second chapter has identified the causes that perpetuate construction of Soviet-era housing estates and hinder the diversification of the housing stock. In response to these causes, this chapter has outlined viable ways in which the proposal described in the following chapter can potentially improve the status quo. Such measures can be summarized as follows.

First, as discussed in the second chapter, oligopolistic tendencies of the development industry and the resultant *low price elasticity of supply* are acknowledged as a given for the proposal in the following chapter. It has been concluded that decentralized and edgeless growth in sharp juxtaposition to the established rural landscape is a reality that will continue into the foreseeable future. The proposal in the following chapter should include mitigative measures that could allow the proposal to integrate seamlessly with adjacent rural communities and ecology. As well, the proposal should be able to function as an auto-dependent and standalone island without access to public transit. Furthermore, the proposal should be comparable in density to the highrise estates that are being developed in New Moscow today. With time, as the housing market evolves, such criteria may no longer be required. Until then, as a baseline, such measures would establish the proposal of the following chapter at least as an equally profitable, and thereby viable alternative.

The high prevalence of prefabrication and the presence of strict insolation requirements, which greatly limit the variety of built form that can achieve desired density, necessitate the

development of a systematic solution that can be replicated, similar to how the new car-free block typology is being replicated around Moscow today. Given the recent attention to this topic in local academia and the development industry, the urban block unit is identified as the most suitable medium for the proposal of the following chapter. The proposed urban block should be conducive to the establishment of green corridors and implementation of green-blue and stormwater management infrastructure. The developed concept could serve as a replicable low-impact blueprint for the development of greenfield lands around Moscow, while minimizing to the extent possible the inevitable consequences of urban sprawl.

In response to high demand for low and mid-rise housing alternatives, despite *low price elasticity of supply* that hinders change, diversification of the housing stock is identified as the clear path toward improving the current standard. Diversification of the housing stock is proposed through subdivision of urban blocks into a range of lot sizes, which results in buildings of varying scales. As well, a range of façade designs can be applied to larger structures, thereby creating at least the appearance of a small-scale and *fine grain* environment. In order to maintain density, floor area lost due to smaller buildings can be transferred to taller towers elsewhere in the block, thereby resulting in a greater range of building heights. The resultant variety of building scales will alleviate the uniformity of today's large-scale housing estates, while better reflecting the demand for alternative forms of housing.

Lastly, in response to lingering welfare state notions that housing provision is the responsibility of the state and that the public realm belongs to nobody, promotion of stewardship is identified as the means to transfer ownership of urban space to local residents. This can be achieved though adoption of housing typologies that are conducive to a sense of private ownership, as well as inclusion of private and semi-private spaces around which a sense of ownership can develop. An enhanced sense of ownership encourages participation in neighbourhood associations, thereby facilitating community ties and better management of shared resources. As well, opportunities for chance encounters and voluntary neighborliness can foster a sense of community, which in turn reflects positively on housing satisfaction. Lastly, and perhaps most importantly, sizes of buildings, number of dwellings per building and sizes of blocks should all be minimized to avoid anonymity among neighbours, thereby avoiding social malaise that is prevalent in large-scale housing estates. Such measures are crucial for enhancing a sense of private ownership and local stewardship, promoting community and as a result creating neighbourhoods with high residential satisfaction.

CHAPTER 4: PROPOSAL

Based on the urban design principles described in the previous chapters, this chapter seeks to determine whether it is possible to propose an alternative urban block typology that better reflects housing aspirations of the population and creates better communities, all while remaining viable from the perspective of the local development industry. Instead of providing a refined solution, the proposal in this chapter is intended to demonstrate a high-level set of recommendations that could be carried into a further detailed design exercise. To determine the viability of an alternate typology, urban design principles were distilled from the previous chapters and further explored in three design exercised. For purposes of this analysis, the *Buninskiye Luga* project (Figure 28) was adopted as the baseline against which alternatives are evaluated. The first design exercise was a rapid prototyping study that tested eighty block configurations with a series of criteria established to measure site efficiency (and therefore profitability) and the quality of the built environment. This exercise determined that the predominant car-free block typology is one of the most effective block configurations, however by combining four blocks together into a superblock configuration a number of improvements can be anticipated. The second design exercise focused on sun exposure, and included a number of experiments that provided guidance on how to minimize surface areas that don't receive sufficient periods of sunlight per the local building code. It was found that small gaps in the block perimeter, alignment of towers in the east-west direction and stepping down of building massing towards central open spaces have the ability to greatly improve sun exposure. Lastly, the third exercise synthesized all findings of this document into an example of how the established urban design principles can be implemented in a superblock configuration. It is concluded that a more marketable and (at least) just as profitable housing typology can be proposed, thereby offering the development industry a viable incentive to build better communities.

4.1. Urban Design Principles

To perform the three design exercises described in this chapter, first a number of urban design principles are distilled from the conclusions of Chapter Three. A summary of these principles is provided below.

Mitigative strategies are required to address the possibility of the proposal being located away from existing nodes of activity and transit, and potentially in sharp juxtaposition to established rural communities and landscapes. One example of how negative impact of such edgeless sprawl could be mitigated is the provision of sufficient vegetated development setbacks from existing communities, as well as stepping new structures down in height to match the scale of the established communities (Figure 88). This would ensure that the visual impact of new structures is minimized.

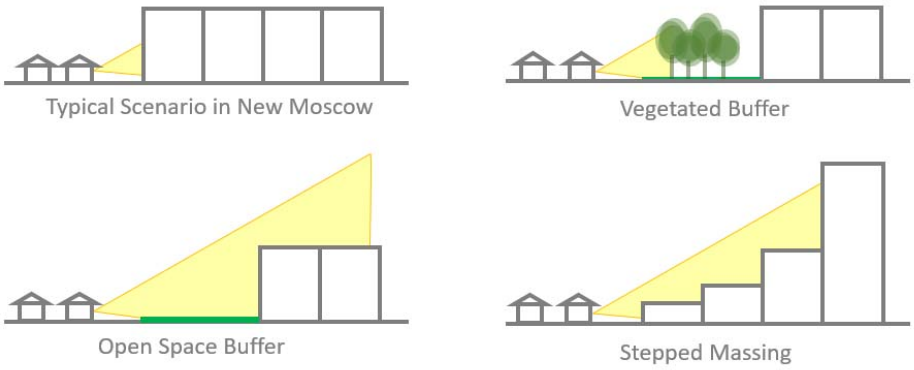

Figure 88: Options to mitigate adjacency to existing homes

To minimize the impact of unplanned growth on the existing landscape, proposed development should integrate to the extent possible with established natural features (Figure 89), ecological corridors and hydrogeology. Existing watercourses could serve as green corridors that double as pedestrian spines for the open space network. Low impact development measures for stormwater management should be implemented to maintain surface and subsurface water flows at predevelopment levels (Figure 90). Swales, treatment trains, stormwater management ponds and infiltration galleries could attenuate water and capture sediments and pollutants prior to release into local rivers. Such measures would help remedy the degradation of New Moscow's riverine environments, while maintaining naturalized habitat and corridors for local species.

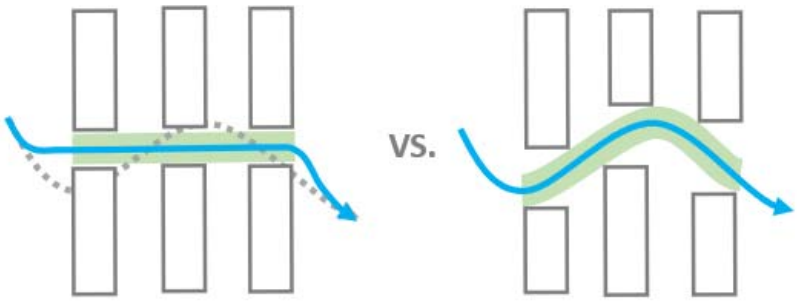

Figure 89: Modifying existing hydrology to fit new development (left) VS. integrating development with existing hydrology (right)

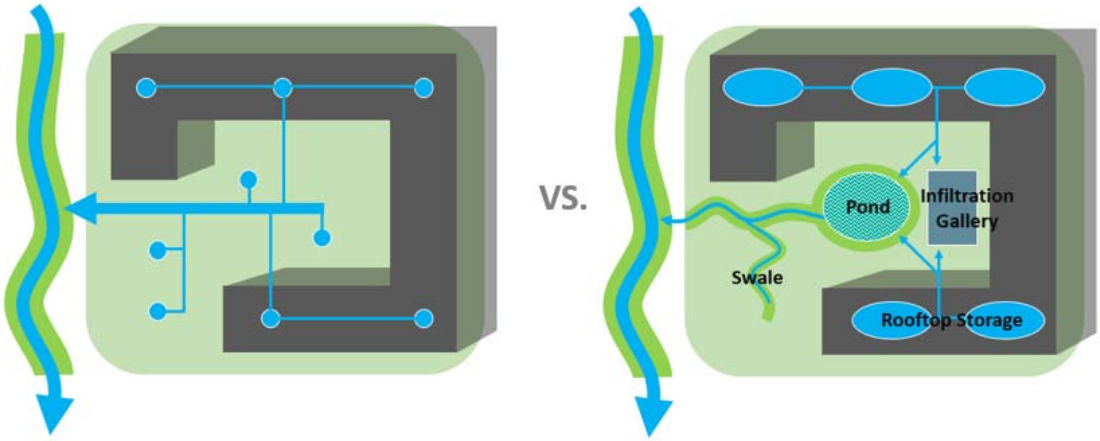

Figure 90: Typical stormwater sewers (left) VS. low impact development (LID) stormwater management measures (right)

To create cohesive standalone neighbourhoods with a sense of place, community functions could be concentrated at main intersections (Figure 91). Possibilities for ground floor residential units to be converted to retail uses should be accommodated in order to permit small retail uses that the community may require. To facilitate this, ground floor units should be located at street level without any grade change or steps from the street. The largest buildings should also be located centrally, thereby establishing main intersections as community anchors where retail uses could locate. Such measures could help establish a local sense of place in the absence of urban nodes within walking range of new development (Urban Strategies Inc. 2012).

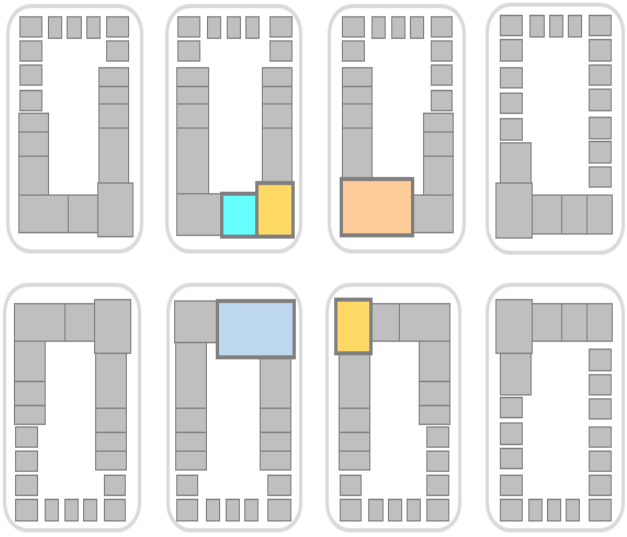

Figure 91: Opportunities for retail at central intersections

Urban design strategies discussed in chapter three can also be deployed in order to encourage a sense of ownership and local stewardship. To the extent possible, urban blocks are to be subdivided into smaller development parcels, thereby encouraging construction of smaller buildings that are more conducive to a sense of private ownership. A larger landowning developer could opt to subdivide land and sell small parcels for low density development, while retaining larger parcels that would be zoned to contain all density that has been removed from smaller parcels (Figure 92). Given that the value of land for high density development is directly tied to potential yield and zoning (Harvey and Jowsey 2004), this strategy would allow such developers to concentrate and retain the majority of density and value on a smaller area of land, while selling the remainder of the land to other developers or individuals. Land for low and mid-rise structures in such districts could be particularly coveted, given the infrastructure and public amenities being developed for a high-density community. By this logic, it could be argued that inclusion of a range of lot sizes in a development could yield higher land value than if all lands were developed by a single developer without subdivision. Alternatively, if a developer opts to retain all lands without subdivision, it would still be advantageous to include a range of building sizes and housing typologies, as this would result in a more marketable product that can appeal to a larger range of homebuyers. As well, the improved urban environment at the very least would improve marketability. More likely, however, rarer units in smaller buildings could sell for a premium, thereby yielding higher profit margins.

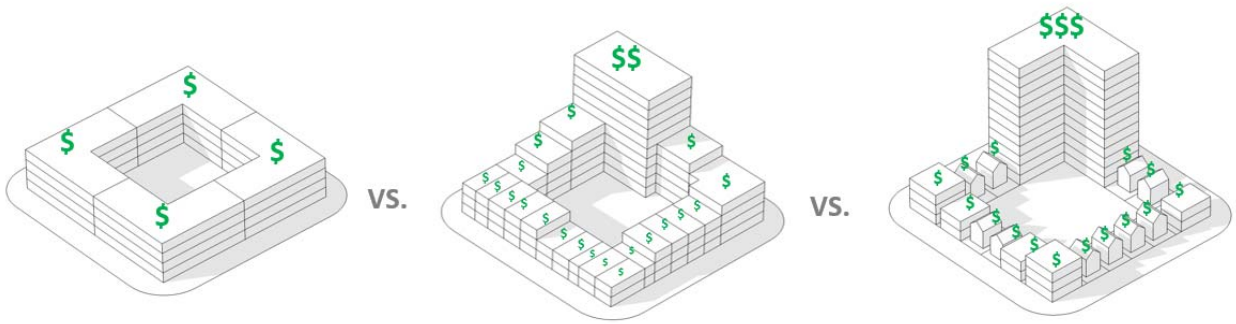

Figure 92: Three options for development of lands with same density - (1) All same height (left) VS. (2) Stepped heights (middle) VS. (3) Tower with all low-rise

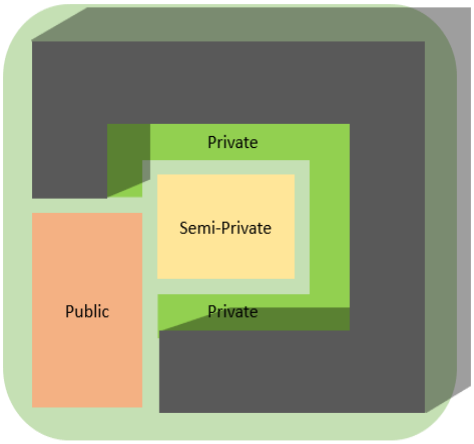

Figure 93: Variety of public/private open spaces

For homeowners, smaller buildings will result in reduced anonymity, improved sense of ownership and local stewardship. Sizes of blocks should also be minimized to the extent possible, to encourage familiarity among neighbours. Private ownership sentiments can be further enhanced by subdividing open space into private yards and creating shared semi-private community spaces (Figure 93). These spaces would encourage cooperation among residents of individual blocks, thereby fostering stewardship that could translate to the larger community and other public spaces.

In summary, without altering the size, density and profitability of the urban block in the baseline *Buninskiye Luga* scenario, a number of urban design concepts can be introduced to create a *fine grain* urban environment, diversify the housing stock, introduce mitigative measures and encourage a sense of ownership and local stewardship (Figure 94).

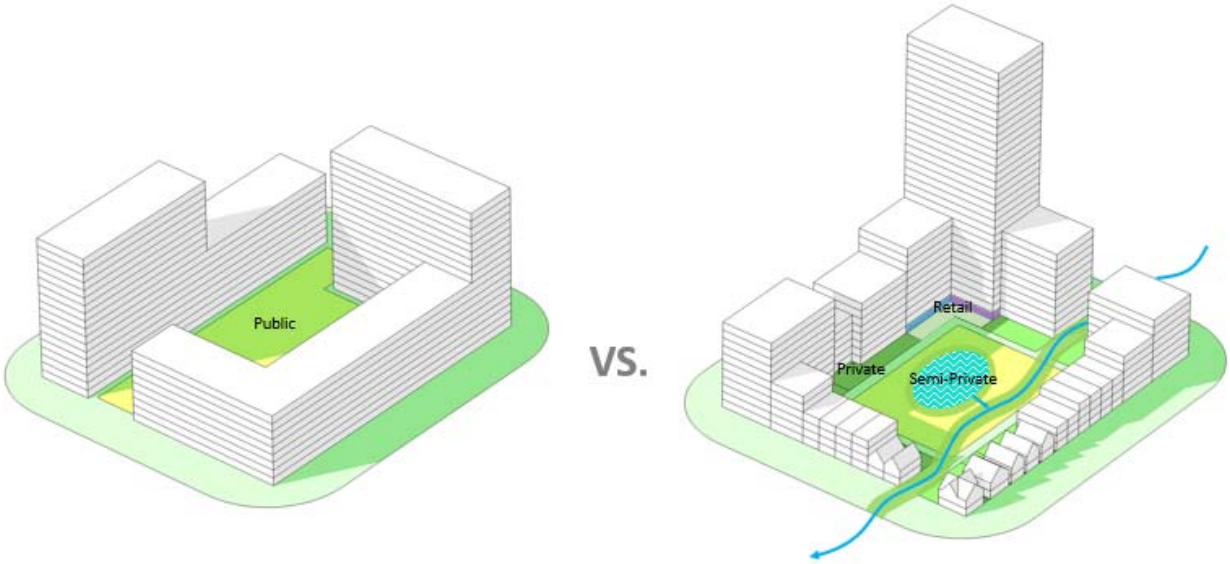

Figure 94: Baseline (Buninskiye Luga) block typology VS. alternate typology per discussed urban design concepts

4.2. Rapid Prototyping

With the above urban design concepts in mind, a rapid prototyping exercise was performed by evaluating and comparing eighty block configurations. This exercise was performed to determine if any overarching patterns emerge that could be utilized in the proposal offered in this chapter. A series of metrics were established by which alternative block configurations could be compared to the baseline *Buninskiye Luga* scenario. These criteria are as follows:

1. As discussed in the second chapter, maintaining profitability is a prerequisite for a viable proposal. To evaluate profitability of various alternatives, the following criteria were established.
    a. Site coverage is one of the key metrics for evaluating profitability as it translates directly to the density that can be achieved with a block configuration. As described in the second chapter, higher site coverage allows for more density without increasing the height of buildings, thereby theoretically yielding more saleable real estate per unit of developable land (Figure 95). Higher site coverage can also be helpful in reducing impact on neighbouring properties due to lower buildings and reduced impact of views and sun exposure.
    b. Infrastructure costs are approximated by measuring the area of public right-of-ways required to accommodate access to all entrances. It is assumed that blocks will be subdivided into small sections with individual entrances, so an entrance at the end of a long building section is not possible. Right-of-ways include costly

road surfaces, sidewalks and subsurface services, therefore the lower this area is, the less costly the block configuration is to service.

c. The ratio of site coverage to infrastructure area serves as a key metric by which efficiency of the proposed block configuration can be evaluated.

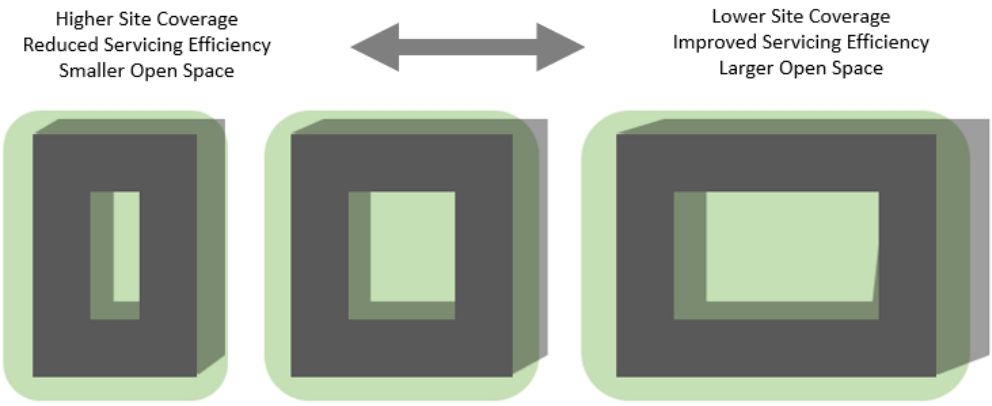

Figure 95: Block sizes with decreasing site coverage but increasing servicing efficiency and size of open space towards the right

2. To evaluate the quality of alternative proposals for residential satisfaction, the following criteria were established
    a. Amount of open space is calculated as a proportion of overall site area.
    b. Size of the contiguous open space is used as a better measure of the quality of open space due to better sun/sky exposure. Size is represented as a ratio, compared to the baseline *Buninskiye Luga* scenario.
    c. Numbers of outer building corners are added up, and the number of inner corners is subtracted. Outer corners are often the most desirable units with improved views, sun exposure and opportunities for more windows and balconies. Inner corners often have compromised views and sun exposure, and result in undesirable adjacency of windows, balconies and at-grade yards (Figure 96).

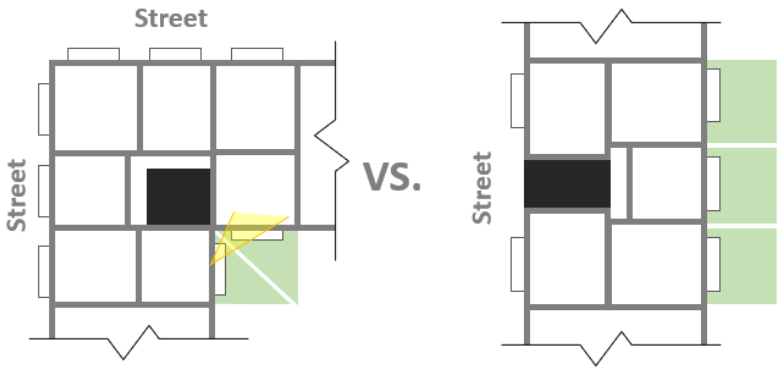

Figure 96: Inner corners result in views into adjacent units; outer corners result in premium units with more sunlight

d. Suitability of a block configurations for creating a range of private, semi-public and public spaces. This criterion assumes that all ground floor units will have private back yards (score of 1), and evaluates whether there is space left over for shared or public spaces (score of 2), or both (score of 3).
e. Insolation is difficult to approximate given that the angle relative to the north axis can give shadow-prone configurations sufficient sunlight, and vice versa. For purposes of this exercise, a simple score of 1, 2 or 3 is given to measure the general shadow exposure over open space of block configurations.

The rationale for devising eighty block configurations is as follows (Figure 97):

1. The baseline configuration has been modeled after the *Buninskiye Luga* project (Figure 28).
2. For purposes of this exercise, all block configurations are comprised of variations of the car-free perimeter block model which maximizes site coverage, creates a continuous street edge and can be subdivided into a variety of lots in a row configuration (per Tarbatt's recommendations).
3. A standard 16m building cross section has been adopted for consistency
4. A standard 9 storey height was established for purposes of this exercise, however as discussed, height is not an important marker for this exercise as all configurations can be equally increased or decreased in height. In other words, height is controlled for in this investigation.
5. Three standard block sizes are assumed for each block configuration. The first is the standard 120x100m configuration adopted from *Buninskiye Luga*. The other two configurations are shrunk to only have a standard minimum distance between building faces of 32m. Therefore, the other two options are 100x64m and 64x120m respectively. It is assumed that a block configuration larger than 120x100m is not desirable, as explained in chapter three.

6. For purposes of this exercise, a standard 30m right-of-way is allocated on two sides of each block, as the other two sides would be serviced by the right-of-way allocation of the adjacent block.
7. A variety of openings in the block perimeter are provided
8. A number of configurations feature an additional building/wing in the middle of the block.
9. It is assumed that a configuration with four buildings on one block is not required, as this is effectively two blocks side by side.

During modeling of the above configurations in Figure 97, it was found that some variations are conducive to being combined in groups of four, thereby creating a superblock with a much larger contiguous open space in the middle (Figure 98). As well, these configurations eliminate the need for internal through streets, which can instead be converted to pedestrian-friendly environments. The result is a much larger superblock, which can reflect negatively on perceptions of anonymity as described in Chapter Three. However, each sub-block can be treated as a standalone unit with its own semi-private shared space, while the larger open space in the middle of the superblock can act as a fully public space. Five of such block configurations were identified and included in the analysis. A fourth block size of 64x64m is also provided for these options.

Altogether, twenty-five block configurations were created. Twenty configurations are in three sizes each, and the superblock options are in four sizes each – which equates to eighty options that were tested. The results are provided in matrix format (Figure 99 and Figure 100), and are as follows:

1. The baseline scenario, as well as the very similar configurations #3 and #4 on a 100x120m block are among the highest scoring configurations in every category.
2. Some of the configurations on 100x64m and 120x64m blocks yield higher site coverage, however score much lower in almost every other category.
3. Some of the configurations with a third building/wing inserted in the middle of the block yield higher site coverage, but score much lower in almost every other category
4. Superblock configurations #21-25 yield the most promising results and have some of the highest scores in every category.

The most successful options described above are adopted for further development, as these options present the potential for better quality of urban space and residential satisfaction (and therefore marketability), while retaining site coverage (and therefore profitability).

Figure 97: Alternate block configurations for evaluation - Options 1-20

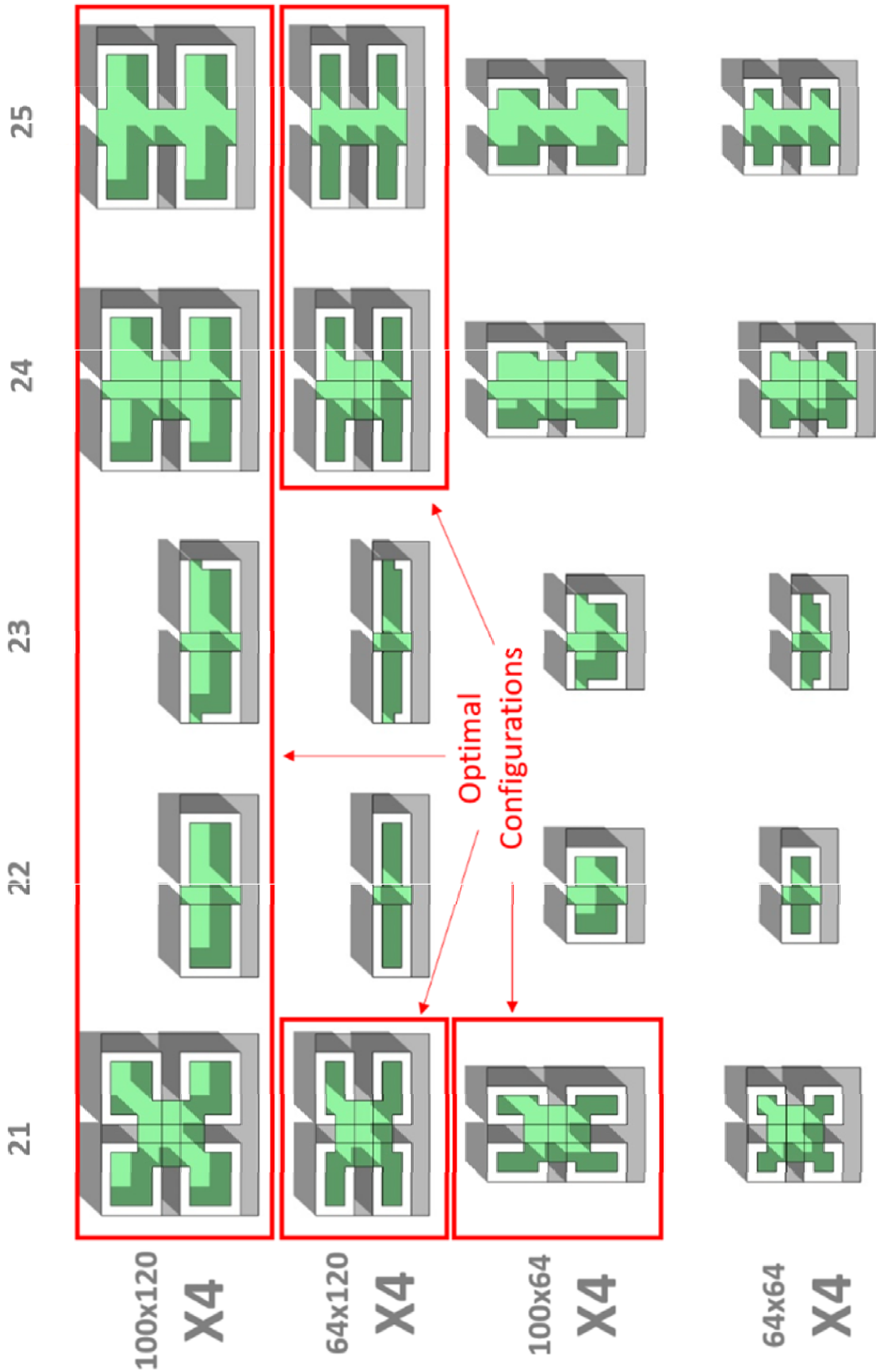

Figure 98: Alternate block configurations for evaluation - Option 21-25

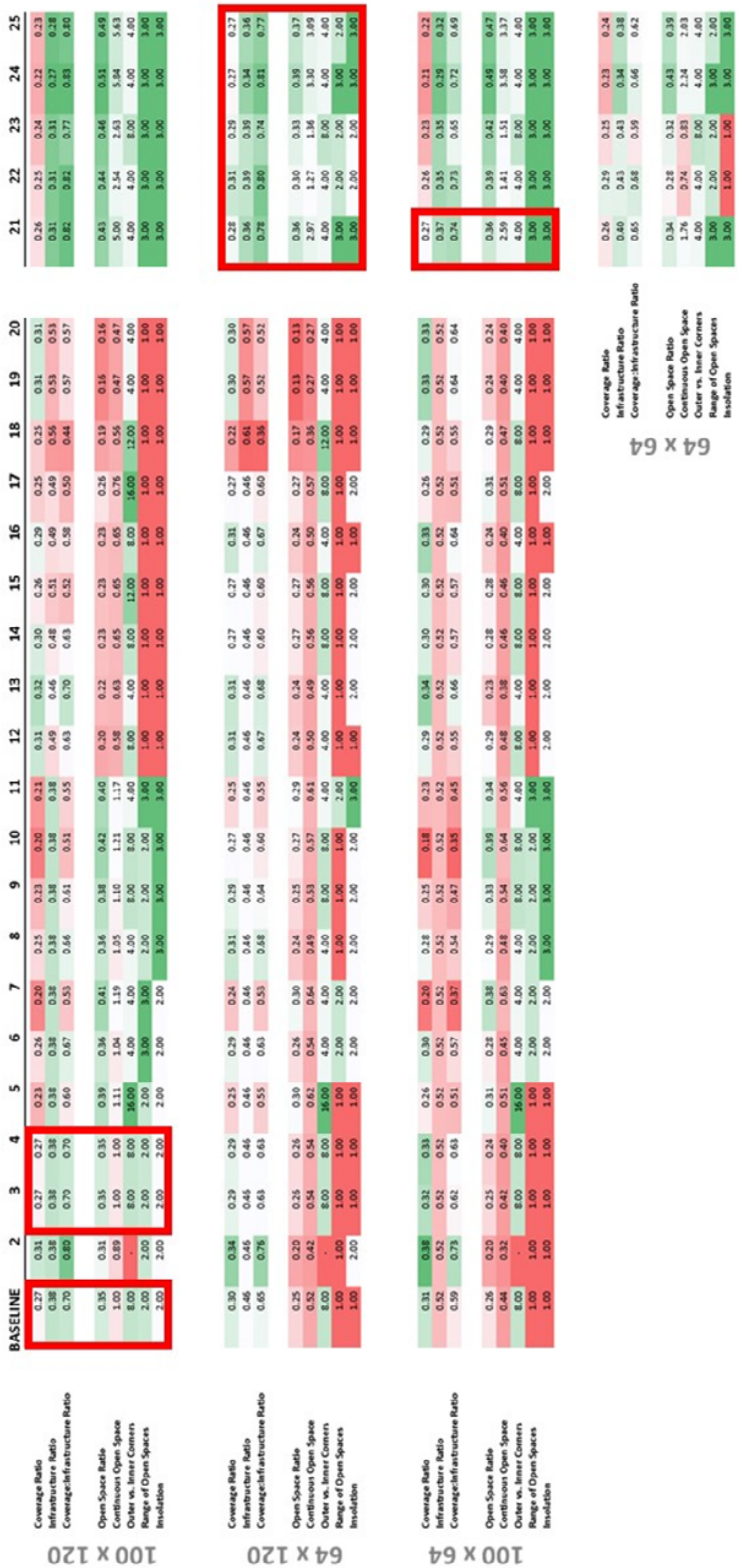

Figure 99: Efficiency and quality scores of the analyzed options

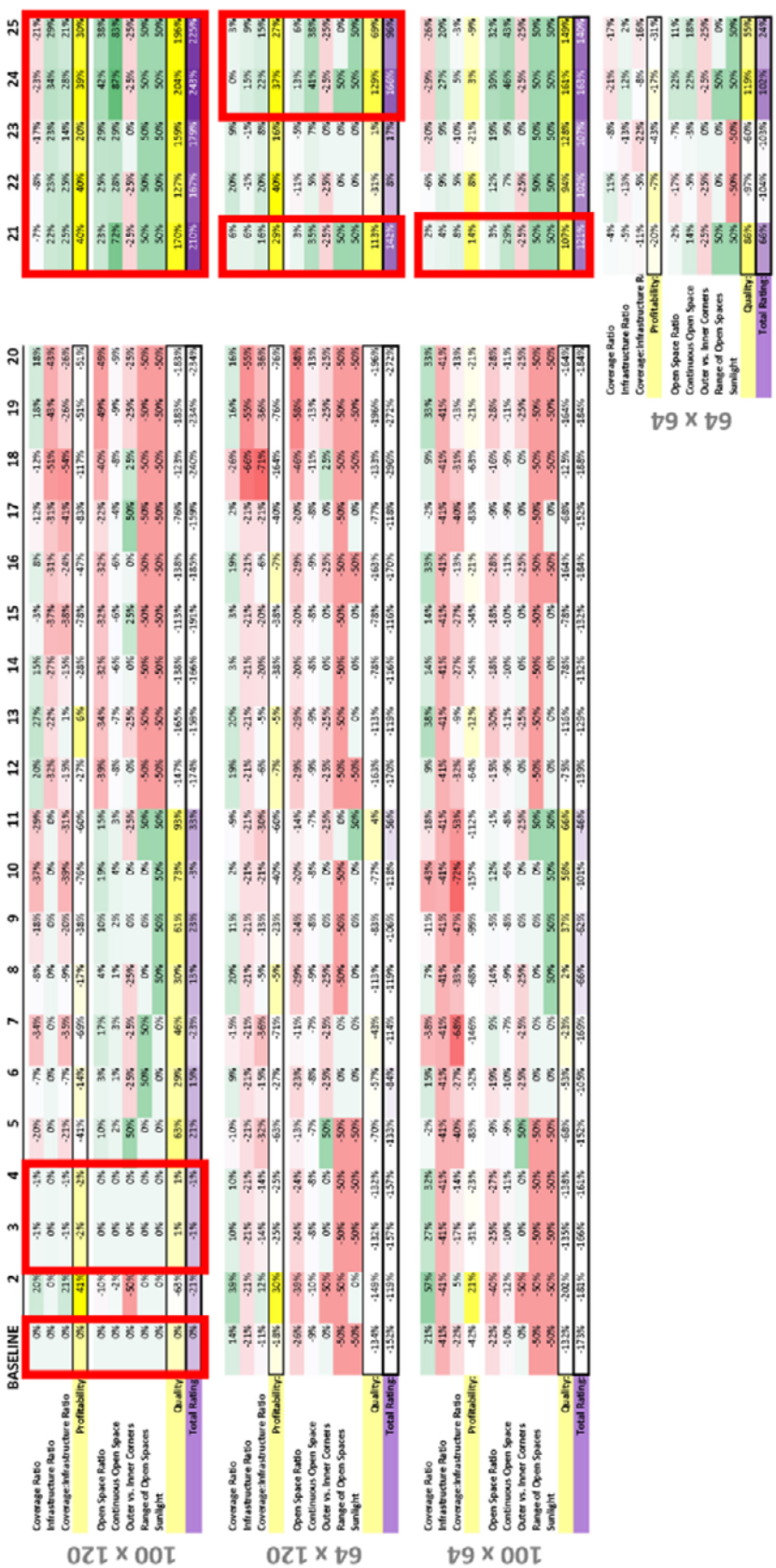

Figure 100: Comparison of results relative to the baseline scenario

4.3. Insolation

Prior to proceeding further with development of the urban block alternatives discussed above, an insolation analysis is performed to gain a better understanding of how numerous factors impact sun exposure. As a simplification of insolation requirements of Moscow's building code, it was assumed that a minimum of two hours of sunlight is required for horizontal and vertical surfaces. All surfaces that receive less than this amount are marked yellow (ground) and red (wall) in the below diagrams. Tests were conducted to evaluate insolation based on a number of criteria:

4.3.1. Baseline – *Buninskiye Luga* example

A simple shadow study was conducted for the baseline *Buninskiye Luga* example, with the block oriented 15 degrees counter clockwise from the north axis to reflect how it is positioned on the site (Figure 101 and Figure 102). First, the results demonstrate that very minimal shadows are visible from the south side, and it is assumed that further shadow studies need to view the massing only from the north as this view angle shows the most shadow-prone surfaces. It is also observed that at the south corner, a significant area does not receive any sunlight. Due to the building code permitting only 5% of units to be exempt from insolation requirements, it is understood that some of the surface areas that don't receive sunlight belong to units where one of the rooms does receive sunlight, either around the corner, or in a room on the other side of the building. Some north-facing areas don't receive sufficient sunlight due to other buildings blocking the evening sun. Otherwise, in general, due to having complied with the local building code, this model is assumed as an approximate yardstick for evaluating whether other massing models satisfy minimum insolation requirements.

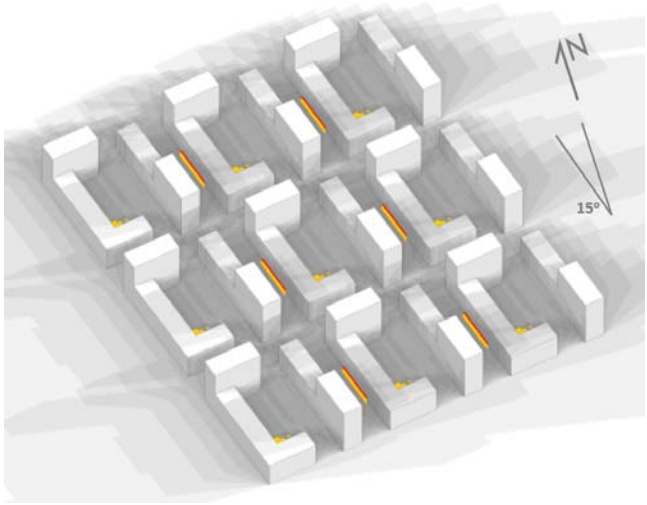

Figure 101: Shadow study for the baseline Buninskiye Luga typology – view from south

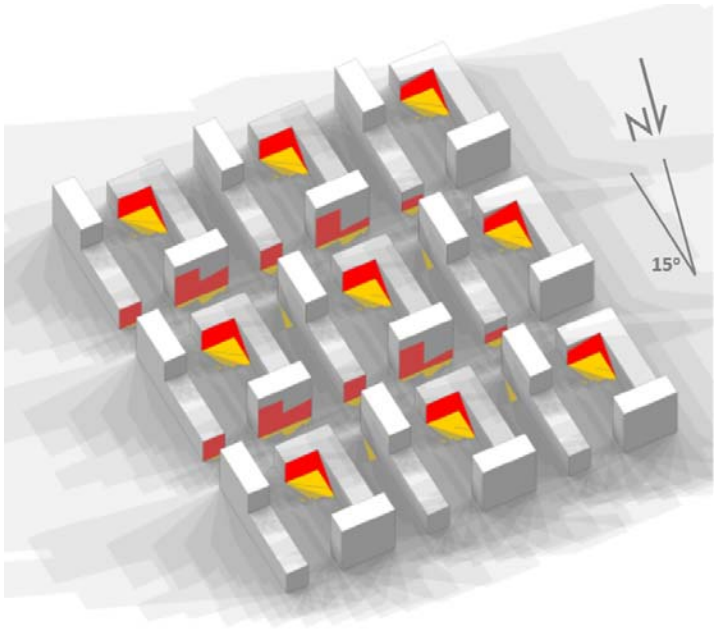

Figure 102: Shadow study for the baseline Buninskiye Luga typology - view from north

4.3.2. Orientation

To test the effects of orientation relative to the north axis, the baseline *Buninskiye Luga* option was modelled and rotated at 15-degree intervals (Figure 103). In general, it was found that options that are close to or in line with the north axis have large north-facing surfaces that are only able to receive minimal morning and evening sun, which is easily blocked by other structures such as towers. Options that are rotated closer to 45 degrees from the north axis have the lowest surface areas that receive insufficient sunlight. To conservatively account for a reasonable worst case scenario, all proposed alternatives discussed further are oriented 15 degrees to the north axis, which poses greater insolation challenges than 45-degree orientation.

In all options, 90-degree corners on the south side produce areas that never receive sunlight. As well, it was found that a west-facing small opening in the block perimeter at the sound end can completely eliminate shadows in this corner (bottom right options). This phenomenon is explored in the following investigation.

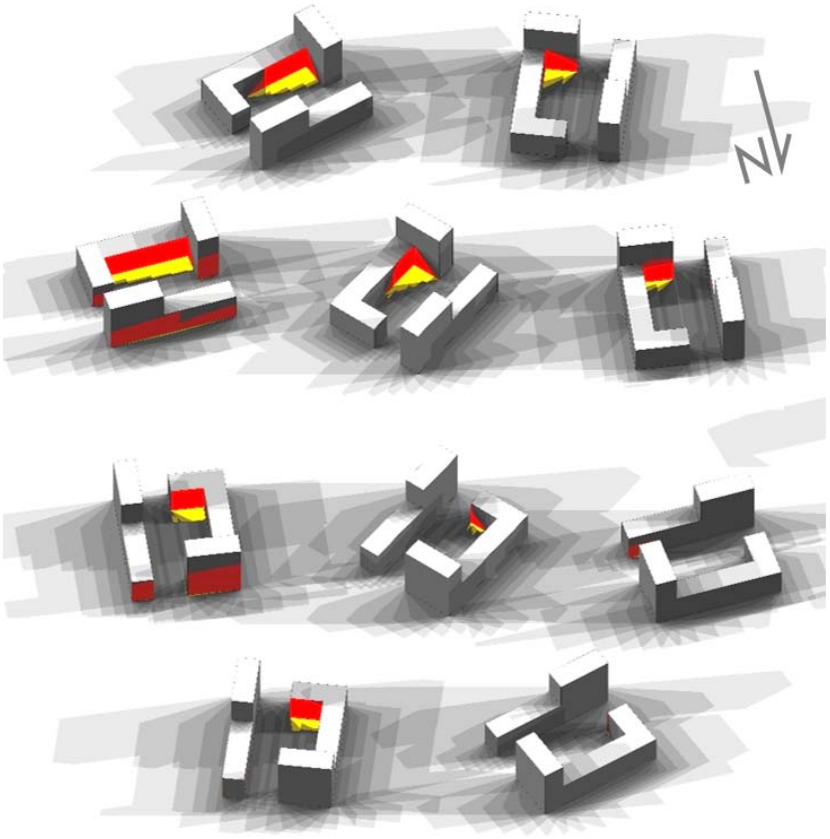

Figure 103: Baseline (Buninskiye Luga) shadow study rotated at 15-degree intervals

4.3.3. Opening in Block Perimeter

To explore the phenomenon of small gaps at the south corners eliminating shadows, another experiment compared ten block configurations with various gaps in the perimeter (Figure 104). Effects of south and west-facing gaps of varying size were compared. It was found that south-facing gaps eliminate shadows by virtue of removing the most shadow-covered portion of the building. However, surprisingly, even the smallest west-facing gaps significantly reduced the amount of surface area that does not receive any sunlight. As a result, west and east-facing gaps at the south end of the block, depending on orientation of the block, are implemented in further design development to maximize insolation. A few superblock configurations are tested with west-facing gaps (Figure 105), and it is found that only a very small portion of vertical surfaces remain with only one hour of sunlight, with all other horizontal and vertical faces receiving two or more hours per day.

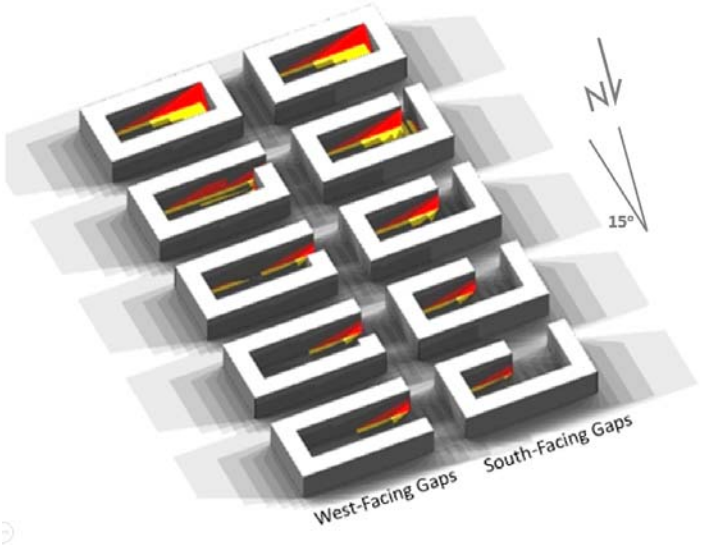

Figure 104: Shadow impact of gaps at south end of block perimeter

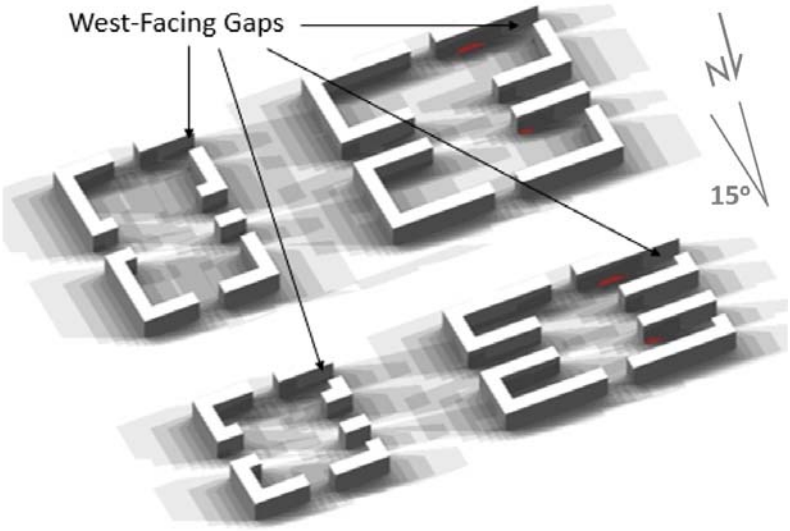

Figure 105:Superblock configurations with west-facing gaps at south corners effectively eliminate areas that don't receive sufficient sunlight

4.3.4. Tower Spacing

Tower orientation, spacing and heights, as well as arrangement and offsetting of tower rows was explored to determine whether various configurations have any effect on insolation. The results show again that 45-degree orientation to the north axis produces the best results (Figure 106), while orientation with the north axis creates overreliance on few hours of morning or evening sun that can easily be blocked by other structures due to the low angle of the sun during these hours. Another finding, naturally, is that sun exposure drops with reduced spacing and increased height (Figure 107 and Figure 108). However, it must be noted that given their height, tower

shadows make a wider sweep across the surrounding surfaces. Therefore, the shadow is dispersed over a larger area and only affects each area for a shorter period of the day. It can be concluded that towers are effective for maximizing density with minimal impact on sun exposure of the surroundings. This is, of course, assuming that other surfaces aren't relying on the specific brief period of sun exposure that the tower may be blocking. This is demonstrated in the example where rows of towers are offset in the north-south direction (Figure 109), thereby blocking critical evening sun that other surfaces rely on. It is concluded that towers, if oriented within 15 degrees of the north axis, should be aligned along the east-west axis (Figure 110) to maintain exposure to morning or evening sun.

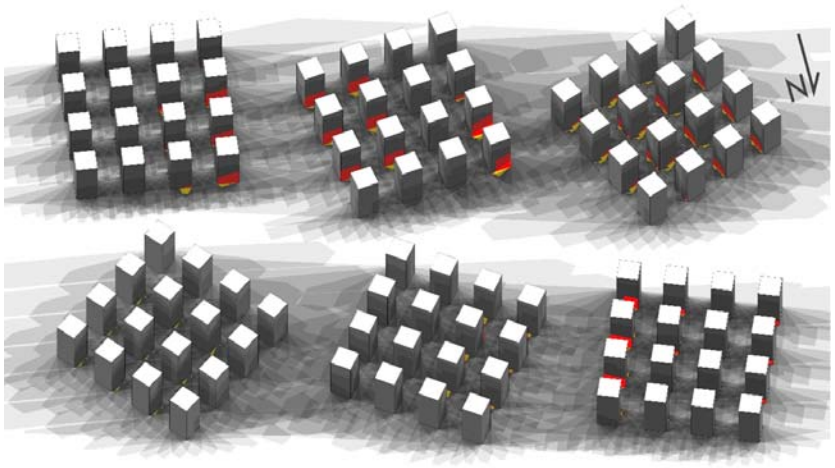

Figure 106: Shadow impact of towers rotated at 30-degree intervals

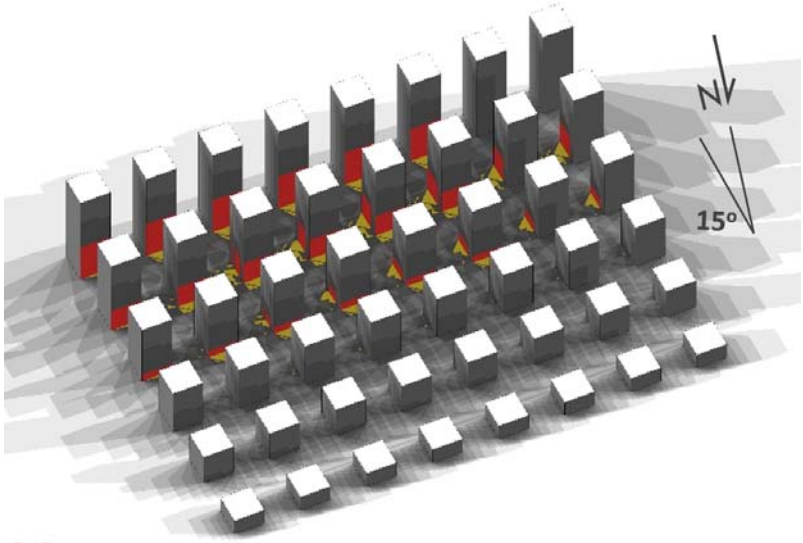

Figure 107: Shadow impact of various tower heights

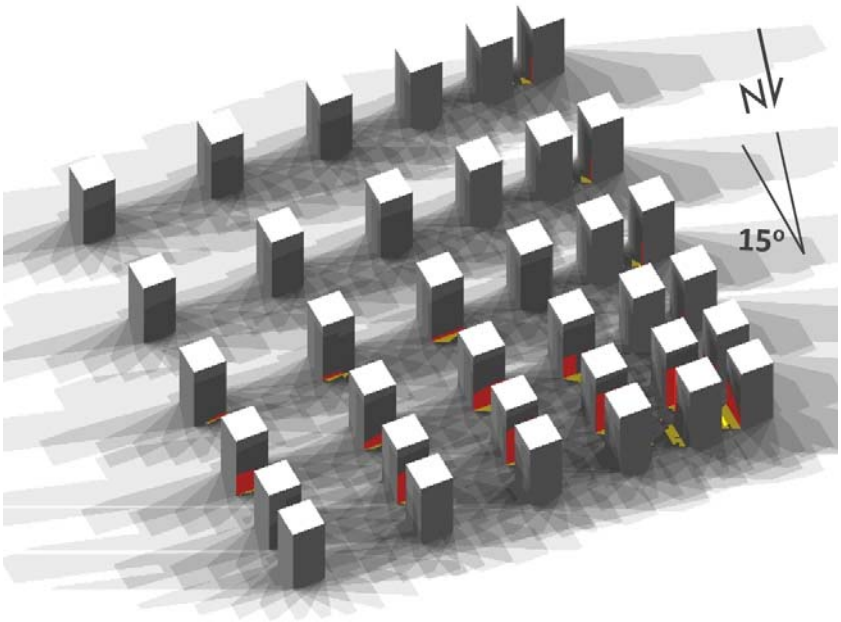

Figure 108: Shadow impact of tower spacing

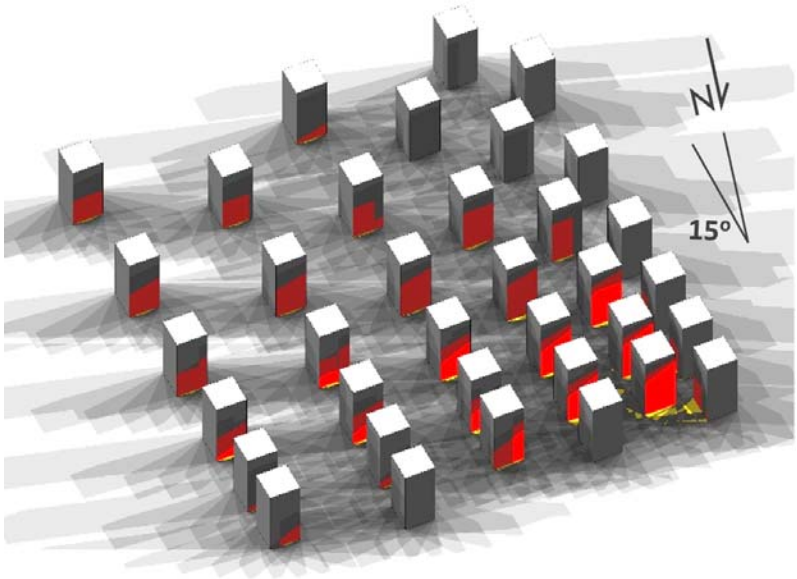

Figure 109: Shadow impact of towers shifting along north-south axis

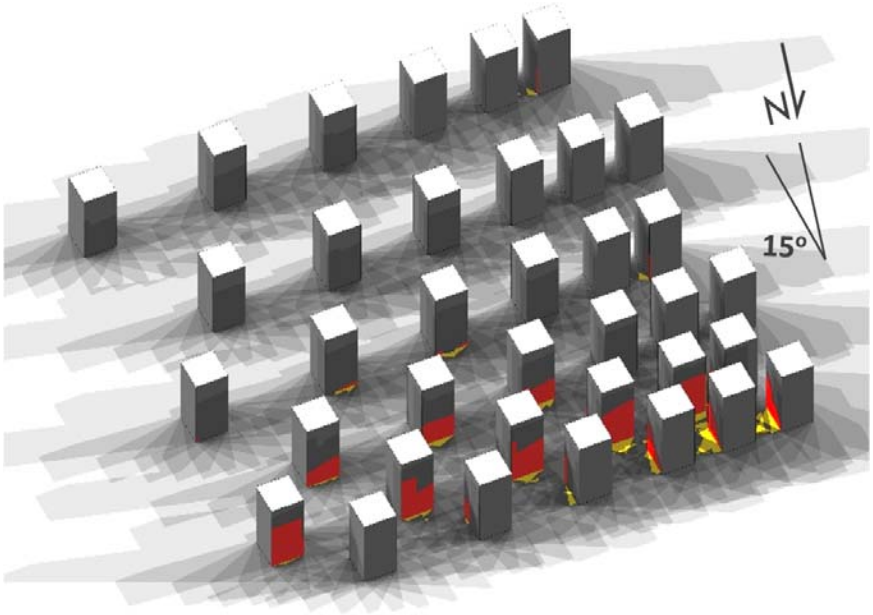

Figure 110: Shadow impact of towers shifting along east-west axis

4.3.5. Stepped Massing

Stepped massing was analyzed to determine whether it has any effect on sun exposure (Figure 111). The findings show that the amount of vertical and horizontal surfaces that receive less than two hours of sunlight remains the same, however, as expected, there is an overall improvement in the amount of sunlight penetrating the central open space. Consequently, stepping of buildings does not permit buildings to be closer together to increase site coverage. However, building stepping will be implemented as a measure to improve overall sun exposure of the main community space, while also reducing the visual impact of the surrounding buildings.

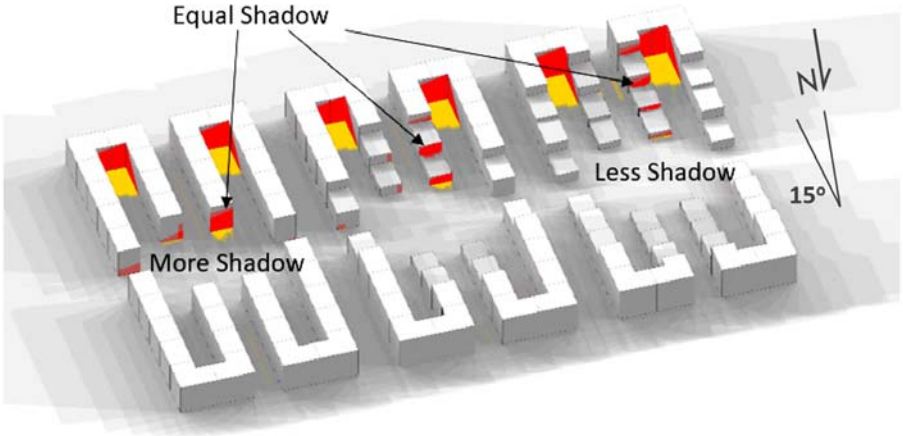

Figure 111: Shadow impact of massing stepping down toward central open space

4.3.6. Summary

Based on the findings of the insolation investigation above, as well as the discovered benefits of superblocks, the following massing is generated (Figure 112). Blocks are oriented 15 degrees off the north axis as a conservative proof of concept. Small west-facing gaps are provided to maximize insolation into south-end corners. Towers are aligned along the east-west axis, thereby not blocking the critical periods of evening sun. Buildings are stepped down towards the central open space, thereby almost entirely eliminating shadows from this area. The result is a block configuration that is of equal density to the baseline Buninskiye Luga scenario, while significantly improving insolation as compared to the baseline scenario (refer back to Figure 103), while also featuring a large continuous open space with minimal shadows and unobstructed views.

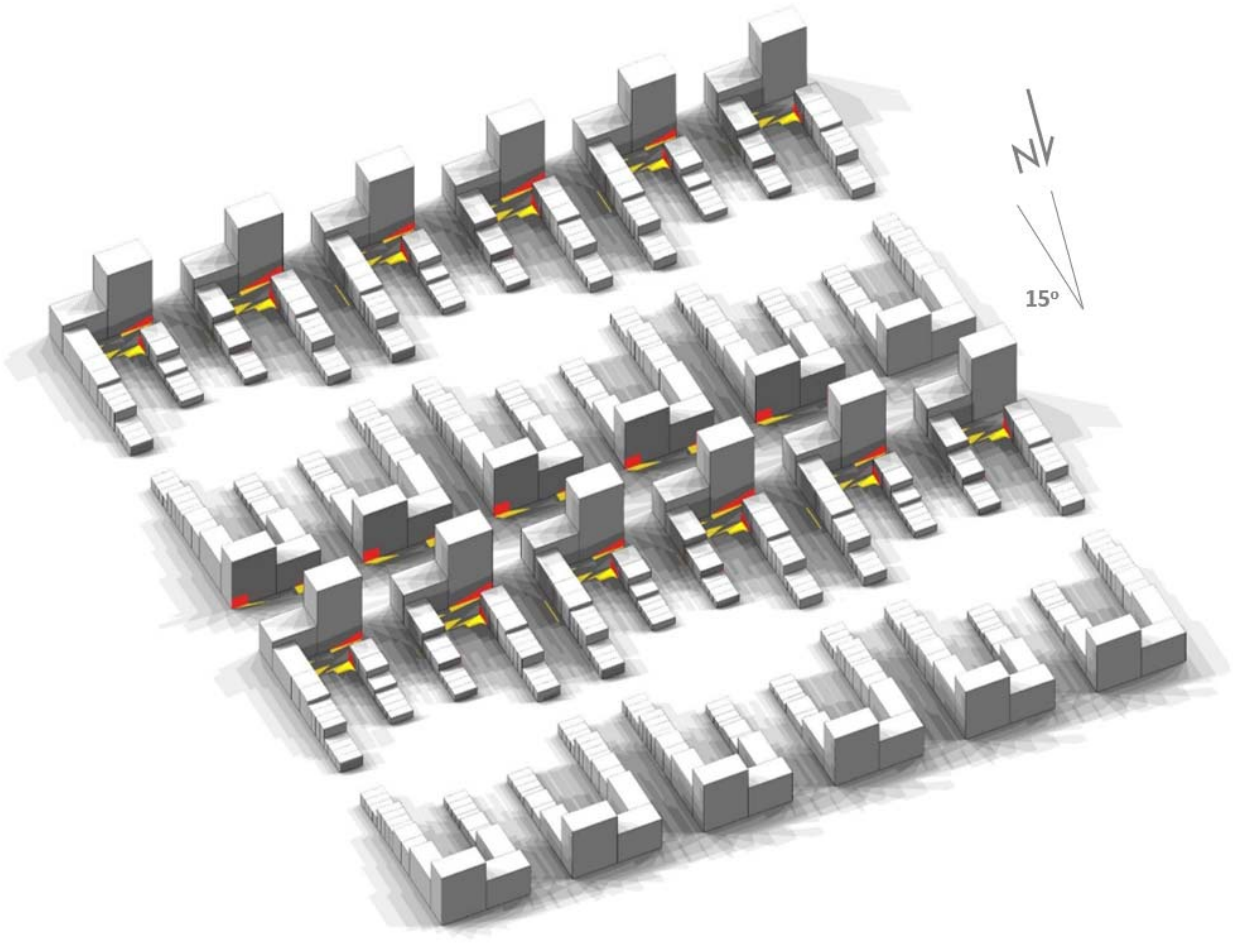

Figure 112: Shadow impact of superblock with west-facing gap at south corner and stepping down toward central open space

4.4. Results

Combining the above findings, the following urban block configuration can be offered as an example of a viable alternative to the *Buninskiye Luga* baseline typology.

1. A superblock configuration creates a large contiguous open space, with pedestrian walkways and cul-de-sacs in lieu of through streets (Figure 113).
2. Same density is included as in the baseline scenario (Figure 114).
3. The proposed urban block typology is conducive to concentrating density at main intersections, which can act as walkable retail anchors of a new district.
4. By stepping building heights, the configuration can mitigate to the extent possible the negative consequences of locating adjacent to an existing rural community.
5. The configuration is conducive to respecting existing or creating new natural corridors that can double as pedestrian paths in an open space network (Figure 115, Figure 119 and Figure 120).
6. Stormwater management swales, treatment trains and ponds promote integration of the built form with continuous natural systems, while maintaining predevelopment hydrology (Figure 118).
7. A range of lot and building sizes provides the opportunity for landowners to retain density in large structures at main intersections while selling the remainder of land for low density housing, potentially at a premium (Figure 113).
8. Sale of small lots to individual homebuilders or small developers can encourage construction of smaller buildings that are conducive to fostering a sense of private ownership.
9. Small buildings and avoidance of large blocks prevents anonymity among neighbours and encourages community ties and local stewardship, and therefore improves residential satisfaction. Each of the four sub-blocks within a superblock can be gated to include an internal semi-private space, whether just a walkway or a larger community space.
10. Private yards connected by pathways, private terraces on stepped building roofs and semi-private shared spaces within each block encourage voluntary and chance encounters between neighbours, thereby improving community ties (Figure 116).
11. Stepping of buildings down to the central open space greatly reduces both shadows over this shared resource and the visual impact of the new buildings (Figure 117).
12. Perimeter openings are provided at the south end of the block to greatly reduce the surface areas that receive less than two hours of sunlight per day.
13. Towers are aligned along the east-west axis to maximize penetration of morning and evening sunlight.

In summary, and as demonstrated in the following images, it is possible to generate a viable alternative to the predominant perimeter block typology that is being replicated around New Moscow today. Without sacrificing density and profitability, the proposed new housing typology

mitigates to the extent possible the negative consequences of current patterns of edgeless growth and the inevitable development of greenfield lands. The proposed typology can be respectful of and integrate with existing communities, landscapes and ecology. The proposed block typology creates separate areas for car and pedestrian traffic (Figure 119) and is conducive to creating continuous naturalized open space corridors (Figure 120). A diversity of lot and building sizes and housing typologies are introduced (Figure 115), thereby better reflecting housing aspirations of the population and encouraging a sense of private ownership. Smaller buildings with low numbers of units and smaller urban blocks promote closer community ties and local stewardship, which in turn result in improved residential satisfaction. Lastly, massing is configured to almost eliminate areas that don't receive sufficient sunlight, and the majority of shadows are eliminated from the central community space (Figure 117). Such improvements can be achieved while retaining the density and profitability that is customary for local developers. Furthermore, it can be argued that the proposed typology would result in greatly improved marketability and higher profit margins, thereby offering the development industry the much-needed incentives to improve the new housing stock.

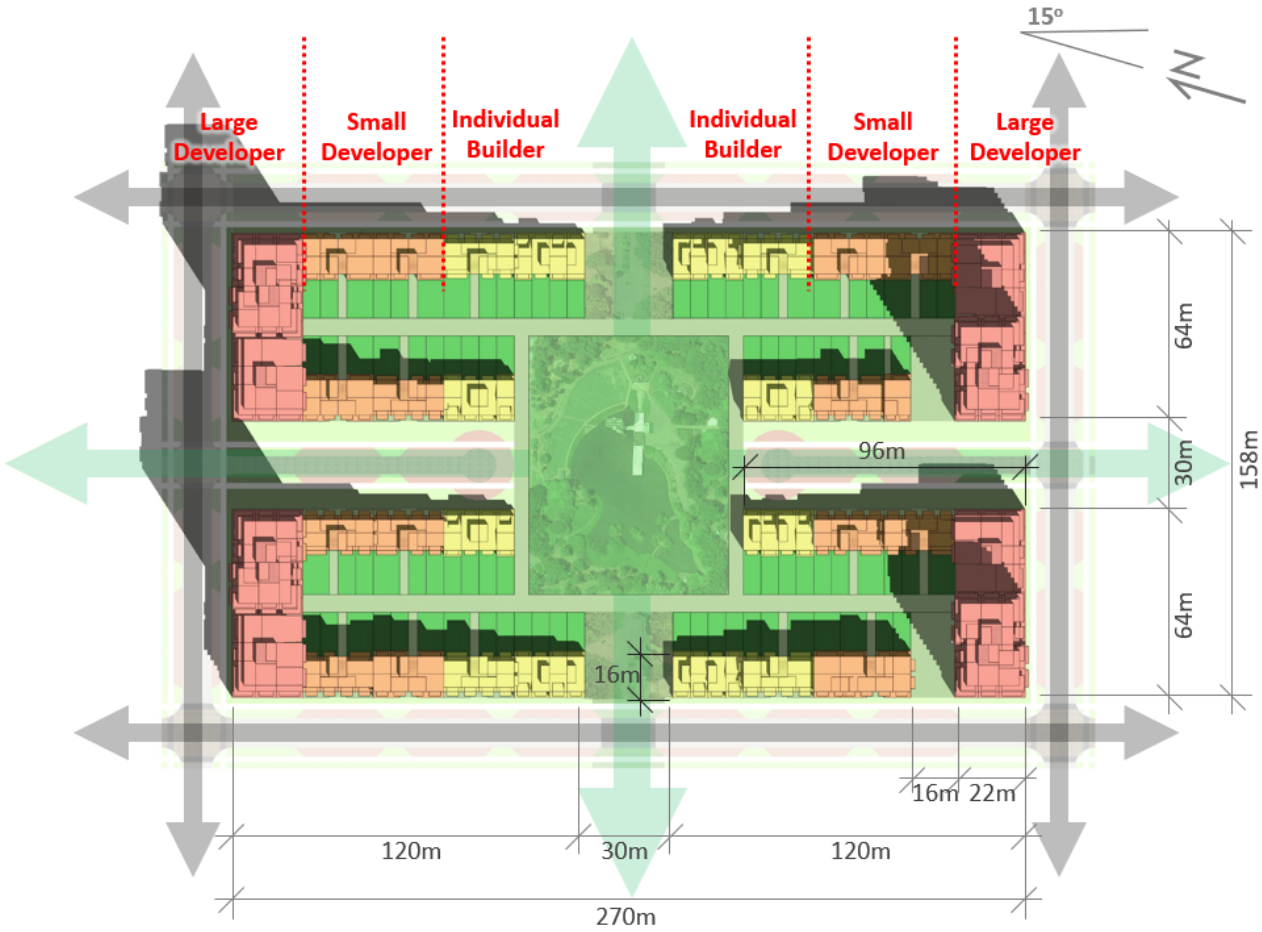

Figure 113: Plan of proposed superblock

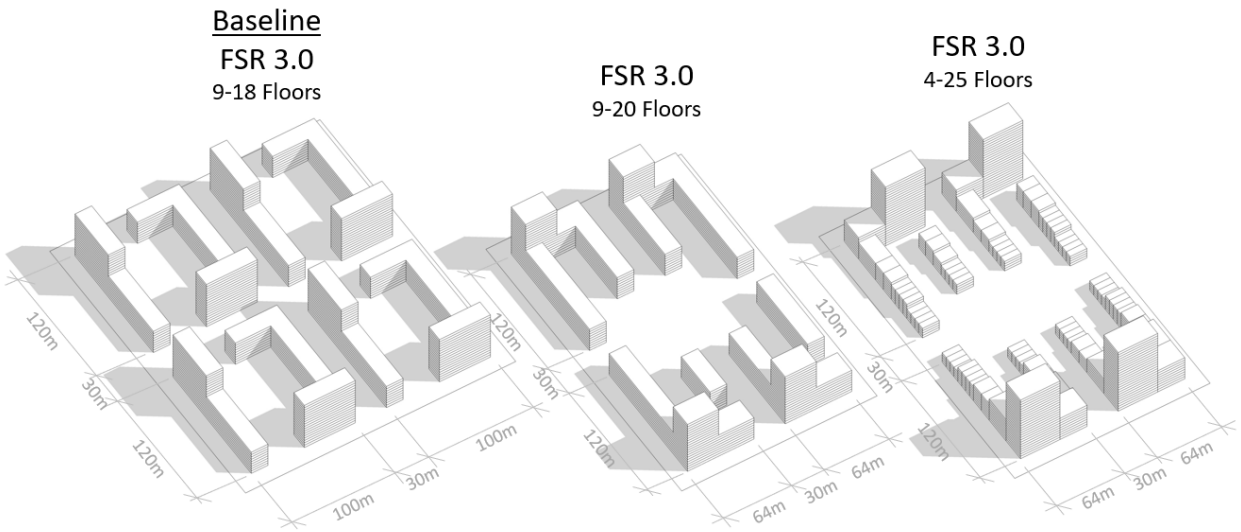

Figure 114: Floor Space Ration (FSR) comparison of massing options

Figure 115: Aerial view of proposed superblock

Figure 116: View of backyards and internal pathway

Figure 117: Perspective view of a central open space

Figure 118: Perspective view over the central open space from a rooftop terrace

Figure 119: Aerial view showing separation of car traffic (on streets) and pedestrian areas (in open space corridors)

Figure 120: Open space corridor through a series of superblocks of varying density

CONCLUSION

Today's housing development industry in New Moscow continues to produce high volumes of what is commonly recognized as an outdated Soviet-era product that is not reflective of the housing aspirations of the population. Recent improvements have resulted in propagation of a better perimeter block configuration with car-free courtyards, but more than anything this model still resembles the old typology, with only minimal improvements to facilitate the marketability of such a product. Given the complex web of factors that hinders the diversification of the housing stock, such improvements are a welcome change and a sign that demand for better housing is shifting the status quo. Still, there is much room for improvement, as highrise estates continue to represent over half of newly constructed dwellings. This predicament poses an architectural challenge: can an alternative high-density mass housing typology be proposed, that better reflects housing aspirations of homebuyers, while remaining viable from the perspective of New Moscow's development industry?

Prior to proposing an alternative housing model, factors that perpetuate the outdated housing typology were explored. Historic inertia of the construction industry in the form of mass-produced and prefabricated building systems continues to flood the market with building materials that are most suitable for highrise slab towers. The building code, with strict solar penetration requirements, greatly limits the types of building forms that can achieve desired densities. Furthermore, inexhaustible demand for fast and cheap housing fuels the construction industry, while long-establish housing traditions continue to normalize the sub-standard housing typology. Slow and reluctant adoption of mortgage credit also hinders market liquidity and perpetuates unjust inequality, which in turn necessitates continued state intervention in the housing market. This phenomenon perpetuates the lingering welfare state notion that the state is responsible for housing provision, and that urban space outside private apartments is everyone's, and therefore no one's. Lastly, the oligopolistic structure of the development industry, with limited competition, results in *low price elasticity of supply*, whereby high demand

for quality housing, along with ample capital from subsidies, does not result in improvements of the new housing stock that is being built. The overarching conclusion from these findings is that there are great obstacles and few incentives for the development industry to change. Consequently, to be viable, any proposal for an alternative housing model for New Moscow must first and foremost offer a profit incentive for the development industry, with improvements in housing quality being treated as a by-product.

Through review of precedent material, a methodology for addressing the status quo has been established. First, edgeless sprawl in sharp juxtaposition to the established rural landscape of New Moscow has been acknowledged as a given for the foreseeable future. In response, mitigative measures are required to address the colonization and environmental degradation of greenfield lands. The built fabric, and more specifically the urban block unit, is selected as the most appropriate medium for the design proposal. The proposed block typology would need to be able to integrate seamlessly with a range of continuously evolving landscapes and contextual conditions. To reflect housing aspirations of the population, a diversity of lot and building sizes, as well as building types are proposed to be integrated into every block. As well, small buildings and minimal block sizes are identified as the means to avoid anonymity among neighbours and improve the sense of private ownership. To transfer ownership of urban space to residents, private yards connected with pathways, rooftop terraces and semi-private community spaces are proposed. Such initiatives foster a sense of ownership, local stewardship and community ties, which in turn reflects positively on residential satisfaction.

Above concepts have been distilled to a series of urban design principles that could be applied to the proposed block typology. Three design exercises were performed to determine whether a viable alternative to the *Buninskiye Luga* baseline typology is possible. By establishing a series of metrics by which to evaluate efficiency, profitability and quality of the built environment, a rapid prototyping exercise was performed on eighty block configurations. It was found that the baseline scenario is indeed one of the most efficient urban block configurations. However, by combining four blocks at a time into a superblock configuration, significant improvements were offered. Open space components of each block would combine together into a much larger contiguous open space, while internal through streets could be converted to quiet cul-de-sacs or entirely to open space corridors. A series of shadow studies were performed to further improve the superblock configuration. Strategically placed gaps in the block perimeter, towers aligned in the east-west direction, as well as stepping of massing down towards the central open space, all resulted in significant improvements in solar exposure.

Combining the urban design principles and findings of the rapid prototyping and insolation exercises above, an example of a viable alternative to the standard perimeter block typology has been proposed. The result is an urban block configuration that is a better reflection of housing

aspirations of the population, with improved sun exposure, a larger contiguous open space and longer uninterrupted views. The proposal is a tangible blueprint for fostering a sense of private ownership over urban space, thereby promoting local stewardship and closer community ties, which in turn results in improved residential satisfaction. Such improvements are proposed while retaining the density and profitability that is customary for local developers. Furthermore, such measures would result in greatly improved marketability and higher profit margins, thereby offering the development industry the much-needed incentives to build better communities.

Limitations

The proposal described in Chapter 4 is intended to be only a starting point that demonstrates one example of how recommendations presented in this thesis could be combined into a viable housing typology for New Moscow. An unlimited number of variations can be explored with other block and building configurations, different ratios of private and public space as well as densities. As the housing market in Moscow evolves and *price elastic of supply* improves, housing aspirations of the public will become increasingly important for maintaining marketability of development projects. As a result, high density may no longer be a prerequisite for suburban projects, and would lead to more appropriate mid-rise and low-rise neighbourhoods. While this would be an improvement, it could also result in developers requiring higher site coverage, thereby leaving less land for central community spaces and open space corridors. The result could very much resemble the typical western model of suburbia, which is already present (albeit unaffordable) to a degree in New Moscow. Regardless, this would constitute a significant improvement due to the housing stock more closely matching housing aspirations of the population.

Further investigation is required to confirm conclusively whether the alternative presented in Chapter Four could indeed work in the New Moscow context. While density is maintained by shifting floor space from smaller buildings to tall and slender towers, it needs to be verified that this does not result in significant cost increases. For purposes of this thesis, it is assumed that taller towers could be built with the same prefabricated materials, however costs could increase due to taller buildings requiring additional reinforcement. As well, it is assumed that selling small lots to private individuals or other developers could be a viable business proposition. There are many examples, such as the Lakeview Village in Mississauga, where large developers partner with other groups, with each group focusing on different products (i.e. townhouses, highrises, retail) without competing with each other. However, this model may not be feasible in the New Moscow context, given the structure of the local industry. It is also assumed that smaller buildings in such dense districts would be marketable. Given the infrastructure costs, these lots may need to be sold at a heavy premium, thereby resulting in these being luxury buildings for residents who may rather opt to live in more exclusive and gated communities. In general, such

districts, due to improved marketability, could become exclusive luxury communities, thereby being yet another example of a housing typology that is not accessible to the general public. However, if it can be demonstrated that such communities do not cost more to construct, the market will eventually adjust, thereby making such housing available to the majority.

Higher costs of construction could also result from the requirement to provide more parking for taller buildings on smaller parcels of land. Currently, parking in new housing estates is provided largely on the street and in centralized parking garages, with only limited high-cost parking being provided underground. To maintain same ratios of underground parking, garages would need to be dug deeper at a higher cost. Alternatively, there could be less parking underground, thereby requiring more residents to park in central garage structures, which are less desirable. In general, parking requirements are not addressed in this document, and require further investigation to confirm the viability of the presented proposal. For purposes of this thesis, it is assumed that parking can be dealt with separately, as is the case today in new housing estates.

Further investigation is also required to confirm that the proposed urban block configuration is compliant with the local building code, and especially with insolation criteria. For purposes of this thesis, insolation requirements are simplified, and it is assumed that two hours of insolation are required for all surfaces. According to Moscow's building code, only 1.5 hours of insolation are required for low angle morning and evening sun, while 2 hours are required in the middle of the day. A limit on sun exposure is also included for the summer months, thereby requiring shading to prevent overheating. Lastly, the building code includes a number of other criteria that have not been included in this investigation (i.e. street setbacks), and require further analysis.

Lastly, the proposal offered in this thesis, similar to earlier urban block competitions, is deliberately devoid of context. Given the patterns of urban growth seen on Moscow's periphery today, it is assumed that such a proposal could be located anywhere. Further investigation is required in order to test how such a proposal could fit onto a real site in New Moscow. Given the size of the proposed superblock configuration, a very large site is required, which makes this configuration applicable only to the largest landowning developers. However, urban design concepts explored in this thesis could also be applied to smaller sites, which should be verified through a further investigation.

Notwithstanding the above, at least as a starting point, this thesis offers a number of urban design recommendations that could be tested by the development industry in New Moscow to improve marketability and profitability of their product, and as a result create better communities that are also more suitable for New Moscow's at-risk rural setting.

BIBLIOGRAPHY

Ahmirova, Rimma. 2018. *Golden Standard. What Apartments Will Replace "Econom-Class".* March 20. Accessed March 30, 2019. https://sobesednik.ru/nedvizhimost/20180320-zolotoj-standart-kakie-kvartiry-pridut-na-smenu-ekonom-klassu.

Alekseevsky, Mikhail. 2017. "What Dreams May Come: What Housing Do We Want and What Do We Buy." *Living Environment: Apartment and City.* Saratov: Academia. 82-87.

Archi.ru. 2010. *Competition for a Master-Planned Residential District "City of Blocks A101" Based on the "Block City" Concept.* December 9. Accessed March 2019. https://archi.ru/contests/3750/konkurs-na-proekt-master-plana-zhilogo-raiona-gorod-kvartalov-a101-na-baze-koncepcii-block-city.

Argenbright, R. 2018. "New Moscow: A Pragmatic Assessment." *Old and New Moscow: Trends and Problems of Development.* Moscow: Moscow Division of the Russian Geographic Society.

Attwood, Lynne. 2010. *Gender and Housing in Soviet Russia: Private Life in a Public Space.* Manchester, UK; New York, NY: Manchester University Press.

Babkin, R.A. 2018. "Industrial Zones: Potential Restructuring and the Role in Spatial Development of the City (in the Example of Moscow)." *Old and New Moscow: Trends and Problems of Development.* Moscow: Moscow Division of the Russian Geographic Society.

Bityukova, V.R. 2018. "Ecological Factor in the Development of New Mosscow: Old Problems on New Territory." *Old and New Moscow: Trends and Problems of Development.* Moscow: Msocow Division of the Russian Geography Society.

BlockStroi.ru. 2018. *Growing Popularity of Suburban Cottage Settlements.* September 29. Accessed March 2019. http://blockstroi.ru/rastushhaya-populyarnost-zagorodnyx-kottedzhnyx-poselkov.html.

Bocharov, Y., and N. Gulyanitskiy. 1987. *Architecture of the USSR 1917-1987.* Moscow: Stroyizdat.

Boldyreva. 2014. *Dlya Rossiyskogo Mentalitetat Psihologicheski Komfortna Odnoetazhnaya Zastroyka.* Moscow, Russia: https://www.novostroy-m.ru/intervyu/lyudmila_boldyreva_dlya.

Brenner, Neil, and Nikolas Theodore. 2002. *Spaces of Neolibaralism: Urban Restructuring in North America and Western Europe.* Oxford: Wiley-Blackwell.

Brown, Eliot. 2019. *Startup Backed by SoBank Pours Money Into a Bid to Reshape Construction.* Wall Street Journal.

Brumfield, William Craft, 1944-, and Blair A., 1949- Ruble. 1993. *Russian housing in the modern age : design and social history.* Washington, D.C., Cambridge, New York;: Woodrow Wilson Center Press, Cambridge University Press.

Buder, Stanley. 1990. *Visionaries and Planners: the Garden City Movement and the Modern Community.* New York: Oxford University Press.

Byrne, D. S. 1986. *Housing and Health: the Relationship Between Housing Conditions and the Health of Council Tenants.* Aldershot, Hants, England ; Brookfield, Vt., USA: Gower.

Chan, Kam Wing. 2009. "The Chinese Hukou System at 50." *Eurasian Geography and Economics* (Bellweather Publishing Ltd) 50 (2): 197-221.

Cox, Terry. 1996. *From perestroika to privatisation : the politics of property change in Russian society, 1985-1991.* Aldershot, England; Brookfield, USA: Avebury.

Credit Valley Conservation. n.d. *Low Impact Development.* https://cvc.ca/low-impact-development/low-impact-development-support/stormwater-management-lid-guidance-documents/low-impact-development-stormwater-management-planning-and-design-guide/.

Demszky von der Hagen, A. M. 2006. *Alltagliche Gesellschaft.* Munchen: Rainer Hampp.

Desai, Pooran, and Ed Blake. 2008. "Is Happiness the Key to Unlocking Sustainability? ." In *Building Happiness: Architecture to Make You Smile*, by Jane Wernick. London: Black Dog Publishing.

DIALOG. 2018. "North King's Town Secondary Plan Process." *City of Kingston.* Accessed March 2019. https://www.cityofkingston.ca/documents/10180/24796058/North+King%27s+Town+-+Secondary+process/8d41649c-789c-4520-af98-e945722c50eb.

Dietz, Robert, and Donald Haurin. 2003. "The Social and Private Micro-Level Consequences of Homeownership." *Journal of Urban Economics*, 401-450.

Dimaio, Alfred John. 1974. *Soviet Urban Housing: Problems and Policies.* New York: Praeger.

DiPasquale, Denise, and Edward Glaeser. 1999. "Incentives and Social Capital: Are Homeowners Better Citizens?" *Journal of Urban Economics*, 354-384.

Dom i Uchastok. 2012. *Lots in Moscow Region With and Without Services.* http://www.kupit-uchastok.ru/uchastki-moskovskaya-obl/bez-podryada.htm.

Dubel, Hans-Joachim, W. Jan Brzeski, and Ellen Hamilton. 2006. *Rental Choice and Housing Policy Realignment in Transition: Post-Privatization Challenges in the Europe and Central Asia Region.* World Bank Policy Research Paper No. 3884.

Edwards, John, Alan Booth, and Patricia Edwards. 1982. "Housing Type, Stress, and Family Relations." *Social Forces* 61 (1): 241-257.

Filatova, Irina. 2013. *Housing Affordability Remains Elusive.* September 2. https://www.themoscowtimes.com/2013/09/02/housing-affordability-remains-elusive-a27309.

Foglesong, Richard E. 2001. *Married to the Mouse: Walt Disney World and Orlando.* New Haven: Yale University Press.

FOM. 2006. "Mortgages and Problems of Access to Housing." August 10. http://bd.fom.ru/report/cat/home_fam/hosehom/hom_ipo/dd063123.

Frantz, Douglas, and Catherine Collins. 1999. *Celebration, U.S.A.: Living in Disney's Brave New Town.* New York: Henry Holt and Co.

Garreau, Joel. 1992. *Edge City: Life on the New Frontier.* New York: Doubleday.

GdeEtotDom.RU. 2017. *Suburban Real Estate: Main Trends of the Market in 2017.* October 9. Accessed March 2019. https://www.gdeetotdom.ru/news/2042299-2017-10-09-zagorodnaya-nedvizhimost-v-podmoskove-osnovnyie-tendentsii-ryinka-v-2017/.

Geraschenko, Ekaterina. 2017. *Suburban Developers Are Restructuring.* April 12. Accessed March 2019. https://www.kommersant.ru/doc/3269095.

Gershman, Arkadiy. 2016. *Why You Can't Building Mikrorayons and How to Recoupe the Urban Block.* September 20. Accessed March 2019. https://gre4ark.livejournal.com/380153.html.

Gillis, A.R. 1977. "High-Rise Housing and Psychological Strain." *Journal of Health and Social Behavior* 18 (4): 418-431.

Gorbunov, Andrey. 2017. *Solar Insolation, Tables of Solar Insolation.* Accessed March 2019. http://docplayer.ru/26874276-Solnechnaya-insolyaciya-tablicy-solnechnoy-insolyacii.html.

Government of Moscow. 1997. "Insolation and Shading - Moscow City Construction Codes." *Aqua Group.* May 2. Accessed March 2019. http://aquagroup.ru/normdocs/1475.

Green, R., S. Malpezzi, and S. Mayo. 2005. "Metropolitan-Specific Estimates of the Price Elasticity of Supply of Housing, and Their Sources." *AEA Papers and Proceedings.*

Gutschow, Niels. 2000. "Happiness in the Light. The Construction of a New Power Plant in Kausan, Lithuania, 1959." In *Happy: Cities and Public Happiness in Post-War Europe*, by Cor, ed. Wagenaar. Rotterdam: NAI Publishers.

Haase, A. 2010. *Residential Change and Demographic Challenge.* Farnham, England; Burlington, VT: Ashgate.

Hackworth, Jason. 2006. *The Neoliberal City: Governance, Ideology, and Development in American Urbanism.* Vol. 30. Ithaca, NY: Cornell University Press.

Halpern, David. 1995. *More than Bricks and Mortar; Mental Health and the Built Environment.* Abingdon: Taylor and Francis.

Harvey, David. 2007. *A Brief History of Neoliberalism.* Vol. 610. Oxford: Oxford University Press.

Harvey, Jack, and Ernie Jowsey. 2004. *Urban Land Economics.* Houndmills, Basingstoke; New York: Palgrave Macmillan.

Hutchinson, Gottdiener and. 2010. *New Urban Sociology.* Boulder, Colorado: Westview Press.

Indicatori Rinka Nedvizhimosti. 2014. *Modern Utopia: Car-Free Courtyards Entering the Econom-Class.* January 21. https://www.irn.ru/articles/36899.html.

Jacobs, Jane. 1961. *The Death and Life of Great American Cities.* New York: Random House.

Karlin, Anatoly. 2018. *Russia Overtaking USSR, Converging with West, on Food, Housing Consumption.* August 18. Accessed March 2019. http://www.unz.com/akarlin/russia-overtaking-ussr-converging-with-west-on-food-housing-consumption/.

Khan-Magomedov, Selim O. 1987. *Pioneers of Soviet Architecture.* New York: Rizzoli International Publications, Inc.

Koolhaas, Rem. 1994. "O.M.A at MoMA: Rem Koolhaas and the place of public architecture: November 3, 1994-January 31, 1995, the Museum of Moder Art, New York." *MoMA.* Accessed March 2019. www.moma.org/calendar/exhibitions/440.

Kosareva, N.B., T.D. Polidin, and A.S. Puzanov. 2012. *Market of Housing Construction in Russia: Current State and Development Prospects.* Accessed March 2019. http://institutiones.com/general/2213-rynok-zhilizchnogo-stroitelstva-v-rossii.html.

Kurichev, N.K., and E.K. Kuricheva. 2018. "Relationship of Housing Construction in the Moscow Urban Agglomeration and Migration to the Metropolitan Area." *Regional Research of Russia*, 1-15.

Kuricheva, E. K. 2013. "Territorial Tranformation of New Moscow under the Influence of Housing Construction." *Regional Research of Russia*, December 20: 220-230.

Kuricheva, E. K., and A. A. Popov. 2013. "Housing Construction Dynamics in the 2010s as a Factor of Transformation of the Moscow Agglomeration." *Regional Research of Russia*, 9-20.

Lang, Robert E. 2003. *Edgeless Cities: Examining the Noncentered Metropolis.* Washington, D.C.: Brookings Institute Press.

Lenta.ru. 2017. *Five Countries, Where Mortgages Are Given At Laughable Percentages.* November 15. Accessed March 2019. https://lenta.ru/articles/2017/11/15/cheapmortgage/.

Lorimer, James. 1978. *The Developers.* Toronto: J. Lorimer.

Makhrova, A.G., T.G. Nefedova, and A.I. Treivish. 2013. "Moscow Agglomeration and "New Moscow": The Capital City-Region Case of Russia's Urbanization." *Regional Research of Russia*, 131-140.

Markin, Peter. 2014. "Renaissance of Bedroom Communities." In *What Moscow Wants: Atlas of Ideas*, by Marina Dubova, Anastasia Fomina, Ekaterina Romanova and Olga Polischuk, 464. Moscow: Stralka Institute of Media, Architecture and Design.

McKenzie, Evan. 2011. *Beyond privatopia : rethinking residential private government.* Washington, DC: Urban Institute Press.

Mints, Victor. 2000. "Selecting a Housing Finance System for Russia." *Housing Finance International 15(2)* 49-57.

Mironov, Vladimir. 2015. *Why Underground Parking Garages Are Empty in New Buildings in Moscow.* February 19. Accessed March 2019. https://realty.rbc.ru/news/577d23439a7947a78ce91778.

Modern Building Services. 2018. *Outdated and Unsustainable Construction Must Change.* September 4. Accessed March 2019. http://www.modbs.co.uk/news/fullstory.php/aid/18096/Outdated_and_unsustainable_construction_must_change.html.

Nefedova, T.G. 2018. "New Moscow Outside Her Cities." *Old and New Moscow: Trends and Problems of Development.* Moscow: Moscow Division of the Russian Geographic Society.

Nelson, Robert H. 2005. *Private Neighborhoods and the Transformation of Local Government.* Washington, DC: Urban Institute Press.

Novostroy. 2019. *Catalog and Rating of Developers of Moscow.* Accessed March 2019. https://www.novostroy.ru/companies/.

Novostroy-M. 2019. *Popular New Developments of Moscow.* Accessed March 2019. https://www.novostroy-m.ru/populyarnie_novostroyki.

O ZhKH. 2019. *ZhKH and Communal Services.* Accessed March 2019. https://ozhkh.ru/mnogokvartirnyj-dom/podval.

Panait, Andreea Iulia. 2013. ""New Towns" in Modern Urbanism: Concepts & History." *Urbanism. Arhitectura. Constructii.* 57-78.

Panerai, Philippe, Jean Castex, Jean-Charles Depaule, and Ivor Samuels. 2004. *Urban Forms: The Death and Life of the Urban Block.* Oxford England, Boston: Architectural Press.

Papov, A.A. 2018. "Geography of Residential Real Estate Purchases in New Construction in Moscow Region in 2010s." *Old and New Moscow: Trends and Problems of Development.* Moscow: Moscow Division of the Russian Geographic Society. 159-183.

Portschy, Szabolcs. 2016. "Community Participation in Sustainable Urban Growth, Case Study of Almere, the Netherlands." *Pollack Periodica*, April: 145-155. https://www.researchgate.net/publication/301601642_Community_participation_in_sustainable_urban_growth_case_study_of_Almere_the_Netherlands.

Pravda.ru. 2018. *Cottage Settlements in New Moscow: What This Year Brings.* Accessed March 2019. https://www.pravda.ru/navigator/doma-i-kottedzhi-v-novoi-moskve.html.

Ralph, E.C. 1987. *The Modern Urban Landscape.* London: Croom Helm.

Ramboll Foundation. 2016. "Making Cities Liveable: Blue-Green Infrastructure and Its Impact on Society." *Issuu.* Ramboll Foundation and the Ramboll Liveable Cities Lab. https://issuu.com/ramboll/docs/bgi__new.

Realty Urist. 2019. *How to Know, Who Owns the Land Under a Multi-Unit Building.* Accessed March 2019. https://realtyurist.ru/mnogokvartirnye-doma/komu-prinadlezhit-zemlja-pod-mnogokvartirnym-domom/.

Revzin, Grigoriy, Rosaliya Tarnovetskaya, Margarita Chubukova, Margarita Kurtsev, Olga Nikitina, and Leonid Krylov. 2016. *How to Building New Moscow.* Moscow: Strelka KB.

Ria Novosti. 2012. *Panel New Construction Will Conquer 60% of the Residential Market in Moscow Region - Experts.* August 27. Accessed March 2019. https://realty.ria.ru/20120827/398333283.html.

Rohe, W.M., S. van Zandt, and G. McCarthy. 2001. *The Social Benefits and Costs of Homeownership: A Critical Assessment of the Research, Low-Income Homeownership Working Papers Series.* Harvard: Joint Center for Housing Studies.

Ronald, Richard, and Marja Elsinga. 2012. *Beyond Home Ownership: Housing, Welfare and Society.* Abingdon, Oxon; New York: Routledge.

Ross, Andrew. 1999. *The Celebration Chronicles: Life, Liberty and the Pursuit of Property Value in Disney's New Town.* New York: Ballantine Books.

Schukin, Aleksey. 2013. *Trapped in the Mikrorayon.* June 7. Accessed March 2019. http://expert.ru/expert/2013/23/v-lovushke-mikrorajona/.

Sexton, Richard. 1995. *Parallel Utopias: The Quest for Community - The Sea Ranch, California / Seaside, Florida.* San Francisco: Chronicle Books.

Sieverts, Thomas. 2003. *Cities without Cities.* London; New York: Spon Press.

Smith, Mark B. 2010. *Property of Communists - The Urban Housing Program from Stalin to Krushchev.* Northern Illinois University Press.

Struyk, Raymond J., Alexander S. Puzanov, and Lisa A. Lee. 1997. "Monitoring Russia's Experience with Housing Allowances." *Urban Studies*, 1789-1818.

Sytin, P.V. 1948. *Iz Istorii Moskovskih Ulits.* Moscow: Moskovskiy Rabochiy.

Tarbatt, Jonathan. 2012. *The Plot: Designing Diversity in the Built Environment.* London: RIBA Publishing.

Thompson, Sam, Saamah Abdallah, Nic Marks, Andrew Simms, and Victoria Johnson. 2007. *The European Happy Planet Index.* London: New Economics Foundation.

Thomson, Tamsie. 2008. "Can Urban Topologies Promote Happiness?" In *Building Happiness: Architecture to Make You Smile*, by Jane, ed. Wernick. London: Black Dog Publishing.

TipDoma.com. n.d. *Planirovki Kvartir i Serii Domov.* https://tipdoma.com/.

Trushin, Georgiy. 2017. *How the Standards Have Changed.* September 18. https://realty.vesti.ru/zhile/kak-izmenilis-standarty-zhilya.

UNECE. 2004. *Contry Profiles on the Housing Sector - Russian Federation.* New York and Geneva: United Nations.

Urban Strategies Inc. 2012. *Cornell Centre Precinct Plan.* Markham: City of Markham.

Varlamov. 2017. *Micro-City "V Lesu" as Example for Reconstruction.* November 12. Accessed March 2019. https://varlamov.ru/2648672.html.

Waldheim, Charles. 2006. *The Landscape Urbanism Reader.* New York: Princeton Architectural Press.

Wernick, Jane. 2008. *Building Happiness.* London: Black Dog.

Whitehead, Christine. 1998. *The Benefits of Better Homes, Shelter.* London: Shelter.

Williamson, John. 1990. *Latin American Adjustment: How Much Has Happened?* Washington: Institute for International Economics.

Yancey, William L. 1971. "Architecture, Interaction, and Social Control: The Case of a Large-Scale Public Housing Project." *Environment and Behavior.* Vol. 3. Sage Publications, March. 3-21.

Zavisca, Jane R. 2012. *Housing the New Russia.* Ithaca, N.Y.: Cornell University Press.

Zelizer, Viviana A. 2005. *The Purchase of Intimacy.* Princeton: Princeton University Press.

Zhuk, Mariam Medzhidovna, and Olesiya Dmitrievna Boykova. 2019. *State Mortgage Subsidies in 2019.* Accessed March 2019. http://lgoty-vsem.ru/subsidii/gosudarstvennoe-subsidirovanie-ipoteki.html.

Zhuravlev, A.M., and N.A. Naumova. 1975. *Architecture of Residential and Mass Public Buildings. 1955-1970.* Vol. 12, in *General History of Architecture*, edited by N.V. Baranova. Moscow: Stroyizdam. http://ussr.totalarch.com/general_history_architecture/1955_1970/house_social.

Zolotoev, Timur. 2018. *The Future of Russian Housing: 20 Design Finalists Announced.* February 1. Accessed March 2019. https://strelkamag.com/en/article/the-future-of-russian-mass-housing.