An exhibition at
The Skyscraper Museum

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What is density? Does the word describe a condition of people or place? Is it people crowded together? Buildings too tightly spaced, or too tall? Or is it a lack of open space on ground level? Built density, which measures the area covered by structures, and population density, which calculates the average number of people in a given area, describe two very different aspects of the urban experience.

Arguments about density have shaped and reshaped New York. Critics of tenement life and housing reformers viewed open space and sunlight as the antidote for overcrowding and created a new vision of master-planned, high-rise, residential communities.

The Depression brought government funding into the business of housing, and by the 1950s “towers in the park” became the standard approach to slum clearance and urban renewal. Yet this formula for working- and middle-class projects, which were designed at extremely low density, housed far fewer residents than the tenement blocks they replaced. By the 1960s, critics led by Jane Jacobs and others denounced the modernist solutions in favor of traditional neighborhoods.

Density today remains a hyper-charged concept – a negative to many who equate it with crowding – or a positive for those who claim it creates more vibrant and affordable urban life. Whatever one believes about its relative merits, a better understanding of density is a first step to meaningful dialogue about the future of the city.
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This document compiles all of the text and images of The Skyscraper Museum's exhibition HOUSING DENSITY: From Tenements to Towers presented in the gallery from May 2019 through mid-March 2020, as well as in the online record of the exhibition on our website skyscraper.org. This document is more like a book than an exhibit, but it is also more like an exhibit than our web presentation of the same material, because it preserves the intended order of ideas and information conceived by the curators. A website is typically presented as an open menu and can be navigated in any order.

The space and layout of a gallery impose constraints on curators, who must adapt their narrative to a flow they can suggest, but not impose on a viewer. HOUSING DENSITY contained an enormous amount of text – almost 16,000 words – and visual information in its graphics.

The texts compiled here are not organized as they would be in a book, because they relate to the space of the gallery and the intended path for the viewer. There is an Introduction, a historical overview, then a series of more detailed historical case studies. On a long wall early in the show, there is a panel of analytical diagrams that compare the density of a dozen housing models across six decades. These diagrams become the basis for understanding the two types of density analyzed throughout the exhibition: population density and built density.

The district models in the center of the gallery examined housing types and their respective densities compared to each other and within a neighborhood context. Another set of three cases displayed and compared nine different unit models. All of the models were created for the exhibition. In order to better follow this virtual tour, we have included reference maps of the show’s physical layout throughout the document.
INTRODUCTION

Aerial view of Lower East Side in 1956, looking south to the skyscrapers of the Financial District, showing the tenement blocks replaced by housing projects. In the foreground, Corlear’s Hook Co-op. NYCHA Collection, La Guardia and Wagner Archives, La Guardia Community College, CUNY.

Tenements and Towers

Manhattan Island today has developed an urban landscape with two distinctly different characters. One is the product of the late 19th- and early 20th-century forces of both expansion and concentration that can be seen equally in the towering skyscrapers of lower Manhattan and Midtown and in the very dense, but low-rise tenement districts that housed the city’s burgeoning immigrant and working-class population. This first pattern of private development, with high lot coverage and limited open space, was already established by the 1880s as tenements and row houses overspread Manhattan.

A second pattern of open space and isolated towers took shape in the Depression and postwar decades and represented a fundamental restructuring of the built environment. From the mid-1930s, government transformed the city according to a vision of reformed residential neighborhoods. Through a range of programs, housing advocates and federal, state, and local officials bought back the land and tenements and organized the creation of affordable housing for working-class and middle-income families. Their work created a new form of large-scale urban housing that dramatically reduced density, both of built area and of people per acre.

HOUSING DENSITY illustrates and analyzes the two characters of New York’s housing stock – privately-developed or publicly-assisted – from the perspective of density and raises questions about how to house the city’s growing populations on its scarce land.
Housing Density: From Tenements to Towers

The Skyscraper Museum

Tenements
- Queensbridge Houses - 1939
- 183 piso / 35.3 piso (1933)
- 38%
- 1000 piso / 6.100 piso
- 87%

The Towers - 1925
- The Sayre House - 1947
- 302 piso / 32.3 piso (1925)
- 20%
- 130 piso

London Terrace - 1930
- Manhattan House - 1951
- Polo Grounds Towers - 1968
- 196 piso / 1960 piso (1968)
- 14%
- 47%

Knickersbocker Village - 1934
- Penn South - 1962
- Co-Op City - 1973
- 416 piso / 4160 piso (1973)
- 15%
- 680 piso / 6800 piso (1973)
DENSITY DIAGRAMS

To represent and compare the different measurements of density – population density, or the average people per acre, and built density, as height, volume, and percentage of lot coverage – the Skyscraper Museum created a system of icons. These diagrams represent twelve case studies of historical housing developments featured in the exhibition. They are laid out chronologically, from top-left to bottom-right. Five are private developments: a typical tenement block, The Towers in Jackson Heights, London Terrace, Knickerbocker Village, and Manhattan House. Four are publicly-subsidized projects: Stuyvesant Town, Penn South, Silver Towers, and Co-Op City. Three are NYCHA public-housing projects: Queensbridge Houses, Taft Houses, and Polo Grounds Towers.

To calculate the density of a particular site, we have used its area in acres (source: OASIS NYC) and its total number of people. To obtain the latter, we have multiplied the site’s buildings unit count (source: OASIS NYC) by the average number of people/unit in the site’s borough (source: 2010 Census). In some cases, we have also included historical density figures borrowed from reports, articles, and other original sources.

As Jane Jacobs wrote in 1961 in The Death and Life of Great American Cities:

The confusion between high densities and overcrowding, which I will go into briefly because it so much interferes with understanding the role of densities, is another of the obfuscations that we have inherited from Garden City planning. The Garden City planners and their disciples looked at slums which had both many dwelling units on the land (high densities) and too many people within individual dwellings (overcrowding), and failed to make any distinction between the fact of overcrowded rooms and the entirely different fact of densely built up land. They hated both equally.
Mounted on the longest wall in the gallery, a continuous panel presented an overview of the history of housing development in New York City—public, private, and publicly subsidized—through the lens of density, both built and population. Guest curator Nicholas Dagen Bloom, urban historian and expert on the history of American public housing and housing policy, established the summary narrative presented in texts and graphics. This overview was then expanded in the case studies in the main gallery.
HISTORICAL OVERVIEW, 1900-1960s

Tenement Crowding

This introductory section of the exhibition presents a timeline of the private and public housing featured in the “case studies” in the main gallery space. The overview highlights the themes expanded in the individual cases, scale models of buildings and neighborhood districts, and historical documents.

By 1900, the density of population of the tenement districts of Manhattan’s Lower East Side was the most extreme of any city in the world. In the infamous Tenth Ward, the census counted up to 1,100 people per acre, crowded into buildings of 4- or 5-stories that covered as much as 87 percent of the lot and block. These suffocating and unsanitary conditions were so demonized in New York reform circles that the term “density” carried a negative connotation for decades.

Tenements were profitable for investors, who fought against regulation. Early efforts at reform (1867, 1879) were weak and did not affect existing buildings. Model tenement competitions and a few small demonstration projects failed to find a way to remedy a cruel market. After decades of activism, the 1901 Tenement House Law (New Law) finally mandated larger lot size, courtyards, modern amenities (heat, hot water, larger rooms, and private bathrooms), and a rule limiting overcrowding. The New Law also required that old tenements be updated with indoor plumbing and water service. Nevertheless, as the population grew to 3.4 million residents in 1900 – more than a third of whom were foreign-born – the pressures of overcrowding remained a public health menace.

Many reformers hoped that the New Law and, after 1904, the expanding subway system would provide a one-two punch that would reduce the density levels of the city’s tenement districts. Yet built density remained high: New Law tenements could still be built at 70 percent coverage on mid-blocks and 90 percent at corners. The occupancy standards per room were also so weak that landlords still packed families and boarders into single rooms. The extreme density of New York’s tenements would, in time, inspire equally extreme solutions to reduce land coverage and people /acre.
The Skyscraper Museum created density diagrams such as the one on the left in order to represent and compare the different measurements of density – population density, or the average people per acre, and built density, as height, volume, and percentage of lot coverage – of the historical case studies featured in the Housing Density show.

Design by Leonardo Tamargo.

Left: Comparative diagrams of three different entries for the Phelps-Stokes Fund Tenement House Competition, 1921 — diagram 3 represents Andrew Thomas’s design, which anticipates the lower land coverage typical of garden apartments. Journal of the American Institute of Architects, v.10, January 1922. Right: Brochure advertising garden-apartment projects designed by architect Andrew Thomas and built by The Queensboro Corporation in Jackson Heights, 1923. The New York Public Library.

Right: Garden-apartment projects The Chateau (1922) and The Towers (1925), designed by Andrew Thomas, at 80th Street and 34th Avenue, Jackson Heights, 1925. NYPL.

Density and Decentralization

Subway construction in the early 20th century benefitted the rising white middle class as they moved from congested tenement districts to new private houses or apartment buildings in upper Manhattan, the Bronx, Queens, and Brooklyn. The outer-borough garden apartment became New York’s
contribution to an international revolution in standards for urban multi-family housing. In Europe, the
government-sponsored many of the most famous perimeter-block and garden-apartment projects, but
in New York, the private sector took the lead.

Densely developed garden-apartment complexes built by the private sector powerfully influenced New
York’s interwar housing market. Architect and reformer Andrew Thomas designed variations in Jackson
Heights with large apartments and landscaped courtyards. Land coverage was lower than tenements
(initially about 70 percent open space) and the people per acre in one early project was just 188. Density
later rose to over 300 pp/acre with more closely packed and taller buildings, but the leafy courtyards
and large units imbued a serenity of affluent family life. Versions of the courtyard type became a staple
of neighborhoods along subway lines, yet few offered an equivalent quality of site planning to Jackson
Heights. Nor were most high-quality apartments affordable to any but the middle classes or above.

Reformers dreamed that the working class might benefit from the burst of creative and healthful design
made possible by decentralization. The result, in part, was Governor Al Smith’s Housing Act of 1926 that
helped labor unions and other parties build garden apartment complexes for working-class people. The
Amalgamated Houses (60 percent land coverage) on the Lower East Side pioneered a slum clearance
project with Art Deco details and a cozy courtyard. In the Bronx, the Amalgamated Cooperative
Apartments offered families a great leap forward from tenements to garden apartments. Yet the Great
Depression, limited funds, and lack of interest or development talent in the union sector limited the
impact of the 1926 Act.

Garden apartments remained out of reach for most New Yorkers, particularly those in the worst
tenements, but the model of spacious urban living they offered would become a goal for both housing
advocates. Many architects and politicians would overlook that, while the garden apartment land
coverage and people per acre were low, the open spaces were defined by clear boundaries and
enhanced by lush landscaping, making the “garden” as much a part of the design as the housing units.
Housing Density: From Tenements to Towers


Tudor City (1927) between 40th and 44th St. by the East River, developed by Fred French. Photograph by Wurts Bros, c.1930. NYPL.

High Rise – High Density

Three examples of very dense high-rise housing developments suggest how the private market might have rebuilt parts of Manhattan for the middle class if the real estate boom of the late 1920s had not ended in the Great Depression. Two were created by the visionary developer Fred French: Tudor City (1927), a 14.5-acre enclave of a dozen towers on E. 42nd Street, and Knickerbocker Village (1934) on the Lower East side, which replaced some of the district’s oldest tenements with modern, but extremely dense, multifamily housing. The other, London Terrace (1930), packed 1,665 units into an avenue-long apartment block in Chelsea. The density of these middle-class developments averaged 463, 800, and 931 persons per acre, respectively.

In the 1920s, the growing obsolescence, squalid conditions, and rising vacancies in old-law tenements near booming business district provoked developers to dream of lucrative, high-density private construction. Businessman Fred French believed slum clearance was the key to making central city life appealing to the middle-class. Successful redevelopment – what he called “scientific rebuilding” – would require wholesale demolition to change the entire atmosphere of a neighborhood so it could compete...
with suburban life. Underwritten by an investment plan that sold small-denomination stocks that promised solid returns to investors, French quietly assembled hundreds of tenement properties in Midtown’s east side for his Tudor City project.

Clearing for the large hilly site began construction in 1926, and French quickly constructed twelve towers ranging from 10 to 32 stories. The high land coverage and population density were mitigated by the ample open space in adjacent private parks and the quality of the heavily ornamented neo-Tudor buildings. French marketed Tudor City as an amenity-rich alternative for white-collar workers who wanted to “walk to work” rather than endure hours of rail or subway commuting. Designed for the “average salary earner” and his family, the small but luxuriously finished units were complemented by common facilities and overseen by careful community controls.

Similarly, real estate developer Henry Mandel used high-rise density and collective amenities as a strategy for London Terrace, which stretched between Tenth and Eleventh avenues on W. 23rd Street. To create his behemoth block, Mandel demolished 80 historic row houses and multiplied the stories to 22, with 67 percent land coverage. With this strategy, Mandel housed a comparable density of turn-of-the-century tenements in modern apartments at an average of nearly 931 people per acre. London Terrace became the densest multifamily housing in the city, and garnered rents of $52-$130 per room.

Density diagram, The Skyscraper Museum
Density Reduction

Three decades after the 1901 Tenement House Law, substandard buildings still covered large areas of Manhattan, as well as portions of Brooklyn and the Bronx. As the Great Depression deepened, housing reformers made their case ever more persuasively for both slum clearance and for government assistance to construct housing for low-income families.

Established in 1934 by New York State, the New York City Housing Authority (NYCHA) became a powerful force for slum clearance under the leadership of Langdon Post, who served as both NYCHA Chairman and Tenement House Commissioner. Between 1934 and 1936, the authority demolished 1,100 old law tenements. Owners abandoned another 40,000 apartments rather than upgrade them to the much higher sanitary and safety standards mandated in the Multiple Dwelling Act of 1929, which also included more rigorous occupancy standards.

Demolition of tenements and code enforcement intentionally reduced land coverage and population density. The crackdown aimed, above all, to create political pressure for public housing. In the words of Langdon Post, “The only way to get action is to create the need.” NYCHA simultaneously launched a housing program to deliver the replacement housing. Mayor LaGuardia predicted that affordable housing “would become exclusively a function of government because of its important relation to government control of public health.”

As early as 1936, NYCHA developed a catalog of site planning solutions, illustrated by the diagrams here, which satisfied its self-imposed standards of low population density and low lot coverage, building height, and construction costs. This standardization effort was led by Frederick L. Ackerman, chief architect of NYCHA’s Technical Division, who sought to secure the maximum amount of open space and sunlight at every site. Ackerman’s standards established the principles for several decades of public housing. Although the early slab buildings would later become Y-shaped plans, and eventually “towers in the park,” the ranges of land coverage and people per acre (100-250) set in the 1930s remained in place through the 1960s.
NYCHA’s Production

NYCHA architects worked to develop housing models that would dramatically reduce density and maximize solar orientation. After the experiment of First Houses, a problem-plagued attempt to both demolish and rehabilitate tenements on the Lower East Side, NYCHA turned to new construction. A pioneering project to demonstrate their goals and guidelines was Williamsburg Houses, designed by the noted Swiss-American modernist William Lescaze, together with Richmond Shreve and the NYCHA team, and built between 1936 and 1938. Its twenty buildings had T- and H-shaped plans that were oriented at a 15-degree angle from the street grid to gain better exposure to sunlight. At four stories, the buildings were walk-ups, the lot coverage was about 32 percent, and the density was 241 people per acre. The
site, which replaced twelve city blocks of mostly substandard buildings, included a school, community center and neighborhood retail. The project, however, was costly: $13 million.

While NYCHA seemed to endorse a garden-apartment approach at Harlem River Houses (1937), in truth Ackerman and other architects remained devoted to more radical schemes such as Queensbridge Houses (1940). The large site, nearly 50 acres of former industrial land just north of the Queensboro Bridge, was purchased for only $1 per sq. ft. The size and repetitive design allowed for standardization, economies of scale, and efficient use of costly foundations in 6-story elevator buildings. NYCHA’s architects were able to both lower density to 209 pp/acre and realize lot coverage of just 18.1 percent, creating acres of open space for courtyards and play areas. Cost cutting required by federal funding produced smaller apartment units and limited commercial or community facilities that pinched the quality of life of many families despite the grand open spaces.

This pattern of density reduction persisted even when land costs became higher. The first Manhattan slum clearance project on the Lower East Side, the 6-story Vladeck Houses (30.7 percent land coverage and 389 pp/acre), was more densely developed than Queensbridge and the property was more expensive at $3.76 a square foot, yet it was much lower density than the tenements it replaced and half that of the developer Fred French at Knickerbocker Village, just down the street.

The low density of new NYCHA projects was embraced by the carefully selected tenant families. The popularity of the early public housing system gratified administrators who boasted of the large number of residents moving from old law tenements to light-filled apartments. They also mistook the excitement for widespread endorsement of low density, with dramatic repercussions for the future of the city.
Large Scale, Open Space

In the postwar years, the rise of the middle-class suburb altered public expectations of density in the New York region and across America. Garden apartments and NYCHA projects were low lot coverage and uncrowded compared to tenements, but they were much more dense than suburban single-family homes. Thanks to industrialized production methods, highway access, and Federal Housing Administration (FHA) mortgages, developments such as Levittown helped families jump directly from crowded apartments to private homes with green lawns and backyards on generous 1/10th of acre lots.
Within the boundaries of New York City there were successful attempts to find a middle ground between high-rise living and single-family concern that New York might become a city divided between rich and poor. Thanks to changes in state law that allowed insurance companies to enter the area of residential real estate, as well as federal programs available through the FHA and the slum-clearance efforts of Robert Moses, companies such as Metropolitan Life Insurance Company developed several large-scale, master-planned, high-rise communities for the middle class in the 1940s and 1950s.

The largest and most significant development in Manhattan was Stuyvesant Town/ Peter Cooper Village (1942-48). The massive project stretched from 14th to 20th streets and from First Avenue to Avenue C. It required a slum clearance program paid for largely by the City, which also granted the project tax exemption for 25 years. The emphasis of the master plan, which de-mapped five city streets was on tree-filled lawns between the identical towers and central community areas of parks and playgrounds. Parking was limited, as access to transit was emphasized. The Stuyvesant Town section covered only 26 percent of the 80-acre site and yet delivered 302 pp/acre thanks to the 8,757 apartments stacked in 15-story buildings. As with NYCHA, sponsors carefully managed occupancy to prevent crowding that would add density.

Density diagram, The Skyscraper Museum
Middle-Market Design

As New York City rebounded during and after World War II and pressure grew for high-quality rental apartments, private companies began to rethink their aversion to residential development in Manhattan. Some began buying up older tenements and commercial buildings that were moderately priced, yet located in areas ideal for residential growth.

A pioneering project was Manhattan House, which was developed without subsidies by the New York Life Insurance Company from 1947-51. Located between 65th and 66th streets between Second and Third avenues, it occupied a full block in an area that was undergoing significant change as the elevated train tracks that had imprisoned that swath of the city were either recently demolished or scheduled for
demolition. An old trolley barn, tenements, and assorted commercial buildings were so affordably priced that New York Life bought extra property in the surrounding blocks.

The clean, crisp modernist design by architect Gordon Bunshaft, principal at Skidmore, Owings & Merrill (SOM), which was associated with the firm Mayer & Whittlesey on the project, was an immediate success and attracted famous tenants such as Benny Goodman, Grace Kelly, and furniture designer Florence Knoll, as well as Bunshaft himself. The apartments were spacious, but the overall density was high at 478 pp/acre. Thanks to New York Life’s interest in long-term profits, the building was more “tower in a garden” than “tower in the park” and covered a higher percentage of land (59 percent) than the vast publicly subsidized projects that were its contemporaries.

The postwar volume of privately-developed housing was less than hoped, and minor compared to either new office towers or suburban growth. Had the private sector fully engaged in redeveloping housing in Manhattan, the city would today look quite different. However, the growing fiscal problems and continuing middle-class flight prevented a massive unsubsidized recovery that might have remade the city at a much higher density level.
Slum Clearance

Given the low levels of private investment in creating new housing in the postwar years, especially in Manhattan, government officials sought ways to attract developers into renovating tenement neighborhoods. Eminent domain and deep subsidies for construction were tools that federal, state, and local leaders used to engineer new programs and powers, including, most notably, Title I Slum Clearance and Mitchell Lama middle-income housing. The unions needed no encouragement, as they had been eager to rehouse their members in new housing since the 1920s, but Construction Coordinator Robert Moses, Mayor Robert F. Wagner, and Governor Nelson Rockefeller, among others, successfully attracted private builders to urban renewal in the 1950s and 1960s.

Once designated by the government, private partners in urban renewal were charged with developing both spacious, modern apartments and a new kind of neighborhood. Civic leaders mandated that new high-rise, private projects reduce ground coverage and population density overall.
Participating builders had to accept these standards even though they might have preferred to replace old tenements with more profitable and densely developed apartment houses.

The Penn South Title I project (1962) reflected the density reduction strategy in full flower. Sponsored by the United Housing Foundation, a consortium of labor unions, the vast cooperative project targeted a tenement district in Chelsea with high lot coverage and population density. Penn South’s 20- and 21-story brick towers reduced building coverage from 70-90% to just 17%. The lawns and parking lots, to say nothing of the spacious apartments with balconies, proposed a new way of middle-class life within the city itself. The final population density of just 302 pp/acre, however, was half that of the neighborhood it replaced, leading to significant displacement of tenants with income insufficient for the new project.

The popularity of Penn South, and similar projects under Title I and Mitchell Lama, confirmed for their sponsors that they had succeeded in delivering the highest quality environment ever sold to the lower/middle class in New York’s history. Although some contemporary critics such as Jane Jacobs and Lawrence Halprin complained of the low density and uninspiring landscape, Penn South remains a successful cooperative beloved by its residents today.
Tower in the Park

“Tower in the park” is the shorthand phrase that describes the master-planning approach of most public- and publicly-assisted housing constructed in New York from the late 1930s through the 1970s. The architectural form and planning theory had its origins in European modernism of the 1920s and especially in the ideas of the Swiss/French architect Le Corbusier. The avant-garde model of European social housing emphasized simple functionalist buildings, unadorned by design. The “park” aspect of the formula emphasized ample landscaped open space between buildings and access to sunlight. The European buildings were multi-stories, but rarely truly “towers.”

NYCHA architects and the many private firms they worked with integrated modernist planning principles into the dominant strategy of density reduction. For them, the ideology of open space and sunlight was paramount – but also matched by necessity of economy, achieved through standardization. Uniform buildings, replicated on a large scale, cut construction costs and achieved economies of scale. According to NYCHA architects, “two factors largely shaped the buildings of this period: efficient use of elevators and fireproof construction.” Buildings spelled out an alphabet of X, T, and Y site plans, leading to “complete standardization of exterior detail: red brick with standard window types and little or no elaboration such as balconies.”

The height of typical NYCHA buildings grew substantially from the six-story formulas at Queensbridge and Vladeck Houses. Typical 1940s and 1950s NYCHA projects in Manhattan often ranged from 10-16 stories, and by the late 1950s could rise to 20 stories. There was an obvious logic to using taller buildings to multiply the number of people housed: that was, after all, the strategy of private developers Fred French or Henry Mandel at Knickerbocker Village and London Terrace. But NYCHA architects were committed to maximizing open space, so where they made the buildings taller, they traded the “vertical density” in the towers for more open space on the ground. The most extreme example was uptown at the Polo Grounds Houses (1968) where four 30-story towers covered only 12 percent of the vast site.
The tower-in-the-park model became ubiquitous in the postwar years, not just for NYCHA projects, but for all publicly-assisted housing in the metropolitan area and beyond. All seventeen of the Title 1 projects proposed by Robert Moses and the Mayor’s Committee on Slum Clearance in 1956 used it. As Moses summarized bluntly: “to accommodate large numbers of people more comfortably, the answer is vertical construction on less land. Instead of building four or five stories, covering 80 or 85 percent of the land, you go up four or five times as high on 20 percent coverage. This will leave plenty of open space, playgrounds for kids, and better views.”
Minimal Density

The final chapter in the policy and programs of density reduction took place in new large-scale communities underwritten by New York State through the Mitchell Lama program. State and City housing administrators had come to believe that projects had to be large enough to reset the environment of whole neighborhoods. Having experienced problems with some smaller projects inserted into declining neighborhoods in the Bronx and Brooklyn, officials concluded that big projects with low density were the best way to compete with suburbia.

During the 1960s the United Housing Foundation would sponsor tens of thousands of units, the most of any non-profit sponsor. At vast cooperatives like Rochdale Village and Co-op City, the UHF built communities that looked urban from a distance, but on closer inspection were not terribly distinct from suburban areas. Thanks to large, cheap, and vacant parcels of land, tall buildings, and large single-family apartments, the density levels per person were very low. Co-op City, constructed from 1968-75 with 15,382 units, boasted 33-story towers that covered just 15 percent of the land and delivered just 51 pp/acre.
Some critics, architects and planners, disillusioned by the widely spaced towers floating in undifferentiated greenspace, sought alternatives to formulaic towers in the 1960s and ‘70s. The State’s Urban Development Corporation (1968) was a short-lived but powerful force for reforming the density reduction ideology, including a “low-rise, high-density” program of housing that its proponents believed was better scaled to human needs and community life. But the cancellation of federal housing programs, and the collapse of the UDC that followed in 1975, ended these promising density experiments.

Density diagram, The Skyscraper Museum
View of the “History of Crowding” wall (left) and the main gallery (right). Photograph by Michael Young.

HISTORY OF CROWDING

After the Timeline that outlines the themes and types of housing solutions surveyed in the exhibition – from crowded tenements to new forms of private-market skyscraper complexes such as Tudor City and London Terrace, the invention of large-scale, low-density public housing, and the postwar examples of slum clearance and “tower in the park” publicly-assisted projects – the next section of the exhibit summarizes the analysis of the densities of the examples and presents icon graphics that allow comparisons. These density diagrams compare different measurements of density – population density, or the average people per acre, and built density, as height, volume, and percentage of lot coverage – of twelve historical case-studies.

An additional section of the wall mural zig-zags between photographs of tenements at different scales and illustrations and texts that describe the history of tenement crowding and reform movements.
Immigration and Overcrowding

New York’s slumlords began erecting purpose-built tenements before the Civil War, and by 1866, reformers had already noted that “a degree of crowding has been attained which by itself has become a subject of sanitary inquiry and public concern.” The situation worsened in the following decades as landlords and builders met the exploding need for housing in areas like the Lower East Side by packing taller walk-ups onto narrow lots and renting apartments by the room. Light barely penetrated to lower floors and windowless rooms were a byproduct of overbuilt lots. In a typical tenement of the era, a toxic privy blighted what little open space remained. Overcrowded apartments exacerbated problems, such as the spread of disease from shared hall toilets or death from fire.

Immigration fueled the need for working-class housing. By 1900, the population of New York City had grown to more than 3.4 million, of which 1,270,080 (37 percent) were foreign born. Nearly two-thirds of New Yorkers (2.3 million) occupied some 82,000 tenements, about half of which (42,000) were in Manhattan. The neighborhoods with the most tenements reached unprecedented levels of crowding. In 1903, in the Tenth Ward on the Lower East Side, the average density was a striking 665 people per acre, and one particularly dense block packed 2,223 residents into just two acres – averaging more than a thousand persons per acre. Historian Andrew Dolkart reports that the block’s 34 buildings primarily housed those newly arrived from Russia: “Of the 310 heads of families, 186 were of Russian parentage; the next largest groups were from Austria-Hungary (52) and Germany (29).” Many of these newly arrived families were large, even though the apartments were small: of the 310 tenement families, 176 had five or more members.

The maps of density and foreign-born nationalities, commissioned in 1894 by the Tenement House Committee, and published in Harper’s Weekly in January 19, 1895, offer details.

High land values, weak building laws, and population pressure encouraged new tenement construction in other emerging neighborhoods such as East Harlem, Williamsburg, and Brownsville. It was hard to shake tenement life for working-class New Yorkers.
To say that in one section of the City the density of population is 1,000 to the acre and that the greatest density of population in the most densely populated part of Bombay is but 759 to the acre, in Prague 485 to the acre, in Paris 434, in London 365, in Glasgow 350, in Calcutta 204, gives one no adequate realization of the state of affairs. No more does it to say that in many city blocks on the East Side there is often a population of from 2,000 to 3,000 persons, a population equal to that of a good-sized village. The only way that one can understand the real conditions is to go down into the streets of these districts and see the thousands of persons thronging them and making them impassable.

— (Report of the New York City Commission on Congestion and Population, 1911, p. 5)

There were in Manhattan, in 1905, 122 blocks with a density of 750 to the acre, and 30 blocks with a density of 1,000 or over to the acre, counting in the acreage of such blocks one-half of the area of the bounding streets.

— (Report of the New York City Commission on Congestion and Population, 1911, p. 7)

In dealing with established conditions of overcrowding, it may be that the only economically sound policy is to promote the removal of part of the population to other areas.

Housing Density: From Tenements to Towers

**The Evils of High Lot Coverage**

As tenements evolved into 4- or 5-story walkups covering 90 percent of their narrow lots, they aligned to create dense blocks. High ground coverage was a predictable response to Manhattan's high land costs, but dense tenement districts created sinister conditions. “Slum” problems of crime, disease, and family breakdown resulted from a complex mix of bad-quality housing (windowless rooms, shared toilets, etc.) with social issues of poverty, overcrowding, poor medical care, and exploitative working conditions. Ameliorating slums by upending American capitalism and politics posed a challenge. Lowering ground coverage and mandating higher building standards became, by contrast, an appealing technocratic solution for architects and reformers.

Reedy tenement owners, who had fatally weakened laws passed in 1867 and 1879 helped the reformers' case. The 1879 law, for instance, had grandfathered in the worst tenements and largely ignored fire safety and sanitation standards of shared hall toilets. The resulting “dumbbell” tenements with their narrow, enclosed airshafts typified the evils of high lot coverage and “slum life.”

The 1901 Tenement House Law, which finally mandated larger lot sizes, courtyards, modern amenities (heat, hot water, larger rooms, and private bathrooms), and included a regulation limiting overcrowding,
was a watershed. Still, these “New Law Tenements” – tens of thousands of which rose across the city – could be built at 70 percent coverage on mid-block lots and at 90 percent at corners, but the larger courtyards required demanded they occupy at least two of New York’s narrow lots.

In the minds of the real estate industry and even of many reformers, the New Law Tenement had solved the problems of dense ground coverage by delivering larger light courts, brighter and better ventilated apartments, private sanitary and water facilities, modern heating, and better fire safety. Housing idealists remained unconvinced. To their dismay, many Old Law tenements survived and there were minimal penalties for allowing buildings to rot or remain substandard. New Law tenements also compared unfavorably with garden apartments in Queens and the Bronx, and reformers preferred models of modernist social housing being created in Europe in the interwar years.

*In Manhattan over one-fourth of the blocks were covered solidly by buildings or had less than 11 percent of the area not covered and over half of the blocks had less than 21 percent, of the area not covered by buildings.*

— (Report of the New York City Commission on Congestion and Population, 1911, p. 9)

*The most deep-seated evil of the tenement districts in Manhattan lies in the extension of buildings over the rear parts of the lots notwithstanding that much of the rear building was more sanitary and durable than the front building; in other words, in the occupation of space which should never have been built upon. The dark bedroom was the product of this rear building, first beginning with two stories and then gradually raised, often without strengthening of the walls, to five or six stories.*


*(A 1903 report by Robert W. de Forest and Lawrence Veiller) drew attention to the fact that the evils of the tenement houses were primarily “insufficiency of light and air due to narrow courts or air shafts, undue height, the occupation by the building, or by the adjacent buildings, of too great a proportion of the lot areas.” This was put down as the major evil, and the principal recommendation was to correct this evil by new tenements with large courts providing light and ventilation for every room in the buildings. An enormous number of new tenements having more ample light and air than the old tenements have been erected.*

Housing Density: From Tenements to Towers

Left: East Harlem tenements at 101-03 East 114th Street, May 1943. These blocks would be torn down as part of a 12-acre site to build the James Weldon Johnson Houses. NYCHA Collection, La Guardia and Wagner Archives, LAGCC, CUNY. Right: Children playing on an empty lot in East Harlem, September 1951. This is part of a 17-acre site that was razed to build the 1959 Jefferson Houses, bordered by First and Third Avenues, East 112th and East 115th Streets. NYCHA Collection, La Guardia and Wagner Archives, LAGCC, CUNY.

Left: Map showing the Penn South site before urban renewal, published in the report “Penn Station South – Slum Clearance Plan Under Title 1 of the Housing Act of 1949 as Amended,” New York Planning Commission, August 1957. Courtesy of Andrew Alpern. Right: Firemen battle smoke from the top floor of a tenement next to the elevated, April 1937. NYCHA.

Abandonment and Decay

In the first four decades of the twentieth century, the city lost 19,000 of its 82,000 old law tenements to abandonment. Some owners evicted tenants and boarded up buildings rather than raise them to 1901 (New Law) or 1929 (Multiple Dwelling Law) health and safety standards. Many owners held onto their derelict properties, despite fines and obsolescence, not only because upgrades were uneconomic, but because they believed future redevelopment would deliver higher prices for the underlying Manhattan land. Added to the old issue of overcrowding, still a serious factor in segregated areas like Harlem, empty tenements often caught fire and threatened lives in adjoining structures. Vermin multiplied in rotting walls and basements. Tenements, in sum, remained a public health issue and impeded general neighborhood improvement.
City leaders had intentionally destroyed tenements during the Great Depression in the name of public health and to make space for civic improvements such as roads, parks, and public housing. Yet tens of thousands of old law tenements survived this civic blitz and remained a crucial piece of the housing market. In 1939, for instance, the 58,000 remaining old law buildings still counted for 38 percent of all city apartments and 2 million poor city residents still inhabited them. Many tenements filled back up during World War II, as well as in and 1950s and Sixties, thanks to the African-American and Puerto Rican migration.

The persistence of squalid, overcrowded tenements remained a broad civic concern during the 1940s and 1950s. Using a mix of city, state, and federal funds—and aggressive implementation of eminent domain—city leaders attacked tenement districts at an unprecedented rate. By the Fifties, however, many began to wonder if the remedy was worse than the disease. Fewer displaced tenement dwellers were rehoused in low-density projects than units were created — raising questions about eliminating even substandard housing without an adequate replacement.

*It is safe to say that almost no city needs to tolerate slums. There are plenty of ways of getting rid of them.*

— Robert Moses (“Slums and City Planning,” The Atlantic, January 1945 Issue)

*It is astounding that anyone in local elected or appointed office, anyone with capital and places to risk it, any cooperative group, any prudent conservative bank or loaning agency not compelled to do so, is willing to run the gauntlet and brave the brick bats, rotten eggs and dead cats on the way to slum clearance.*

— Robert Moses (Speech On Slum Clearance, NYC Municipal Archives WNYC Collection, Apr 17, 1958)

*Everybody, it would seem, is for the rebuilding of our cities...But this is not the same as liking cities...most of the rebuilding under way and in prospect is being done by people who don’t like cities. They do not merely dislike the noise and the dirt and the congestion. They dislike the city’s variety and concentration, its tension, its hustle and bustle. The new redevelopment projects will be physically in the city, but in spirit they deny it – and the values that since the beginning of civilization have always been at the heart of great cities.*


*No more than 15 percent of those displaced from renewal areas moved into public housing. The rest faced higher rents, and non-whites in particular moved to other slums. Title I aggravated a housing problem by reducing the supply of low-income housing.*

— Hillary Ballon (included in Roberta Brandes Gratz’s article “Robert Moses Reconsidered: Blight Is in the Eye of the Beholder,” Citylimits.org, April 2, 2007)
The exhibition cases feature models of housing projects at the same scale. One might think that an easy way to increase density is to add more floors to a building. But these projects show that more height does not necessarily mean more density. The “people per acre” density calculations for these projects – left to right: Queensbridge, Penn South, and Silver Towers – are 189, 302, and 76 ppa. That is because lot coverage and unit size are factors affecting the average density.
High-Rise, High Density

Before the Wall Street Crash of late October 1929, real estate development in New York was advancing at full tilt, with skyscrapers growing in both number and scale. The Chrysler Building and 40 Wall Street were competing for the title of world’s tallest building when the announcement of the future Empire State Building surpassed them by 200 feet. Residential projects of unprecedented size were likewise erected by a few bold private developers, notably Fred French and Henry Mandel. Both men began their careers in real estate in the early 1900s constructing single buildings – first high-rise apartments, then office buildings. The key to their larger ambitions and vision was a talent for assembling large sites from many smaller lots and for securing financing for their massive projects.

Located on the eastern end of the major crosstown thoroughfare of 42nd Street, just two avenues from Grand Central Terminal, Tudor City rose on a hilly site of nearly four city blocks occupied principally by rundown tenements that backed up at the First Avenue waterfront and a series of slaughterhouses. French’s concept was to fashion an enclave of turreted, Tudor-themed residential towers rising in a landscaped park. The small apartment units were marketed to the “average salary earner” and were made appealing by the ample open space of private gardens, amenities, and careful community controls. French called his approach to development “scientific rebuilding” and maintained that destruction was required to change the entire atmosphere of a neighborhood so it could compete with the suburbs. His vision for a new district in the city was as bold as his innovations in financing, which pioneered selling small-denomination stocks — what he called the French Plan — in his real estate company.

While Tudor City flourished, the perils of private-sector redevelopment emerged at French’s next major project, Knickerbocker Village, located on the Lower East Side near the Manhattan Bridge. When his plans, which included the demolition of the infamous “Lung Block,” faltered in the Depression economy, he was left holding 14.5 acres of tenement property, optioned at about $14 psf. In 1933, French went hat-in-hand to the federal government’s Reconstruction Finance Corporation to beg for millions to realize his dream. Federal officials provided only enough for part of the project: two massive perimeter...
blocks that, at 12 stories, rose high above the surrounding tenements, yet covered just about half the land. The project achieved a density of 800 people per acre. NYCHA’s first Chair, Langdon Post, called Knickerbocker Village “new types of slums,” but the tenants disagreed after repairs were made to the hastily-built buildings.

**Left:** Knickerbocker Village (1934), developed by Fred French on the Lower East Side, c.1940. NYCHA Collection, La Guardia and Wagner Archives, LAGCC, CUNY. **Right:** Dedication of Knickerbocker Village. Former Governor Alfred E. Smith of New York is shown as he makes an address at the opening ceremony, on October 2, 1934. Press photo, ACME. The Skyscraper Museum.

Invitation to the opening ceremony of Knickerbocker Village, by the Fred F. French Companies, October 1934. Fred F. French Companies Records, NYPL.
NYCHA, Density Reduction

In 1934, as the Great Depression deepened, New York State established the New York City Housing Authority (NYCHA) as a vehicle for housing reformers to continue their campaign for both slum clearance and government assistance to construct housing for low-income families. Between 1934 and 1936, the authority demolished 1,100 Old Law tenements. NYCHA planners and architects evolved a program of density reduction that went far beyond any previous models. Both in number of units and
use of large sites, NYCHA’s scale afforded the opportunity to adjust the various site-planning factors with the goal of maximizing open space and sunlight. This aim is one of the least-understood aspects of NYCHA’s history.

The person most responsible for NYCHA’s housing models was Frederick Ackerman, the head of the Technical Division’s staff of architects and planners. A 1937 report titled “A Note on Site & Unit Planning,” prepared by Ackerman and his assistant William F. R. Ballard, laid out site diagram scenarios of different building configurations. These explored methods to maximize openness by means of adjusting the height, open space, and cost, as shown on the rear wall. NYCHA eventually shifted from bar-buildings to Y-plan buildings, seen in the Queensbridge model, and slowly moved towards the high-rise. The ranges of land coverage and people per acre set by Ackerman in the 1930s remained, and even decreased, during the following decades.

Ackerman’s obsession with open space stemmed from his desire to provide residents more light and air, as he believed that light should be maximized at the expense of other conditions — especially population density.
Queensbridge and Stuyvesant Town

New York City’s leaders pioneered a revolutionary vision of urban living: large-scale, master-planned, high-rise, low-density, apartment communities. The success of these places—with residents, the media, and designers—set the city on a path to density reduction in the decades that followed. In public housing, NYCHA developed the vast Queensbridge Houses (26 percent land coverage and 209 pp/acre) as an efficient, self-contained mini-city for the working-class with a central shopping district and community center. The site, a former industrial area, was purchased for just $1.00 a square foot, a bargain compared to Vladeck Houses on the Lower East Side ($3.76 per square foot). Fredrick Ackerman, chief architect of NYCHA, who defined Queensbridge’s parameters, encouraged 6-story elevator buildings to reduce the cost of expensive foundations. The design team economized by repeating the same building type across the entire site. With 3,142 units, the small, but efficient apartments boasted...
light in every room and modern sanitary and heating facilities. The primary on-site luxuries were the acres of trees and numerous playgrounds.

When Queensbridge opened in 1939, the first tenants (mostly white), were carefully selected nuclear families who agreed to be highly supervised by nosy housing assistants who kept close track of their incomes, housekeeping, and behavior. Queensbridge’s approach to design and tenancy was imitated, usually in much taller buildings, in the NYCHA projects that followed.
City leaders, most notably Robert Moses, also encouraged middle-class, large-scale, master-planned, low-density projects. Stuyvesant Town, developed by the private company Metropolitan Life Insurance, required a massive slum clearance program paid for largely by the city. Located between 14th and 20th streets and First Avenue to Avenue C, the 80-acre site replaced the Gas House district of gas storage tanks. Planned in 1942, the first buildings opened in 1947. The buildings of Stuyvesant Town covered only 26 percent of the site and delivered 302 pp/acre. Stacking up the 8,757 apartments in 15-story buildings failed to overcome the impact of low ground coverage. The all-white residents benefited from generous apartments, private green spaces, and neighborhood retail. Sponsors carefully managed occupancy to prevent crowding. Those families lucky enough to get apartments realized that they had gotten far more than just apartments—they were living in a new, lower density urban landscape that stood apart from the city and was secured by private police. Many would stay for decades.
Slum Clearance and Title I

The federal Title I redevelopment program of 1949 provided a powerful new tool for density reduction in postwar New York. Robert Moses, the City’s Construction Coordinator, who also dominated the Mayor’s Committee on Slum Clearance, combined eminent domain and local subsidies with generous Title 1 grants for site acquisition. The success of the Title I program depended upon participation by a mix of private and non-profit sponsors.

In the 1950s, the area south of Washington Square, today the province of the NYU campus, contained blocks of low-rent tenements and was considered a “blighted area.” It became an early target for two studies for slum clearance under the Title I program: Washington Square South and the South Village. The architectural firm Skidmore, Owings & Merrill (SOM) prepared reports shown on the rear wall: neither was built as drawn, but a large swath of tenements from LaGuardia Place to Mercer Street, north of Houston was cleared for redevelopment.

As built, Washington Square Village (1959) was a superblock project that delivered 1,292 apartments in two parallel slabs set in spacious landscaped gardens. Demand for the bright, modern units was surprising weak, however, so the private developers Paul Tishman and Morton S. Wolf sold the project to NYU in 1964 for graduate and faculty housing.
Intent on building out areas near the campus bulldozed under the Title I plan, NYU commissioned I. M. Pei Associates to design the three-building complex Silver Towers (1965) for additional university housing. The trio of 30-story concrete towers with oversized windows broke with the standardized postwar slabs and marked one of the most architecturally significant of Title I Mitchell Lama projects targeted towards middle-class residents.

The dramatic reduction of land costs made possible by government subsidies reduced pressure on developers for higher-density housing in projects like these across the city. For many years, Robert Moses received wide support from journalists, city officials, non-profit leaders, and the business community for his Title I projects.
Postwar, the private sector showed signs of renewed interest in high-density housing. The resurgence of the city’s service sector, as embodied in gleaming office towers of midtown, indicated a real estate vitality not seen in the city since the 1920s. Modernist apartment projects pointed the way to stylish, in-town living that would have been familiar to Fred French, had he lived to see their development.

Located between 65th and 66th streets between Second and Third avenues, Manhattan House (1947-51) occupied a full block in an area that was undergoing significant change as the elevated train tracks that had imprisoned that swath of the city were either recently demolished or scheduled for demolition. An old trolley barn, tenements, and assorted commercial buildings were so affordably priced that New York Life bought extra property in the surrounding blocks.

The clean, crisp modernist design by architect Gordon Bunshaft, principal at Skidmore, Owings & Merrill (SOM), which was associated with the firm Mayer & Whittlesey on the project, was an immediate success and attracted famous tenants such as Benny Goodman, Grace Kelly, and furniture designer Florence Knoll, as well as Bunshaft himself. The apartments were spacious, but the overall density was an impressive 478 pp/acre. Thanks to New York Life’s interest in long-term profits, the building was
more “tower in a garden” than “tower in the park” and covered a higher percentage of land (59 percent) than the vast publicly subsidized projects that were its contemporaries.

Manhattan House inspired its share of glazed brick imitators, but the truth about private investment in postwar New York was grim. With unrelenting middle-class flight, the demand for high-quality, higher-priced apartments in Manhattan remained comparatively weak. Density reduction, given these facts, made more sense to both private and public developers. Had density levels of Manhattan House been pursued across large areas of the city during the postwar years, it is likely that the city would already be accustomed to much greater density as is the case in crowded cities like Hong Kong. Instead, market failure in postwar New York was used to justify an aggressive strategy of subsidized low-density living.
Labor unions were enamored with density reduction because many of their members and leaders had endured tenement crowding. Unsentimental about the old neighborhoods, they endorsed their replacement with modern, comfortable, well-located apartments. The United Housing Foundation (UHF), a consortium of labor unions led by Abraham Kazan, was a major partner in Title I and the largest sponsor, by far, of the state Mitchell Lama program. The UHF, with the help of Robert Moses and Governor Nelson Rockefeller, used low-cost mortgages, site-acquisition assistance, and other subsidies to build a social democratic vision of urban living. Apartment dwellers would manage their own housing as “cooperators.” Profits were limited and amenities for tenants compensated for other problems in a declining neighborhood.

A stand-out project of this new model was Penn South, developed in 1962 as a cooperative by the UHF, on an urban renewal site stretching from West 23rd to 29th streets from Eighth to Ninth avenues. The federal government’s Title I program underwrote the project as “part of the overall plan to eliminate substandard areas in the City and create in their stead sound, permanent reuse areas for housing and community facilities.” The widely-spaced towers replaced a “blighted area” heavily built up with Old Law
and New Law tenements that covered 70 to 90 percent of their lots. The land was purchased through eminent domain at the very reasonable price of $4 a square foot.

UHF in-house architect Herman Jessor laid out Penn South as a superblock offering a “unified area with long vistas of landscaped gardens.” With low land coverage of just 17 percent, the sponsor was required to go up to 20 and 21 stories to provide an average of 280 apartments per building in order to make the project economically feasible. The density level of 302 pp/acre was achieved by stacking all the families on the small built areas. The large size of the units, big balconies, and the careful control of tenancy through a cooperative management plan meant that there was little chance of overcrowding.

Yet there was a price to be paid for project development. Thousands of poor site tenants were displaced; large areas of these projects went underbuilt and remain so today; class lines sharpened between those inside and outside these communities; many cooperatives encountered management difficulties; the projects offered little or nothing in service to neighborhoods around them; and their park surroundings undermined the vitality of neighborhood commercial districts.
Towers in the Park

The dreams of New York’s housing reformers – a revolutionary vision of urban living in master-planned, low-density, high-rise apartment communities – were realized in postwar New York. From the 1940s to the 1960s, bulldozers tore down block after block in neighborhoods such as Harlem, Brownsville, and the Lower East Side; in the place of the dense tenement and commercial blocks rose standardized red-brick towers. Some redeveloped blocks were all public housing, while others filled in with subsidized middle-class projects. Yet they all had something in common: the “towers in the park” model.

Postwar NYCHA towers such as those of Manhattanville Houses (20 stories) or Polo Grounds Towers (30 stories) dwarfed pioneering 6-story projects like Queensbridge Houses. Additional height was a result of improved construction technology, but rarely meant greater population or built density. Still in the thrall of a density-reduction strategy, and limited by government funding in the total number of units they could build, administrators created postwar superblocks far larger than was required to guarantee light
and air in every apartment. De-mapped streets boosted open space percentages, further isolating buildings from the grid. Car-free pathways, often lined by benches, threaded project grounds and offered shady walks as the canopy of London Plane trees matured. System-wide, by the 1960s towers covered just 18 percent of their sites, which was a point of pride among NYCHA administrators. Yet these superblocks lacked the vitality that stores, services, and restaurants gave to traditional New York neighborhoods.

The tower in the park was also the model for Robert Moses’s private-sector and non-profit partners in a variety of state-subsidized housing programs. An early example of postwar middle-income housing was Queensview (1950) in Long Island City. Subsidized by New York State’s Redevelopment Companies Law, and targeted for veteran families, it featured freestanding blocks that maximized sunlight in apartments and open space between towers and abundant parking. The popularity of Queensview encouraged deeper state subsidies. Most of the succeeding developers in middle-income programs, later known as Mitchell Lama, would adopt towers in the park to achieve the density-reduction strategy.
Critics

Jane Jacobs:

Already by the late 1950s, critics of the “towers in the park” and superblock planning began to publish influential essays that took on the modernist orthodoxies. The most famous of these critics today is Jane Jacobs (1916–2006), who in 1961 published her classic book The Death and Life of Great American Cities. A resident of the West Village and owner of a three-story row house at 555 Hudson, Jacobs became the defender and eloquent evangelist of traditional streets and mixed-use neighborhoods.

In Chapter 11 of Death and Life, “The Need for Concentration,” Jacobs argued against the standardization of buildings and the emphasis on open space in new housing projects. In careful and complex analysis, she recommended a much higher person-per-acre density for vibrant and successful neighborhoods. She was a fierce critic of formulas and called the calculations of “average” density – raw
figures of persons per acre — a “statistical monstrosity much used by reformers.” Nevertheless, pushed to quantify, her target ideal density was about 500 pp/acre.

**Lawrence Halprin:**

Lawrence Halprin (1916–2009), a leading American landscape architect of the postwar era who was born and bred in Brooklyn, but practiced in San Francisco, was invited by the John V. Lindsay administration to consult on ways the city could repair the damage done to the urban and social fabric by sterile, and often dangerous, tower-in-the-park projects. His team’s report, New York, New York; a study of the quality, character, and meaning of open space in urban design, was broad and brilliant, offering ideas as relevant for today as building on the housing projects’ parking lots.

In general, Halprin called for increasing density, both of population and built area, which he maintained would create more vital neighborhoods. Although he was as careful as Jacobs to warn of the difficulty of any analysis of ideal densities, he ventured: “certainly 500-600 persons per acre is acceptable with the new technologies and new methods of achieving amenity.”

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**Jane Jacobs. The Death and Life of Great American Cities:**

*High dwelling densities have a bad name in orthodox planning and housing theory. They are supposed to lead to every kind of difficulty and failure.*

*But in our cities, at least, this supposed correlation between high densities and trouble, or high densities and slums, is simply incorrect, as anyone who troubles to look at real cities can see.*

*One reason why low city densities conventionally have a good name, unjustified by the facts, and why high city densities have a bad name, equally unjustified, is that high densities of dwellings and overcrowding of dwellings are often confused. High densities mean large numbers of dwellings per acre of land. Overcrowding means too many people in a dwelling for the number of rooms it contains. The census definition of overcrowding is 1.5 persons per room or more. It has nothing to do with the number of dwellings on the land, just as in real life high densities have nothing to do with overcrowding....*  

*Adding further to the confusion came a statistical monstrosity much used by reformers to aid their housing project crusades—a raw figure of numbers of persons per acre.*  

*Nor does slum clearance as practiced in our cities usually have anything to do with solving the problem of overcrowding. Instead, slum clearance and renewal typically add to that problem. When old buildings are replaced with new projects, the dwelling densities are often made lower than they were, so there are fewer dwellings in a district than before. Even if the same dwelling densities are repeated, or lifted a little, fewer people are accommodated than were put out, because the people who were displaced were often overcrowded.*  

*In the city of enough people in enough dwellings, the diversity can be generated and people can develop attachment and loyalty to their unique neighborhood mixture of things...*  

*Overcrowding within dwellings or rooms, in our country, is almost always a symptom of poverty or of being discriminated against, and it is one (but only one) of many infuriating and discouraging liabilities of being very poor or of being victimized by residential discrimination, or both.*
What are proper densities for city dwellings?...Just so, proper city dwelling densities are a matter of performance. They cannot be based on abstractions about the quantities of land that ideally should be allotted for so-and-so many people (living in some docile, imaginary society).

Densities are too low, or too high, when they frustrate city diversity instead of abetting it...

... As a general rule, I think 100 dwellings per acre will be found to be too low.

...How high “should” city dwelling densities go? How high can they go?

Obviously, if the object is vital city life, the dwelling densities should go as high as they need to go to stimulate the maximum potential diversity in a district. Why waste a city district’s and a city population’s potential for creating interesting and vigorous city life?

This is fatal, because great diversity in age and types of buildings has a direct, explicit connection with diversity of population, diversity of enterprises and diversity of scenes.

Popular high-density city areas have considerable variation among their buildings—sometimes immense variation. Greenwich Village is such a place. These averages are obtained from mixtures of everything from single-family houses, houses with flats, tenements and all kinds of small apartment houses and flats, on up to elevator apartments of many different ages and sizes.

The reason Greenwich Village can reconcile such high densities with such great variety is that a high proportion of the land which is devoted to residences (called net residential acres) is covered with buildings. Relatively little is left open and unbuilt upon. In most parts, the buildings cover the residential land at averages estimated as ranging from 60 percent to 80 percent of the land, leaving the other 40 percent to 20 percent of the land unbuilt on as yards, courts and the like. This is a high ratio of ground coverage. It is so efficient a use of the land itself, that it permits a good deal of “inefficiency” in buildings. Most of them need not be highly efficient at packing, but even so, high average densities are reached.

Now, suppose that only 15 percent to 25 percent of the residential land is built upon, and the other 75 percent to 85 percent is left open and unbuilt on. These are common figures for housing projects, with their expanses of open land which are so hard to control in city life and produce so much vacuity and trouble. More open land means remarkably less building space.

If open land is doubled from 40 percent and becomes 80 percent, the amount of land that can be built upon is cut by two thirds! Instead of having 60 percent of the land to build on, you have only 20 percent to build on.

When so much land is left open, the land itself is being used “inefficiently” so far as packing dwellings on it is concerned. The strait jacket is very tight when only 20 percent or 25 percent can be built upon. The density of dwellings must be very low, or, alternatively, dwellings must be packed with great efficiency onto the fraction of the ground that can take the buildings. Under these circumstances, it is impossible to reconcile high densities with variety. Elevator apartments, and often very high ones, are unavoidable.

.... I doubt that it is possible, without drastic standardization, to go higher than the North End’s density of 275 dwellings per net acre. For most districts—lacking the North End’s peculiar and long heritage of different building types—the ultimate danger mark imposing standardization must be considerably lower; I should guess, roughly, that it is apt to hover at about 200 dwellings to the net acre.
... cities need high dwelling densities and high net ground coverages...

...Systems of thought, no matter how objective they may purport to be, have underlying emotional bases and values. The development of modern city planning and housing reform has been emotionally based on a glum reluctance to accept city concentrations of people as desirable...

No good for cities or for their design, planning, economics or people, can come of the emotional assumption that dense city populations are, per se, undesirable. In my view, they are an asset. The task is to promote the city life of city people, housed, let us hope, in concentrations both dense enough and diverse enough to offer them a decent chance at developing city life.
From 1885 until 1961, the height of residential buildings in New York City (except hotels) was limited by absolute height caps. These caps, which were established by either city or state law, were based on the width of the street – wide or narrow – so that, especially on Manhattan’s grid, wide avenues could have taller buildings than narrow cross streets. Although height limits moved up slightly over the years, in general, residential buildings could not rise above 125 feet (about 10 stories) on narrow streets, and 150 feet (about 12 stories) on wide streets. The city’s first zoning law, passed in 1916, regulated only setbacks and lot coverage, so because of the low height caps, zoning had little effect on residential buildings. In 1929, a revision of the state Multiple Dwellings Law allowed apartment buildings on large lots sited on 100-foot avenues to rise to three times the width of the street, or 300 feet.

Housing Reforms Zoning

Today, zoning regulates all development across the city. What emerges from the history of housing recounted in this exhibition, however, is that, until 1961, zoning in fact had very little effect on the forms of residential architecture or public housing. The change to the formulas that so powerfully affect the city today is the result of the zoning revisions of 1961, which were shaped by the work of housing reformers of the 1930s who emphasized low density and open space and created the all-important new concept of Floor Area Ratio (FAR). The mechanism of FAR changed the previous system of a cap on height for residential buildings to a cap on floor area – i.e., a maximum buildable area in square feet, based on a multiple of the area of the lot.

Where did the concept of FAR originate? It is astonishing that the answer to this question, so determinative for the city’s built environment for more than half a century, has been so obscure. Although the idea existed in several precedents in the early 1930s, the specific lineage seems to lie in the work of Frederick L. Ackerman (1878-1950), the head of the Technical Division of NYCHA and his young deputy William Ballard (1905-1993). In 1934, the two authored a little known NYCHA study titled “The Population of New York City as Permitted by the Zoning and Multiple Dwelling Laws.” Their report was the first to explore – indeed to obsessively calculate – the total buildable area of both full blocks and of the city as a whole allowed under the 1916 zoning. Translating that volume (“bulk”) into floor area, and estimating the average floor space needed per person for work and for housing, they concluded that the city could accommodate more than 76 million people. That excessive number proved to them the need for reform.

Sixteen years later, in 1950, working as a consultant to the New York City Planning Commission, Ballard produced the Plan for Rezoning the City of New York. This major study outlined most of the revisions eventually incorporated in the 1961 law, including the citywide application of FAR formulas and an increase in open-space requirements for residential buildings. The drumbeat of the report, prepared by his firm Harrison, Ballard & Allen, argued that the 1916 zoning law allowed far too much built density. As in the earlier NYCHA study, Ballard keyed the buildable floor area to projections of future population and made specific recommendations for FAR limits.

As implemented in 1961, the reforms of the new law dramatically reduced the total amount of built density allowed citywide on both commercial and residential land, cutting the hypothetical total developable area of the city by more than three quarters. In addition, the new code’s low lot-coverage standards, including “tower in the park” zones, mandated that private developers build under guidelines formerly applied to subsidized housing only. Ballard became Chairman of the City Planning Commission from 1963 to 1966, overseeing the rules he helped to frame.

In the years that followed, though, the 1961 law collected critics among private developers, who complained the new rules made building uneconomic. This problem was addressed by a revision of the code in 1987 that introduced contextual zoning, a part of the Quality Housing Program. The QHP’s allowance, in certain districts, for additional FAR for new buildings that blended in with older ones (covering a higher percentage of lots, etc.) was a repudiation of the housing reform ethos that had prioritized open space over density and neighborhood context since the 1930s.
DISTRICTS

The centerpiece of the installation are large district models of Chelsea and East Harlem, which illustrate the contrasting building types and dramatically different site-planning strategies of private-market and public and publicly-assisted housing in two Manhattan neighborhoods. The projects analyzed are painted white, while the gray blocks of low- or medium-rise buildings show the surviving context of mostly tenements, row houses, commercial, or industrial structures that once covered the area.

The models emphasize built density – that is, the percentage of the lot covered by buildings – versus open space. The public- and publicly-assisted projects are extremely low density – in general, around 20 percent buildings and 80 percent open area. Superblocks that close some city streets further exaggerate the open space. By contrast, in Chelsea, the private-market developments of London Terrace and the High Line apartments cover 68 percent of their lots.

Open space affects average density, as does the number of stories per building and the number of units. London Terrace averages 931 people per acre and the Tate (2002) and 555 W 23 (2005), frame a block west of Tenth Avenue have densities of 775 and 800 pp/acre, respectively. In East Harlem, projects following the “tower in the park” model have much lower densities and lot coverages. Taft Houses (1962), for instance, has a density of 251 pp/acre and a lot coverage of 19 percent, and Jefferson Houses (1959) has only 191 pp/acre with a coverage of 20 percent.
Installation views of the Chelsea model.

Chelsea

The redevelopment of Chelsea began in 1930 with London Terrace, a private venture of the real estate entrepreneur Henry Mandel. A single block of fourteen contiguous buildings of 17 to 19 stories created a population density that equaled the most crowded tenements of the Lower East Side and today numbers 931 people per acre. The lot coverage was high at 68 percent, but a landscaped interior court afforded light, and cross ventilation.

Two recent market-rate rentals, The Tate (2002) and 555 W 23 (2005), frame a block west of Tenth Avenue and pack apartments into 14-story structures, creating densities of 775 and 800 pp/acre, respectively, by taking advantage of special zoning incentives implemented for the High Line district.

The other major projects highlighted in the model are public, or publicly-assisted housing. The western blocks of cruciform and slab towers set in ample open space are NYCHA’s Elliott (1947) and Chelsea Houses (1954), which both have densities of less than 300 pp/acre and cover only about one-fifth of their land with buildings.

The expansive open space at the center of the model is the superblock of Penn South (1962), a limited-equity housing cooperative housing project that de-mapped cross streets between 23rd and 29th streets and Eighth and Ninth avenues. Even though Penn South’s towers rise to 22 stories, the low lot coverage of 20 percent yields an average per person density across the site of just 302 pp/acre – one third the population density of London Terrace.

The underlying transparent yellow acrylic indicates blocks that are under-built in relation to the zoning law implemented in 1961 and revised in subsequent decades. The transparent red acrylic shows blocks that are overbuilt according to contemporary zoning.
Installation views of the East Harlem model.

**East Harlem**

This context model, showing a portion of East Harlem, illustrates the massive reduction in built density that resulted from city officials’ and NYCHA’s ambitious redevelopment program that targeted Harlem since the 1940s. The grey blocks of low or medium-rise buildings are mostly tenements, townhouses, or commercial structures that once covered much of the neighborhood. By 1957, NYCHA had cleared 137 acres of compact blocks like these to make space for its towers in the park.

Highlighted in white are NYCHA projects including Johnson Houses (1948), King Towers (1954), Jefferson Houses (1959), Taft Houses (1962), and Lehman Village (1963). The transparent yellow acrylic that underlies the NYCHA projects indicates that are under-built according to current New York zoning. Indeed, the multiple variations of “tower in the park” planning range in lot coverage, or built density, from just 16 to 20 percent.

The model also includes the twin octagonal towers of Schomburg Plaza (1974), a publicly-assisted Mitchell-Lama project built by the New York State Urban Development Corporation. The UDC’s exemption from the city’s zoning laws allowed for both the innovative design and higher density of lot coverage and people per acre – 63 percent and 677 people per acre – numbers otherwise found only in private-market models such as Manhattan House. The transparent red acrylic under Schomburg Plaza indicates it is more dense than zoning would allow.
The district models in the show were complemented by interactive screens that presented an array of graphics, data, and text about the districts. These included before-and-after aerial views, density diagrams, and basic data of the case studies within the district.
UNITS

In the calculus of measuring density, the last factor illustrated by the models created for the exhibition is the size and number of apartment units. The students built six models of apartment types in projects featured in the Chelsea and Harlem District Models. In addition, they created three models that addressed new strategies of in-fill housing that increased the built density/lot coverage on NYCHA sites and one project for “micro-units,” a prototype for apartments smaller than those generally allowed under the current building code.
The compiled plans for the apartments featured in the Unit cases allow comparisons across the economic types of private-market, public, and publicly-subsidized projects. The areas of the apartments range from 300 sq. ft. – for the 1863 typical tenement and for the 2016 Carmel Place micro-units – to the 960 sq. ft. Penn South union-built housing. It is notable that the 2-bedroom apartment in NYCHA’s Taft Houses in Harlem affords 720 sq. ft., the same as the 2002 luxury rental the Tate in Chelsea. The 1930 studio in the privately developed London Terrace contains 420 sq. ft. and remains a highly-desirable apartment today.

Of course, the number of people who occupy an apartment will also affect the average population density, especially if there is extreme overcrowding. Around 1900, buildings on the Lower East Side like 97 Orchard Street, now the Tenement Museum, could have apartments of 300 sq. ft. occupied by up to ten people. Today’s similarly-sized micro-units would be occupied by one or two people.

From the mid-1930s, public housing was designed for families, with two bedrooms for a standard family of four.
London Terrace

Completed in 1930, London Terrace was the densest apartment development in the city. Composed of fourteen inter-connected buildings, the complex occupied a full city block and enclosed a large landscaped courtyard. Developer Henry Mandel, like his contemporary Fred French, believed the future of New York lay in redevelopment of old neighborhoods into urbane blocks of high-rise buildings with abundant amenities. Apartments were small and rented mostly to individuals or childless couples.

The unit shown here, Type C, faces either the street or the interior courtyard. It is considered a studio—a large room with support spaces on either side. One side contains a generous kitchen; the other, the entry, bathroom, and “dressing room.”

Date: 1930

Units: 1,700

Shown: Studio Apartment, 420 SF
Penn South

In a bid to prove housing built by and for workers could be as high in quality as that built for profit, the sponsors employed a network of small corridors internal to the apartments to create separate zones of public and private use. An oversized foyer doubled as multivalent space between the entry, kitchen, and living room. The dimensions recalled pre-war market-rate apartments and could accommodate bookcases and grouped seating.

The living room opened through floor-to-ceiling glass doors onto a large balcony that offered ample sunlight and fresh air and compensated for the lack of cross-ventilation (central air conditioning kept the apartments cool in the summer). Grouping the bathroom and kitchen allowed for efficient distribution of building services and enhanced privacy. Bedrooms were placed on a corridor off the opposite side of the foyer, separated from the living areas by the bathroom and kitchen.

Date: 1962

Units: 2,820

Shown: 2 Bedroom Apartment, 900 SF
The Tate

The Tate, a project built under the City’s rezoning of the High Line area, represents the return of private development to Chelsea. More than 300 apartments are contained in two long street-front buildings of 11 stories and 14 stories, framing an internal courtyard. Residents of the Tate, like those of London Terrace, pay high rents for relatively small apartments, with the tight spaces compensated for by extensive amenities and attentive management. The many small units with high ground coverage produce high population density.

The through-block development has more than fifty different floor plans, from studios to three-bedroom units. The two-bedroom model shown here is typical, with a small alcove kitchen, separated from the main living spaces, and two bathrooms. These modest units—with high prices— are a market standard in many New York neighborhoods.

Date: 2002

Units: 313

Shown: 2 Bedroom Apartment, 960 SF
Schomburg Towers

Schomburg Towers are part of the Schomburg Plaza development, comprising twin, 35-story octagonal towers and a rectangular mid-rise slab, separated by a landscaped multi-level outdoor plaza. The Urban Development Corporation (UDC), reacting to criticisms of mass displacement in earlier slum-clearance projects, sought to house larger numbers of tenants on smaller sites. Schomburg’s taller buildings on smaller footprints, as well as small, but efficient units helped achieve density levels higher than most public housing projects.

Apartment sizes ranged from studios to five bedrooms, allowing for a mix of residences and occupant groups, building on the UDC’s desire to create neighborhoods consisting of both families and individuals. The octagonal layout centralized the building services, maximizing light to the units and minimizing internal circulation.

Date: 1975
Units: 600
Shown: 2 Bedroom Apartment, 800 SF
Taft Houses

Taft Houses Type A Building consists of full floors of two-bedroom units. These generously scaled apartments are similar to Chelsea’s Penn South development, with half the unit is devoted to private areas (bedrooms, bathrooms, and storage) and half to a spacious living room and a pass-through kitchen connected to a dining alcove. NYCHA administrators limited apartments to a nuclear family and banned boarders.

The combination of tight occupancy controls, large units, and low land coverage across sprawling superblock sites generated population density of just 410 persons per acre despite lofty 19-story buildings.

Date: 1962

Units: 1,470

Shown: 2 Bedroom Apartment, 720 SF
A Typical Tenement

While Harlem had many tenement blocks, this section depicts a unit at 97 Orchard Street, on Lower East Side, a typical tenement erected in the 1860s that today houses the Tenement Museum. This is a “modified” tenement typical of those predating the 1901 housing reforms that required an airshaft (3×3 feet), shared water closets in the stairwells, and “tuberculosis windows” that allowed light and air to penetrate from the street facade to interior rooms.

Landlords frequently rented these small apartments by the room and let tenants sublet to boarders. The overcrowding of these apartments, combined with extremely high lot coverage, generated the extreme population density of the Lower East Side.

Date: 1900

Units: 20

Shown: Apartment, 300 SF
New Strategies Units

The apartment models in this case illustrate recent experiments that use the strategy of allowing increased density to grow the city's supply of “affordable” housing – which means the project both needs some form of public subsidy to build and requires renters to document their income eligibility. As a response to the demand for more variety of housing types, these new projects generally include large numbers of compact units, higher lot coverage on small or residual sites, and mid-rise buildings with ground-floor community space or retail.
New Strategies Units

The first project built under New York City’s new “Extremely Low and Low-Income Affordability” (ELLA) program, Acacia Gardens was developed under the Harlem Rezoning of 2017. The corner development matched market standards of building organization, unit arrangements and size, and building amenities. The unit strategy helped deliver a higher density consistent with the rezoning goals.

The units are organized around a central area that acts as both foyer and visual center of the rooms. This rather large “open space” at the center of the apartment orients to the kitchen, entry, the bedrooms, and the living room, making an otherwise small unit feel spacious upon arrival.

Date: 2018

Units: 179

Shown: 2 Bedroom Apartment, 815 SF
Arbor House

Built as part of the NYCHA infill strategy using contextual zoning, Arbor House creates a new courtyard that relates to the existing NYCHA buildings. The small but efficient apartments, delivering density levels higher than the adjacent NYCHA project, are typical of new affordable housing in New York. The aim is to add housing that helps rebuild neighborhood vitality and street life without displacement of existing NYCHA tenants.

The unit layout is organized in three equal areas, with entry directly into the deep living space and bedrooms. The similar widths of the living room and bedrooms, along with the consistent location of the kitchens and bathrooms to the corridor, makes it easy to create unit mix variations from floor to floor.

Date: 2011
Units: 124
Shown: 2 Bedroom Apartment, 720 SF
Carmel Place

Carmel Place was the first micro-unit apartment building in NYC. The micro-unit strategy was widely hailed when first proposed because of the growing demand for apartments to house individuals and childless couples.

The tiny apartments offer an opportunity to develop small lots in desirable neighborhoods. The efficiency apartments, however, deliver only moderate density (even with high ground coverage on a small site) because they are not suitable for families. The architects aimed to achieve a sense of spaciousness through high ceilings, tall sliding windows, and Juliet balconies. Efficiency of space is delivered through flexible built-in furnishings that integrate storage, couch, and bed into the layout of almost half of the units. Modular construction techniques utilized in the project offered further efficiencies.

Date: 2016

Units: 20

Shown: Studio Apartment, 300 SF
EXHIBITION VIEWS

Co-curator Matthias Altwicker and his architecture students from NYIT developed the design concepts and refined work that resulted in the custom tables, outstanding models, and highly-didactic cases in the main gallery. The talent and hard work of the professor and students was a key component of the exhibition’s success.
View of the historical timeline (left), the “History of Crowding” wall (center), and the main gallery (left).

View of the main gallery.
Views of the model districts of Harlem (left) and Chelsea (right).

Closeup views of the model districts of Harlem (left) and Chelsea (right).
View of the Critics wall.
CREDITS

This exhibition is a collaboration between two teams, from the New York Institute of Technology (NYIT) and The Skyscraper Museum.

New York Institute of Technology

Co-Curators: Prof. Matthias Altwicker, AIA LEED AP, and Prof. Nicholas Dagen Bloom, Ph.D.

The historical framework and texts were the work of Nicholas Bloom, who over the course of the exhibition changed university affiliation to the Department of Urban Policy and Planning, Hunter College.

The analytical and exhibition models were created by NYIT students in a special studio, under the direction of Matthias Altwicker. For their extraordinary hard work, we thank: Jhancarlos Carvajal, Andrew Donnelly, Aimee Flanagan, Jamie Lopez-Lamar, Adrian Mierzwa, Gjuljana Mulosmanaj, Laura Perez, Francis Rodriguez, Anthony Rosas, Marcela Ona Sandoval, Hajdi Sinani, Eddy Voltaire.

The Skyscraper Museum

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Exhibition and graphic design: Leonardo Tamargo.

For their work on the project, the Museum thanks its staff and interns: Daniel Denci, Amhara Hernandez, Jose Hernandez, Stephanie Montalti, Merritt Rosen, Peter Sohmer, and Maya Silver.

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