Urban Infill for City Growth

Historically, infill was a primary strategy for city growth—reuse and repurposing of buildings no longer serving a useful function; efficient use of small, un-built parcels of land; or tearing down decaying structures and rebuilding. Archeologists exploring ancient city sites often find layers of buildings and foundations beneath current ruins. Modern streets and buildings in old cities like Rome are often perched on many feet of rubble above the original building sites.

New evidence suggests that growth in modern cities (despite the automobile and its identification with urban sprawl) tends to conform to an ancient pattern of urban development. A new study,[1] based on comprehensive archeological data collected in the 1960's in and around Mexico City and the pre-Hispanic Basin of Mexico, explores the underlying drivers of urban growth, both ancient and current—an approach known as "urban scaling theory." Researchers concluded that despite industrialization, the internal combustion engine, the evolution of political and economic models, and everything else we identify as making us more advanced than ancient civilizations, the drivers of urban growth remain

A single-family home in Pergamino, Argentina was rebuilt as the Transportation Workers Union Headquarters. Architects Franco Piccini and Carlos A. Piccini. Photo by Walter G. Salcedo, used with permission.

the same. As population increases, so does density in the central city core, allowing more social and economic interaction among inhabitants, and thereby increasing overall productivity. Greater density, usually achieved through infill projects, pulls a growing population into closer proximity, resulting in a more efficient and productive socioeconomic network.

Infill is a key strategy for growth

Reflecting on a key point of urban scaling theory, a city experiencing rapid population growth today more often than not will rely on infill projects to help ease residential and commercial building shortages. Rapid growth since the 1960's in southwestern urban areas of the U.S. has meant steady densification within such cities as Los Angeles, Las Vegas, Dallas/Fort Worth and Phoenix. The urban sprawl phenomenon, created primarily by automobile culture, is giving way to a gradual change in approach to land use regulation referred to as "smart growth"[2] or planned development that attempts to curb urban sprawl and worsening environmental conditions through strategies such as infill development and increased transportation options. If the research on urban scaling theory proves correct, urban sprawl and auto-centric comprehensive city planning may eventually appear to be a short deviation in the long history of urban growth, as we return to the traditional, and more satisfying model of increased density as the way to drive sustainability and productivity.

A report in 2012 from the Environmental Protection Agency[3] has studied the growing trend toward more infill projects in metropolitan areas. According to this report, "Nearly three out of four large metropolitan regions saw an increased share of infill housing development during 2005-2009

compared to 2000-2004. Among the 51 large metropolitan regions (population one million or greater) examined in this study, 36 saw an increased share of infill housing development during 2005-2009 compared to 2000-2004. In many regions, this increase was substantial... Infill accounted for one-fifth of new housing construction. Among all 209 metropolitan regions examined in this study, 21 percent of all new home-building occurred in previously developed areas."

An imaginative infill proposal titled "Polikatoikea," designed by Ana Luisa Soares and Filipe Magalhaes of the firm fala atelier, Porto, Portugal. Images used with permission, copyright fala atelier.

After World War II, automobile ownership rapidly increased, and the pressure for new housing led the building industry to adopt the least expensive form of city development: building in surrounding farmland or vacant land (greenfields). This resulted in a "leap-frog" approach to city growth, with rings of new suburban development overtaking previously built neighborhoods, as the city marched relentlessly into the surrounding countryside. Ordinances and zoning practices that have encouraged this car-based suburban culture include generous parking requirements for commercial businesses; zoning to separate commercial from residential development; rules dictating minimum housing units per acre; and a bias toward development of highways and large traffic arteries that ignore pedestrian, bicycle and public transportation access or options.

Infill, as currently reinterpreted within the concepts of community resilience, and energy and resource efficiency, has become a primary growth strategy for salvaging the commercial and communal potential of the inner urban core, and revitalizing tired and depleted first and second-ring suburbs. Communities have begun to assess the environmental, economic and quality of life costs of auto-intensive development patterns. This growth approach to planning and regulation focuses on creating accessibility for all residents as the path toward reviving the city center and its inner ring suburbs. Infill development, both as single buildings, larger developments or gardens and parks, is now a vital element of growth planning. Infill development can be tied to all the following elements:

- energy and resource efficiency
- mixed-use development
- diversity of housing choices
- efficient and economical use of infrastructure
- greenspace preservation
- integration of transportation options
- regionally-based long term planning

What makes infill an important growth strategy?

Infill supports planning that seeks first and foremost to increase accessibility to jobs, essential shopping, and daily activities by decreasing distances and increasing transit options, and providing more residential and business real estate options within a smaller geographical area. The most successful infill projects are integrated into overall neighborhood planning efforts with a high value on infill and redevelopment using existing infrastructure, strengthening existing neighborhoods, and preserving (or creating new) green space.

The Hintonburg Six Project, Montreal, Ontario, Canada. Architect: Colizza Bruni Architecture, Inc, Ottawa. Photo by Peter Fritz, used with permission.

Types of infill development

Infill development, or retrofitting underutilized buildings and land in urban and suburban neighborhoods, can take many forms. Assessment of community needs is a vital first step for infill development. Adaptive reuse of existing buildings can include abandoned big box retail stores, unoccupied factories, warehouses or industrial complexes, or old hotels/motels. A successful reuse project will depend largely on seeking out community wants and needs, and integrating the design into the existing neighborhood in such a way that it helps bring vitality back to the area.

Underutilized or abandoned land exists in both urban and suburban locations, and as single building lots or entire blocks. Building a new single or multi-family building on a vacant lot in a residential area is much less complex than designing a large infill development, but certain considerations must be observed, such as formal consistency with surrounding structures, and maintaining neighborhood setbacks and height requirements. The burden on local infrastructure and traffic patterns will likely be light, particularly if a new building is replacing one that was torn down.

Larger developments might include mixed-use buildings or significantly increased residential density. They will likely require integration with infrastructure improvements and advanced transportation design. Well-considered redevelopment of rundown areas, unused parking lots and other abandoned land can satisfy planning goals to increase density, walkability, and reduction of vehicle traffic, while creating a resilient and livable neighborhood.

Alexandra Residence, Montreal, Canada. Architect: naturehumaine, Montreal. Photo by Adrien Williams, used with permission.

Advantages of infill development

Infill development contributes to growing the capacity of a city within existing city limits, preserving the surrounding countryside for agriculture and recreation.

Infill projects can also make efficient use of city services readily available (or easily expandable)

in existing neighborhoods or city districts such as streets, water, natural gas, sewage and communications. An infill project can be a tipping point project to bring a partially vacant urban neighborhood back to life, offering attractive housing and mixed-use development, and bringing people closer to cultural attractions and restaurants within walking distance.

By increasing density with infill projects in old neighborhoods, public transportation becomes more efficient and less expensive. Higher density invites more creative transportation planning to serve the larger and more diverse population, including bicycle lanes and paths, shared streets, public transit options and transit-oriented development. New infill projects can increase neighborhood property values and encourage other redevelopment and renovation, thereby encouraging civic pride and lowering local crime rates.

Recommended Infill Design Tactics[4]

- **Reuse the box.** Reusing vacant commercial buildings to meet new communal space demands, ie. libraries, medical clinics, schools[5]
- **Provide environmental repair.** Revitalizing creeks, riverbanks and wetlands to rebuild the local watershed
- **Revise Zoning codes and public works standards.** Revisit the code structure and change what prevents mixed use and complete street development—move away from the auto-dependent development patterns that have long been the traditional approach
- **Improve connectivity for drivers, bicyclists and pedestrians.** Build interconnected street networks, complete streets and shared streets that encourage all types of transportation
- **Consider future connectivity and adaptability.** Plan for future improvements when greater density will become higher priority in the community by providing easements for potential network linkages
- **Use appropriate street types.** Focus on walkability in street upgrades and sensitivity to context
- **Keep block size walkable.** Pleasant neighborhoods for walking provide more appropriate scale for the slower pace of travel, and visual interest in a variety of buildings and landscaping.
- **Diversify housing choice and price.** Demographics continue to change—housing should reflect the flexibility required to keep a neighborhood vital.
- **Add new units to existing subdivisions.** ADUs (accessory dwelling units, or mother-in-law flats) can increase density without dramatically changing the neighborhood appearance.
- **Invest in quality architecture.** Well built, efficient and environmentally friendly building is worth the investment as a primary neighborhood sustainability approach.

Greenspace as infill

Also, re-greening or revitalization of green spaces through demolition of unused structures or land can increase ambience and walkability, making new outdoor public spaces available. For example, community gardens and parks are popular infill projects that involve residents and help revitalize neighborhoods.

103rd Street Community Garden, East Harlem, NYC. Design assistance provided by SCAPE/Landscape Architecture PLLC, Manhattan. Project was overseen by the New York Restoration Project, which also gave permission to use this photo. nyrp.org.
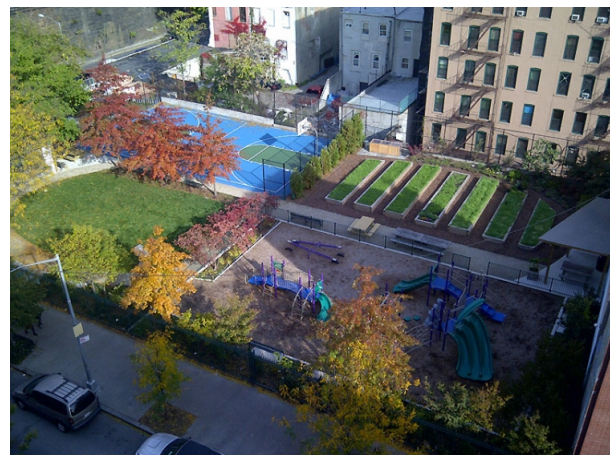
Planning for infill

The comprehensive planning process in a community is an excellent place to begin incorporating infill as one of the city's growth strategies. Initial steps might include identifying and mapping buildings or properties eligible for retrofit or redevelopment such as greyfield and brownfield locations and properties least efficiently used. Closely aligned to knowing where infill opportunities exist is identifying potential community needs, whether housing, shopping areas or public services.

Planners and planning boards should revisit zoning codes to eliminate or reduce parking requirements, setbacks, density limits and restrictions on multifamily housing. They will need to coordinate with city and utility services, and work with other government authorities on any necessary brownfield cleanup requirements. For larger projects, planners should establish guidelines to assure that projects maintain or coordinate with existing visual style.

To derive maximum benefit from a city infill strategy, city planners can work with other community priorities and growth initiatives, such as public/private development plans, economic development, and public health.[6] A new trend, based on an increasing population of older residents, is planning for lifelong communities—places where people can live their whole lives in a place where they can access all their needs.[7]

Community Based Infill Development[8]

Infill projects can originate from the neighborhood itself. This is the case with the Sawmill Community Land Trust redevelopment of a highly industrialized area of Albuquerque, New Mexico that had seen better days. Neighborhood concern had begun in the 1980's surrounding pollution produced by a particle-board plant, one of the last surviving businesses in an area dominated by the lumber industry since 1903. Residents in the area, many former lumber company employees, lived in small, owner-built homes near Albuquerque's historic Old Town. They began to realize that gentrification was about to drive housing prices out of reach for working families.

"Arbolera de Vida" single-family housing, Sawmill Community Land Trust. Development is located on 27 acres in the Sawmill neighborhood, directly north of Old Town in Albuquerque, New Mexico. Architect: Integrated Design and Architecture. Photo used with permission from the Sawmill

The non-profit Sawmill Community Land Trust was founded in 1996 and began working with the City of Albuquerque to transform what was essentially a 27-acre brownfield site into a master planned, affordable neighborhood. In a land trust, the residents own their homes but not the land, and they agree to the organization's cap on selling prices if they leave. The Land Trust later bought the site of the offending particle board factory, and on their total of 34 acres are now 93 single-family homes and three apartment complexes, including live/work lofts, senior housing, community gardens and a public plaza. The Sawmill Community Land trust has partnered with additional developers to create market-rate housing and to develop commercial opportunities in what is quickly becoming a diverse and popular place to live. The Land Trust itself has begun working to duplicate its model in other underserved neighborhoods around Albuquerque.

[1] Ortman, S.G. etal, Settlement scaling and increasing returns in a ancient society, February 1, 2015, Science Advances, Vol. 1 No. http://advances.sciencemag.org/content/1/1/e1400066

[2] Cox, Wendell, Special Report: Infill in US Urban Areas, 06/15/2009; published on newgeography website, http://www.newgeography.com/content/00852-special-report-infill-us-urban-areas. Downloaded 12-2

[3] U.S. Enviromental Protection Agency, December 2012 Edition. Residential Construction Trends in America's Metropolitan Regions. http://www.epa.gov/smartgrowth/pdf/residential_construction_trends.pdf

[4] Adapted from Retrofitting Suburbia: Urban Design Solutions for Redesigning Suburbs by Ellen Dunham-Jones and June Williamson, 2011, John Wiley and Sons

[5] How three towns converted former big-box retail stores into a library and two schools. http://buildabetterburb.org/take-two-for-big-boxes /Also, a video about the Walmart that became a library in McAllen, TX: http://player.vimeo.com/video/59751284?portrait=0

[6] ChangeLab Solutions, June 2014, Building in Healthy Infill: A Guide for Improving Public Health Through Development: http://changelabsolutions.org/publications/building-healthy-infill

[7] Environmental Protection Agency, Smart Growth and Economic Success: Investing in Infill Development, February 2014. http://www.epa.gov/smartgrowth/pdf/economicsuccess/Developer-Infill-Paper-508b.pdf

[8] Sawmill Community Land Trust web site: http://www.sawmillclt.org/

2030 PALETTE

architecture **2030**