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# How to drive urban infill development in your city

[Spotlight On: Urban Growth and Revitalisation](#)[Transport](#)[Urban Planning and Design](#)Author(s): **C40 Cities Climate Leadership Group, C40 Knowledge Hub**

In many cities, there is a desperate need for more affordable, secure and climate-resilient housing. By building in and up rather than sprawling out, cities can address housing shortages, reduce car dependence and the cost of providing public infrastructure and services, boost neighbourhood economies, conserve scarce land and improve the quality of life of residents by creating less polluted, mixed-use, walkable and diverse neighbourhoods.<sup>1, 2</sup>

Urban infill (also known as infill development or urban densification) is the process of densifying cities by developing on vacant or under-utilised parcels of land within existing urban areas.

The scale of infill can vary greatly across projects and cities. Typically, small-scale projects are characterised by the construction of rowhouses, courtyard housing, low-rise multifamily developments, or duplex, triplex or fourplex buildings in low-density residential zones. Larger-scale projects might involve the development of an entire block or larger area into mixed-use sites for housing, work, retail, entertainment and commercial spaces, or multistorey residential dwellings.<sup>3</sup>

Urban infill is a key component of action to create complete ‘15-minute-city’ neighbourhoods. Why every city can benefit from a ‘15-minute city’ vision explains what cities can gain from ‘15-minute city’ planning, while 15-minute cities: How to create complete neighbourhoods provides policy recommendations on how to do so. This article builds on both, suggesting actions cities can take to drive compact development that benefits residents, the climate and the local economy.

## Understand where there is opportunity for urban infill in your city

**Conduct an inventory of empty and underutilised parcels of land across the city** in English  
focus neighbourhoods for infill, communicate opportunities to developers, and act as a baseline on which to measure progress on infill action. Your city's inventory might include:

- **The size of sites identified.** Small-scale urban infill sites are usually found in low-density neighbourhoods, often single detached housing zones. These include vacant lots, parcels with vacant buildings, dilapidated or degrading buildings, or lots with existing in-use developments and the capacity for sustainable intensification. Larger urban infill sites are typically underutilised, previously developed land, such as old factory sites or parking lots (sometimes called brownfield or greyfield land). Many cities already have a register of brownfield land. An example is London's Strategic Housing Land Availability Assessment, which separates sites into large (over 0.25 hectares) and small sites (below 0.25 hectares) to assess the city's new housing capacity.
- **Land ownership, highlighting municipally owned and private owned land.** City governments often own a large percentage of land in the urban centre, which can provide opportunities for the development of social value and affordable housing projects. Boston conducted an inventory of city-owned property and developed a public Geographic Information System (GIS) visualisation tool to show vacant parcels of land with high opportunity to meet supportive and affordable housing goals. On municipally owned land, Toronto developed the 69-acre Regent Park site – formerly a low-density neighbourhood with poor-quality social housing – into a high density, mixed-used, mixed-income area containing social housing, rental, commercial and market-rate units.



Scale model of Regent Park development, Toronto – Photo credit: wyliepoon via Flickr (CC BY-NC-ND 2.0)

- **Infrastructure and amenities surrounding potential sites**, including water, sewerage, electricity, transportation networks. Prioritise development in areas with good infrastructure links to save public money. Consider the fact that large infill projects may place pressure on existing infrastructure and require additional investment.
- **Typology of development around potential sites**. Include the size of buildings and building use around the site. Infill projects are an opportunity to alter built context that is no longer fit for purpose, for example, providing mixed use and adaptability, but should be sensitive to the immediate surroundings. In many North American cities, low-density, single detached housing areas offer the biggest opportunity for infill, yet developments should broadly remain in line with the characteristics of the neighbourhood (that is, densifying to low-rise multifamily residencies or duplexes, rather than multistorey buildings).

**Map identified infill sites.** GIS and mapping software can be used to help with the inventory and mapping process. For example, Edmonton's [Infill Data Explorer](#) allows users to explore potential sites for infill construction. Information on nearby housing types, zoning, parcel-lot area and nearby services and amenities is available for each lot. Chicago's [city-owned lot map](#) encourages the purchase and

redevelopment of city-owned vacant land in partnership with community stakeholders.  English Design  
Lab provides a list of [tips for urban mapping here](#).

**Assess the viability of potential infill sites.** Assessing the viability of potential sites is critical to ensure the social, economic and environmental sustainability of projects. For municipally owned sites, assessing the development potential is a key step prior to finding development partners. Site viability will depend on your city's urban growth and land-use plans, the surrounding infrastructure, and current and previous land use. Housing Assessment Resource Tools (HART) has developed a [Land Assessment Tool](#) for Canadian cities to map well-located government land for housing development, based on proximity to amenities, with an assessment model that could be adapted by others.

**Determine priority areas for infill development.** Use your inventory and mapping to identify target areas to prioritise for infill, which will often be low-density or low-rise neighbourhoods. The list below describes the benefits that infill projects can bring, which can be used as criteria to assess priority sites.

### Infill projects can:

- **Bring investment back into historically underinvested areas, characterised by an absence of development and investment activity compared with other areas of the city:** Public investment should prioritise equity and help revitalise economically disadvantaged communities. [Chicago's Planning and Development Department](#) looked at data on capital and programmatic investments from various city departments to help determine 10 target areas in systemically underinvested neighbourhoods on the South and West Sides of the city.
- **Revitalise neighbourhoods experiencing population decrease in relation to the city:** Infill can bring new employment and housing opportunities to a neighbourhood, encouraging a younger population to stay or move to an area. [The city of Avondale](#) uses 'continued decline in population in relation to the city as a whole' as one of four criteria to assess infill incentive districts.
- **Reactivate vacant buildings:** Incentivising building in districts with many empty plots or buildings can bring new life to neglected areas of the city. Potential criteria could be areas with high rates of vacancy, underused properties, or older or dilapidated buildings compared with the rest of the city. In city of [Chandler, AZ](#), developers can access financial incentives for projects that redevelop all or a significant portion of an existing commercial site if the vacancy rate is at least 50% higher than the average city-wide retail centre vacancy rate or the retail centre is at least 15 years old.
- **Improve or restore environmentally contaminated sites and protect vulnerable populations around them:** Potential sites should be assessed for their environmental quality. Contaminated sites could be developed after treatment, but may be costly to remediate in order to do so. Such sites could be considered for restoration and used for recreation purposes. In addition, sites with high exposure



to natural hazards, such as flooding, wild fires and landslides, should not be developed for housing, but can provide opportunities for nature-based risk-reduction measures and recreational facilities. The Sunnyside Energy project in Houston, for example, transformed a former landfill site into the largest urban solar farm in the US.

- **Reduce crime or nuisance rates:** Developing vacant buildings, bringing commercial activity back to urban corridors, increasing foot traffic and reducing the neglect of neighbourhoods can remove crime hotspots.<sup>4</sup> Arizona state statute (ARS 9-499.10) cites the ‘high occurrence of crime’ as one of six possible criteria that cities can select to help designate infill incentive districts.

**Involve communities and community organisations at the early stages of infill planning.** This can help determine whether vacant sites or open spaces have current uses, and how new developments can best suit community needs.

- **Conduct community engagement,** such as digital engagement platforms, map-based surveys, focus groups or roundtables. The city of Vancouver is hosting enquiry sessions with landowners on potential site use for infill. As part of Chicago’s INVEST South/West project, the city’s Department of Planning and Development gathered representatives from city agencies, aldermanic offices, neighbourhood organizations, small businesses and resident groups in a series of roundtables in each of the project’s 10 selected communities, to discuss priorities for development. Similar initiatives were conducted in Austin.
- **Partner with community organisations.** For example, Bristol, UK has partnered with community land trust WeCanMake, which has identified more than 1,500 potential microsites across the city where a one- or two-bedroom home could fit. Owners of the sites can ‘opt-in’ and express their interest in selling the land for infill.



*Photo credit: Brett VA via Flickr (CC BY 3.0 US)*

## Amend land use and development policy to enable and encourage infill

In many countries, land use or zoning laws segregate neighbourhoods by use, restricting construction of multi-family and middle housing in residential areas zoned for low-density, high-value, single-family occupancy dwellings. City, state or country-wide land use codes may require minimum parking, stipulate strict street setback, building spacing and floor area ratio requirements, or maximum height limits. These can limit the construction of more compact and affordable 'missing middle housing', causing neighbourhoods to sprawl out, requiring costly new infrastructure and often increasing car dependence. Cities can instead encourage higher-density, mixed-use buildings through infill using the following mechanisms:

- **Adjust zoning regulations city-wide or in specific target neighbourhoods.** *Reshaping the City: Zoning for a More Equitable, Resilient and Sustainable Future* by the Urban Land Institute explains various zoning models and provides case studies from cities using rezoning to encourage infill development. Examples include zoning code changes made by Portland, OR to allow 'missing middle' housing where code previously only allowed a single house, and Auckland's legislation to enable higher buildings around transit stations.
- **Use form-based codes (FBCs):** Adopt form-based codes that focus on the physical form and characteristics of development rather than strict land-use categories. This can provide more flexibility in accommodating diverse uses within the same area. For example, Cincinnati has introduced

neighbourhood-level FBCs, enabling city-wide FBC use to grow organically over time. Buenos Aires' hybrid code system uses an FBC designation to promote mixed use along the city's main corridors; multiple building uses are allowed, but buildings must meet form requirements. The Form-Based Codes Institute provides guidance for cities in the United States on establishing an FBC and highlights good-practice codes.

- **Revise design codes to remove restrictive design standards.** Review regulations on minimum parking-space requirements, height limits, minimum street setbacks and floor/area ratios. In areas close to the city centre or transport hubs, consider removing minimum parking-space requirements and increasing allowed density.

The above mechanisms can allow cities to implement land use and development changes to encourage infill, including:

- **Increased density allowance:** Raise the maximum allowable density in certain zones to encourage developers to build more units on a given parcel. Increase the number of units and allowable configurations on lots. Set minimum densities for developments in target areas.
- **Reduced minimum lot sizes and frontage widths:** Lower the minimum lot and frontage size requirements to allow for smaller parcels, making it easier to develop infill projects on available land. Austin, TX, reduced the minimum lot size from 5,750 square feet under the single-family zoning regime to 2,500 square feet, so that lots can be subdivided and developed with a variety of housing types, such as row houses, townhouses and duplex, triplex and fourplex buildings.
- **Flexible height limits:** Adjust height limits to allow for taller buildings, maximising the use of available space in densely populated and developable areas. In 2022, Auckland legislated to allow buildings with six storeys or more in areas within a 15-minute walk of the city centre or a 10-minute walk of train and bus stations and to allow more building height and density within the urban core.
- **Setback regulations:** Adjust setback regulations to allow for more flexible and efficient use of space. This can enable developers to build taller structures or utilise more of the lot for construction, increasing the potential for infill development. In El Paso, TX, the city council can reduce side, front and rear setback requirements of the base-zoning district by up to 100% for infill developments.
- **Reduced parking requirements:** Modify or eliminate parking requirements to make affordable housing cheaper and easier to build, lower rents, and make it more feasible to build on smaller lots. In urban areas with good public transit, reduced parking can be particularly beneficial. Less parking, more city looks at how Mexico City switched parking minimums for parking maximums. New York City's City of Yes for Housing Opportunity proposes to eliminate parking requirements on developments. It calculates that each underground parking space costs US\$67,500 and for the cost of

every four off-street parking spots, a new home could be built. *Breaking the code: English off-street parking reform for the Institute for Transportation and Development Policy* shares lessons from six cities that have reformed parking requirements.

- **Accessory dwelling units (ADUS):** Allow or incentivise the construction of accessory dwelling units, such as ‘granny flats’, garage suites or backyard cottages, to make more efficient use of existing residential lots.
- **Mixed-use zoning:** Implement mixed-use zoning that allows for a combination of residential, commercial and/or office uses within the same development and other essential services, such as schools, parks and health, within the neighbourhood. This fosters vibrant, walkable communities.

**If your city lacks the regulatory mandate to adjust zoning codes, lobby the relevant government agency on changes to zoning regulations.** For example, in 2024, the British Columbian provincial government plans to introduce legislation that overrides the zoning regulations of municipal governments as part of its Homes for People action plan. The provincial government will work with municipal governments to simplify and speed up permitting processes, with a focus on expanding digital tools.



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# Provide incentives and guidance to encourage private developers to take up infill projects



Often, the private sector has an interest in building densely, as dense, multi-use developments can generate higher profits. Financial and regulatory incentives and easy-to-follow design guidance can make infill sites an attractive option for densification projects. Incentives can also be used to encourage the provision of public benefits as part of a project, such as public and green space or affordable housing.

- **Offer planning-permission exemptions, expedited planning-permission processes, and planning application-fee exemptions or reductions.** Establish a streamlined and expedited permitting process specifically for infill projects to reduce delays and bureaucratic hurdles. Los Angeles' Parallel Processing System means that the entitlement, design and permitting processes of a project can be assessed in parallel. Rehabilitation or remodelling projects in urban areas in Avondale, CO are allowed a 50% reduction in planning and permitting fees and are not subject to development impact fees.<sup>6</sup>
- **Offer tax relief.** Washington State's Multifamily Housing Tax Exemption (MFTE) Program applies to all cities with a population of over 15,000. It encourages the development of multifamily housing in designated 'residential target areas' by exempting the value of new housing construction, conversion or rehabilitation from property taxes over 8, 12 or 20 years. Twelve- and twenty-year programmes require a certain percentage of the housing to be affordable to low- or moderate-income households.
- **Increase floor area or height concessions on individual projects, or reduced street setback options.** Density bonuses allow developers to build more units than zoning dictates on a particular lot. Often, this is allowed, as a percentage of housing remains below market rate, as explained later in this article, or because developers include public amenities such as parks or public space in their projects.
- **Implement transfer of development rights (TDR).** TDR programmes allow property owners in restricted area (sending areas) to transfer development rights to desired areas for development (receiving areas). This can encourage development in designated infill areas while preserving open space elsewhere. New York, São Paulo and Medellín allow property owners in designated historic districts to sell their development rights to developers in other areas of the city.
- **Offer pre-approved building designs and design standards advice.** The city of South Bend, IN offers a set of pre-approved building designs at no cost to developers interested in undertaking infill development in the city's neighbourhoods. Developers choose from a catalogue of housing options provided by the city and do not pay any development approval fees. The city of Swansea, Wales has

‘Placemaking Guidance for Infill and Backland Development’, which provides English advice on producing planning proposals that respect the character of the local neighbourhood and enhance a sense of place.

- **Encourage adaptive reuse.** Los Angeles’ 1999 Adaptive Reuse Ordinance gave developers permit incentives to convert historical (often abandoned) commercial buildings into residences and has proven a powerful tool in revitalising neighbourhoods.
- **Create site assessment and design guidance** for developers to facilitate the application and design process, encouraging high-quality and context-sensitive design for infill projects, ensuring compatibility with existing neighbourhoods. For example, Edinburgh’s Design Guidance includes technical guidance for developers on how to prepare an application and comply with local planning policies for infill projects.

**Provide financial support, such as interest-free loans or investment, to small and medium-sized house builders for infill development.** For example, in London, the Mayor’s Housing Strategy is fostering greater dispersion and competition in the industry by re-engaging small and medium-sized builders. The Greater London Authority (GLA) awarded a £51.4 million interest-free loan to Pocket Living, a small company that delivers infill homes at least 20% cheaper than the local market rate by building under adjusted design parameters. The GLA also invested in shares of the company through its Enterprise Group social investment fund, marking the first time that the GLA and all of London’s local authorities had invested in a profitmaking private housing developer.<sup>7</sup>

**Provide advice to developers on how to communicate with residents and community groups about what they stand to gain from infill in their area.** Work with community groups to define the vision and goals of any new development plan, and how they align with the neighbourhood's identity, values and priorities. Promote benefits of infill projects, such as economic regeneration of an area, saving public money, the opportunity for multiple generations to stay in a district, expansion of amenities and community assets. Communicate any updates clearly and regularly with residents in the surrounding areas throughout the project lifespan to avoid backlash.

New York City created an interactive storybook for its proposed City of Yes for Housing Opportunity. The city of Toronto produced a guide for developers outlining best practices and communication tips for developers working on infill construction. The city of Edmonton created an explanatory video to explain the benefits of infill to residents.

**Adaptive reuse and other measures to optimise the use of existing buildings are important clean construction practices.** Promoting the repurposing, retrofitting and refurbishing of buildings to bring them back into use helps to limit demolition and unnecessary new construction, reducing the substantial emissions

associated with the construction of new buildings. Follow the links to find advice on ways to reduce embodied emissions in private and residential buildings and municipal buildings.



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## Introduce supplementary policy to ensure infill development prioritises equity and benefits the community

**Implement measures to keep some new dwellings affordable and accessible.** Policies aimed at incentivising new infill development projects will not tackle housing crises or significantly reduce emissions in cities alone. Policies to avoid the displacement of residents, limit congestion and ensure new developments provide community benefit are important to make sure that infill projects fulfil their social and environment benefit potential. These may include:

- **Community benefit requirements/agreements:** Introduce requirements for developers to provide community benefits, such as public spaces, affordable housing or infrastructure improvements, in exchange for certain zoning concessions. For example, Redwood City, CA leverages a fee from big developments to provide community benefits such as affordable housing, improved schools, parks, transportation systems, programmes for the arts and support for special programmes and events. Santa Monica's LUCE programme requires that approved projects exceeding the set base floor area ratio, density and height must be accompanied by a range of community benefits from four priority categories: affordable housing, trip reduction and traffic management, community physical improvements, and social and cultural facilities.

- **Inclusionary zoning** requires developers to create below-market housing stock as part of any new development. In 2017, Portland, OR, mandated that all new residential projects with 20 or more units must deliver a specified amount of affordable housing. In Johannesburg, any development application comprising 20 dwellings must reserve 30% of units for affordable housing.
- **Density bonuses** allow developers to build more units, as long as a percentage of them remain affordable. For example, Madison's Inclusionary Housing Ordinance uses a city-wide density bonus to encourage developers to provide housing for low- and moderate-income families. To receive a density bonus, eligible housing projects of 10 or more total units must include a minimum 15% of affordable units.
- **Ring-fence a proportion of new homes for local people:** As part of Toronto's housing reforms, tenants in housing that is demolished and redeveloped typically have a 'right to return' to a new replacement rental unit. Rent increases for replacement rental units are capped at the annual rent increase guideline amount set by the Ontario government.
- **Consider running high-profile competitions to infill and redevelop underutilised sites and buildings:** Invite proposals that will be judged on the benefits for the neighbourhood, community and environment. Chicago's Come Home competition aims to reimagine missing middle infill housing in six Chicago neighbourhoods that have historically been underinvested. Winners' plans will become pre-approved models for developers or be used as starting points for projects. Winners will also be paired with local emerging real-estate developers, with the goal of starting construction on anywhere from 30 to 100 of the city's empty lots. C40 Cities' Reinventing Cities competition is a global call to practitioners to transform public or privately owned underutilised sites into zero-carbon resilient projects. Winners include the Kelsey Civic Center in San Francisco and L'Innesto in Milan.

Also read 15-minute cities: How to ensure a place for everyone, which looks at ways to avoid displacement and make the mix of homes within neighbourhoods more diverse.

**Review infrastructure capacity around proposed large developments.** Invest in upgrades if current infrastructure will struggle with new load. Work with transport departments to improve and introduce cycle lanes and increase the coverage and frequency of public transport to underserved areas identified for development. The City of Alexandria and the Washington Metropolitan Transit Authority (WMATA) worked together on funding and commissioning a new Metrorail infill station in Potomac Yard. The station provides walkable and bikeable access to transit for commuters already in the area and is part of a large redevelopment project to build a mixed-use community comprising retail, residential and new commercial development. In Heidelberg, Germany, where a large brownfield site next to the central train station was redeveloped into a new near-zero-carbon district with homes for around 6,500 people (of which 20% is designated for social housing), a tramline was extended to include three stops in the area.



**Align infill development plans with other city strategies**, such as transport, biodiversity mitigation and adaptation, as infill can reduce transport emissions, increase vegetation and green space in a city, and create retail or grocery opportunities in disconnected neighbourhoods. Building use is often one of the biggest sources of emissions in cities. Consider setting energy-efficiency standards for both new and redeveloped infill projects. [How to set energy efficiency requirements for new buildings](#) and [How to set energy efficiency requirements for existing buildings](#) can help.

Vancouver's 2018 update to the city's rezoning policy was updated in 2018 to better align with the City's Transportation 2040 programme, the Vancouver Food Strategy and the Climate Change Adaptation Strategy. It includes clauses in new development permits to combat the prevalence of food deserts in the city. Winnipeg's Climate Action Plan states that by 2031, 50% of new developments must come from infill, while Plan Melbourne sets a goal of 70% of new housing supply to be built within Melbourne's established areas.

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