SECTION 2G: Designing for Adaptability: Fine-Grain Blocks, Parcels, and Plots

How small-scale urban structure increases resilience, supports transformation, and sustains diversity over time

Inner green in Amsterdam blocks. Source: Françoise Labbé

Why Fine Grain Matters: Designing for Adaptability and Resilience

Urban resilience is not only ecological—it is spatial, social, and economic. Fine-grain blocks, parcels, and plots provide the structural flexibility cities need to adapt over time. Unlike coarse-grain superblocks that lock urban form into rigid and inefficient patterns, fine-grain urbanism supports transformation, diversification, and inclusion.

A fine-grain structure:

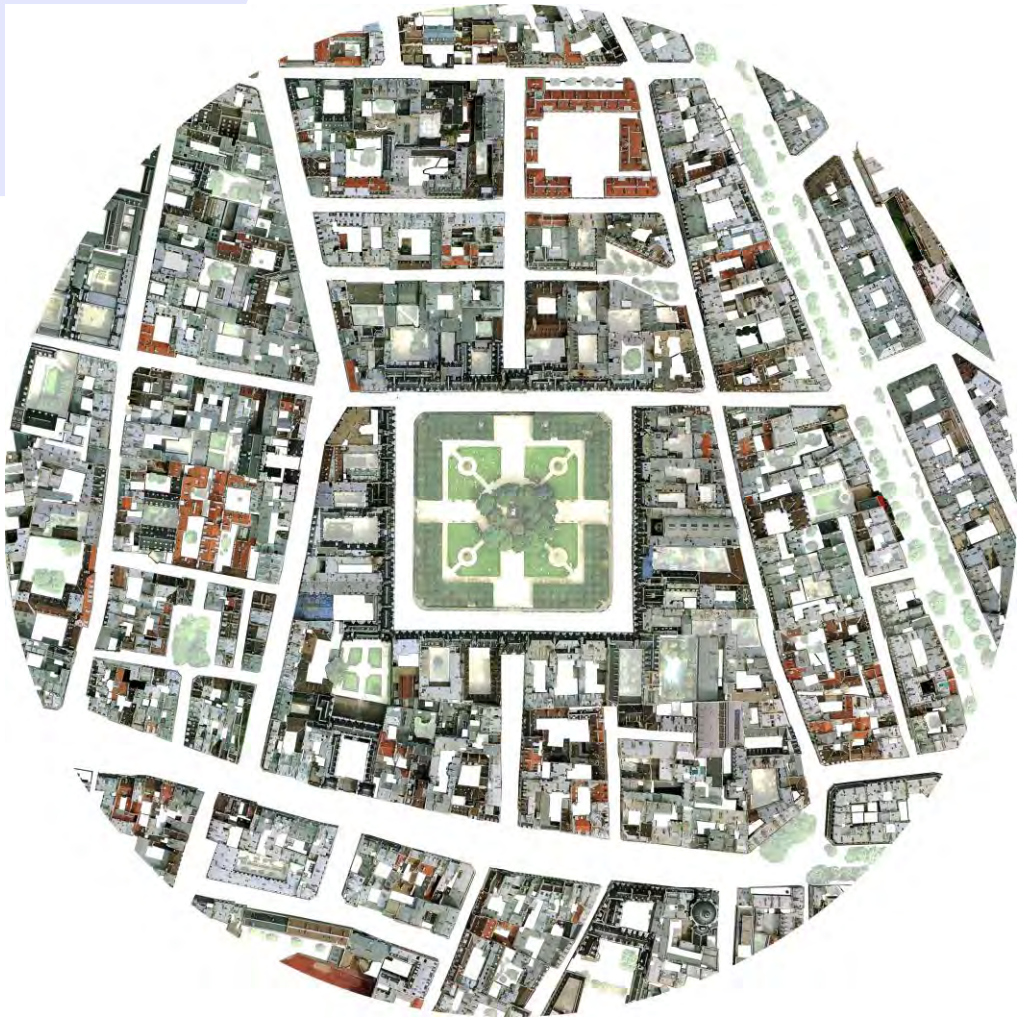
– Enables incremental change and adaptive reuse

– Increases land use efficiency and economic density

– Enhances walkability, permeability, and public life

– Creates a human-scaled environment that evolves with its community

In this section, we explore how small blocks and plots—from Paris and Greenwich Village to Kampung Admiralty and Hammarby Sjöstad—create more adaptable, resilient, and livable cities.



URBAN SH/FT

Superblocks Undermine Land Efficiency and Connectivity

Chongqing's superblocks consume more land per resident and job than any other urban fabric.
They are spatially inefficient and poorly connected to transit, leading to increased car dependency and congestion.

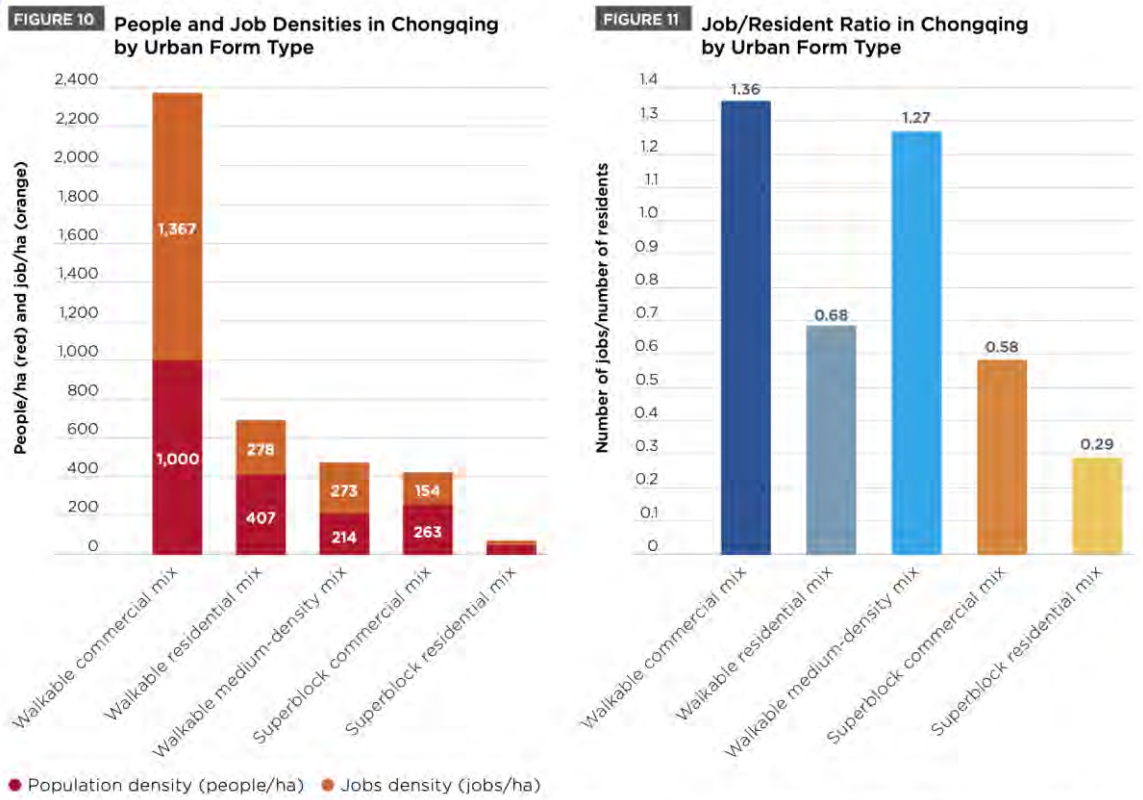
Density gap:
Walkable core neighborhoods have **6× higher** combined human and job density than superblocks.

Residential superblocks:

- Only **5,700 people/km²**
- Just **1,660 jobs/km²**
  → Well below efficient urban density thresholds recommended globally.

Spatial imbalance:

- **80% of central residents** live in car-dependent superblocks with limited transit access.
- Residential superblocks house **36% of the population** but only **0.29 jobs per resident**.
- In contrast, walkable mixed-use cores hold **1.36 jobs per resident** on just **1.13% of land**.



Source: Produced by the Urban Morphology and Complex Systems Institute for this report, based on the assessment made for *Chongqing 2035: Urban Growth Scenario*.

Impacts:
→ Increased travel distances and traffic congestion due to poor spatial match between housing and jobs.

Policy implication:
A more balanced distribution of density and functions is essential for a low-carbon, connected Chongqing.

URBAN SH/FT

Economic costs of superblocks

Superblocks weaken urban connectivity, limit walkability, and inflate infrastructure costs.
They hinder both human interaction and economic agglomeration.

Sparse street networks:

- **<10 intersections/km²** in superblocks
  Only **5 km of streets/km²** (publicly accessible)
  400 meters average between intersections
  → Pedestrian-unfriendly, car-dominant urban form

Low economic density:

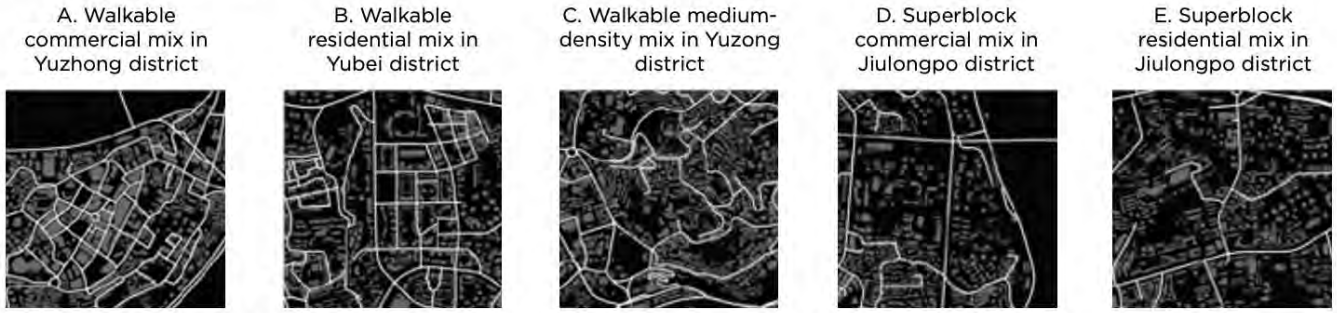
- Residential superblocks have **16× less economic density** than walkable mixed-use areas

High infrastructure cost:

- **11× higher** cost of street infrastructure per unit of GDP in superblocks

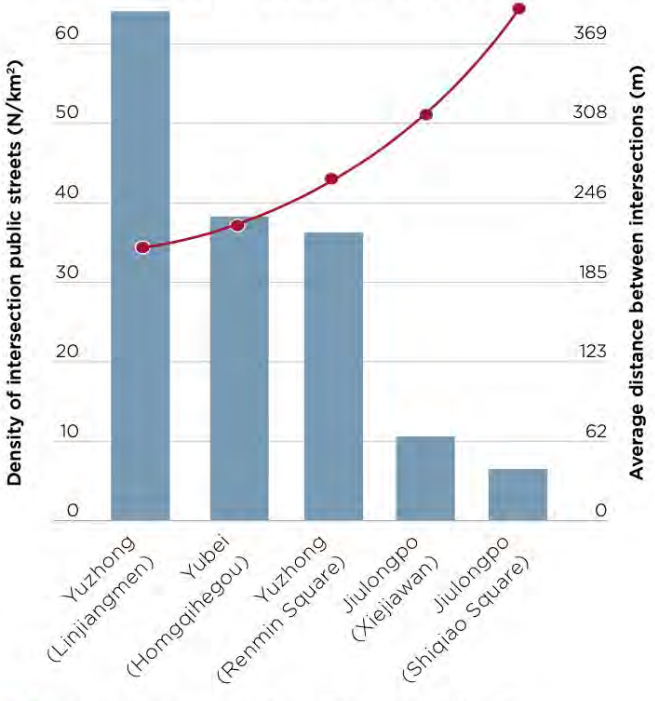
Strategic direction:
To boost agglomeration and reduce costs, Chongqing must **retrofit superblocks** and design future growth with **smaller blocks, denser street networks, and mixed uses**.

FIGURE 12 **Chongqing's Urban Forms**



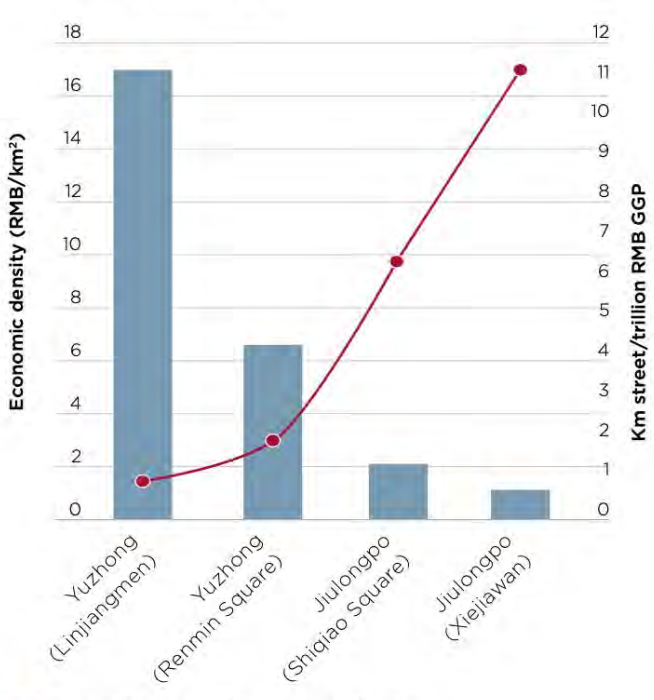
Source: Produced by China Sustainable Transportation Center (CSTC) for this report.

FIGURE 13 **Density of Intersections and Average Distance between Intersections in Chongqing's Five Urban Form Types**



Source: Produced by the Urban Morphology and Complex Systems Institute for this report.

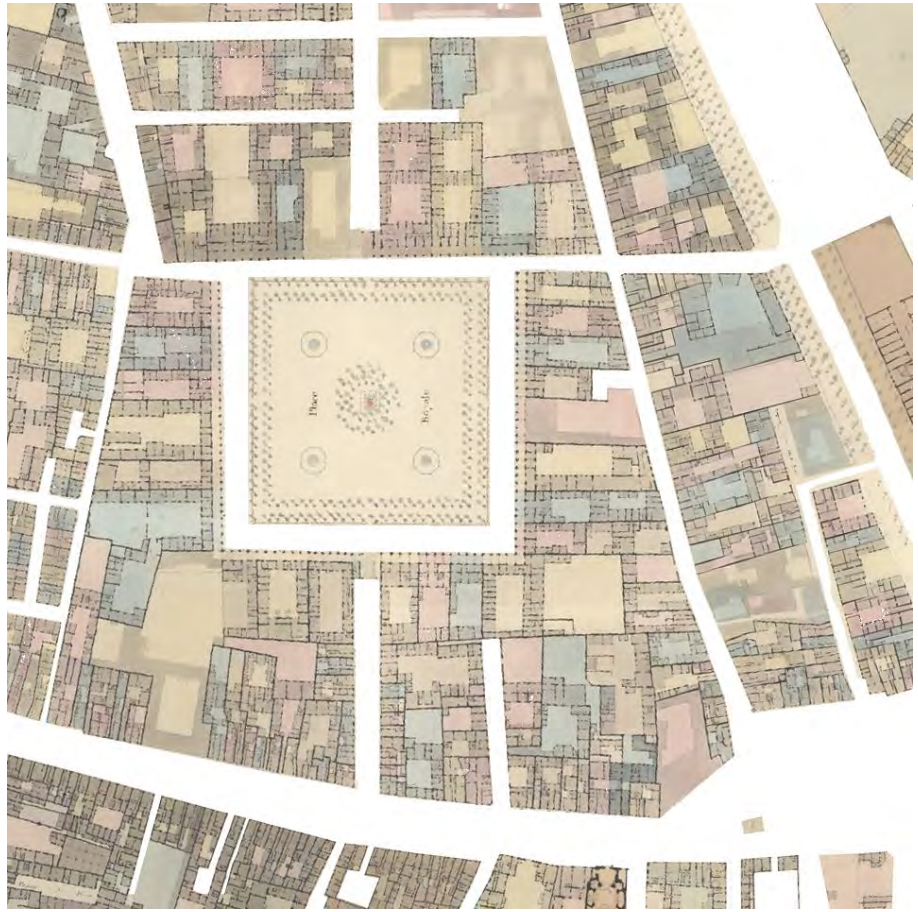
FIGURE 14 **Economic Density and Length of Streets Per Unit of GDP in Chongqing's Five Urban Form Types**



Source: Based on information provided by China Sustainable Transportation Center (CSTC) and Chongqing Municipal Bureau of Statistics and NBS Survey Office in Chongqing 2016.

COARSE GRAIN VERSUS FINE GRAIN URBAN FABRIC

- Coarse grain fabrics made of very large blocks and buildings don't provide many opportunities for interconnecting and are inhospitable to interaction.
- Fine-grain fabrics consist of small blocks in close proximity.
    - Within each block are several buildings, most with narrow frontages, frequent store fronts, and minimal setbacks from the street.
    - Streets and opportunities to turn corners are frequent
    - Street patterns are easily navigable and lattice like offering many opportunities for discovery and exploration.
    - Fine grained urban fabric evolves over time in a piecemeal way, responding to what came before, and adapting to what came afterwards. This evolutionary process creates resilient places that are not frozen in the era when they were built, but are dynamic and reflective of a neighbourhood's changing needs.

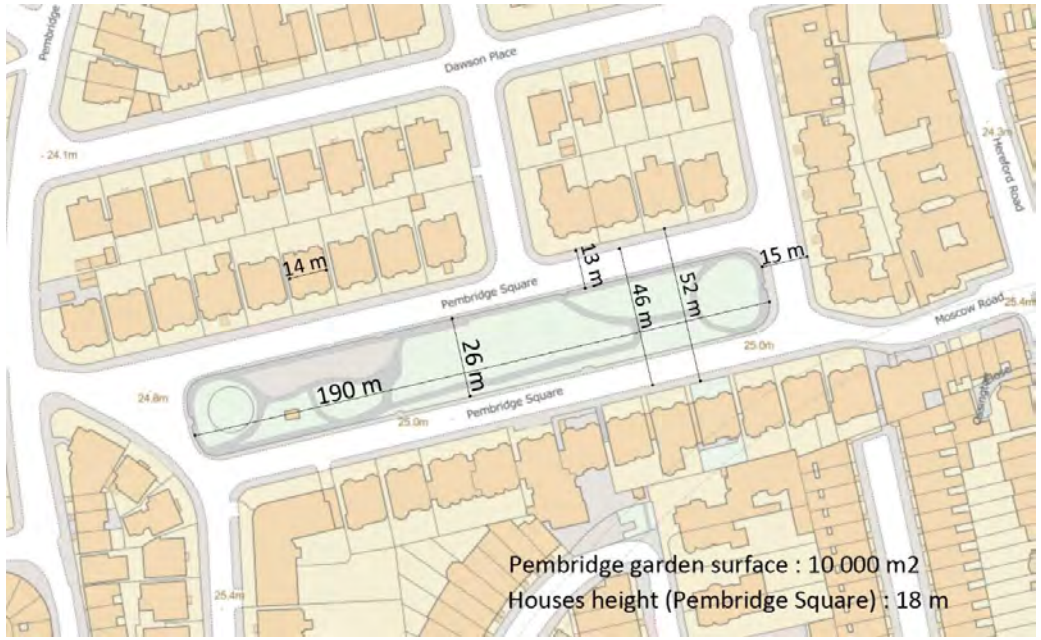


Fine-grain urban fabric in Paris, Place des Vosges. Atlas Vasserot 1810-1836. Source: Atlas Vasserot

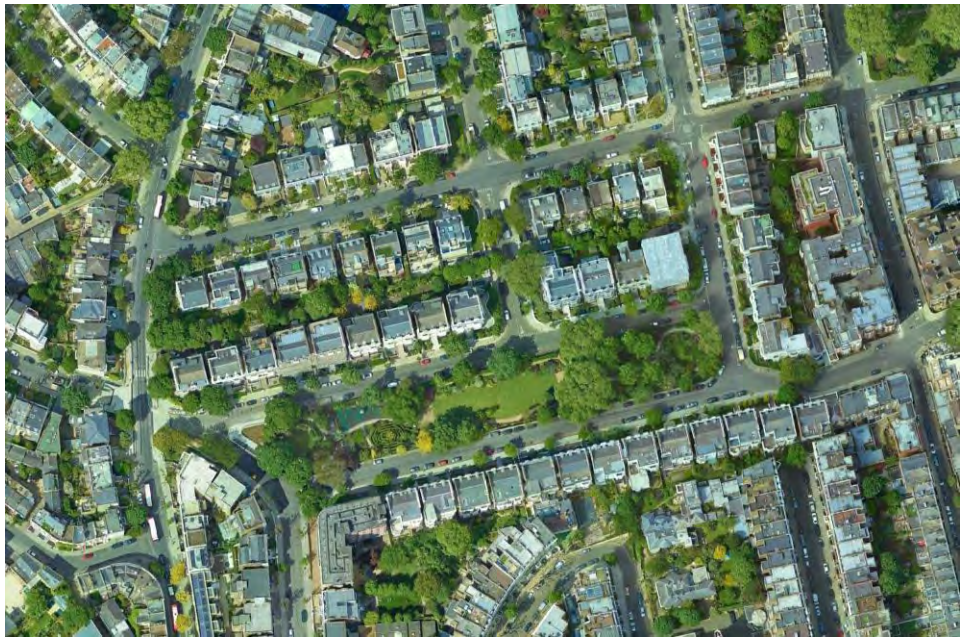
URBAN SH/FT

THE URBAN BLOCK 1/2

Blocks developed around their perimeter establish a strong and coherent relationship with streets and the public realm.



Urban block in Pembridge square, London. The block pattern comprises about 18 buildings with an inner green core and is bordered by tree lined streets. Typical block size is 45 m x 125 m (0.56 ha) with thus a density of 32 buildings per ha. Row houses are 18 m high and 14 m wide and each offers a garden at the back. Streets for pedestrians are slow traffic and 13 m wide. Source: Urban Morphology Institute.



Blocks surround and frame a 190 m x 26 m (0,5 ha) community garden offering various children's playgrounds. Source: Urban Morphology Institute.

URBAN SH/FT

THE URBAN BLOCK 2/2

Left: Pembridge square. Source: Françoise Labbé.

Middle and right: Urban block porosity, Dawson street. Source: Françoise Labbé.

Urban blocks define the network of streets around their edges, the building plots and green spaces arrangement in the middle.

URBAN SH/FT

DESIGNING WITH SMALL PERIMETER BLOCKS

***Above** : Paris.*
***Bottom**: Kampung Admiralty, Singapore, designed by WOHA, Architects.*
Both are developed along the perimeter with a continuous street frontage offering a coherent diversity. Both contain an inner complex courtyard. The Singapore block develops the green in 3 dimensions with 'gardens in the sky' and a community farm. This creates a breathing urban texture, and encourages social exchange. More than 100 % of the original plot is greened.

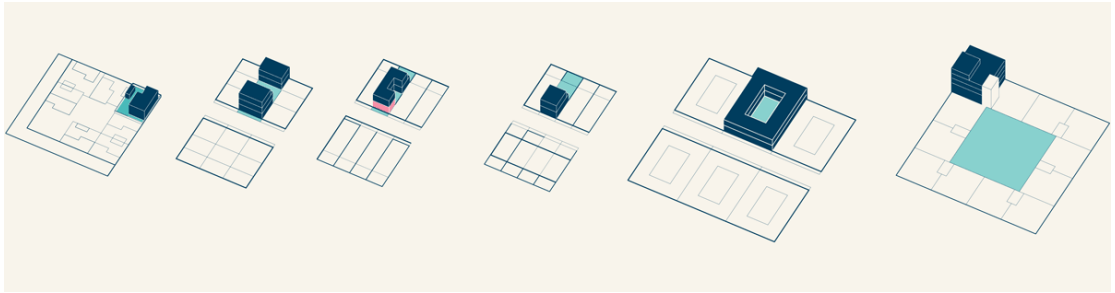
- **Plan with a high number of street intersections.**
- **Choose a block type** fitting the community culture and aspirations.
- **Adapt blocks to local climatic conditions:** Ensure a continuous street frontage and enhance the streetscape.
- **Adapt the perimeter block typology to different combinations of mixed uses,**
- **Design fronts and backs, outside and inside differently**.

Sources: above, Françoise Labbé; below, WOHA Architects.

URBAN SH/FT

DESIGNING WITH DIVERSE BLOCK TYPES

- Diverse block types support the creation of a diverse, inclusive and equitable public life. A ‘kit of parts’, such as the one developed by Gehl for Huechuraba, provides applicable building typologies according to the variation of landscape, climate, and expected users.
- By including a mix of typologies, the courtyard house, the apartment building, the townhouse, the row-house, the work live house, and the single-family house, the block becomes a framework for embracing diversity.



The diversity of typologies provides options to adjust and refine the experience of outdoor micro-climates which in turn informs the use and feel of public space – a self-fulfilling loop centred on making the best of Huechuraba’s natural conditions for people’s everyday lives. Source: Gehl architects.

URBAN SH/FT

DESIGNING WITH GREEN OPEN BLOCKS 1/2

An example of successful transposition of traditional blocks into contemporary open green forms is Hammarby Sjöstad in Sweden. The blocks are open and organized around large green courtyards.

Green open blocks, Hammarby Sjöstad. Source: Creative Commons.

Left. Historical map of Stockholm. Right. Hammarby map.. Source: Urban Morphology Institute based on Stockholm city hall plans.

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DESIGNING WITH GREEN OPEN BLOCKS 2/2

The Hammarby Sjöstad open green blocks hold a green common space within, creating a semi-private area to serve the residents social needs.

In Hammarby Sjöstad, the design method integrates modern design elements with the traditional urban morphology and is a good tool to achieve sustainability. Hammarby Sjöstad Design Code. Source: City of Stockholm.

Open composition of buildings. The dense settlement structure comprises four- to five-story constructions around spacious green courtyards. Source: Françoise Labbé.

URBAN SH/FT

DESIGNING WITH 3D GREEN BLOCKS

Breathing urban fabrics can offer outdoor community spaces at many scales and at multiple levels within a '3-dimensional green matrix'. In Kampung Admiralty, the various components are stacked and layered within a single building: markets, shops, food court, plazas, health-care facilities, children's playground and elderly facilities, sky gardens and a rooftop urban farm are integrated, not segregated.
Source: WOHA Architects

- **Layering, hollowing and greening urban blocks in 3-D** has the potential to recreate street life, community space, and intensify mix use.

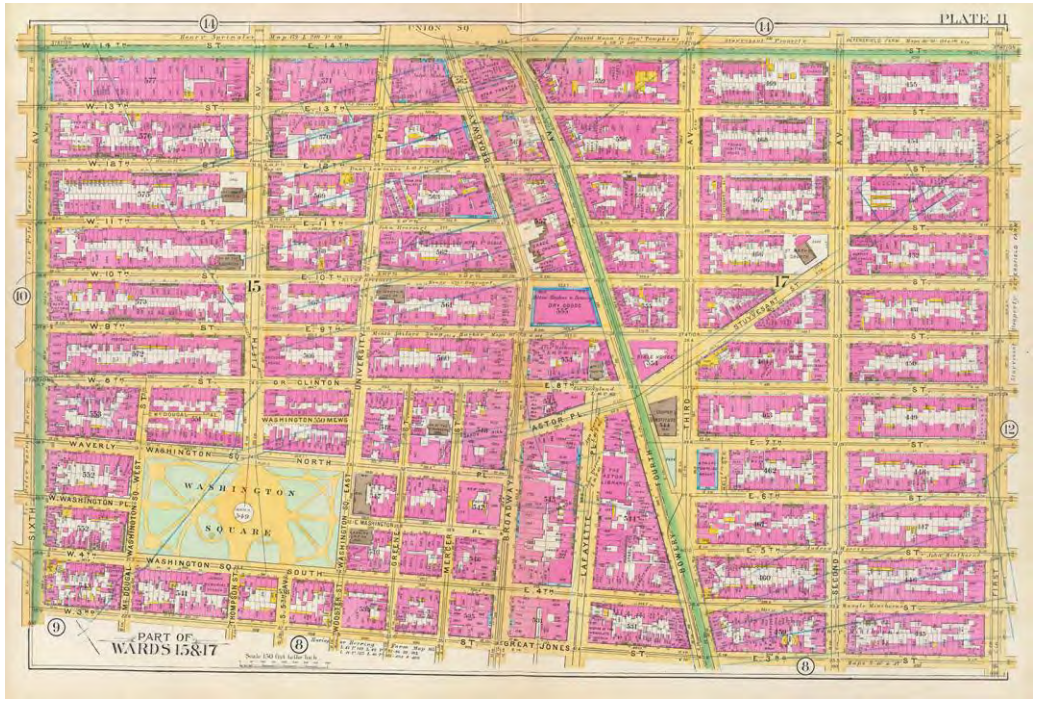
- These open-air precincts offer new street levels as part of a three-dimensional matrix.

- **Blocks with a 3-D micro urbanism** allow integrating solar energy, urban agriculture, commercial and recreational space, and housing in stacked structures.

- **Three-dimensional greening allows reaching a green plot ratio above 100%.** This mitigates the urban heat island effect, saves cooling energy and provides shading for communal spaces. **King's Cross, London, zero carbon urban development**

URBAN SH/FT

ADAPTIVE URBAN FABRIC WITH FINE-GRAIN PARCELS AND PLOTS



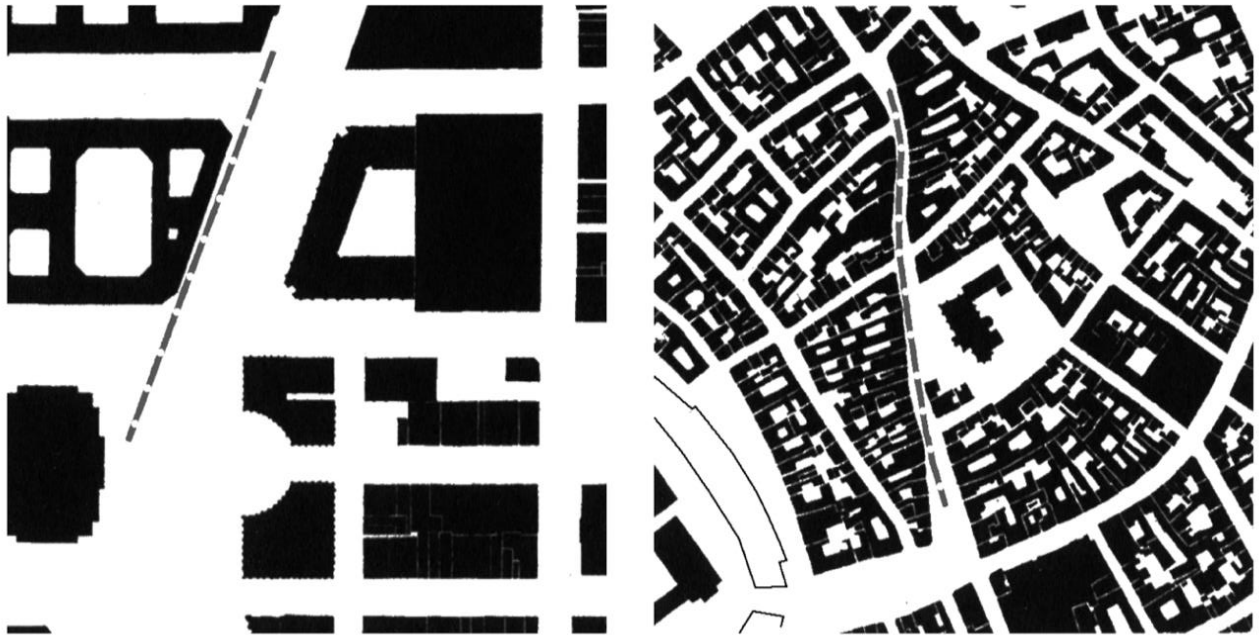
Left: Greenwich Village, Bromley insurance map, 1891.

Right: Washington Square 2020. Source: Creative commons

- Urban grain is essentially an outcome of the pattern of plots in an urban block and when this pattern is dominated by small plots, it is described as fine urban grain.
- Dividing blocks into smaller development plots and parcels, each developed by a different team of architects and developers working according to a form-based code (see unit 432) creates an adaptive urban fabric.

URBAN SH/FT

FINE-GRAIN PLOT PATTERNS CREATE VARIETY AND RHYTHM



The grey line indicates the length of the two four-minute walks, in Washington, D.C. (left) and in Copenhagen (right). They are reproduced here on plans at the same scale.
Someone leaving the National Archives, 700 Pennsylvania Avenue, in Washington, D.C., and crossing 9th Avenue and 10th Avenue, will reach the Old Post Office, 300 metres away, in four minutes having encountered six buildings. During a four-minute walk in Copenhagen centre, a person will go by 42 edifices.
Source: Serge Salat, Cities and Forms.

The variety and rhythm of the urban experience created by a fine subdivision of the blocks into many small plots creates human scale places.

Smaller spatial dimensions, more variations, more changes in direction, and narrower blocks impact the walking experience and make it more enjoyable.

URBAN SH/FT

SECTION 2H: Bioclimatic Urbanism and Nature-Based Design

Harnessing local climate and ecosystems to create resilient, comfortable, and living urban environments

Smart Kalasatama, Finland

Designing with Nature: From Climate Logic to Ecological Form

Sustainable cities begin by aligning with nature. Bioclimatic design and Nature-based Solutions (NbS) work together to shape more liveable, energy-efficient, and resilient urban environments. Rather than opposing climate and terrain, these approaches use them as assets—orienting streets and buildings to harness sun, shade, wind, and water, while integrating ecosystems into every scale of urban design.

This section explores how streetscapes, campuses, and entire districts—from Dhaka to Hangzhou to Guangzhou—demonstrate that climate-sensitive and nature-integrated design is not a luxury, but a foundation for long-term urban sustainability.

Hammarby Sjöstad

URBAN SH/FT

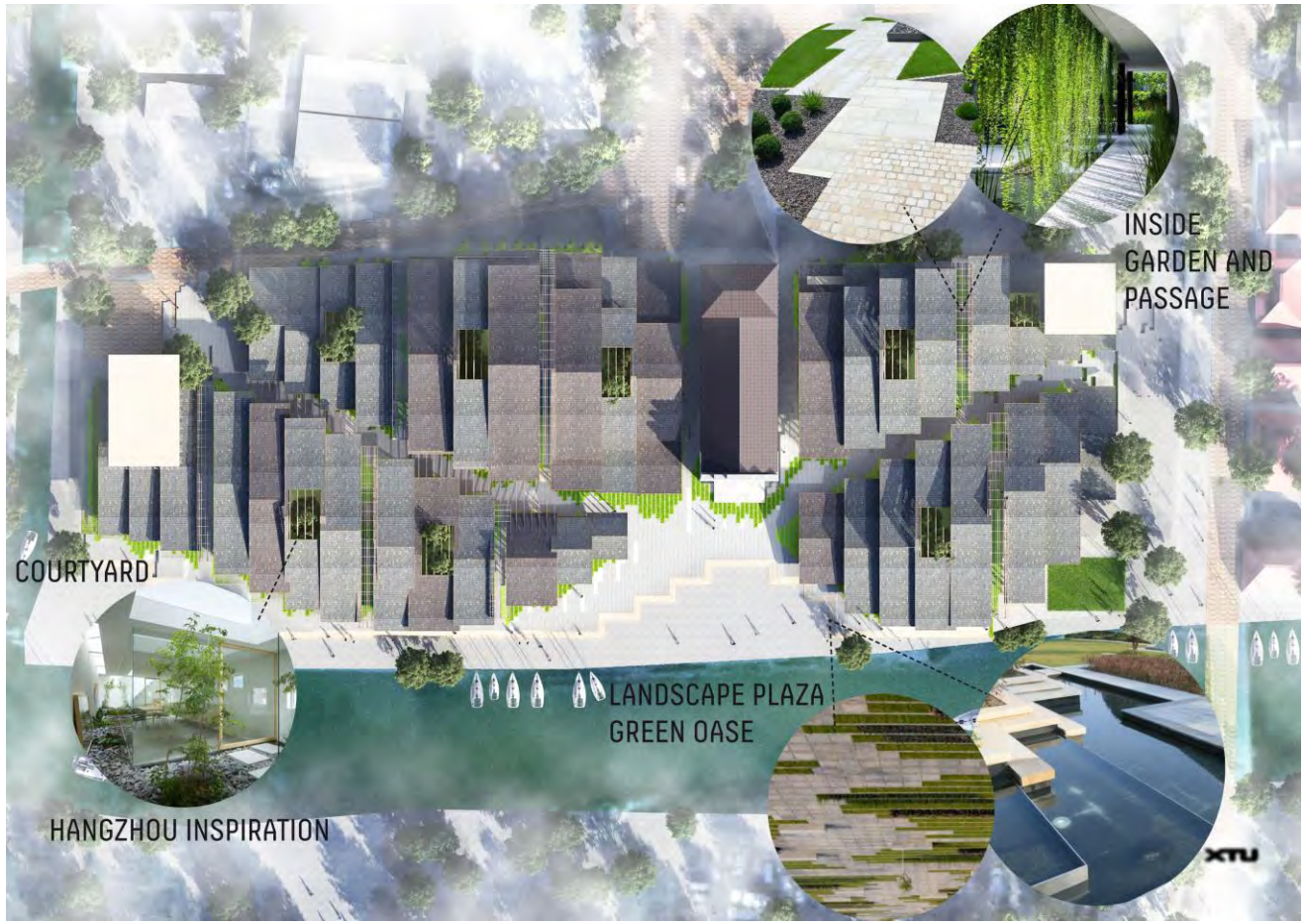
Designing with Climate: Bioclimatic Principles for Urban Comfort

What: Bioclimatic design shapes spaces to optimize climatic comfort and reduce energy use.
How: By orienting streets, buildings, and open spaces to maximize winter sunlight, capture breezes, and provide summer shading and cooling. It also avoids climatic discomfort—blocking cold winter winds and summer overheating.
Why: Because climate-responsive design enhances outdoor comfort, reduces cooling and heating demands, and improves livability without relying on mechanical systems.

What: Bioclimatic design can eliminate the need for air-conditioning in tropical climates.
How: At BRAC University in Dhaka, breezeways, porous façades, garden terraces, and sculpted building sections guide natural ventilation and diffuse daylight into learning spaces.
Why: This makes dense urban campuses more sustainable, comfortable, and integrated with their environment—even in hot, humid conditions. *Source: WOHA Architects.*

URBAN SH/FT

Nature-Based Solutions: Enhancing Cities with Living Systems



In French Dream Town, Hangzhou, micro-scale weaving of greenery into the urban fabric creates breathable, ecologically functional spaces.

What: Nature-based Solutions (NbS) use natural systems to improve both ecological health and human well-being.
How: NbS involve protecting or restoring ecosystems—or creating new green infrastructures—in ways that integrate biodiversity, water cycles, and climate functions into urban form.
Why: These solutions regenerate environmental quality, foster local participation, and offer co-benefits such as cooling, stormwater retention, and habitat creation.

URBAN SH/FT

Cooling with Wind, Water and Nature in Guangzhou

Ventilation corridor in Guangzhou

Integrating Nature and Topography: Guangzhou Knowledge Green Valley

What: Microtopography and 3D greening are used to embed nature into urban form.
How: Hills, ponds, and vegetation are structured to form rain gardens, ventilation corridors, and “knowledge units.” Buildings adapt to terrain with stilts, terraced forms, and vertical planting.
Why: These layered systems protect local ecology, create a connected green infrastructure, and support natural ventilation and cooling—demonstrating how urban design can work with, not against, topography.

SECTION 2J: Circular and Zero-Carbon Neighbourhoods

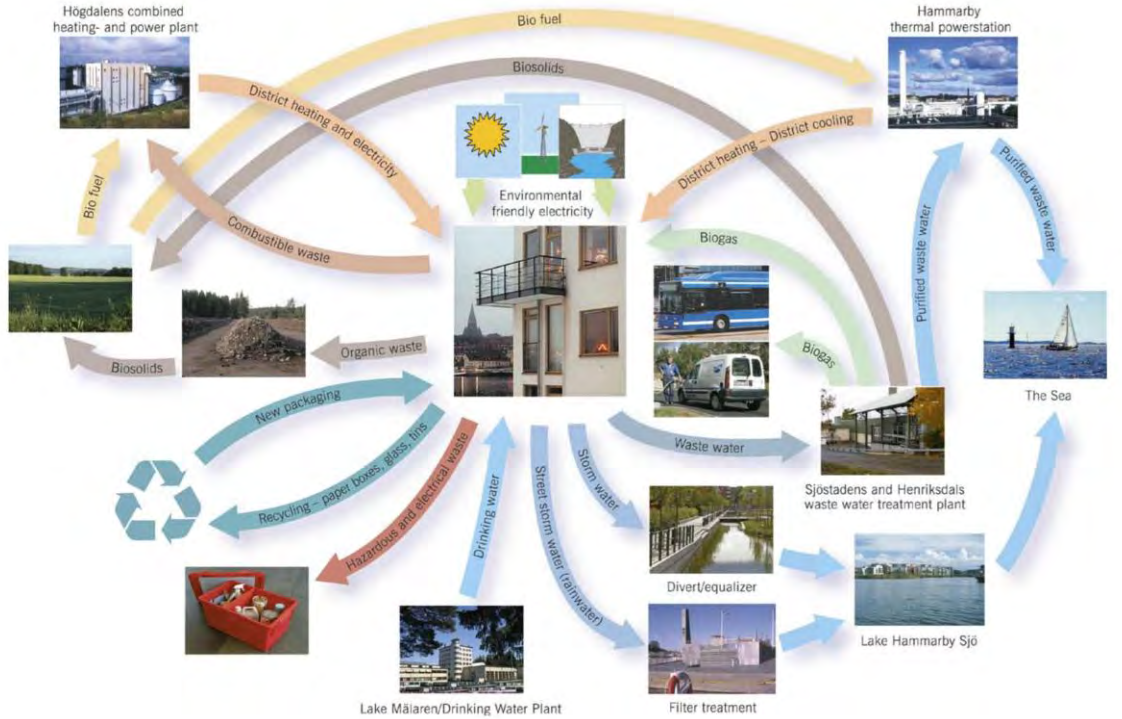
How interlinked systems, clean construction, and net-zero design transform neighbourhoods into engines of resource efficiency and climate resilience

BedZed London. Source: Creative Commons

CIRCULAR NEIGHBOURHOODS

- Neighbourhoods are starting points to a radical transformation towards circularity in the use of finite resources. Circular neighbourhoods:
  - Limit waste and pollution.
  - Regenerate natural systems.
  - Interlink flows of energy, water and waste

- The neighbourhood level makes circularity more tangible with manageable actions applicable in many contexts:
  - circular construction
  - shifting to a service economy
  - neighbourhood food systems and urban agriculture



Formerly an industrial site, Hammarby Sjostad, Stockholm, Sweden, is now a global model for zero-waste, energy net-positive and sustainable mixed-use development. Its defining feature is the interlinked flows of energy, water and waste, resulting in a district which recovers 50% of its energy from waste, recycles 100% of its water usage and uses 80% of the energy recovered from waste within the district limits.
Source: City of Stockholm.

URBAN SH/FT

CLEAN CONSTRUCTION

- Any construction, whether new assets or renovations, will add embodied emissions to the neighbourhood's emissions profile.
- To minimize this impact, make the most of existing assets by optimizing, reusing and repurposing existing buildings and infrastructure or underutilized space.
- Where construction work is required, plan, design and implement for the long term, to ensure the resilience of the neighbourhood to future changes.
- Select materials and use them efficiently to reduce embodied emissions following life cycle emissions data.

Full Fill Homes. Pondichery, India. Architect: Anupama Kundoo. Full Fill Homes are speedy and affordable housing units that have low environmental impact, using a combination of sophisticated and low-tech. Built using specially designed modules of prefabricated ferrocement hollow block units, full fill homes can be assembled on the site in 6 days including foundation. Source: Anupama Kundoo. Photo by: Javier Callejas.

URBAN SH/FT

NET ZERO BUILDINGS

In French Dream Town, Hangzhou, bioclimatic design with porous urban fabric, natural ventilation directing breezes through atria, sky gardens, facades filtering light and extensive solar roofs make the entire development net zero. Design: Anouk Legendre, XTU, Southern Part, Serge Salat, Architect, Northern Part. Drawing: Nanfang Institute. Source: Optiva Darna.

During operation, buildings are among the largest energy consumers.

Accelerating towards net zero involves adopting passive design principles, investing in high-efficiency neighbourhood-wide energy infrastructure and decarbonizing the energy supply.

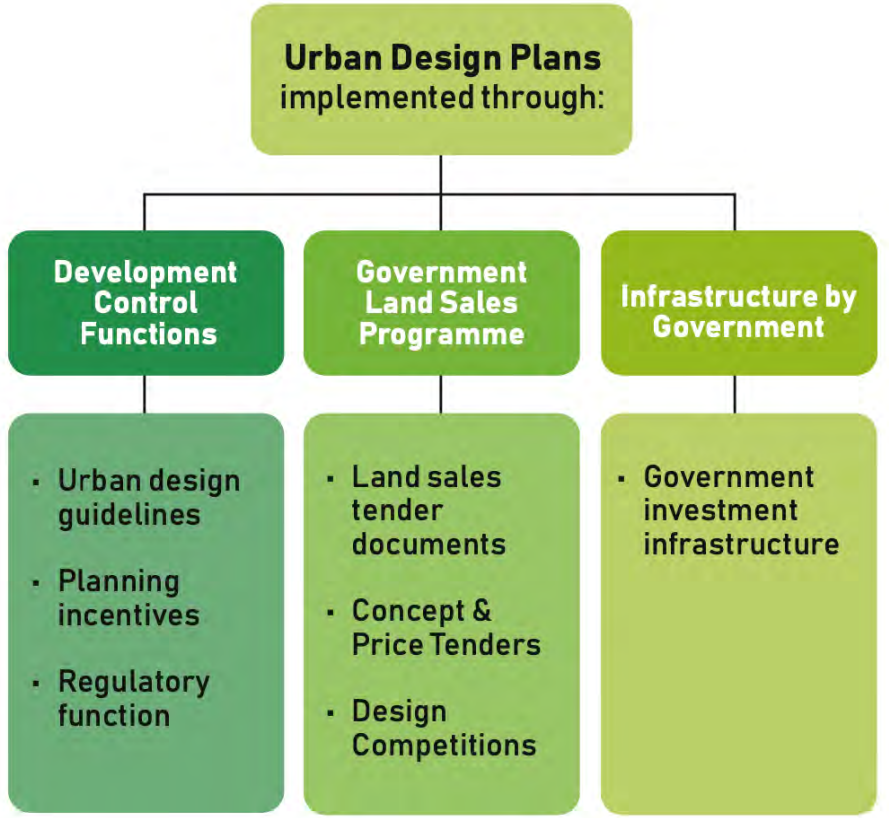
URBAN SH/FT

SECTION 3
IMPLEMENTATION ROADMAP

Malmö Bo01, Sweden. Source: Creative Commons

Integrated Spatial Planning Strengthens Institutional Coherence

What:
Long-term sustainability demands the alignment of institutions, regulations, and investments within a shared spatial logic.
How:
Integrated spatial planning provides a concrete framework to break silos and coordinate across sectors.
Chongqing: The 2035 Strategy links zoning, land use, transport, and investment.
Melaka: Planning tools consolidate growth boundaries and harmonize mandates.
Singapore: URA integrates urban design, land sales, and infrastructure funding to co-evolve vision and implementation.
Why:
When spatial strategies and institutional frameworks are aligned, cities gain the capacity to deliver coherent, cross-sectoral, and future-oriented action.



Singapore's urban design framework aligns institutions, regulations, and investment instruments around shared spatial objectives. Coordinated development control, land sales, and public infrastructure enable the realization of integrated spatial plans, demonstrating how institutional coherence underpins long-term sustainability.
Source: URA, UD_Guidebook_Green_and_Liveable_City.pdf, pp. 8–11

URBAN SH/FT

THE PATHWAY

Establish a baseline
Ensure the whole team has a consistent understanding of the factors that will impact the neighbourhood liveability, public space quality and emissions profile.

Set the vision

- Embed green and thriving outcomes into the neighbourhood vision and objectives.
- Tailor the vision and objectives to the local context.
- Establish a framework to monitor progress towards this goal.

Determine actions

- Define clear design, technology or process interventions.
- Achieve quick wins to build momentum, to improve a neighbourhood's potential and attract further funding and investment.

Every courtyard in this project in Huechuraba, district, Santiago, Chile is different, defined by its location, context, and historical traces of what was there before. This contributes to each community having a unique identity and sense of place. Source: Gehl architects.

URBAN SH/FT

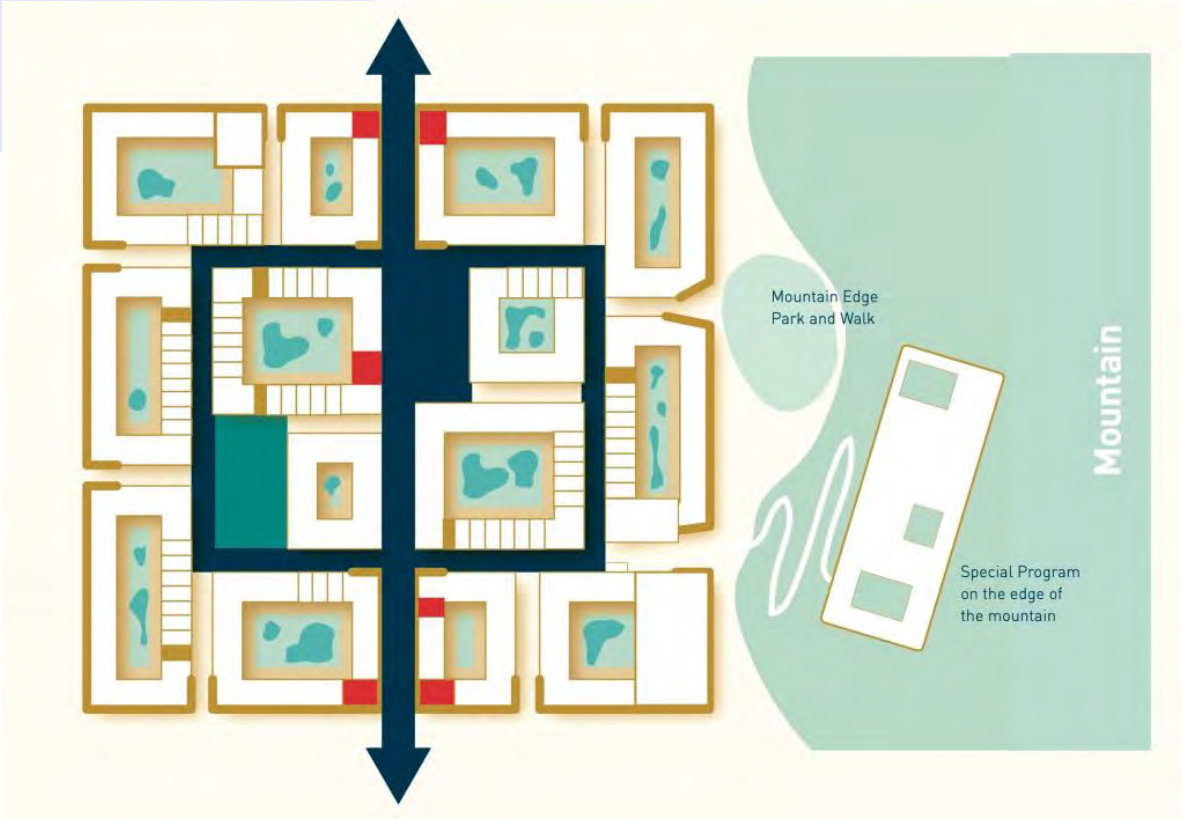
THE PROCESS

- Engage and empower the community.
  - Change perspectives
  - Build together common visions
  - Grow partnership and trust
  - Test ideas via pilots
  - Engage and empower the most vulnerable in the process.

- Integrate urban planning and design with systems based on circular economy.

- Update regulatory frameworks

The end results are inclusive communities where people live better, ultimately enjoying a healthier environment.

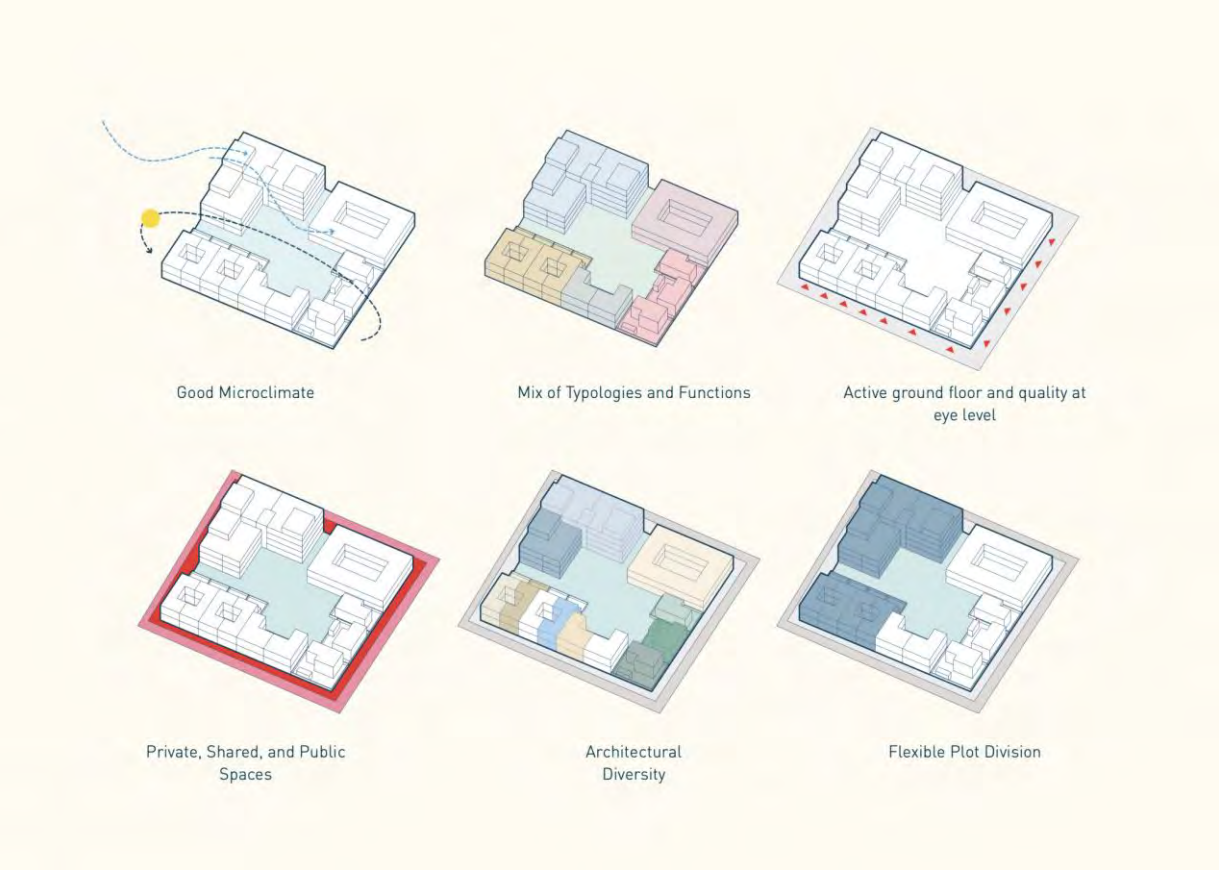


Huechuraba district, Santiago, Chile. A legible and structured neighbourhood connects public space and built form with an edge, a crossing main street, an internal loop, a hard plaza, a park.

In this project, each neighbourhood special program integrates the mountain edge with it, providing unique purpose and identity points. These include food, technology, recreation, culture, education and health programming.
Source: Gehl architects.

URBAN SH/FT

UPDATE PLANNING AND ZONING RULES



Guiding principles of combining building typologies. The diversity of typologies provides options to adjust and refine the experience of outdoor micro-climates which in turn informs the use and feel of public space – a self-fulfilling loop for people centred urbanism.
Source: Gehl architects.

- **Move from conventional zoning to form-based codes and/or mixed-use zoning.**
  - Form-based codes (FBC) regulate the general form and character of buildings allowed in a zone, and focus on the quality of public space, without specifying the use
  - whereas conventional zoning separates buildings by use.
- **Zone for medium density development and smaller block size.**
- **Provide financial and regulatory incentives**
- **Promote the adaptive reuse of vacant or underused buildings.**

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CREATE AND CAPTURE VALUE TO FINANCE PROJECTS

- Land Value Capture enables communities to recover and reinvest land value increases resulting from public investment and government actions.

- When associated to good governance and sustainable urban planning principles, land value capture can be an effective tool to help local governments advance green and thriving neighbourhoods environmental and inclusiveness outcomes.

- Land Value Capture can allow the public sector to finance common goods such as affordable housing, inclusive public realm, green parks, social amenities and local workforce upgrading, mitigating thus gentrification risks.

- Part of the value captured can also be used to preserve heritage and to invest in carbon neutrality targets.

Creating value with high quality family-friendly public space in King's Cross mixed use net zero development, London.
Source: Françoise Labbé.

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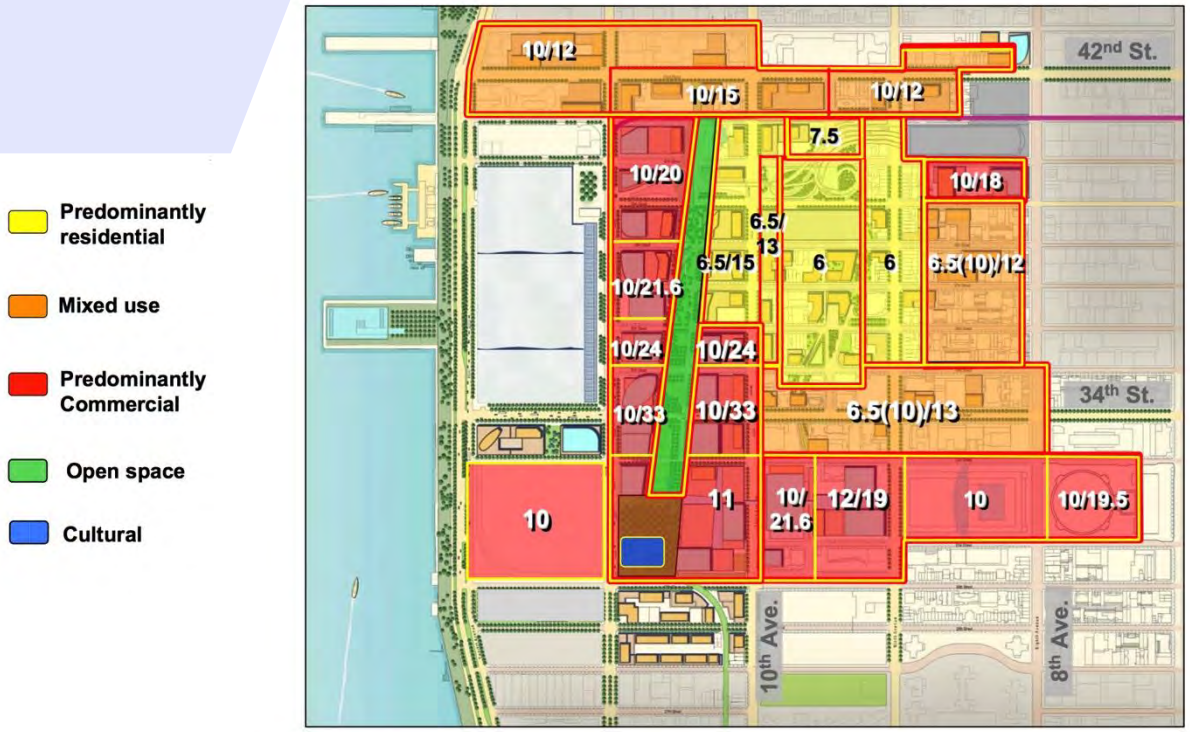
CREATE AND CAPTURE VALUE TO FINANCE PROJECTS

One of these key financial/economic mechanisms is **land value capture**. Land value capture consists of financing the construction of new transit infrastructures using the profits generated by the land value price increase associated with the presence of new infrastructure.

For example, Hong Kong's integrated 'Rail plus Property' model allows the MTRC to operate as a profitable enterprise. **Financial benefits to the Hong Kong government resulting from the 'Rail plus Property' have totaled US$27bn since the establishment of the company in the 1970s.**



Flexible zoning in New York Hudson Yards

Adapted zoning in Hudson Yards sets varied FAR for predominantly commercial, mixed use, and predominantly residential with a range between base and maximum FAR, in order to introduce flexibility and capture value. **Developers which want to build over base FAR and up to maximum FAR (for example between base FAR 10 and maximum FAR 33 in the densest blocks), can do so by paying bonus payments into the zoning-based District Improvement Fund (DIF).** This creates an additional real estate opportunity and allows for demand driven development. The real estate potential up to 2035 is 2.5million m^2 office floor space, 1.13million m^2 residential space, 135,000m^2 hotel space, and 630,000m^2 retail space, totaling 4,4 million m^2.

URBAN SH/FT

CREATING A POSITIVE FEEDBACK LOOP 1/2

A positive feedback loop is started when these increases are captured and reinvested in the same location.

It comprises **four components**:

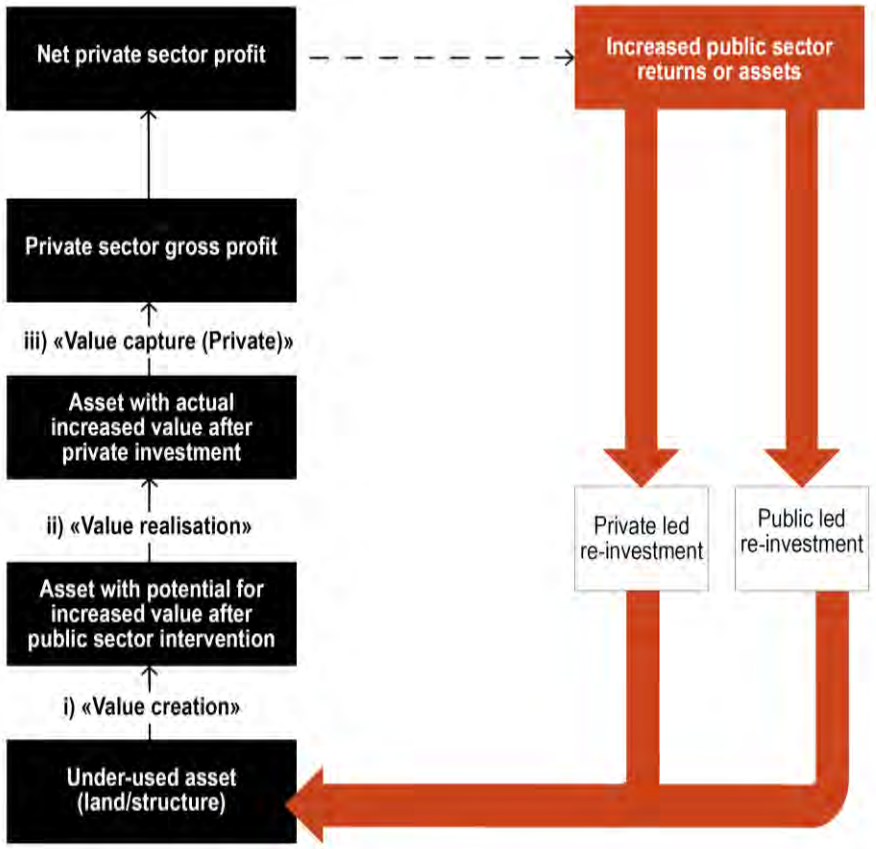
1. **Value creation.** The unlocking of the potential value of under-used assets (land and/or structures) as a result of a public sector intervention to stimulate demand from the private sector.

2. **Value realisation.** Subsequent investment and development from the private sector which ensures that potential asset value increase is realised.

Creating a sense of place by framing views towards heritage buildings and with high quality family-friendly public space in King's Cross net zero development, London.
Source: Françoise Labbé.

URBAN SH/FT

CREATING A POSITIVE FEEDBACK LOOP 2/2



An idealised VCF positive feedback loop.
Source: Adapted from the Urban Land Institute's report 'Value Capture Finance: Making urban development pay its way'

3. Value capture. Arrangements by the public sector for the acquisition of a proportion of private sector returns for local reinvestment. This can take the form of monetary or in-kind contributions from the private to public actors

4. Local value recycling. The re-investment from the private sector within the same development site or scheme. This can pay for the initial public intervention but tends to fund further interventions.

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CONCLUSION:
THE WAY FORWARD

Hammarby, Sjöstad. Source: Creative Commons

Key Takeaways 1: Reclaiming the Art of Integrated City-Making

1. Urban Form Is Not Neutral—It Is Destiny
The structure of our cities determines long-term emissions, infrastructure costs, access to opportunity, and resilience. Once built, form locks in impacts for decades.

2. Neighbourhoods Are the Scale of Transformation
Neighbourhoods link form and function—connecting spatial strategies with infrastructure, climate action, economic inclusion, and identity in tangible, human-scaled ways.

3. Integration Across Scales Is Essential
Sustainability emerges when regional planning, urban systems, and micro-scale design work in synchrony—from wind corridors to zoning to street trees.

4. Design Drives Belonging, Legibility, and Liveability
Well-structured neighbourhoods—with clear centres, boundaries, paths, and landmarks—foster social cohesion, identity, and spatial clarity.

5. Density Must Be Human-Scaled and Climate-Responsive
Compactness only works when tied to fine grain, diverse typologies, and bioclimatic form. Sustainable density is dense **and** green, inclusive **and** walkable.

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Key Takeaways 2: Reclaiming the Art of Integrated City-Making

6. Streets Are Urban Infrastructure and Cultural Space
Connected, permeable, and textured street networks support movement, identity, and ecological performance—shaping how people live and interact.

7. Fine-Grain Blocks and Parcels Enable Adaptability
Small-scale urban structure allows cities to evolve flexibly, encouraging reuse, diversity, incremental development, and deeper community resilience.

8. Nature and Climate Must Be Woven into Urban Form
Bioclimatic design and nature-based solutions—from rain gardens to breezeways—anchor comfort, resilience, and ecological function at every scale.

9. Circular and Net-Zero Neighbourhoods Are Now Feasible
By interlinking water, energy, and materials flows—and by minimizing embodied emissions—neighbourhoods can become self-sustaining systems.

10. Integrated Planning Requires Institutional Coherence
Cities that align spatial vision with regulations, investments, and governance—like Singapore or Chongqing—are best equipped to deliver lasting sustainability.

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