



# Planned City Extensions: Analysis of Historical Examples

## **PLANNED CITY EXTENSIONS: ANALYSIS OF HISTORICAL EXAMPLES**

Revision 1

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Cover Photo: Villa el Salvador

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# Foreword



The world is fast becoming predominantly urban, and relentlessly so. At the beginning of the 19th century, only 2 per cent of the world's population was urban. By the beginning of the 20th century, that percentage had

increased to 10. By the beginning of the present decade, the world's population living in urban areas had reached 50 per cent. This rapid urbanization is an unprecedented challenge in the history of humanity. In forty years, four of every five people will live in towns and cities, and ours will be an urban planet.

It was only in 1960 that the first 1 billion people had urbanized. We have since then seen a runaway urban growth. In the 15 years between 2003 and 2018, 1 billion people will have been added to our cities. Most of this growth is occurring in developing regions. In fact, it is predicted that seven out of ten urban dwellers will be African or Asian in 2030. Beyond being a demographic phenomenon, urbanization is a transformative force that is continually shaping societies, their economies, political systems and environments.

In a business as usual scenario, we can project that more than half the world's urban population will live in sub-human conditions in the future. Already today, almost 60 per cent of the urban population in sub-Saharan Africa resides in slums and although great efforts are being made to improve many slums around the world and better the lives of those that live there, solutions and new approaches are needed to prevent their formation and expansion. Slums are but a manifestation of rapid unchecked urbanization – a result of allowing our cities to expand without design or regulation and with disregard for environment or social concerns.

Similarly, cities will also bear the brunt of years of uncontrolled expansion and sprawl, without

planning provisions, the delimitation of sufficient public space and the establishment of basic connectivity. Only cities that are able to address the double challenge of land in good supply and orderly patterns of expansion will be able to establish a solid basis for future economic and social growth.

The urgency of the accelerated growth experienced by cities around the world should not be an excuse to perpetuate the dominant development model of the last seventy years. By 2050, cities will host 70 per cent of the world's urban population. This is a fact. But there is no justification for urban expansion that leads to more segregated, more unequal, more unfair and intolerant cities.

The urbanization process should be planned for the long term; it should provide an essential structure, the spine, the matrix, the pattern of how the city will expand. Over time, economic activities and the various social needs will change the shape and urban land uses, but not the pattern. This essential element must be defended and protected by the local authority, the repository of political legitimacy, and the rule of law.

To address the challenge of rapidly urbanizing cities, UN-Habitat advocates for planned city extensions – an urban planning approach that can offer sufficient, affordable and serviced urban plots in a timely fashion. This approach requires that cities plan in advance, plan at the scale of the expected growth, plan in phases, plan for contiguity, apply sustainable and efficient usage of resources and ecosystems and promote a system of cities at the national level. First and foremost, cities must define public space and protect it. Without social and political understanding of the use and productivity of public space, no capacity for planned urbanization can be developed. Planned city extensions can help cities become more compact, more integrated and more connected and thus more liveable.

Without planned city extension measures we risk compounded informal proliferation and its consequences. These include economic consequences such as loss of economies of urbanization, loss of agglomeration benefits and loss of job opportunities, especially for the youth; social consequences such as socio-economic segregation, mobility and transport breakdown, lack of access to energy and clean water and lack of public health and increased safety risks; and environmental consequences such as sprawl-induced stress on land and resources, geographic vulnerability, loss of biodiversity and the vital system functions it supports.

This collection of historical examples of planned city extensions illustrates UN-Habitat principles and exemplifies the adaptability and versatility of the approach and how it can – if meticulously and consistently carried out – provide long term spatial direction for growing cities while allowing local reality and socio-economic forces to thrive and evolve.

The publication of this compilation is especially relevant in the context of the third United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in 2016. The Conference offers a unique opportunity to discuss the important challenge of how cities, towns and villages are planned and managed, in order to fulfill their role as drivers of sustainable development. Planned city extensions will be one of the essential elements to take into consideration in the creation of a pattern of sustainable urban development fostering a new model city.

A handwritten signature in black ink, appearing to read 'Joan Clos', with a long horizontal flourish extending to the right.

**Joan Clos**

Under-Secretary-General, United Nations  
Executive Director, UN-Habitat

## Selected city case studies



## List of cities considered

AFRICA	ASIA	EUROPE	LATIN AMERICA AND THE CARIBBEAN	OCEANIA
Argel (Algeria)	Kyoto (Japan)	Amsterdam (Holland)	Buenos Aires (Argentina)	Adelaide (Australia)
Cairo (Egypt)	Saint Petersburg (Russia)	Berlin (Germany)	Mexico D.F (Mexico)	
Cape Town (South Africa)	Seoul (South Korea)	Edinburgh (Scotland)	Santiago (Chile)	
Nairobi Sites and Service (Kenya)	Taipei (Taiwan)	Lisbon (Portugal)	Previ Lima (Peru)	
Dakar Sites and Service (Senegal)	Xi'an (China)	Madrid (España)		
Sadat City (Egypt)	Jaipur (India)	Milan (Italy)		
	Gangnam (Seoul)	Stockholm (Sweden)		
	Pudong-Shanghai (China)	Turin (Italy)		
		Bari (Italy)		
		Le Havre (France)		



# Introduction

Developing countries are urbanizing at an incredibly fast pace and, in many cases, with unplanned settlements that pose enormous challenges.

Growing cities need to define the urban planning frameworks that will guide the construction of new neighbourhoods and city extensions.

From the analysis of cities that have been built in the historic or recent past and that have evolved in different ways, we can draw lessons that only the passage of time can provide. These lessons can be useful in guiding future urban growth, particularly in countries where urban life is not predominant.

This document, through the analysis of ten existing cities, draws lessons that can be useful for future urbanization. The cities presented are apparently very different: they are in developed or developing countries; they were built in the 17th or 20th centuries; they are neighbourhoods or complete cities; they house the rich and the poor. However, they also have common aspects that serve to define and explain an approach that can guide future urbanization so as to generate cities that are sustainable, socially inclusive, and economically viable.

The main criteria for the initial selection were cities with: layout in a grid or in a physically rational plan; mixed-use development; clear distinction between public and private space; street life and street frontage; endurance through time and adaptation to changing needs; adequate proportion of street, open space and built up areas; and well dimensioned streets and blocks.

For all these cities we have tried to analyze the physical configuration, the process or phasing that led to their construction and the regulations that shaped them.

A longer list of cities was considered, out of which the ten case studies were selected.

An effort was made to include cities in different continents and periods of time. Despite this, the paper does not include an Asian or Australian example, not because there are no interesting cases, but because time and resources limited research in this direction. Many good examples were found in European and North American city plans and extensions of the 19th century – cities built in grids, with a flexible plan and dimensions that have allowed their optimal adaptation to changing times. We would have liked to include cities such as Berlin, Amsterdam, Turin, Bari, Edinburgh or Philadelphia but many of the lessons that can be drawn from these cities are found in Barcelona and New York. Furthermore, many cities that had an interesting and rational layout were disregarded due to the small dimension of the basic units (blocks and most importantly streets) which condition and limit their change and evolution. This was the case with many South American cities designed in the time of the *Ley de Indias*, and of some traditional Asian cities (Xian or Kyoto).

The intention of this analysis was to examine all aspects of each case study related to physical configuration, process, phasing and regulation. Nevertheless the difficulty of finding some of the information in the available time frame, inhibited a complete analysis of all aspects for all cities.



# Manhattan

Location: New York, U.S.A | GDP: 14,991,300 M. USD | Area: 4.036 Ha  
Population: 1,073,573 | Density: 266 p/Ha | FAR: 2.89



© Flickr/Jens Karlsson

## Brief history

- 17th.c Dutch settlement of New Amsterdam
- 1796 Goerck Plan of the Common Lands
- 1807 Establishment of the Street Commission
- 1811 The Commissioners' Plan of 1811
- 1858 Greensward Plan for Central Park, designed by Frederic Law Olmsted and Calvert Vaux
- 1871 The grid is built up to the 155th Street
- 1863 Plan for Upper Manhattan

## The grid



The grid of Manhattan extends through the peninsula in a direction that is parallel and perpendicular to the Hudson and East rivers. The orientation of the grid is Northwest-Southeast and Northeast-Southwest.

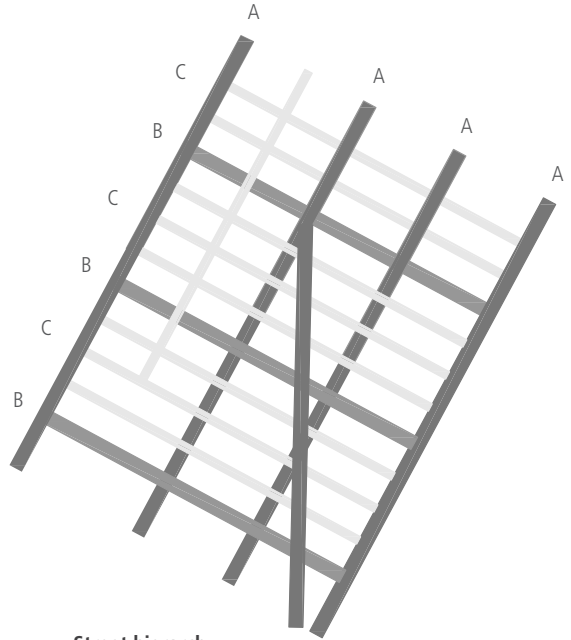
The Commissioners' Plan of 1811 follows in many ways the Goerck Plan of the Common lands of 1796. The Common Lands were the vacant areas of central Manhattan that were granted by the Dutch Provincial Authority to the Government of New Amsterdam in 1656. Originally this area was ignored, but after the Revolution the impoverished city government decided to profit by selling the land. The Goerck Plan divided the area into hundreds of 5-acre lots, separated by N-S roads. The lots would evolve into blocks and the roads into the N-S avenues.

The existing topography was abrupt, 'an island of hills', and it was regraded to accommodate the grid. Although some of the main slopes remain, there was an average increase in elevation of 3m and a decrease of 4m (some areas stayed the same but others were regraded up to 30m).

Some of the original topography can be observed today in Central Park. In the Upper West Side, some of the more extreme topographical features were also maintained in parks (Morningside and St. Nicholas Parks) and streets (Convent Av, Morningside drive and St. Nicholas Av.).

# The street

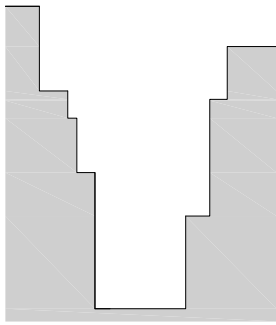
Manhattan's grid has two main factors that create variety: street widths and block dimensions. Although block widths are constant (60m), block lengths vary. The street network considers the territorial and the local scales. The 30m wide, NE-SW Avenues, represent the territorial scale. The 30m wide major cross streets and the 18m wide standard cross streets represent the local scale. Broadway is the exception to the grid.



### Street hierarchy

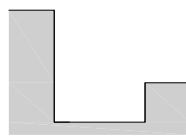
- A: Avenues 30m
- B: Major cross streets 30m
- C: Standard cross streets 18m

### Street types



#### Avenue 30m

33% Pedestrian space  
 67% Vehicular space  
 Building height/Street width prop.:  
 Front plane: 1.5V/1H



#### Major cross street 30m

40% Pedestrian space  
 60% Vehicular space  
 height/width prop.: 1.2V/1H



#### Standard street 18m

45% Pedestrian space  
 55% Vehicular space  
 height/width prop.: 0.75V/1H

— Pedestrian  
 — Vehicular

# The block

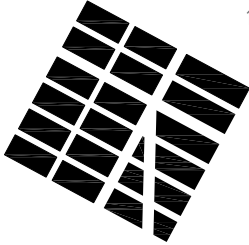
Block width: 60m  
Block length: 280m, 244m,  
189m, 125m, 198m

### Built up/public space:

- Built up area
- Public space - Streets

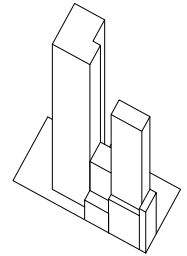
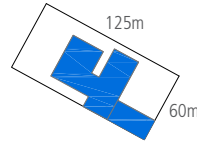
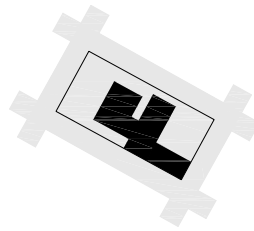
### Uses:

- Residential, single family
- Residential, multi-family
- Services
- Industry
- - - GF commercial



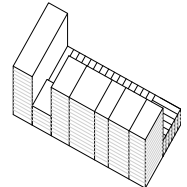
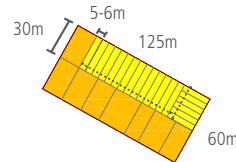
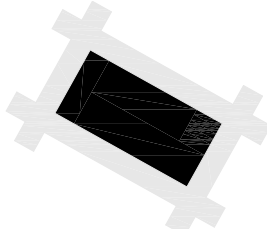
### Business block

FAR: 10m<sup>2</sup>/m<sup>2</sup>  
Land coverage: 40%  
Average plot size: 7500m<sup>2</sup>



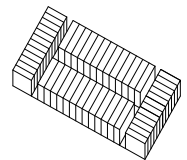
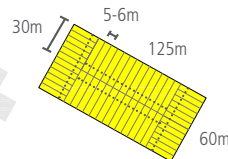
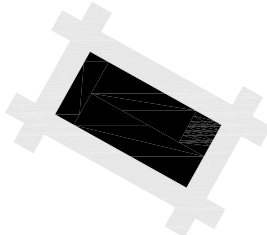
### Mixed residential block

FAR: 7m<sup>2</sup>/m<sup>2</sup>  
Land coverage: 90%  
Average plot sizes: 150-600m<sup>2</sup>



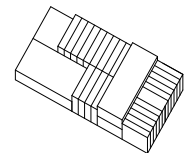
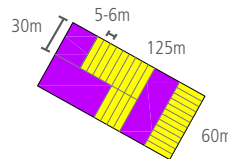
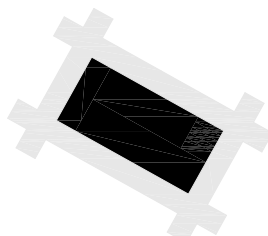
### Residential block

FAR: 3.25m<sup>2</sup>/m<sup>2</sup>  
Land coverage: 80%  
Average plot size: 150m<sup>2</sup>



### Industrial and residential block

FAR: 3m<sup>2</sup>/m<sup>2</sup>  
Land coverage: 90%  
Average plot sizes: 150-1500m<sup>2</sup>



## Open spaces & facilities

The first stage of development (1811-1850s) contemplated smaller open spaces such as small parks and squares which worked at the neighbourhood scale:

- In the initial plan there were several smaller interruptions of the grid, such as the Grand Parade between 23rd Street and 33rd Street, which was the precursor of Madison Square Park, and four squares named Harlem, Hamilton, Bloomingdale and Manhattan.
- Between the 1820s and 1840s public officials and private individuals spearheaded the creation of smaller squares that served as nuclei for new and exclusive neighbourhoods, such as Washington Square, Gramercy Park or Union Square, amongst others.

The second stage of development (post-1850s) introduced Central Park, a public park of 340Ha that would become the main open space at city scale and was not present in the 1811 Plan. (Land acquisition started in 1853 and the park design competition in 1859 was won by F.L.Olmsted and C.Vaux).



## Phasing and management

Manhattan was constructed in four different phases:

### Phase 1: Street layout

In this phase the streets were laid out. The existing topography was abrupt and it took a long time to regrade the slopes and lay out the basic lines of the general plan.

### Phase 2: Street construction

This was a multistep process managed by the Street Commission:

In the first step the city would acquire or trade the lands required for street openings. The 1807 state legislature act defined the street opening system, which enabled the city to trade land destined for streets or other public areas and to compensate the owners financially. Proprietors often contested this system and refused to cede land to the city. This resulted in a subsequent law, passed in 1836, which reinforced the position of the city council.

The second step was the assessment of the value of the properties adjacent to the new streets and the calculation of how much the streets would increase the land value of these properties. The land owners of the properties were then charged proportionally to the increase in land value and this surplus was dedicated to the construction of the streets. Only after 1869 was the city permitted to fund half the cost of the street with tax revenue.

The last step was the construction of the street, which comprised the regrading of the surface and street paving.

### Phase 3: Plot division

The 1811 Plan did not dictate plot dimensions but the block yielded a modular system (a block was dividable into modules 20-25ft wide and 100ft long, which were the standard dimensions of townhouse plots). The resulting standard plot dimension was 5-7.5m x 30m. In 1835 single plots dominated but many properties combined two, three, four and six plots and some even retained a full block.

### Phase 4: Buildings

# Regulations

	THE GRID	THE BLOCK							THE STREET				USES
		SPATIAL DEFINITION				HYGIENE			SPATIAL DEFINITION		FORM	SERVICES	
		LAND COVERAGE	BUILDING DEPTH	PLOT DIVISION	TYPOLOGIES	VENTILATION	LIGHT EXPOSURE	COURTS	ALIGNMENTS	HEIGHTS -3D	FAÇADE	STREET	
Commissioners' Plan 1811	●												
Tenement House Act 1901					●	●	●	●		●			
Zoning regulation 1916		●	●			○		○		○			●
Zoning resolution 1961				●		◎	○	◎		◎			○

● First regulation    ○ First modification    ◎ Second modification

Commissioners’ Plan of 1811: Original design plan for the streets of Manhattan, which put in place the grid plan that has defined Manhattan to this day.

Tenement House Act 1901: A series of height restrictions on residential buildings in response to the loss of light and air to the taller residential buildings that had appeared. Among other sanctions, the law required that new buildings be built with outward-facing windows in every room, an open courtyard, proper ventilation systems, indoor toilets and fire safeguards.

Zoning Resolution 1916: Regulation of the height

and bulk of buildings, the area of yards, courts and other open spaces. Setback principle and maximum spatial envelope regulation. District use regulations: the districts were classified into three categories: residence, business and unrestricted with use restrictions defined for each one.

Zoning Resolution 1961: It coordinated use and bulk regulations, incorporated parking requirements and emphasized the creation of open space. It introduced incentive zoning by adding a bonus of extra floor space to encourage developers of office buildings and apartment towers to incorporate plazas into their projects.

## Key lessons

### Strengths:

- A simple, clear and flexible grid structure, with a limited city extension area defined by the river.
- The grid has proved extremely flexible by accepting many variations to the original 1811 Plan without losing its essence: the introduction of Madison and Lexington Avenues, Broadway, Central Park, the broadening of Park and Lenox Avenues, the introduction of neighbourhood squares and superblocks (Columbia University, United Nations, Grand Central station, NY Public Library) and so on.
- A global project understood at different scales: city scale and local scale. A street hierarchy composed of a territorial system of avenues and a basic street grid.
- The flexibility of the street pattern was defined by the generosity of the initial street and avenue dimensions.
- A varied grid. The grid contained two elements that generated variety: street widths (with 30m wide avenues,
- 30m wide major cross streets and 18m wide standard cross streets) and block dimensions (always 60m wide and varying lengths diminishing from the centre of the island to the shorelines).
- Although the original plan did not regulate alignments, the pairing of block and plot sizes with common housing typologies ensured maximum land coverage and resulted in street frontage.
- Although the initial plan didn’t regulate the image of the city, the city has produced a series of regulations to control the evolution of its image, hygiene and functionality.
- The involvement of the private sector (property owners) in the economic field, through the imposition of charges to cover the cost of street urbanization.



**Weaknesses:**

- Land use zoning that has separated the business and residential districts. Nevertheless the high density and a mix of certain uses (commercial use is spread throughout the city) has diffused this problem.
- As in most North American cities, although the layout plan is rational and organized, the building heights are anarchical, resulting in a

disorderly urban image where skyscrapers are adjacent to buildings of few floors. As A.E.J Morris explains in *The History of Urban Form* the substitution of the domestic scale buildings of the original city nucleus took place in an urbanistical void after the innovations of building in height and public and private transport had taken place.



## Current image of the city



© Flickr/Hubert K





© Flickr/Willem van Bergen



© Flickr/Paco Gaitero



# Barcelona

Location: Spain | GDP: 1,478,206 M. USD | Area: 1,826 Ha  
Population: 483,500 | Density: 265 p/Ha | FAR: 2.65



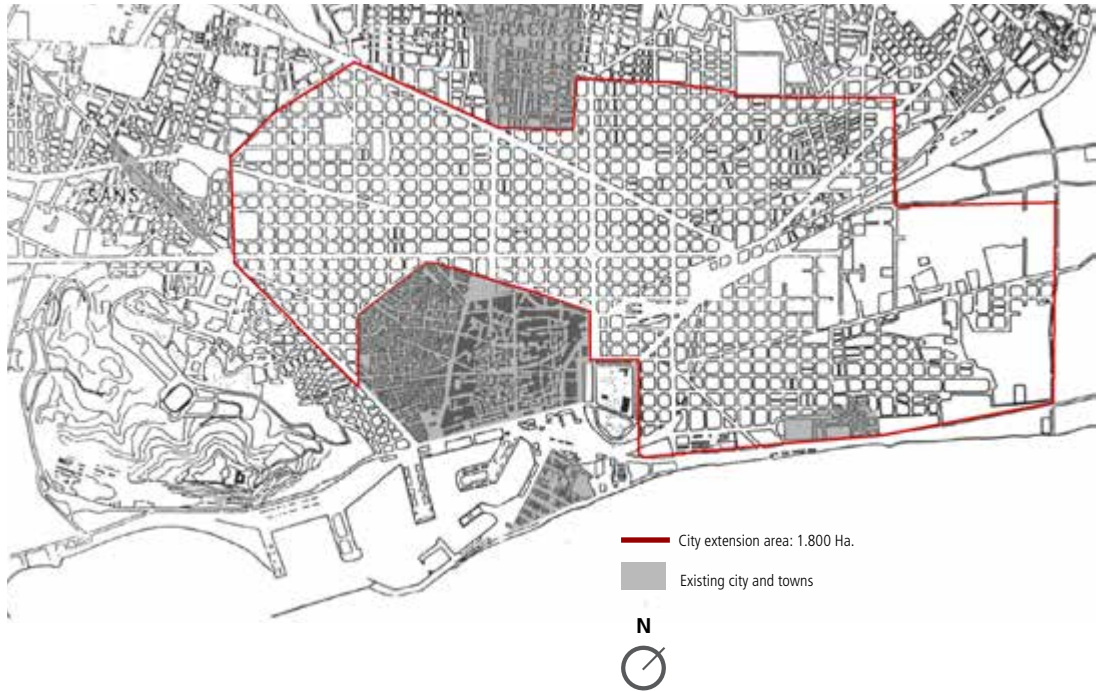
© Flickr/Aldas Kirvaitis.

## Brief history

- 1821 Passeig de Gracia's construction
- 1854 Demolition of the city walls
- 1859 Municipal competition for the city extension
- 1860 Approval of Barcelona's masterplan by Ildefons Cerdà
- 1865 Constitution of the Eixample's Commission
- 1883 Beginning of the Gran Via Avenue construction
- 1888 Barcelona Universal Exposition
- 1891 Garcia Faria's Project for the implementation of sewerage network. Water, sanitation and sewerage systems are designed
- 1899 First tramway in the city
- 1929 Barcelona Universal Exhibition. Consolidation of the East Eixample
- 1992 Olympic Games of Barcelona. Construction of the seafront area
- 2004 Universal Forum of Cultures. The Diagonal Avenue reaches the sea



## The grid



The grid extends in directions that are parallel and perpendicular to the sea. The corners of the square blocks match the cardinal points and, therefore, all the façades have direct sunlight throughout the day, showing the importance that the designer gave to solar exposure.

The design takes full advantage of predominant wind directions (sea-land breeze) to facilitate oxygenation and cleanse the city air.

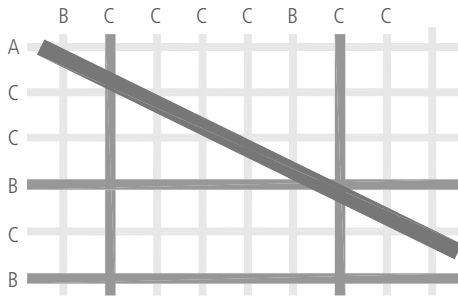
# The street

The Example can be read at different scales: the avenues represent the territorial scale, while the streets define the local scale.

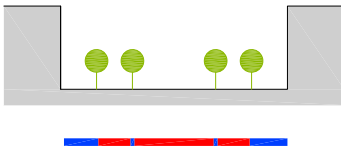
In the original project the proportion of streets space for pedestrians was crucial (with 50 per cent dedicated to pedestrian use and 50 per cent to vehicular traffic). The generous width of streets and avenues has resulted in a flexible and evolving

project. The original homogeneous street has evolved into a variety of street sections, ranging from the mainly vehicular street to the pedestrian promenade.

The street width has also permitted the adaptation to the new ways of urban transportation (car, tramway) and urban infrastructure that were not common when the plan was designed.



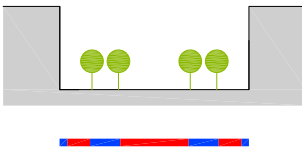
## Passeig de Gracia 60m



## Passeig de Gracia

40% Pedestrian space  
60% Vehicular space  
height/width prop.: 1V/3H

## Avenue 50m



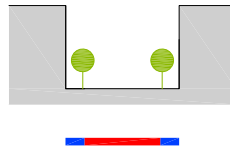
## Diagonal Avenue

40% Pedestrian space  
60% Vehicular space  
height/width prop.: 1V/2.5H

## Street hierarchy

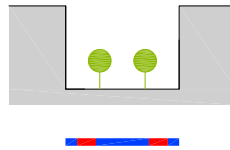
A: Avenues 50m  
B: Major streets 30m  
C: Standard streets 20m

## Main street 30m



## Aragó street

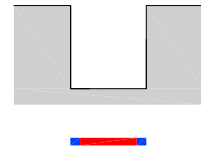
33% Pedestrian space  
67% Vehicular space  
height/width prop.: 1V/1.5H



## Rambla Catalunya

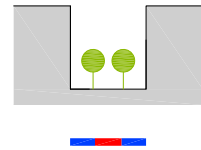
67% Pedestrian space  
33% Vehicular space

## Standard street 20m



## Balmes street

25% Pedestrian space  
75% Vehicular space



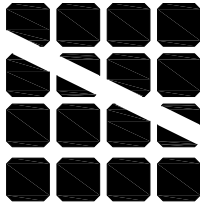
## Enric Granados

65% Pedestrian space  
35% Vehicular space

— Pedestrian  
— Vehicular

# The block

Block width: 113m  
Block length: 113m  
Maximum block height: 22m

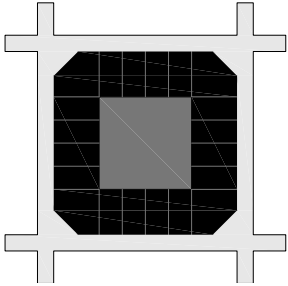


### Built up/public space:

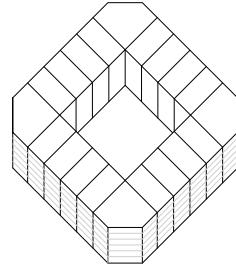
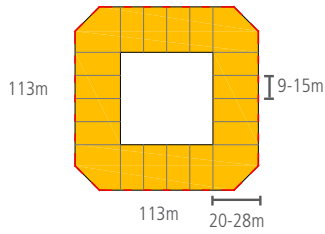
- Built up area
- Public space - Streets

### Uses:

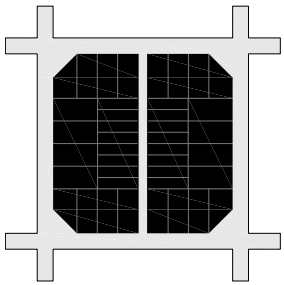
- Residential, single family
- Residential, multi-family
- - - Commercial on GF



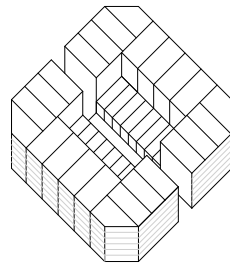
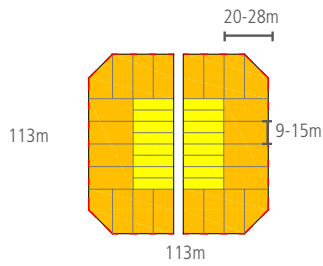
Block A: Standard block with court



Max. 22m  
FAR: 4.3m<sup>2</sup>/m<sup>2</sup>  
Land coverage: 70%  
Plot sizes: 160-450m<sup>2</sup>



Block B: Standard block with passageway



Max. 22m  
FAR: 4.7m<sup>2</sup>/m<sup>2</sup>  
Land coverage: 98.5%  
Plot sizes: 140-450m<sup>2</sup>

## Open spaces & facilities

The open space and facilities are spread out throughout the city and integrated into the grid design using the block as a basic compositional unit. The combination of several units (two, four, six and nine units), has created areas of various dimensions that can integrate squares, parks and facilities of various sizes.

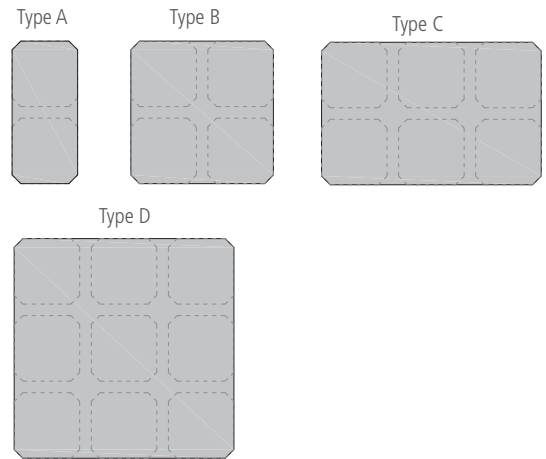
### Open spaces



## Facilities

The facilities are integrated into the grid by grouping blocks:

- Type A:** Combination of two blocks. Hospital Clinic, Universitat.
- Type B:** Combination of four blocks. Escola Industrial, Escorxador.
- Type C:** Combination of six blocks. Estació del Nord.
- Type D:** Combination of nine blocks. Hospital Sant Pau



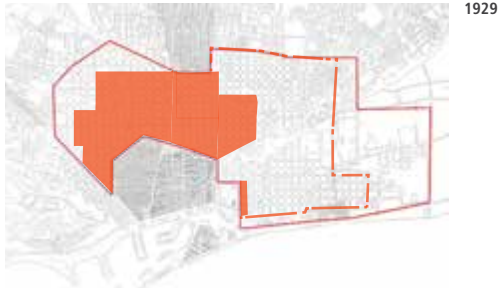
## Phasing and management

The Example of Barcelona was constructed in four different phases:

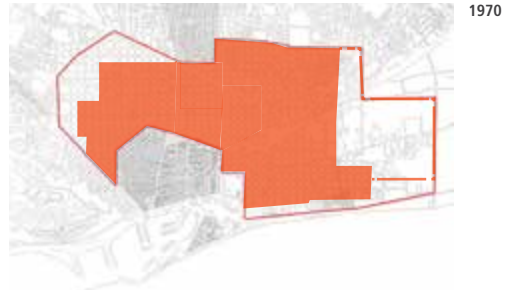
- Phase 1:** Street layout
- Phase 2:** Street construction
- Phase 3:** Plot division
- Phase 4:** Buildings

The cost of the street urbanization was assumed with the imposition of charges on the land owners.





1929



1970

■ Streets and buildings  
    Street layout

## Regulations

	THE GRID	THE BLOCK							THE STREET				USES
		SPATIAL DEFINITION				HYGIENE			SPATIAL DEFINITION		FORM	SERVICES	
		LAND COVERAGE	BUILDING DEPTH	PLOT DIVISION	TYPOLOGIES	VENTILATION	LIGHT EXPOSURE	COURTS	ALIGNMENTS	HEIGHTS -3D	FAÇADE	STREET	
1861. Eixample's regulation. *It was not approved	⊙	⊙	⊙	⊙		⊙	⊙	⊙		⊙		⊙	⊙
Municipal regulations 1857 /1859 building regulations:		●		●						●			
Eixample's regulation 1891		○	●			●	●	●	●	○			

● First regulation    ○ First modification    ⊙ Cerda's regulation not approved

### 1959 General plan of the Eixample

Municipal regulations 1857 and minimum common building regulations 1859: At the beginning of the construction of the Eixample, Barcelona had municipal regulations approved in 1857, but they were designed for the old city conditions. In 1859 a minimum building code was published regulating general land coverage, plot land coverage (50 per cent), building height and plot gardens.

Eixample's 1861 Regulation. Ildefonso Cerda elaborated a regulation to be incorporated to the general plan of the Eixample of Barcelona. This was meant to control the image, hygienic conditions and the construction of the city extension. The document regulated a maximum land coverage of 50 per cent, plot depth and width, building heights, courtyards and ventilation. It defined street dimensions as well as the proportion of the space destined to pedestrians (50 per cent). The regulation was not approved.

Eixample's Regulations of 1891. This ordinance was specific to the Eixample's construction. It regulated building alignment to the streets; a maximum height of 22m (Ground floor+5) for standard streets, resulting in a street section of 1:1; perimetral occupation of the block, with a maximum building depth of 28m and ventilation of courtyard surfaces. It gave the possibility of occupying the interior of the block with buildings one floor high.

The subsequent regulations of 1932, 1942, 1947, 1958 and 1976 resulted in a continuous modification and distortion of the ordinances of 1891 and, consequently, of the initial image of the Eixample, with the increase in building heights and building floors, and the occupation and construction of the interior of the block.

## Key lessons

### Strengths:

- It was one of the first city projects that used modern urbanistic instruments: a general plan and a regulation. This generated a project that could be built in a long timeframe and evolve with changing needs. The plan was permanent and created an orderly and flexible framework for the development of the city, while the regulation could be modified in response to changing requirements.
- Regulations allowed the incorporation of health and hygiene criteria through the control of parameters such as land coverage, plot depth and courtyard surfaces. There was an initial control of the image of the city and the construction of buildings through the definition of a construction ordinance.
- The block gives a double reading to the city based on a clear distinction between private and public space. The block is divided into the 'periphery' and the 'interior', the periphery is the area of contact and exchange with the street and the interior is removed from the street space, not perceived, hidden, and can be designed with looser codes. (P. Panerai: Formas urbanas, de la manzana al Bloque).
- The alignment of façades to the street fronts is a basic and simple mechanism of division of private and public urban space. Street alignments generate street life and urban activity.
- The division of the block in plots becomes a flexible tool for the construction of the city. The rationality of the block design generates rational plots.
- There is a relation and continuity with the city's main communication routes. The identity of the prevailing city is maintained through the adaptation of the grid to the existing city fabric and the incorporation of existing urban elements and areas (Graça, Sant Andreu, Rambla Poblenou, Clot and so on.)
- The generous dimension of streets and avenues has given great flexibility and adapted well over time:
  - By allowing the creation of a variety of public spaces. The initial homogeneous configuration of the street has evolved into many different street sections and typologies. The basic 20m wide street is used in a variety of ways today: mainly for vehicular traffic such as Balma Street; mainly for pedestrians and bicycles such as Enric Granados Street or for mixed use.
  - By allowing the creation of a street hierarchy with the superposition of fast vehicular routes over the homogeneous city grid
  - By allowing the use of the underground layer for infrastructural services
  - By adapting to new and evolving means of transportation and urban infrastructure (tramway, car and so on)
- The mix of uses without zonification and high density creates a vibrant city. The lack of zoning has resulted in a spontaneous organisation of the main business and commercial areas around the most identifiable urban spaces such as the concentration of offices and commerce in Passeig de Gracia due to high land prices which make it less accessible for housing.

### Weaknesses:

- There is a lack of open spaces at the city and neighbourhood scale. The privatization of the interior block courtyards left few spaces for urban recreation and retirement from the bustle of street life. Nevertheless an effort has been made by the city government since 1985 to recuperate some of the block interiors as public gardens (this currently amounts to roughly 50 public interior gardens with an area of 100,000m<sup>2</sup>)



## Current image of the city



© Flickr/Leonora Enking



© Flickr/Matias Brum



# Savannah

Location: Georgia, U.S.A | GDP: 14,991,300 M. USD | Area: 129 Ha  
Population: 1,585 | Density: 12 p/Ha | FAR: 1.65



© Flickr/Brian Trammell

## Brief history

- 1733 The plan of the colonial city of Savannah is laid out by General James Edward Oglethorpe
- 1734 The first four grid units were laid out
- 1751 The city of Savannah became the colonial capital of the Province of Georgia
- 1851 There were 24 grid units in the city

## The grid

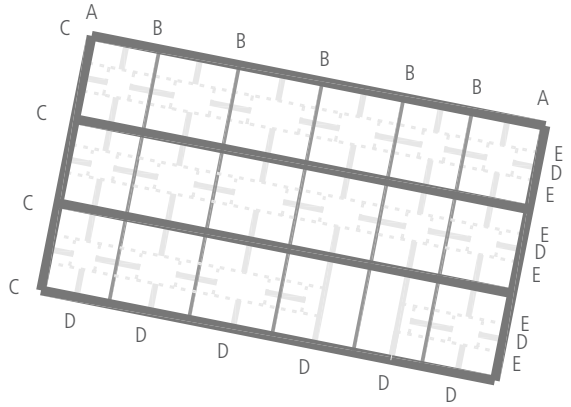


In 1732, King George II granted a new colony to the trustees of Georgia. The city of Savannah was originally designed in 1733 by James Oglethorpe, the chief trustee. Following the usual practice for port cities, Savannah was laid out parallel to the riverfront. The grid's orientation was aligned approximately with the cardinal points.



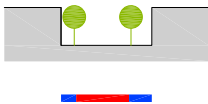
# The street

The larger grid is composed of main streets that are 24-26m wide, are oriented in the E-W direction and carry the main vehicular traffic, and standard streets that are 10m wide and are oriented in the N-S direction. This grid defines modular units (wards) that are built around a central park or square. The streets within the module are 18-10m wide; they penetrate into the neighbourhood unit and border the central square. The streets within the module are 18-10m wide; they penetrate into the neighbourhood unit and border the central square.



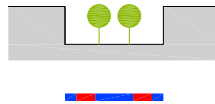
## Street hierarchy

- A/C: Main streets: 24-26m
- B: Standard streets: 10m
- D: Module main streets: 16m
- E: Module standard street: 8 m



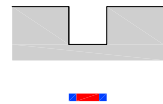
### Vertical major street 24 m

40% Pedestrian space  
60% Vehicular space  
Building height/Street width prop.: 1V/2.4H



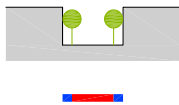
### Horizontal major street 26 m

60% Pedestrian space  
40% Vehicular space  
height/width prop.: 1V/2.6H



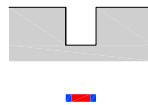
### Standard street 10 m

40% Pedestrian space  
60% Vehicular space  
height/width prop.: 1V/1H



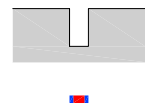
### Grid unit main street 16 m

40% Pedestrian space  
60% Vehicular space  
Building height/Street width prop.: 1V/1.6H



### Grid unit standard street 8 m

60% Pedestrian space  
40% Vehicular space  
height/width prop.: 1V/0.8H



### Service street 5 m

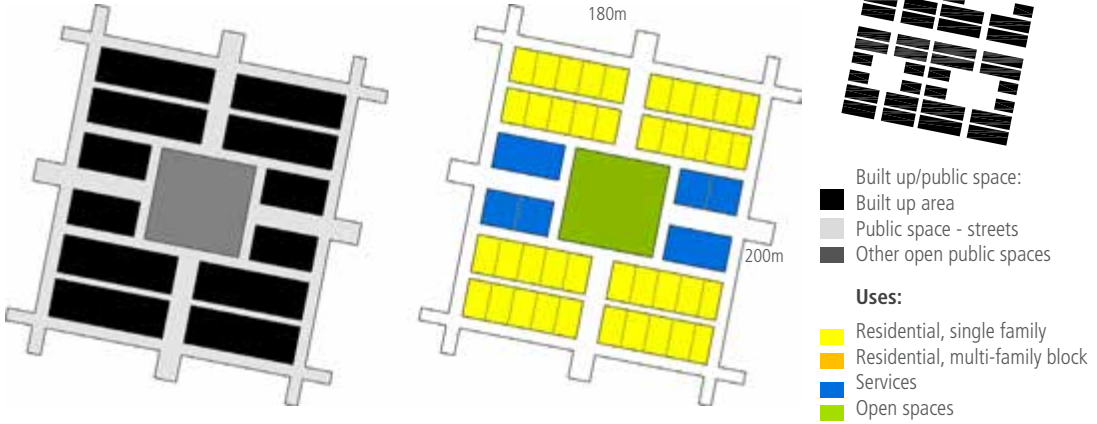
40% Pedestrian space  
60% Vehicular space  
height/width prop.: 1V/0.5H

— Pedestrian  
— Vehicular

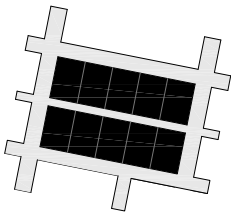


# The block

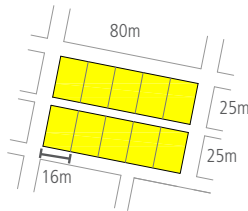
The neighbourhood units/modules:



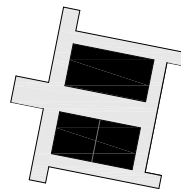
Neighbourhood/basic blocks:



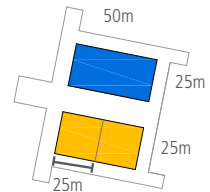
Blocks B1, tything blocks.  
Residential



Height: GF+2  
FAR: 2.72m<sup>2</sup>/m<sup>2</sup>  
Land coverage: 90%  
Plot size: 400m<sup>2</sup>



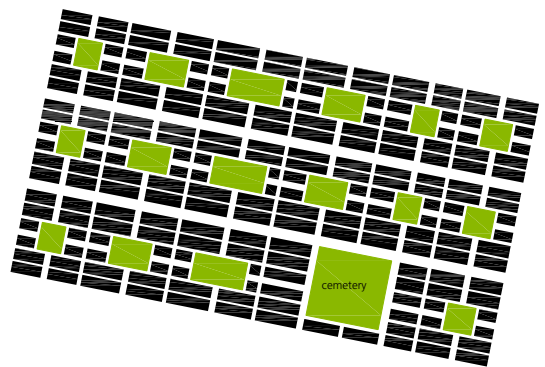
Blocks B2, trust blocks.  
Residential multi-family block  
and facilities (intended for  
institutional and representative  
buildings)



Height: GF+2  
FAR: 2.6m<sup>2</sup>/m<sup>2</sup>  
Land coverage: 85%  
Plot size: 625m<sup>2</sup>

## Open spaces & facilities

The plan of Savannah neighbourhood units composed of eight building blocks surrounding a central local square. The square, the core of the unit, served originally as town meeting area and a center of business. Facilities such as markets or churches were grouped around the square, in blocks of different sizes and shapes, increasing the activity of the public space.



## Phasing and management

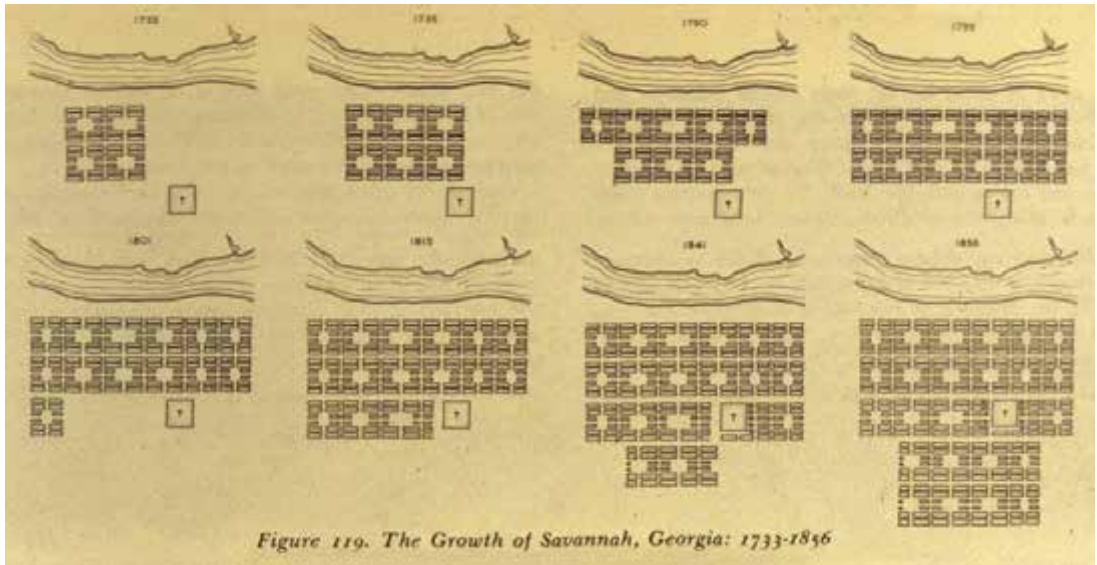


Figure 119. The Growth of Savannah, Georgia: 1733-1856

© www.columbia.edu

In 1733, General James Edward Oglethorpe designed the plan of the colonial city of Savannah based on a system of town wards, each containing building lots surrounding a central square.

By 1734, the first four squares were laid out. Over the next century, Savannah would continue to grow

towards the east, west, and south extending the square system, and by 1851 there were 24 grid units in the city. In the early 20th century, three of the original squares were demolished or altered beyond recognition, leaving 21 squares.

## Key lessons

### Strengths:

- The simplicity of the general plan creates a legible structure
- The neighbourhood units provide public spaces and facilities at the local scale. The central position of the squares within the modules results in civic spaces that can be easily controlled and monitored by the neighbours
- The idea of the module and its capacity to generate neighbourhood life has served as inspiration for many urban plans since
- The module introduces a larger urban scale that breaks the monotony of a simple grid
- The basic module can be repeated facilitating urban growth
- There is a clear and well organized street structure. The buildings are aligned to street fronts and streets are well urbanized and planted

generating relevant and livable urban spaces

- The proximity of the urban squares results in a network of interconnected public spaces

### Weaknesses:

- The only mix of uses happens around the local squares. The character of the district is mainly residential without commercial in the ground floor which reduces street activity and, therefore, the complexity of the district
- The infinite repetition of the grid can generate monotony and provide unnecessary public spaces. In order to mitigate this problem, further hierarchization of streets and public spaces at the city scale is required.
- The rigidity of the urban pattern makes it difficult to create exceptions (such as multi blocks for larger programmes)
- It is a low-density city extension

## Current image of the city



© Flickr/David Biesack



© Flickr/Graham Coreil-Allen





# Back Bay

Location: Boston, U.S.A | GDP: 14,991,300 M. USD | Area: 175 Ha  
Population: 18,088 (2010) | Density: 103 p/Ha | FAR 2.15



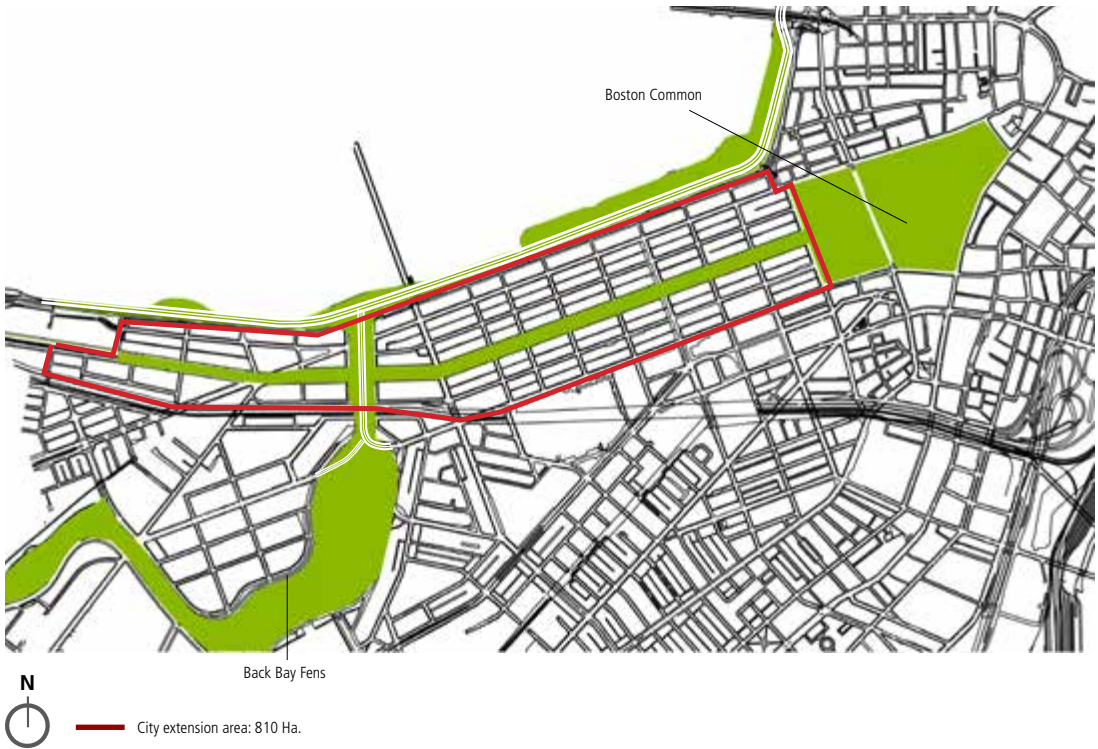
© Flickr/Scutter

## Brief history

- 1814 Beginning of the development. The mill company builds a dam along what is now Beacon Street to cut off the tidal flats from the river.
- 1856 The Commonwealth of Massachusetts decides to fill in the Back Bay of Boston city and construct a new neighbourhood. Back Bay master plan by Arthur Gilman.
- 1857 The filling of the Back Bay began.
- 1900 The filling of Back Bay was completed



## The grid & the open space structure



The grid orientation is adapted to the natural features of the city. The longitudinal and main direction of the extension is parallel to the tidal lines of the Bay so as to align with the direction of the original dam and the filling phases of the tidal flats.

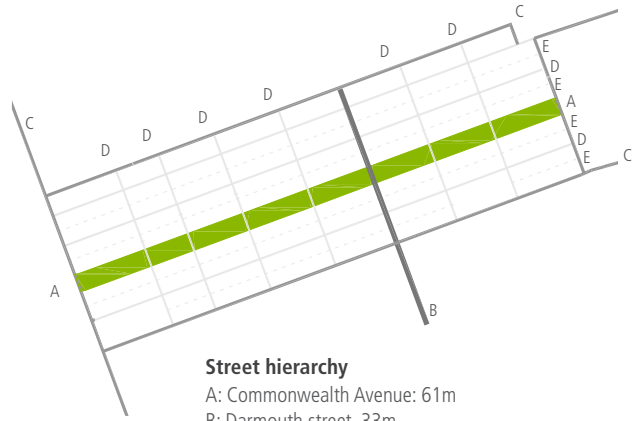
Back Bay is characterized by its open spaces which are a part of The Emerald Necklace, a metropolitan park system designed by the landscape architect Frederick Law Olmsted. This was a linear system of parks at the city scale that connected the Boston Common and Franklyn Park through parkways and waterways.

A central green axis, Commonwealth Avenue, crosses the Back Bay neighbourhood. This avenue, which consists of a central green promenade and is the core of the district, connects the Boston Common and the Back Bay Fens tying the neighbourhood to the metropolitan green structure. Tree-lined streets, parallel to the central avenue complete the neighbourhood open spaces.

# The street

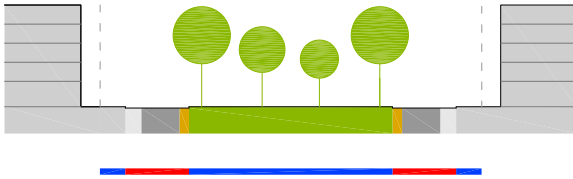
The street grid has a clear and well organized structure characterized by its vegetal elements and unitarian street fronts.

The streets that surround the neighbourhood and connect it to the city-wide street grid are 26m wide. The streets within the neighbourhood are 21m wide and distribute internal circulation. Commonwealth Avenue is the core of the neighbourhood. This 60 m wide avenue runs from East to West and combines the vehicular circulation and a green pedestrian axis.



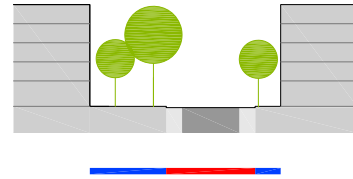
### Street hierarchy

- A: Commonwealth Avenue: 61m
- B: Darmouth street: 33m
- C: Limit streets: 26m
- D: Standard street: 21+12 m
- E: Service streets 5 m



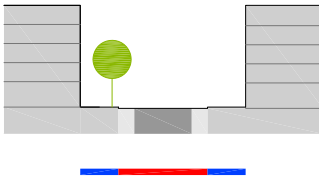
### Commonwealth Avenue 61+12m (6m building setback on each side)

80% Pedestrian space  
20% Vehicular space  
Building height/Street width prop.: 1V/3.75H



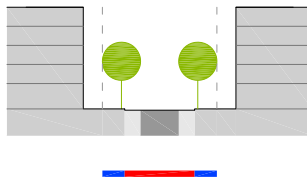
### Darmouth street 33 m

45% Pedestrian space  
55% Vehicular space  
height/width prop.: 1V/2H



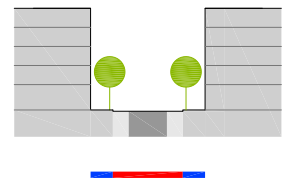
### Limit streets 26 m

45% Pedestrian space  
55% Vehicular space  
height/width prop.: 1V/1.6H



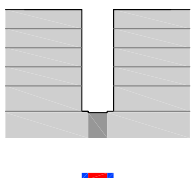
### Standard long. streets 21+12m (6m building setback)

40% Pedestrian space  
60% Vehicular space  
height/width prop.: 1V/1.1H



### Standard transv. streets 21 m

40% Pedestrian space  
60% Vehicular space  
height/width prop.: 1V/1.1H



### Block distribution street 5-15m

40% Pedestrian space  
60% Vehicular space  
height/width prop.: 1V/0.3H

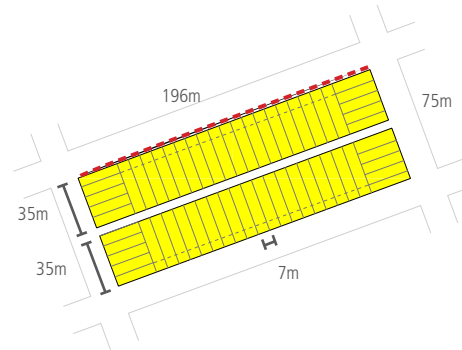
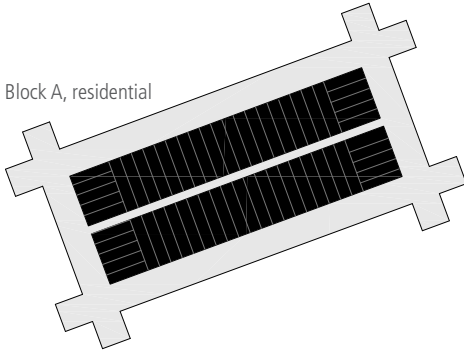
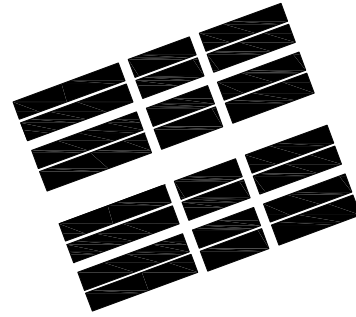
### Street use division:

- Road
- Bicycle lane
- Sidewalk
- Green area
- Pedestrian area
- Vehicular area

## The block

The grid is composed of (GF+4) blocks occupied by single family housing with street frontage and inner courtyards. Only some streets such as Newbury and Boylston Streets, have commerce on the GF.

The block is composed of a double row of single family housing, with an inner service street. The depth of the block is 75-85 m, while the width varies from 114m to 208m.



### Built up/public space:

- Built up area
- Public space - Streets

### Uses:

- Residential, single family
- GF commercial

Height: GF+4  
 FAR: 3m<sup>2</sup>/m<sup>2</sup>  
 Land coverage: 60%  
 Average plot size: 260m<sup>2</sup>

## Phasing and management

The development began in 1814 and was completed in 1900. The filling of the tidal flats began at the edge of the Public Garden and extended westward so as to produce the best lots first and attract buyers. As the tidal flats were slowly filled in residential construction followed. Construction advanced concurrently on filled-in lots as they became available.

The land below the tidal line (thus, most of the area) belonged to the state of Massachusetts. A tripartite agreement was reached between the state, the city and some private proprietors which settled property rights. The state legislature refused to provide money for the start-up of the land filling process; as a result, the state had to pay the contractors with land, giving them the best lots beside the Public Garden. The contractors sold their land at more competitive prices and the initial inability of the state to sell its lots to finance the rest of the operation slowed down the process.

The intention was to create a neighbourhood for wealthy inhabitants and, for this reason, ample avenues were designed. Throughout its construction, the image of the city was controlled with strict regulations, passed in 1871, 1872, and 1873. These regulated fire safety, construction for the soundness of buildings (foundations), the appearance of buildings (mandatory building setbacks, limits on building heights, roofs and cornices, limitation of building materials and so on) and uses (industrial and mechanical uses prohibited, commercial uses only in designated streets).

The installation of public institutions in Back Bay was encouraged by the city and the state governments to dignify the area. Institutions such as the Museum of Natural History, the MIT, the Boston Public Library, the Museum of Fine Arts and Harvard Medical School originally settled in the area.

## Key lessons

### Strengths:

- The open spaces configure the city extension design and connect it to the city scale. The grid is based on the voids rather than on the built-up spaces. Commonwealth Avenue is the core of the neighbourhood, a central linear open space that ties the neighbourhood to the metropolitan scale. The rest of the neighbourhood is built around it.
- Great importance is given to streets as the basic compositional units of the public space network. The quality of the street space is ensured by:
  - Providing street alignment and building frontage
  - Carefully designing street sections in order to obtain an adequate height/width proportion
  - Homogeneous building heights and materials
  - The service alleys that contain and resolve many of the functional requirements of housing

- (garbage collection, services and supplies), removing these uses from the streets
- Generating a great variety of street compositions, resulting in a varied public space network
- Planting street trees abundantly
- Back Bay has a cohesive image that generates neighbourhood identity

### Weaknesses:

- Due to the cost of the filled-in terrain and its central location, Back Bay was planned as a fashionable residential district without a mixture of social classes. Despite this, the open spaces within the neighbourhood are always related to streets, which is easily repeatable in less privileged locations.
- There is not an extensive mix of uses. The district is mainly residential with commercial ground floors only in designated streets.

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## Current image of the city



© Flickr/Eye Tunes





© Flickr/John Niedermeyer



© Flickr/PremshreePillai



# Bahir Dar

Location: Ethiopia | GDP: 30,247 M. USD | Area: 6,238 Ha  
Population: 219,000 (2010) | Density: 109 p/Ha | FAR: 1.05



© Flickr/Al and Marie

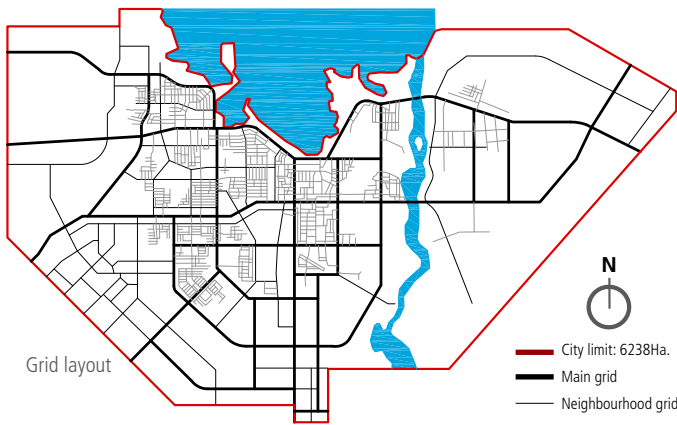
## Brief history

- 14th.c Original settlement, related to the establishment of St. Georgis Church
- 1928-33 Italian occupation
- 1948 Becomes capital of Awaraja region
- 1965 Master Plan by German engineer Professor Mantner
- 2002 UNESCO Cities for Peace Prize for addressing the challenges of rapid urbanization
- 2006 Integrated development Plan by NUPI (National Urban Planning Institute)
- 2013 Local development plans (lake shore and downtown)



# The grid

## 2006 Integrated Development Plan:



### Area distribution:

- 12% roads
- 44% open spaces & Special planning areas
- 44% Built-up areas

Grid layout



Land use plan

The main grid is oriented in the N-S direction. This orientation adapts to the surrounding natural features: one of the directions of the grid is parallel to the Blue Nile river and the main commercial street has its ending in the lake shore.

The streets of the neighbourhood grid are mostly aligned in the N-S or E-W directions, resulting in a variety of orientations for housing.

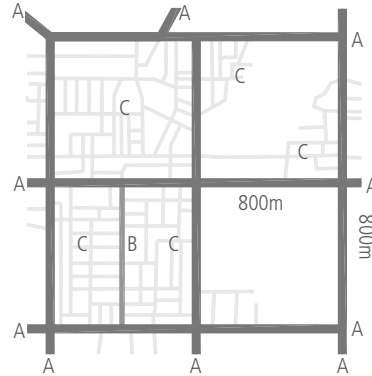
The 2006 integrated Development Plan proposes a land use distribution for the city area. Commercial, administrative and productive uses are aligned with the main avenues in the N-S and E-W directions which are connected to the major city outlets (Gonder, Mota, Debre Marqos).

# The street

The main grid (800x800) is composed of 35-40m wide avenues that carry the main vehicular traffic.

In the city's central avenues, the buildings are aligned with the sidewalk limit creating a livable street with commercial uses on the GF and street planting. On the other hand, in the avenues that cross the residential areas, the buildings are set back from the sidewalk, generating little street life. These avenues are occupied mainly by vehicular traffic.

In the inner neighbourhood streets the building façades front the street. There is no space reserved for pedestrians, therefore vehicles and pedestrians use the central street space.



### Street hierarchy

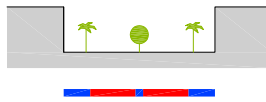
- A: Avenues: 40m
- B: Intermediate sts: 16m
- C: Inner neighbourhood streets: 12m

### Street types:



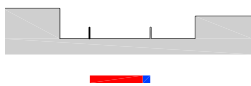
#### A. Avenue. Residential area 40m

- 25% Pedestrian space
- 60% Vehicular space
- 15% Building setback
- Height/width prop.: 1V/2.5H



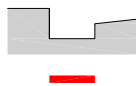
#### A. Avenue. City center 40m

- 40% Pedestrian space
- 60% Vehicular space
- Height/width prop.: 1V/2.5H



#### B. Intermediate street 16m

- 12% Pedestrian space
- 88% Vehicular space
- Height/width prop.: 1V/3H



#### C. Inner neighbourhood street: 12m

- 35% Pedestrian space
- 65% Vehicular space
- Height/w prop.: 0.8V/1H

- Pedestrian
- Vehicular

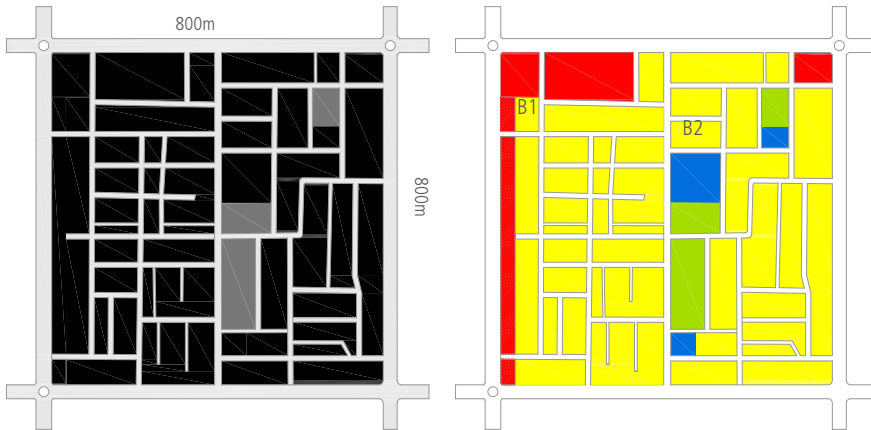


# The block

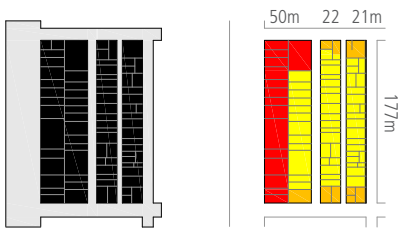
The inner areas of the 800x800 units are occupied by single family and incremental housing (GF+2) with street frontage and inner courtyards. On the streets fronting the commercial avenues, there are commercial or office blocks (GF+4) with commerce on the GF.

In the center of the unit some smaller blocks are reserved for open spaces and services. The shape and size of the smaller blocks with the main grid is rather random and spontaneous. The most common block is composed of a double row of single family housing.

## Main grid unit:



## Neighbourhood/basic blocks:



Blocks B1, fronting a commercial avenue on the W

Plot sizes: 220m<sup>2</sup> - 900m<sup>2</sup>  
 Heights: GF+4 avenues  
 GF+2 inner sts.  
 FAR: 1  
 Land coverage: 75%



Block B2, inner neighbourhood

Average plot: 300m<sup>2</sup>  
 Heights: GF+2  
 FAR: 1  
 Land coverage: 75%

## Built up / public space:

- Built up area
- Public space - Streets
- Public space - other open spaces

## Uses:

- Residential, single family
- Residential, multi-family block
- Commercial
- Services
- Open spaces

## Open spaces & facilities

### Open spaces:

Many of the open spaces defined by Integrated Development Plan adapt to the natural features of the site:

- Special Planning areas in the lake shore and Blue Nile riverside (composed of open spaces and facilities)
- Land reserves in wetland areas
- Preserved forest patches
- Agricultural land reserves

There are also open spaces of various sizes within the city fabric

### Facilities:

The urban and neighbourhood services are evenly distributed throughout the city (see land use plan)

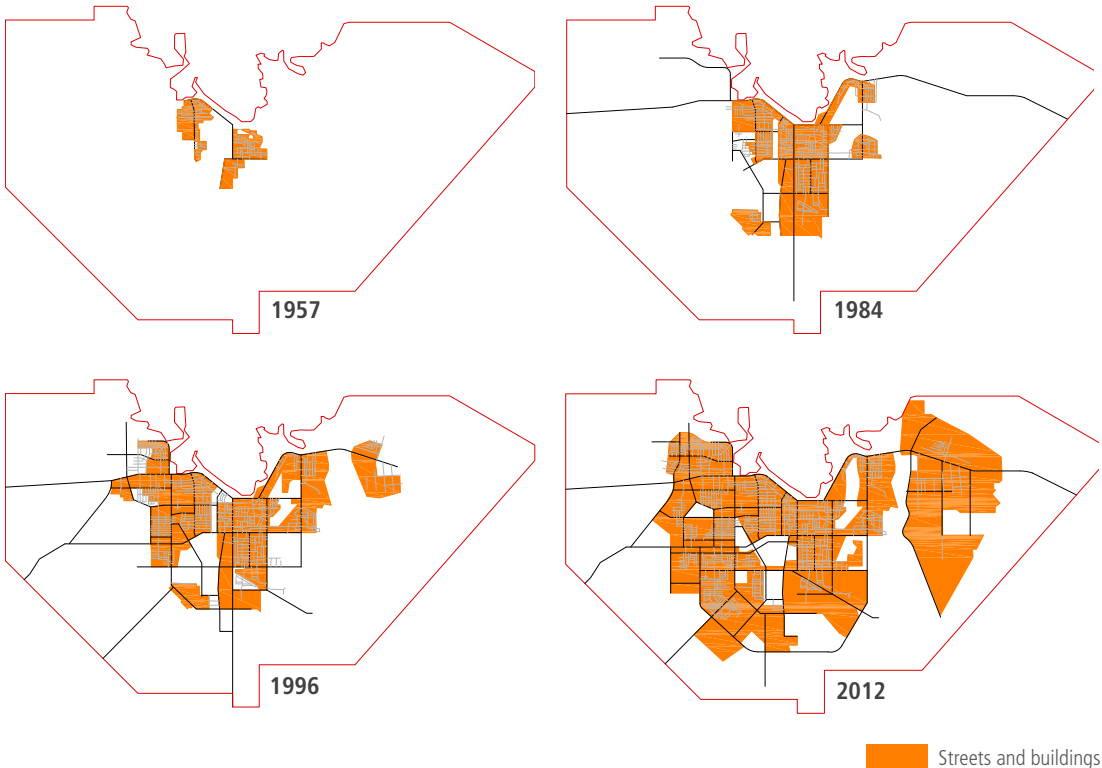


#### Uses:

- Open spaces
- Forest
- Agriculture
- Wetlands
- Special Planning Areas

## Phasing and management

### Bahir dar population growth 5.4% (1984-1994) and 4.9% (1994-2007)



The layout and urbanization of the streets of the main grid is done simultaneously with the construction of the buildings. The inner neighbourhood streets seem to appear more spontaneously and not respond to a rigid plan. Their creation is more diffused through time once the main grid that supports them is in place.

The development of urban plans in 1965 and, particularly, in 2006 (Integrated Development Plan analyzed in this document) allows for the existence of a basic framework that guides the growth of the city.

The existence of an institutional planning and legal framework allows for the generation of the 2006 Integrated Development Plan and its enforcement.

The current regulatory framework in Ethiopia is the following:

- 2005 National Urban Development Policy - by the Ministry of Urban Development
- Regional Urban Development Plans - by the Regional Government
- Citywide master & structure plans - by chartered cities and urban administrations
- Local development plans (kebeles) - by urban administrations.

---

## Key lessons

### Strengths:

- The existence of a city wide plan allows for a coherent and organized growth of the city in a period of rapid urbanization.
- The land use plan takes into account the basic natural features of the site and organizes the city accordingly. Lake Tana and the Blue Nile River have an important place in the city structure and many of the open spaces and services are located beside them. This provides a good basic organization of the main open spaces that are relevant in the initial phases of the city and can be upgraded as the city evolves.
- The land use plan allows for a certain mix of uses. Commercial, service and productive areas are broken up into smaller units which are distributed throughout the city.
- The land use plan respects the preeminence of the street as a defining urban element. It concentrates commercial, business, productive and representative activities along the main streets, rather than in designated abstract areas.
- In the city centre the buildings are aligned, with the sidewalk limits providing street frontage and street life. There is commerce and activity in the ground floor. The street is read as a public space.

- The avenues in the city center are well urbanized and planted, generating relevant and livable civic spaces.

### Weaknesses:

- The clear structure of the main grid allows for a somewhat random and spontaneous layout of the smaller neighbourhood grid. There are many streets with dead ends and random alignments.
- In the areas developed after 1984 the grid is deformed, losing structural clarity and homogeneity, which results in subsequent city extensions that are less related to the original city fabric.
- When the main grid avenues cross residential neighbourhoods, the buildings are set back from the public space and the avenues are dedicated mainly to vehicular traffic and have little street life.
- The new developments on the East and South West of the city are less dense with single family detached housing or isolated condominiums that do not conform to streets as civic spaces. The land footprint of the city is becoming very large in these areas (see comparative plans of cities in page 81).

## Current image of the city



© Wiki Media/Brian Dell



© UN-Habitat



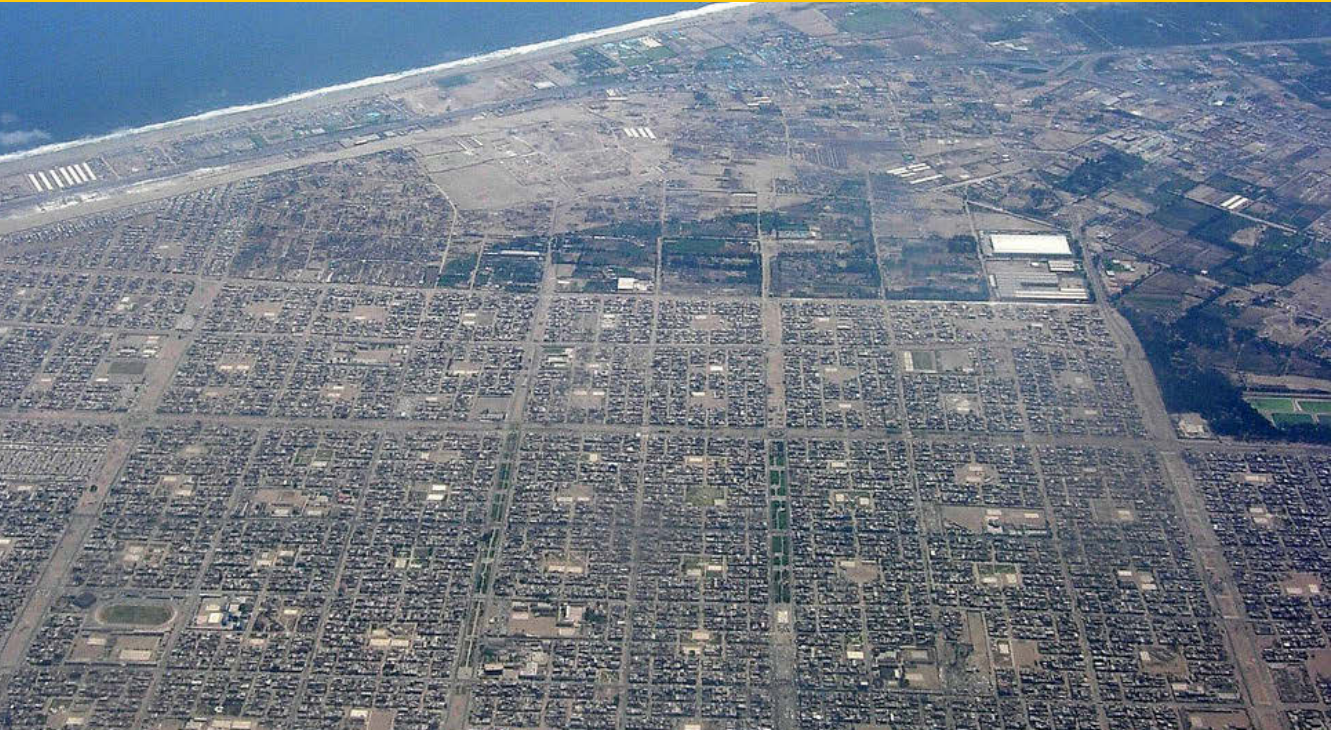
© Flickr/April Rinne.





# Villa el Salvador

Location: Lima, Peru | GDP: 180,464 M. USD | Area: 3,546Ha (district) 2,400Ha (urban area)  
Population: 381,790 (2007) | Density: 160p/Ha | FAR: 1.3



© Flickr/David Almeida

## Brief history

- 1971 28 April. 80 migrant families "invade" the area of Pamplona in the district San Juan de Miraflores in Lima. 11 May. After several days of tension and violence the families are relocated in an alternative site in Hoyada Baja de Tablada de Lurín. The settlement starts based on the plan done by architect Miguel Romero Sotelo. (Civil servant of Junta Nacional de Vivienda). The settlers are allocated a plot of land and they are required to build a basic shelter within 24 hours. After 2 years permanent occupancy inhabitants can apply for a land title.
- 1973 Foundation of CUAVES (Comunidad Urbana Autogestionaria Villa el Salvador), a popular assembly that manages the new neighbourhood. First census (self managed). Villa el Salvador already has 109,165 inhabitants
- 1975 The World Bank Sites and Services project provides water and electricity to Villa el Salvador and Canto Grande.
- 1983 Villa el Salvador becomes a municipality.

## The grid

The grid is oriented in the NW-SE direction, responding mainly to the geometry of the site limits. There are housing units in all orientations (NW, NE, SW and SE).

There was a demand by CUAVES from the first stages of the project for Villa el Salvador not to become a dormitory town (“Before the houses, factories!”). Part of the area is designated for industrial and agricultural uses.



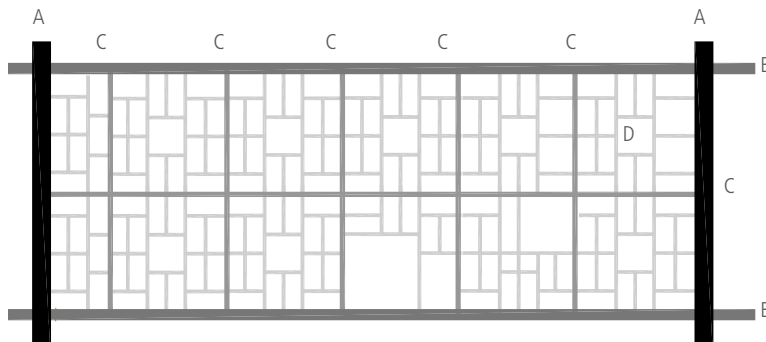
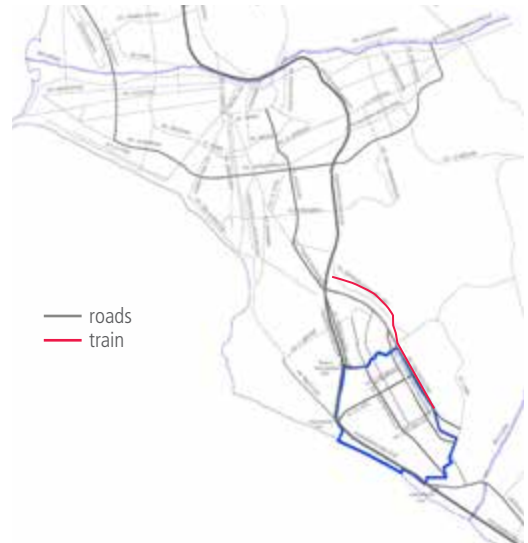
## The street

Even in the initial stages of development, the proposed road network is well connected to the existing train and road network at the national (Pan Americana Sur), metropolitan and local level.

A very distinctive street hierarchy is put in place:

- 50-70m wide avenues for vehicular traffic and pedestrians. Most NW-SE Avenues are dedicated to vehicular traffic, whereas most SE-NE avenues are traffic distributors and also contain a central open area for pedestrians and recreation.
- Narrower inner neighbourhood streets (10-14m). In the initial stages of the development these streets have no defined spaces and combine pedestrian and vehicular traffic.

Road network, Lima  
Source: www. munives.gob.pe



### Street hierarchy

- A: NW-SE Avenues: 70-80m
- B: SW-NE Avenues: 50-70m
- C: Intermediate streets: 14m
- D: Inner neighbourhood streets: 10m

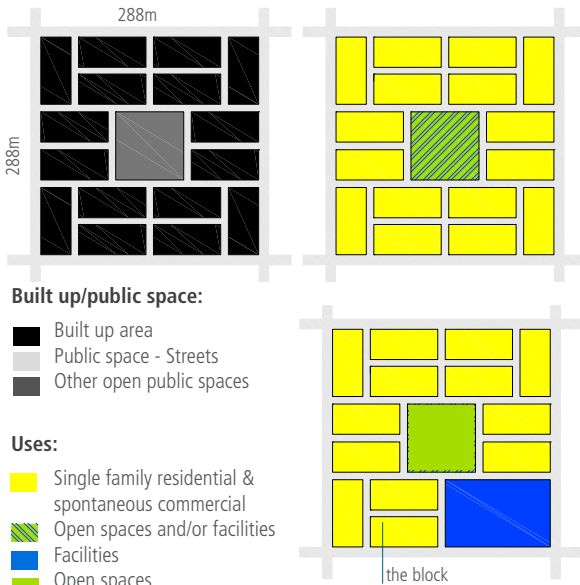
# The block

The homogeneous urban fabric is composed of basic cellules: the modules.

A module is composed of 16 identical blocks grouped around a common space that can be occupied by facilities or recreational areas. The estimated population of a module is 2500 people. The modules are grouped in sectors and several sectors compose the district. The module is also the basic organizational cellule at the administrative and political level.

The neighbourhood is designed for future growth. The incremental self-built housing units are expected to have 1-2 height levels at the origin and grow to 3-4 levels as the neighbourhood densifies. Commercial areas are not designated; these uses appear spontaneously, mostly in the ground floors of denser residential blocks along the main avenues and within the neighbourhood fabric.

## The module:



**Built up/public space:**

- Built up area
- Public space - Streets
- Other open public spaces

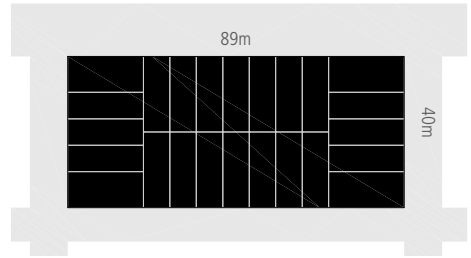
**Uses:**

- Single family residential & spontaneous commercial
- Open spaces and/or facilities
- Facilities
- Open spaces

**Area distribution of modules**

- 28% Roads
- 10% Open spaces
- 62% Built up areas

## The block:



**Plot sizes:**

- basic: 140m<sup>2</sup> (7mx20m)
- corner: 190m<sup>2</sup> (9,5x20m)

Heights: GF to GF+4

FAR & Land coverage: not regulated, current land coverage is 100% in many cases



## Open spaces & facilities

There are neighbourhood open spaces within each module with basic recreational facilities (sports and play areas), and larger open spaces at the district level such as Huascar zonal park and the linear promenades in the main SW-NE avenues.

The facilities are also organized hierarchically. In the core of each module there is a neighbourhood facility (basic educational centre, women's association) and/or an open recreation area. Larger facilities (primary and secondary schools, churches, health centres, markets and so on) are shared by several modules. These larger facilities are inserted in the continuous urban fabric, replacing a group of residential blocks.



1. Huascar zonal park SW-NE avenues with central open spaces:
2. Av 1 de Mayo
3. Av el Sol
4. Av Juan Velasco Alvarado
5. Av Cesa Vallejo
6. Av Jose Carlos Mariategui
7. Av 200 millas

■ Facilities  
■ Open spaces

## Phasing and management

### Phasing:

The terrains of Villa el Salvador (VES) were occupied in a very short time frame (1971-1990s). Today, there are no more lots to be designated and assigned.

Once the lots were occupied, the inhabitants built their house with their own means (incremental housing). The first shelters were very simple structures; in 1971 they were made with straw mats, today they are usually built with tin or timber walls and frames. As the neighbourhood evolves the original shelters are substituted with concrete and stone houses that can reach 3-4 stories. Commerce appears spontaneously.

The original settlement in 1971 only marked street and plot limits and assigned lots. There were no services or facilities (initially, water was distributed by government trucks daily). Services (such as electricity or running water) and facilities came later as a result of the demands of the population. They were installed through donations (World Bank, UN, UNICEF, NGOs, Municipality of Lima,

Peruvian Government and so on) and the work of the inhabitants. Examples of this include the installation of public lighting which came through a Sites and Services World Bank project but the inhabitants negotiated that the network be installed underground. Each inhabitant dug the 7m long trench in front of his or her own lot.

### Time frame:

- 1971: First market, first church, first primary and secondary schools
- 1973: First communal transport line
- 1974: First communal bank
- 1975: Public lighting inaugurated through a World Bank Sites and Services project
- 1979: Lagoons of agricultural zone built; water and sewerage systems of sectors I-II-III
- 1982: Asphalt lining of roads A and B
- 1986: Network of public libraries; asphalt lining of Road C; Solidary square urbanization and construction of industrial park starts
- 1990: First section of electric rain
- 1991: Asphalt lining of Avenues Juan Velasco and Separadora Industrial



- 2000: Inauguration of Hospital Uldarico Fernandez Roca
- 2001: Urbanization of Avenue and promenade Juan Velasco Alvarado - donation of the city of Amstelveen.
- 2002: Municipal stadium Ivan Elias Moreno
- 2003: Urban security programme
- 2005: Asphalt lining of Av. Micaela Bastidas financed by the municipality
- 2006: Town Hall building financed by the municipality

Today 75 per cent of the houses have running water, 92 per cent have electrical lighting, 75 per cent are connected to a public sewerage system, 77 per cent are built in brick or concrete block and 84 per cent are owned by the inhabitants (out of which 74 per cent of the houses are paid off totally). (INEI census 2007 data).

### Management:

From the origin of the neighbourhood in 1971 to 1983 Villa el Salvador was run by a communal organization, CUAVES (*Comunidad Urbana Autogestionaria Villa el Salvador*), an autonomous government system composed of community representatives that was organized and elected directly by the population. In this phase the physical organization of the neighbourhood defined the administrative and political organization. Each

residential module elected its own representatives. In turn, the residential module representatives elected the Communal Executive Committee of VES which was divided in several areas of government: General Secretary, Education, Health, Planning, Economy and Finance, Administration, Relations and Vigilance.

In 1983 VES became a municipality of Lima and the management was taken over by a Municipal Government. In the first few years the municipal government was based on the organization of the Communal Executive Committee.

### Regulations:

The masterplan of VES put in place a grid and defined and assigned housing lots according to this general organization plan. The grid served as a basic structure for the spatial layout of the city. Facilities, services and commerce were put in place later and the grid was altered where necessary. The original organizational structure was not altered deeply by these additions and remains readable today.

Housing was meant to be incremental and self-built. Formal, constructive and hygienic aspects of housing were not regulated. Today many of the lots are occupied fully, resulting in 100 per cent land coverage with deficient hygienic conditions (light and ventilation); 90 per cent of the kitchens have no chimneys (INEI 2007 census).

---

## Key lessons

### Strengths:

- The existence of a simple plan allows for coherent growth of the city in a period of rapid urbanization
- The physical form (neighbourhood modules) is easily transferable to an economic and social organization and, in this case, can be held accountable for the generation of the communal government CUAVES that managed the development of the neighbourhood for the first 12 years
- A considerable area of land is reserved for productive uses (industrial and agricultural park) generating economic activity and jobs within the district
- There are no other zoning designations besides the main productive areas. This has resulted in a mixed use neighbourhood where commerce has appeared spontaneously in the busiest areas. Today the VES district area is dedicated to residential use (34 per cent), commerce (16 per cent), industry (9 per cent), facilities (12 per cent) and agricultural uses (15 per cent). (source: VES municipality [www.munibes.gob.pe](http://www.munibes.gob.pe))
- Although the plots are initially destined for single family housing (incremental) they are tightly dimensioned and therefore bring density and alignment to the street. Most streets today maintain a general alignment

- The street network of the neighbourhood is dimensioned for future growth and well connected to the metropolitan network
  - The importance of facilities (schools, associative and spiritual centres and so on) as an element of community cohesion is understood and enhanced. The location of neighbourhood facilities in the core of each module results in increased security and durability due to the vigilance of the neighbours.
- Weaknesses:**
- The repetition of the basic modular unit and the similarity of scale of the urban elements can generate a monotonous urban landscape. In this sense the SW-NE avenues serve as breaking points and introduce some variety. So do the zonal park and the larger facilities. The neighbourhood would nevertheless benefit from more large-scale open spaces.
  - There is no regulation with regards to housing which results in deficient hygienic conditions and deficient construction (more than 88 per cent of the houses in VES would collapse in an 8.5 earthquake).
  - There is no regulation with regards to street definition, which results in an incoherent public space image.
  - Failing to introduce services in the first stages of development brings the risk of these services never being put in place and thus leading to the degradation of the neighbourhood. In VES the active management of the community (favoured by the spatial organization) and donations result in a record-time installation of the basic urban services. Nevertheless VES today still lacks some basic services such as educational facilities.
- 

## Current image of the city



© Centro de Documentación de Villa El Salvador, Asociación Amigos de Villa, Escuela Mayor de Gestión Municipal.



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# Tel Aviv

Location: Israel | GDP: 258,217 M. USD | Area: 300 Ha  
Population: Circa 45,000 persons | Density: 150 p/Ha | FAR: 2-2.89



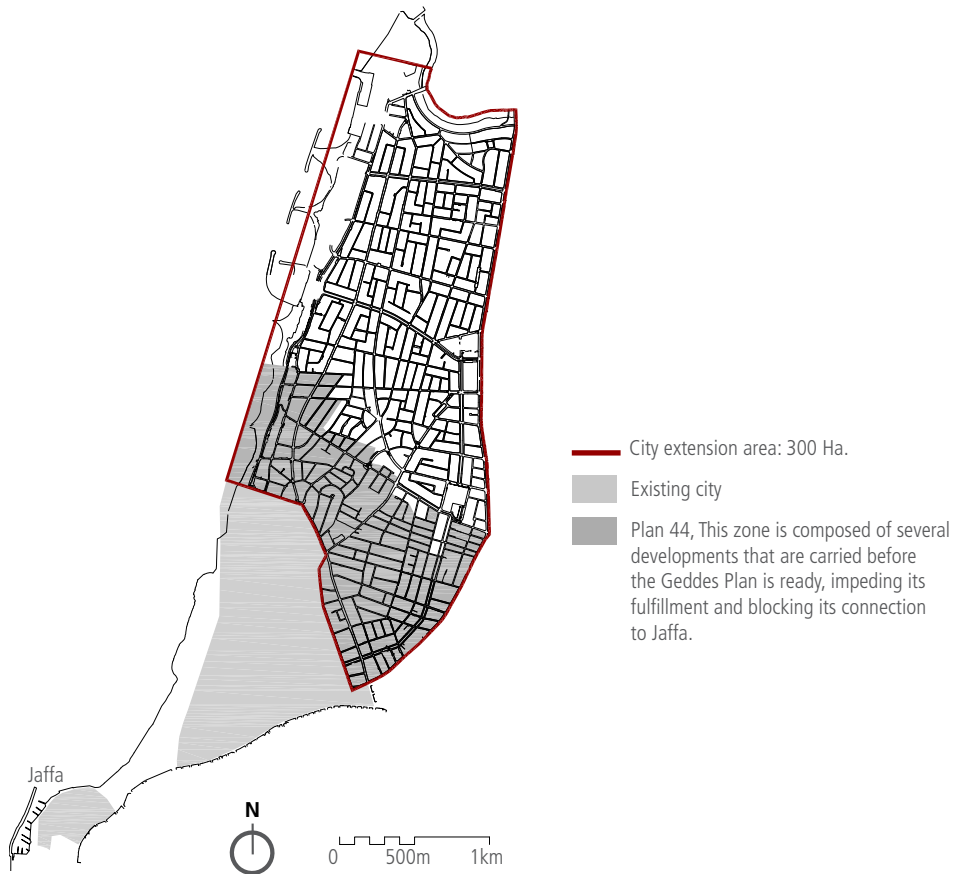
© Flickr/Kristie Wells

## Brief history

- 1911 Sixty parcels of land are purchased to build the first neighbourhood of what would become Tel Aviv.
- 1923 British rule authorizes a separation from Jaffa into a self-administrative zone proclaiming Tel Aviv a new Township.
- 1925 The need for a master plan becomes obvious and the local town planning authority assigns the task to Patrick Geddes.
- 1927 Official approval of the plan. Several developments were consolidated in the meantime – before the plan implementation – and blocking its connection to Jaffa.
- 1930 The early effects of the plan done by Geddes are visible, since Tel Aviv is growing quickly.
- 1938 A revised plan comprising a larger terrain is submitted for approval.
- 1948 After the Second World War, Tel-Aviv becomes a township of 50 sq. km, housing close to 300,000 residents.
- 1965 Tel-Aviv is complete, including the finalized Geddes plan.



## The grid



The Geddes master plan consisted of a grid of main arteries and secondary streets forming urban blocks. The system is close to an orthogonal grid but is far from being rigid. Each block is different from the other, but all are structured according to the same external logic being larger in the north-south direction and narrower in the east-west direction and contain a public garden in the interior.

Three major streets, roughly parallel to the coastline, are cut by boulevards running from east to west. The Geddes plan was the first urban plan for Tel Aviv to recognize the sea as an essential element in the city and use it to achieve a better local climate (comfortable temperature, ventilation and humidity) and as a place of recreation for its citizens.

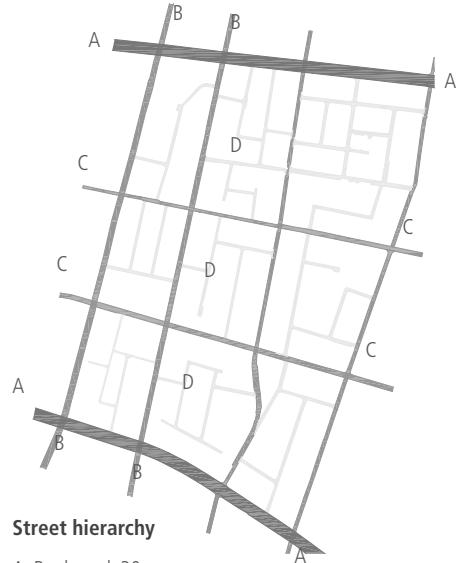


# The street

The model offers a clear road hierarchy: quiet streets connected to internal gardens within the modules that contrast with wider perimeter commercial roads. The road system is designed with the will to discourage vehicular traffic in internal streets. Streets are well defined by buildings and respected as public spaces.

The streets parallel to the sea are primarily for commercial and other related uses while the boulevards and avenues provide access to the sea breeze.

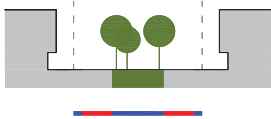
Buildings are set back 4m from all plot limits. This space is intended for ventilation and is occupied with vegetation that improves air quality and outdoor temperature. These spaces are present in homeways but disappear in some of the commercial roads, where the façades can align to street limits.



**Street hierarchy**

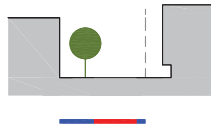
- A. Boulevard: 30m
- B. Commercial roads: 22-25m
- C. Other main roads: 15-20m
- D. Homeways: 7-10m

## Street types



### Boulevard 30m

55% Pedestrian space  
45% Vehicular space  
Building height/Street width prop.:  
Front plane: 0.5V/1H



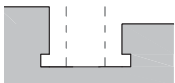
### Commercial roads 22-25m

50% Pedestrian space  
50% Vehicular space  
height/width prop.: 0.75V/1H



### Other main roads 15-18m

37.5% Pedestrian space  
62.5% Vehicular space  
height/width prop.: 1V/1H



### Homeways 7-10m

35% Pedestrian space  
65% Vehicular space  
height/width prop.: 1V/1H

— Pedestrian  
— Vehicular

# The block

The module is subdivided internally in a way that restrains through traffic, constituting a quieter residential environment. Within each block, a sub-system of short and narrow residential streets (homeways) encircles a small public park in its centre in a windmill pattern and this is considered one of the major innovations of the plan.

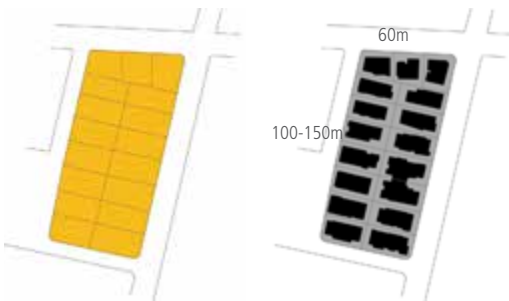
There is a mixture of uses: commercial, office, and residential that makes the city lively.

Parcels are around 500 sq. meters with building setbacks of 3m on the sides, 4m in front and 6m in the back.

## The module:



## The block:



### Uses:

- Residential, multi-family
- Services
- Open Spaces

### Built up/public space:

- Built up area
- Public space - Streets
- Public space - Other open spaces

Average plot sizes: 500m<sup>2</sup>

Heights: GF+3 to GF+4

FAR & Land coverage: Geddes plan land coverage: below 40%

Current land coverage: below 50%

FAR: 2

## Open spaces & facilities

Geddes's idea was to make Tel Aviv a garden city with tree-lined pedestrian boulevards and shared public spaces. Boulevards or sidewalk promenades are essential and form the backbone of pedestrian circulation. Geddes recognized the sea as a major natural contribution and a key element for the city.

Vegetation and public gardens are integrated in the urban plan since green areas are present in both boulevards and in the small squares of residential blocks. The blocks are built around a small garden. There is a varied block pattern all over the town that avoids repetition and gives a distinct character to each one.



Compilation of several developments  
 Open spaces

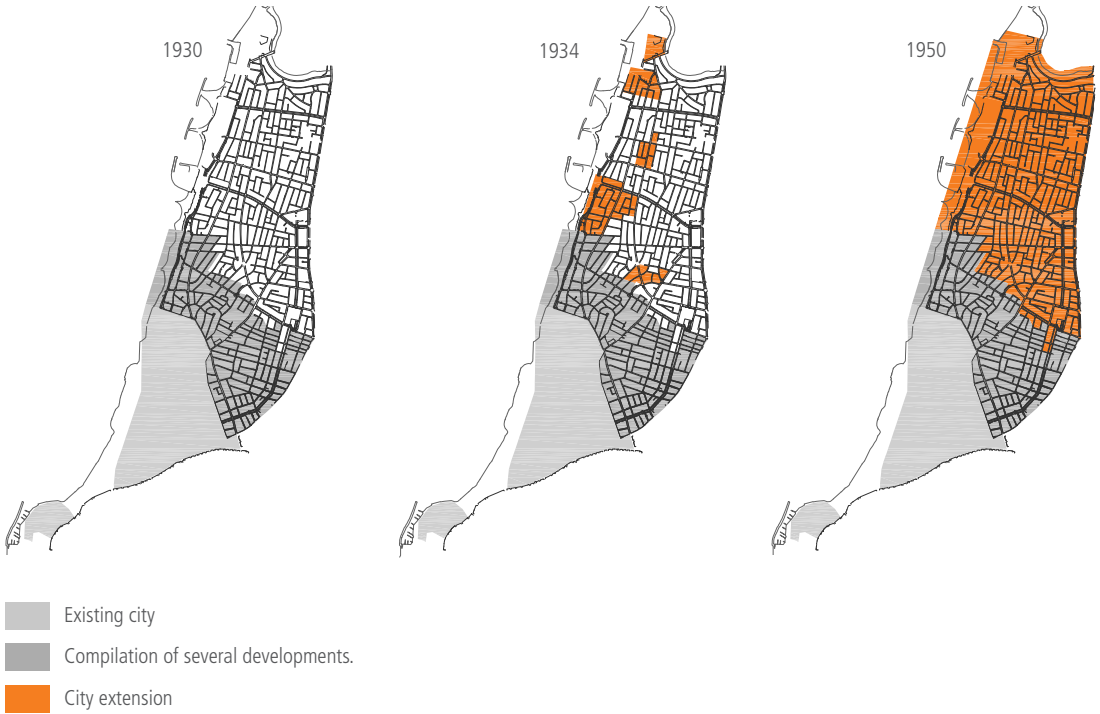
## Phasing and management

In 1925, Patrick Geddes presented a report on the city plan for Jaffa-Tel Aviv, accompanied by a sketch (master plan) for the vacant areas located in the north of the city. In 1930 the Geddes plan was approved and its implementation began but, due to the city's urgent need of expansion, several indistinct developments continued to evolve in the brief years between the time when the plan was drawn and the beginning of its implementation. In 1934, parcel division was carried out in the north area. Surveyors had completed the layout of the public and private plots and building permits were issued.

Even though Geddes's idea for the plan was to be fulfilled gradually with the expected expansion of the city, by 1950 it was virtually complete. In fact, the strong demand for housing (100,000 new people in the period ranging from the mid 1940's to 1960's) and the moderate size of the private

parcels helped to consolidate the model during hard periods, allowing it to remain economically feasible. The total population of Tel Aviv in 1948 after the city extension was approximately 300,000 and the estimated population of the Geddes plan was 45,000 people.

Geddes proposed a flexible street structure composed of boulevards, main streets, residential streets and paths, which made up a flexible grid. This flexibility was essential because the government did not own the land and had to acquire it piece by piece while the city was being built from south to north. In the unpredictable process of obtaining land, the extension plan adapted to the changing situations resulting in a city fabric that was significantly different from the original proposal but that worked coherently because of the strong structure of boulevards and main streets.



## Regulations

The Geddes plan was designed to maximize hygiene, climate control and ventilation (with the penetration of the sea breeze in the city). The plots had a surface area of approximately 500 sq. meters with building setbacks from plot limits ranging from 3m to 6m and were designed to be occupied by four storey buildings. Maximum land coverage of the plots was 40 per cent.

Shortly after starting the construction on the Geddes Plan, a revised plan was submitted for approval. The size of population growth was unexpected and revisions were made to the zoning laws to allow higher buildings. From then on it was possible to increase land coverage to 50 per cent and building height to five storeys. Many of the ground floors of the commercial and main roads were occupied with commerce.

## Key lessons

### Strengths:

- The plan is an evolution of traditional and tested concepts like the grid (mildly orthogonal) and a system of open spaces composed of squares and boulevards
- Street fronts, virtually uninterrupted, create the public realm (street, avenue, boulevard and squares) in a defined way
- The pedestrian scale is taken into account since the size of blocks (100-150 metres long) results in manageable walking distances
- Mixed use creates a vibrant city with commercial, office, and residential uses
- Flexibility in time and implementation: none of the internal gardens and quiet streets was realized exactly in the manner prescribed by the Geddes Plan since the city has been in a continuous state of change. A flexible process in which the general idea is preserved is a proof that strong and flexible planning concepts can have various outcomes but retain their essence.

### Weaknesses:

- The 3m building setback from plot sides creates residual open spaces. The size of these spaces is considerable, that leads us to question the necessity of block separation rather than a continuous facade.
- The inner block gardens give character and structure to the grid. It provides a nearby open space, a cluster in which the daily social life can develop away from the busy main streets. Nevertheless, the dimension of this open space is too small to respond to all the needs of the dense urban fabric.
- The only morphologic unit of the Tel Aviv plan is the 'Tel Aviv block', a building with a free ground floor that is four storeys high and has a constant separation from neighbouring buildings. In the main streets some of the social needs were underestimated, such as commerce of proximity. The problem was solved by occupying the ground level with commerce and by unifying the space between the blocks in order to give continuity to the street. This shows the need of more morphological pieces in order to respond to the complexity and diversity of urban life.

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## Current image of the city







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# Ouagadougou

Location: Burkina Faso | GDP: 10,726,304,841 USD (2012) | Area: 11,826 Ha  
Population: 874,623 (2001) | Density: 63.5 p/Ha | FAR: 0.5-0.85



© Olga Stavrakis

## Brief history

- 1441 Ouagadougou is the capital of the Mossi empire
- 1960 Burkina Faso gains independence from France. Ouagadougou becomes the capital city.
- 1980s At the beginning of the 1980s Ouagadougou grows at a rate of 9 per cent. New inhabitants settle in informal settlements around the city centre.
- 1983 Revolution Democratique Populaire (RDP). A military coup brings Capitain Sankara to power.
- 1984 Reforme Agraire et Foncière (RAF) is put in place, nationalizing all land.
- 1984-1990 Lotissements massifs Operation of massive reparcellation of the informal areas around the city centre.
- 1990 ZACA project for the modernization of the city centre of Ouagadougou.
- 1995 Decentralization and creation of the urban commune of Ouagadougou that will be in charge of urban projects.

# The grid



## Pre-existence:

Ouagadougou is located on a plateau that does not offer any major geographical resistance to urban sprawl. Only a few areas such as the barrage reservoirs, the barrage forest or the green belt of eucalyptus trees north of the city, have been protected from urban development.

## The urban fabric:

The orthogonal grid patterns that compose the city extension are arranged in packets that have diverse orientations. These orientations are usually concentric to the city centre. The operation of massive reparcellation or the *lotissements massifs* that was carried out between 1983 and 1995 resulted in the creation of approximately 66,500 new lots.

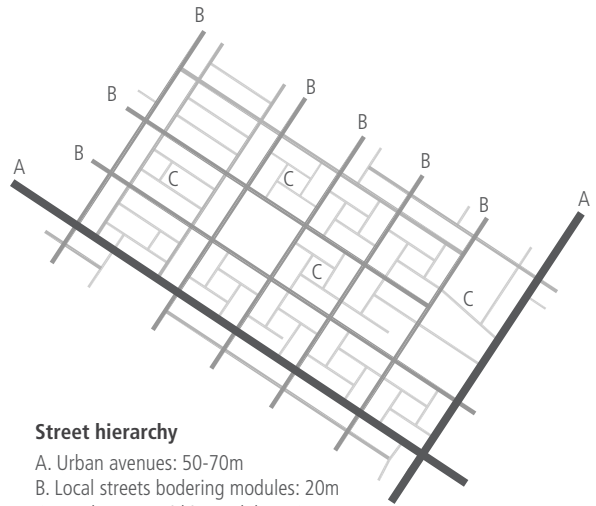


## The street

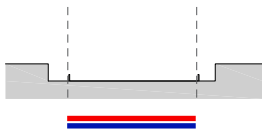
The streets are organized in a hierarchical system. The widest and more continuous streets or avenues (50-70m) are those that connect the periphery to the city centre. There are two types of local streets, 20m wide ones border the modules, while within the modules streets are narrower (12m) and shorter in length.

Since the plots are relatively large in relation to house sizes, the buildings only occupy a part of the plot, liberating the rest of the area as a courtyard or garden. The buildings are frequently set back from the street and the borders of the street are defined by fences or walls, which does not encourage street life.

To date, most streets are not urbanized. They are compacted earth surfaces that are shared by vehicles and pedestrians. Infrastructure is little or inexistent; there is no storm water drainage, water or electricity supply networks.

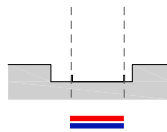


### Street types



**B type street bordering module: 20m**

Pedestrian and vehicular space undefined



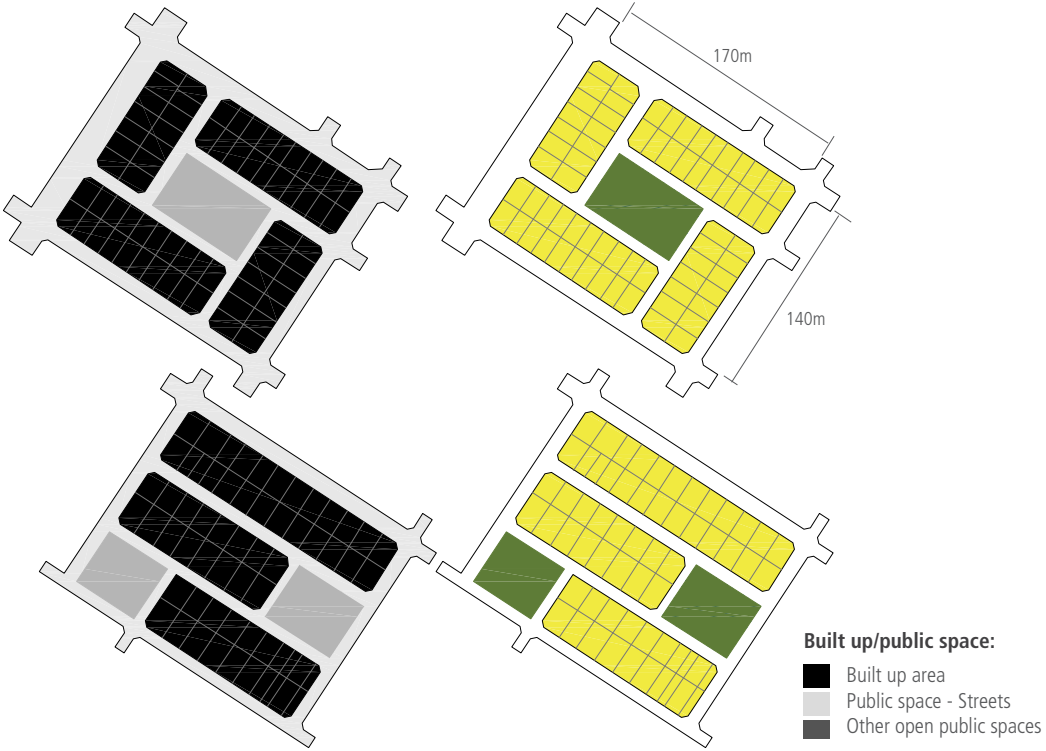
**C type street within module: 12m**

Pedestrian and vehicular space undefined

— Pedestrian  
— Vehicular

# The block

## The neighbourhood units/modules:



**Built up/public space:**

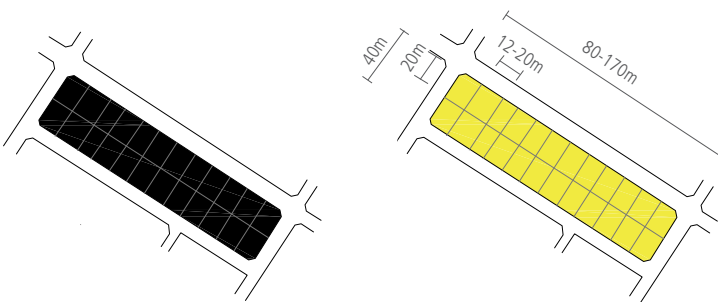
- Built up area
- Public space - Streets
- Other open public spaces

**Uses:**

- Residential, single family
- Residential, multi-family block
- Services
- Open spaces

Height: GF  
 FAR: 0.5-0.85m<sup>2</sup>/m<sup>2</sup>  
 Land coverage: 50-85%  
 Plot size: 240-300m<sup>2</sup>

## Basic blocks:



The blocks in the areas of *lotissements massifs* have diverse configurations. The urban fabric is often organized in modules or neighbourhood units. These modules are composed of blocks arranged concentrically around an open space.

The blocks are mostly occupied by one-storey single-family residential homes. The resulting city has low density and very little street life in most cases. Plot sizes range from 240m<sup>2</sup> to 300m<sup>2</sup>. There is very little commercial activity and few facilities.



## Open spaces & facilities

### Open spaces:

Many of the blocks are organized around small scale open spaces. These open spaces are over dimensioned in relation to the urban density and are not urbanized, therefore they tend to be insecure and degraded spaces. There are no middle scale or large scale open spaces at the neighbourhood or district scale. The open spaces at city scale, such as the barrage lakes or the barrage forest, are too far from the southern neighbourhoods.

### Facilities:

There is a lack of facilities in the new neighbourhoods and the existing ones are not arranged in a clear structure or hierarchy. There is a larger density of facilities (schools, markets, health centres etc.) in the city centre.



## Phasing and management

### Management:

In 1984 through the RAF reform (*Reforme Agraire et Fonciere*) carried out by Captain Sankara, all land was nationalized. Before this measure was taken, traditional chiefs managed access to land.

After the RAF reform people have the right to obtain a lot in usufruct, which allows them to own a house but not the land on which it is built. Lots are laid out according to a master plan developed with Dutch cooperation. The houses are built according to a progressive layout system MAF or  *Methode d'Aménagement Progressif*. The persons who receive the plots are entitled to build their house there. They have the obligation to start construction no later than one year after they receive the land.

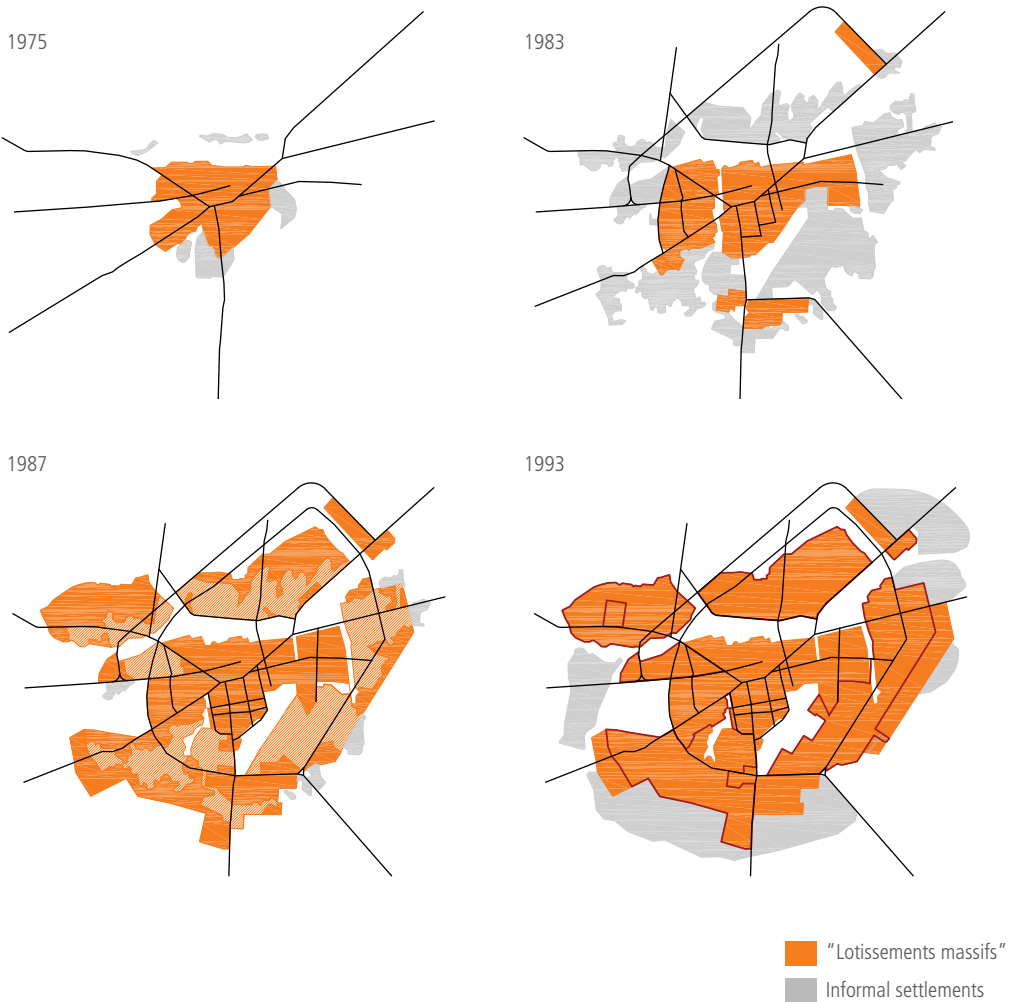
In the initial stages water and fuel were provided by the informal and private sectors. To this date, public infrastructure has been scarce. According to the 1996 census (Meunier-Nikiema), only 30 per cent of the homes in the area of *lotissements massifs* had electricity while 67 per cent used gas and petrol lamps; only 10 per cent had running water; and only 10 per cent had septic tanks, with the rest of the used water being disposed of in the streets (50 per

cent) or courtyards (30 per cent). Since 1995, more emphasis has been put on providing the new areas with infrastructure such as storm water drainage, electricity and street lighting, running water, street paving or garbage collection systems, although the situation has not evolved significantly since 1996.

A street addressing system has been put in place for the new districts. This measure proves very useful since it allows a certain readability of the city and the imposition of small taxes. The residence tax was put in place in 1990 and it is dependent on the public services available for each neighbourhood.

### Phasing:

Relating the *Lotissements massifs* to the basic operations of urban development (P), (U), (E): (P) Plot division: including street layout, separation of public and private space and plot division, (U) Urbanization: construction of the common infrastructure (E) Building, Ouagadougou has followed a sequence of P,E,U in which the initial phase of street layout and plot division (P) was immediately followed by building construction (E) with most of the urbanization (U) lagging seriously behind.



## Key lessons

### Strengths:

- The urban fabric has a clear structure and the street network is interconnected and hierarchical.
- The massive reparation operation has provided relief to the more disfavoured households who obtained access to land and housing at low prices.
- Informal housing is drastically reduced, moving from 70 per cent to 7 per cent.
- Most of the residents of the new neighbourhoods (70 per cent) are property owners. This results in the constant improvement of buildings and in constructions that are more resistant to natural catastrophes.

- The clear urban structure and the street addressing system generate a city that is more readable to the government and easier to operate (for infrastructure provision, investment, census or taxation)
- The metropolitan area is conceived as a whole, which results in little urban fragmentation.

### Weaknesses:

- The relatively large size of the plots in relation to building sizes generates low density neighbourhoods. This results in:
  - A lack of infrastructure and facilities, since the costs of services can't be supported by the city or taxation.

- Buildings that are set back from street fronts. Limits between private space (plots) and public space (streets) that are defined by fences or walls. The streets have very little activity and are insecure.
  - Scarce small-scale economic and commercial activity.
  - Large distances and a lack of urban transportation. Residents are far from any economic activity.
  - An unnecessary occupation of land.
- The new neighbourhoods are basically residential, with few services or activities.
  - The *lotissements massifs* are developed without a basic land use plan (a land use plan is envisaged to be approved in 2025). The establishment of basic allowances or prohibitions of uses and constructions can avoid important interferences that may be harmful for health or security.
  - Since the operation of *lotissements massifs* was developed in a very short period of time, the sociological character of the inhabitants is very homogeneous. Younger generations tend to occupy the new neighbourhoods while the ageing groups occupy the city centre.
- .....

## Current image of the city





© UN-Habitat



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# Aranya

Location: Indore, India | GDP: 1,872,840 M. USD | Area: 85 Ha  
Population: 40,000-65,000 | Density: 400-650 p/Ha | Far: 1.5



© Vastu Shilpa Foundation.

## Brief history

- 1983 The Vastu-Shilpa foundation was entrusted with preparation of a master plan with innovative ideas for the development of a new township in Aranya.
- 1983 Design process starts
- 1985 Construction
- 1989 Project occupancy

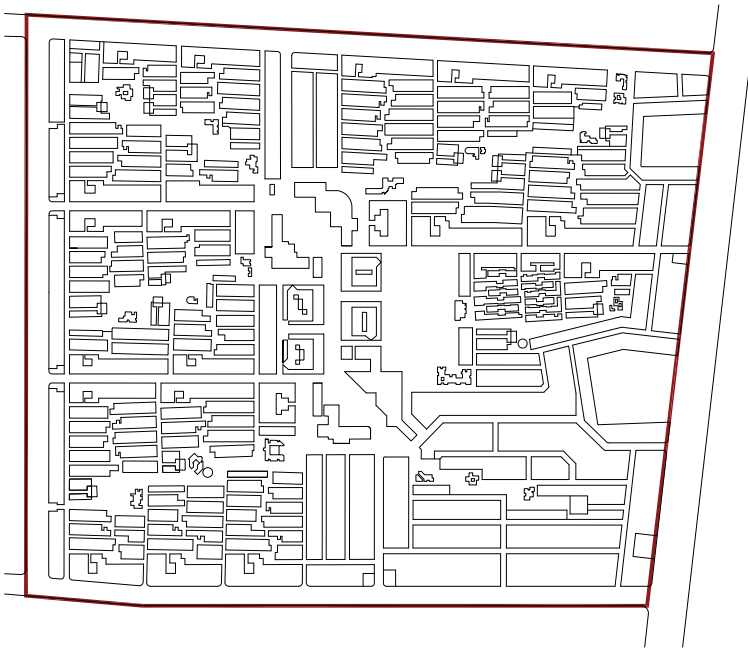


## The grid

Aranya replaces the grid plan so frequently associated with sites and services projects with a more adaptive urban design, and attempts to provide an architectural vocabulary suitable to the socio-economic circumstances and the climate of the site. The proposed plan allows growth, increase in population density and house extensions in the context of the Indian lifestyle. It builds from variation, interlinking open spaces and amenities.

The township is divided into six sectors that converge in a central spine, known as the Central Business District and includes commercial and institutional uses.

The urban fabric and the blocks are aligned with the site limits. The longer facades of the block are oriented North and South but facing narrow streets in order to reduce solar radiation on the houses.



Residential use: 58%  
Roads: 23.5%  
Open spaces: 8.15%  
Community and commercial facilities: 6.73%



City extension area: 85 Ha.



# The street

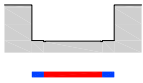
The formal street network draws the vehicular traffic outward to the perimeter road, while pedestrian traffic flows in the interior on informal pathways and an open space network thus achieving a clear segregation of slow and fast moving flows. Non-rectilinear street alignments, varying widths of transit spaces, turns and widenings, accommodate a range of spontaneous activities.



### Vehicular street hierarchy

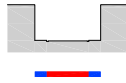
- A: 30m city road forming the boundary
- B: 15m central spine road
- C: 12m sector boundary road
- D: 9.5m block access roads
- E: 4.5m internal streets in front of plots

### Central spine road: 15m



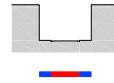
30% Pedestrian space  
70% Vehicular space  
height/width prop.: 1V/2H

### Sector boundary road: 12m



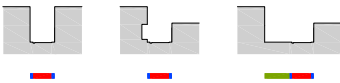
35% Pedestrian space  
65% Vehicular space  
height/width prop.: 1V/1.75H

### Block access road: 9.5m



45% Pedestrian space  
55% Vehicular space  
height/width prop.: 1V/1.5H

### Internal streets (plot access): 4.5m



Regular with variation: Otla<sup>1</sup> and service plots

25% Pedestrian space  
75% Vehicular space  
height/width prop.: 1.5V/1H

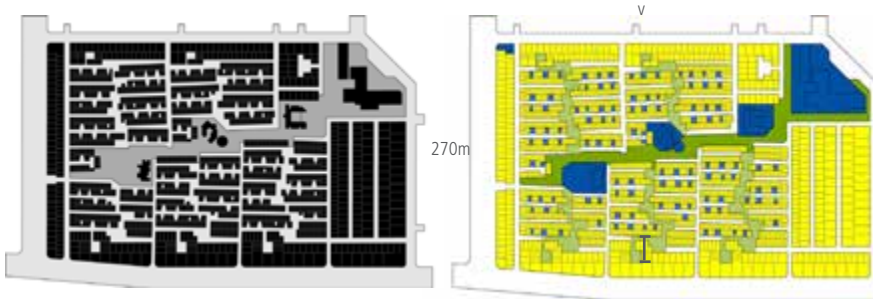
— Pedestrian  
— Vehicular

<sup>1</sup> The otla (also named otta or otlo) is an architectural element that occurs in some traditional homes in India. The otla has many variations but generally performs a transitional zone between the public and the private domain (from street to house) with a change in elevation, and often with a change in material.

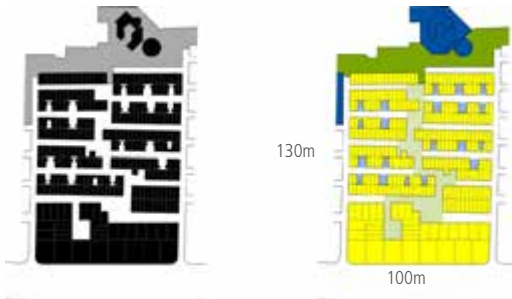
# The block

The plots accommodate single-family housing arranged in rows. These row houses are interrupted by service courtyards that are also used as small gathering spaces.

## Sector:



## Neighborhood unit:



## Basic block:



### Built up/public space:

- Built up area
- Public space - Streets
- Public space - Other open spaces

### Uses:

- Residential, single family
- Services
- Open Spaces

Plot sizes: 35m<sup>2</sup> - 614m<sup>2</sup>  
Heights: GF to GF+1  
Land coverage: varies from 50 to 100%

## Open spaces & facilities

### Open Spaces:

Open spaces have been specially qualified to encourage social intercourse. They are organized hierarchically and inter-connected to form a pedestrian network that ties the whole settlement.

- The smallest spaces are the services courtyards shared between ten houses.
- Pedestrian pathways run along the centre of each neighbourhood unit and connect it to the sector green axes.
- Sector green axes run along the centre of each sector, linking it to the main business district.

### Facilities:

Facilities are also organized hierarchically:

- The central spine, known as the Central Business District is located in the core of the settlement. It consists of four clusters of shopping, residential and office complexes and two mixed-use clusters of social functions.
- The local community facilities are located within each sector, by the sector green axes.



Uses:

- Facilities
- Open Spaces

## Phasing and management

Aranya was primarily designed for the Economically Weaker Sector (EWS) groups but, to ensure a balanced development, all sections of society were catered to. The funding agencies included the condition that at least 65 per cent of plots were affordable by the EWS without any external subsidies; otherwise some cross-subsidisation within the project was acceptable. Cross subsidy was made available for the lower income housing through profit generated by selling plots at market rate to the High Income Group. Commercial plots were auctioned and plots for social facilities were sold without any profit.

Aranya was a planned effort of slum improvement providing access to financed and serviced land. In a sites and services approach, each family was provided with a small plot and varying levels of services depending on the beneficiary's ability to pay. The service cores (latrine, water tap /bath and an optional 1 room (kitchen)) form a nuclei around which the houses grow and the communities eventually develop.

## Regulations

A kit of building elements is developed to be implemented in all housing units. Form variations on a standardized plan are achieved through

a permutation of combinations of various elements which are to be exercised by users. This participatory process satisfies users' wishes and offers variety to the street façade.

## Key lessons

### Strengths:

- The project promotes cooperation, neighbourhood life, tolerance and a cohesive social network by creating common spaces. Small open spaces play a vital role, especially in a low-income neighbourhood.
- The plan has a loose arrangement that absorbs change and growth as a part of a natural development process.
- The composition of houses with a set of elements that are common for all neighbours, offers choice of form and design flexibility while creating a coherent image. Variations enrich the street façade.
- The climate is taken into account in urban and housing design.

- The topography of the site is an important determinant in the planning of roads and other service networks, to maximize the use of gravity flow and minimize cut and fill of land.
- Essential amenities and utilities are provided in every street.

### Weaknesses:

- The plan is very concrete and creates a fixed city image that leaves little room for substantial change.
- Narrow streets impede vehicular traffic and prevent densification.
- The central business district is dependent on the location of large businesses and institutional centres. If this does not happen the centre of the township has the risk of becoming a void.
- The neighbourhood is mainly residential and there is very little commercial activity.

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## Current image of the city







© Vastu Shilpa Foundation



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# Mariano Melgar

Location: Arequipa, Peru | GDP: 180,464 M. USD | Area: 50 Ha  
Population: 3,000 –7,000 | Density: 85 p/Ha | FAR: 1 to 2



© Allan Paolo Ayala Centeno.

## Brief history

- 11950 The Mariano Melgar squatter settlement is established in the south-east of Arequipa. At that time, the area occupied by informal settlements in Arequipa is larger than the planned city.
- 1957 In June architect John F.C. Turner takes up a position in the Arequipa government office responsible for the regulation and improvement of *barriadas* (self-managed, spontaneously built settlements).
- 1957 Turner presents a study for “the control and integration of the *barriadas* with the city itself” based on rehabilitation of an existing settlement and the proposal of a new satellite city.
- 1958 An earthquake hits the region of Arequipa predisposing both citizenship and government to accept new ideas and methods, and providing credit. Development of the area, until then reluctant, starts to advance.



## The grid

There was already an existing settlement in the area arranged in a grid plan that is an extension of the grid street system of the adjacent suburb of Miraflores. The plan creates a uniform environment only broken by few open spaces: a football field, a circular open space and a dry gully occasionally filled with storm water.

The refurbishment plan directed by John F.C. Turner followed Geddes's model of using diagnostic survey and 'conservative surgery' to minimize intervention.

The existing settlement of Mariano Melgar was sparsely populated, making it socially fragmented and uneconomical for the provision of basic services. A study of existing densities was carried out in order to identify zones that already showed incipient consolidation. New construction was

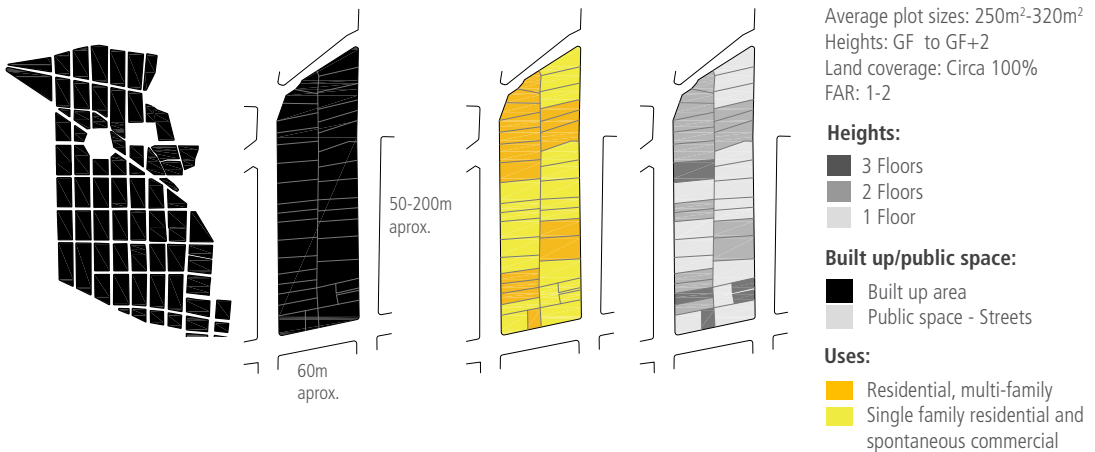
planned in these areas in order to enhance an existing process, accomplish integration with the existing urban fabric and favour the economic viability of services and infrastructure.



## The block

The original settlement was made up primarily of private dwellings, amongst which were scattered artisan workshops and small retail units. The plots were surrounded by walled fences and grouped into blocks that were 60m wide and had varying lengths.

The original plots were approximately 250m<sup>2</sup>. The majority of the housing plots have grown in size to approximately 320m<sup>2</sup> and building construction has been reinforced. The original courtyard typology still prevails but three storey apartment buildings are gradually emerging along the main roads. Commercial activity has grown.



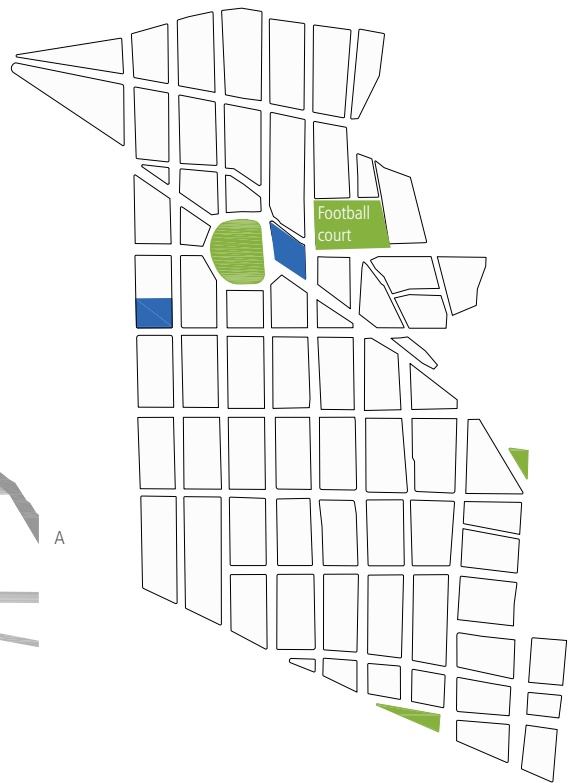
## Streets & open spaces

In the original spontaneous settlement the roads, which were 8m to 12m wide, served as informal semi-public meeting places for the community. Other open spaces were very few: only a football court and a circular open area that later became an urban park.

The spontaneous settlement was upgraded by the governmental organization COFOPRI (Commission

for the Formalization of Informal Settlements): streetscapes were transformed into 16m to 20m wide avenues, streets were paved and defined and the anarchic street frontage was ordered into rows.

But, in the end and following the upgraded public space that amounted to 40 per cent of the area, the neighbourhood was mostly dedicated to streets without a clear hierarchy established.



### Street hierarchy

- A: Sepúlveda Street. 320m
- B: Standrad street. 16-20m
- C: Dry Gulley. 8-12m

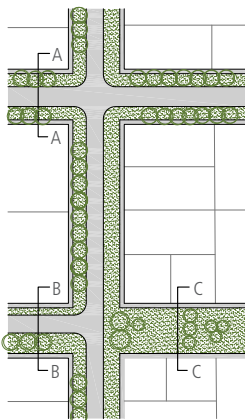
- Facilities
- Open spaces



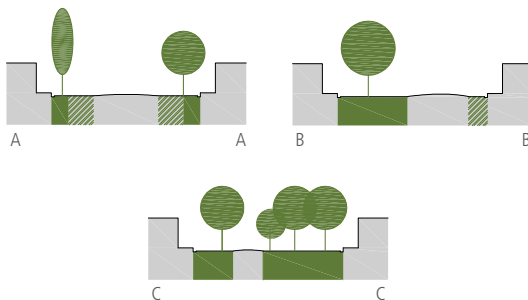
## Improvement of Mariano Melgar as proposed by John F.C. Turner

The study developed by John F.C. Turner detected an excess of circulation spaces and a shortage of open spaces for community use. Turner proposed the transformation of the street network into a structural system of open spaces. His initial scheme differentiated major and minor streets, introducing variable streetscapes and hierarchy into the existing system. The plan proposes public parks substituting alternate transverse streets in order to create a healthy and modern district.

In order to limit cost and increase planted areas, Turner proposed to pave only roadways and sidewalks and leave the remaining sections of the streets as planted bands. Turner also suggested the unification and dignification of the environment by planting street trees that would mitigate the monotonous regularity of the grid and hide the anarchic and unfinished housing frontages.



Plan Street scheme

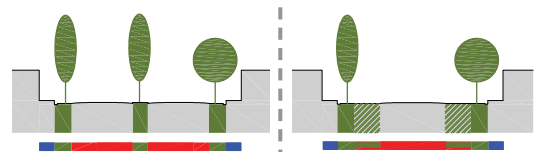


Section Street scheme

## Mariano Melgar today

During the upgrading process the importance of the street parks proposed by Turner was underestimated. The proposed street hierarchy was not established and the resulting streets were given very similar treatments, thus composing a monotonous urban landscape. Of Turner's ideas, only scarcely-planted bands have remained. These green bands have become residual spaces that do not compose a system and don't dignify public space.

Today the streets of Mariano Melgar, although generously dimensioned, are mostly dedicated to cars. Streets have narrow sidewalks and do not encourage pedestrian use. There is little street life and public spaces are unsafe.



### Sepulveda Street 20m

15% Pedestrian space  
60% Vehicular space  
height/width prop.: 1V/5.7H

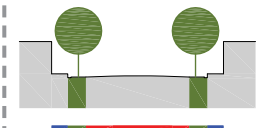
### Standard Street 18m

16.5% Pedestrian space  
64% Vehicular space  
height/width prop.: 1V/5.1H



### Old Dry Gully 8-12m

20% Pedestrian space  
80% Vehicular space  
height/width prop.: 1V/2.3H



### Standard Street 16m

18.75% Pedestrian space  
60% Vehicular space  
height/width prop.: 1V/4.7H

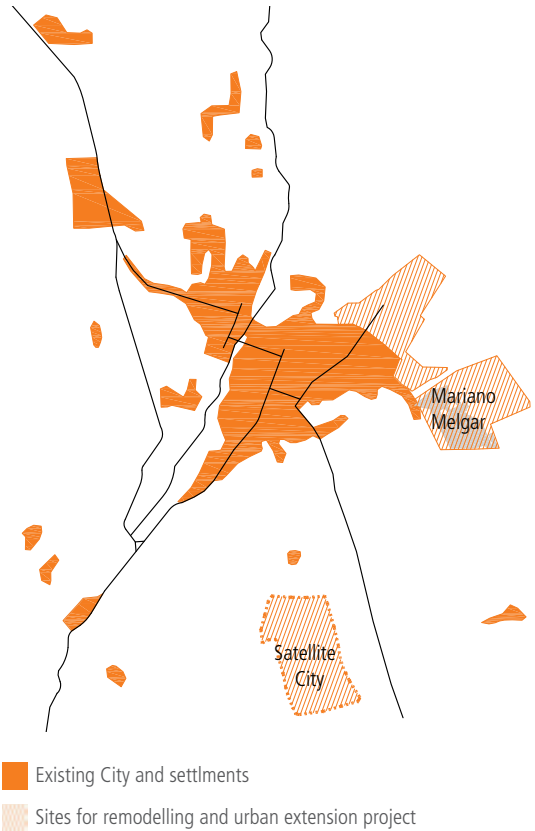
- █ Vehicular
- █ Pedestrian
- █ Planted areas

## Phasing and management

Turner's work in Arequipa dealt mostly with the consolidation of self-managed and spontaneously-built *barriadas*. Stretches of land had been occupied through land invasions by *pobladores* and were filled with self-built incremental housing. In a subsequent stage the government made efforts to formalize and consolidate these settlements. Turner's approach was inspired by the Geddes four-phase process: survey, plan, administration and plan in action.

In 1957 Turner presented a study for the urban extension of Arequipa. From the analysis of the existing conditions Turner proposed two plans: a rehabilitation scheme of existing settlements, amongst which was Mariano Melgar, and an outline for a new satellite city. This programme was intended to be a real strategy to direct 'the control and integration of the *barriadas* with the city itself'.

Although the initial transformations were slow and received opposition from the inhabitants (such as AUPA, the *Asociacion de Urbanizadores Populares de Arequipa*), the earthquake that hit the region in 1958 made funds available for earthquake reconstruction and made the housing problem pressing, thus accelerating changes.



## Key lessons

### Strengths:

- The proposal considers informal settlements as an opportunity to solve the housing need by developing them and integrating them in the city.
- The rehabilitation scheme is conceived as a plan to order the existing settlement using diagnostic survey that minimizes disruption of the urban fabric.
- The consolidation and densification of existing settlements makes basic services economically sustainable for the community.

### Weaknesses:

- There is a large amount of open space but it is dedicated mostly to streets. This results in a lack of variety of public spaces.
- The deficient urbanization of the streets attenuates the system's hierarchy and makes it monotonous.
- The predominance of vehicular space in the street results in a feeble collective appropriation of public space, diminishing public life and social control and transforming the neighborhood into an unsafe place.

## Current image of the city



© Allan Paolo Ayala Centeno



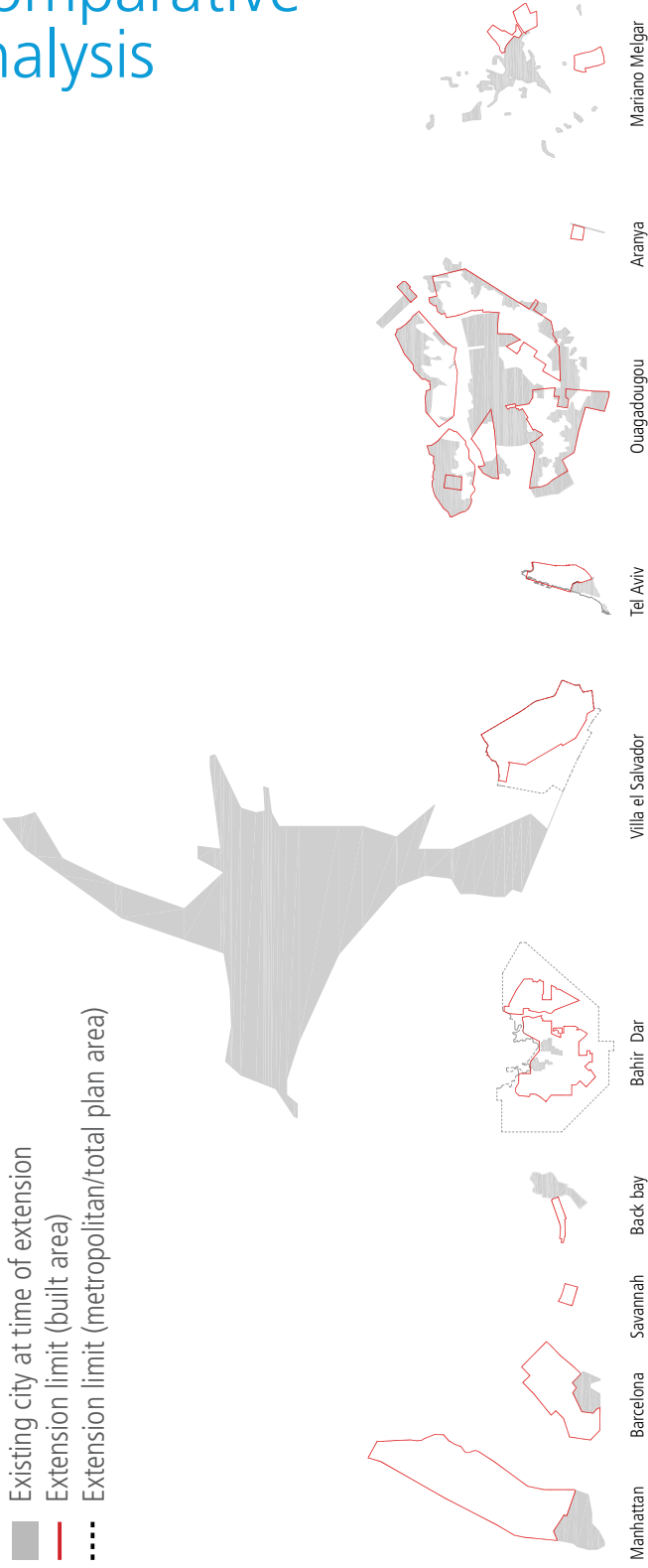
© Allan Paolo Ayala Centeno



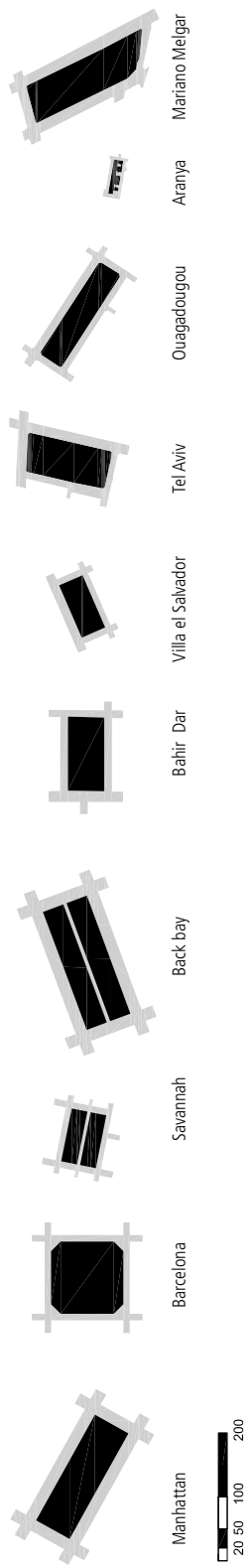
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# Comparative analysis

## Surface of extensions and existing city at time of extension:



## Block and street sizes and orientation:





## General parameters:

	Manhattan	Barcelona	Savannah	Back Bay	Bahir -dar	Villa el Salvador	Tel Aviv	Ouagadougou	Aranya	Mariano Melgar
Date of plan	1811	1859	1733	1856	1965/2006	1971	1927	1984/1990	1983	1957
Surface area (Ha)	4,036	1,826	129	175	6,238	3,546	300	11,826	85	50
FAR	2.89	2.65	1.64	2.15	1.05	1.3	2-2.89	0.5-0.85	1.5	1-2.5
Density (p/Ha)	266	265	12	103	109	160	150	63,5	400-650	85
Inhabitants	1,073,573	483,500	1,585	18,025	219,000	381,790	45,000 aprox	874,623	40,000-65,000	3,000-7,000
Block area (m <sup>2</sup> , median)	12.150	12.320	4.400	14.700	7000	3560	7.500	4.500	800	7.200
Minimum plot area (m <sup>2</sup> )	150	150	400	210	200	140			35	
Most common plot area (m <sup>2</sup> )	450	350	400	210	300	140	500	250	35-614	320
Maximum street width (m)	30	60	26	60	40	70	30	20	30	20
Minimum street width (m)	18	20	10	18	12	10	7	12	4.5	16

### Comments:

Despite the variation in the general parameters (total surface area, FAR, density, number of inhabitants) of the various cities analyzed, the basic units of block and street have comparable dimensions that relate to the basic housing units and human scale.

When the streets and blocks have generous and proportioned widths (minimum street width of 18m, such as in Manhattan, Barcelona or Back

Bay and minimum block width of 60m such as in Manhattan) cities can evolve and densify accommodating higher densities and FAR. If the dimensions of streets and blocks are too tight, densification might result in less livable cities or might not accommodate all required building typologies. If street, plot and block sizes are too large, the city loses its relation to the human scale and is less feasible economically.

# Conclusions

There are probably many ways to create cities that are socially inclusive, livable, economically viable and sustainable but we believe that these case studies present us with some common lessons that have been repeatedly successful and that should be pointed out:

## The use of the grid as a formal and organizational base

The grid as a basic organizational structure has proved valid and useful in the development of large and small cities all around the globe and through all periods of time. The main virtue of the grid is its simplicity; the rational organization of streets in a geometrical network simplifies the complex process of city construction and allows the urbanization of extensive areas with a single identity and a coherent image.

In situations where there are many stakeholders present and the timeframe for construction is dilated, a grid-based plan provides a functional, cohesive and readable city and optimizes infrastructure. A grid becomes a tool that is understandable and that can be embraced by all agents. Furthermore, when private land must be acquired by the city for the creation of streets, a grid arrangement provides a more equalitarian and less random layout that is more acceptable to reluctant land owners.

A successful city grid is based on very clear distinction of private and public space through the generation of two basic urban elements: the street and the block. The urban street, when it is defined with continuous building frontages and alignments, generates civic and economic activity and optimizes infrastructural costs and transportation time. The blocks are the essence of private space in the city (residence, business, facilities and so on) and through their façades generate areas of contact between the private and public spheres.

Finally, a grid need not be monotonous. Variety can be introduced in subsequent phases, through hierarchy or with the definition of smaller scale elements.

## The General Plan and the Regulation vs. the Master Plan

Cities are very complex entities that hold a great variety of people and that must prevail through changing times. They are not static and need to relate to their culture and time. With the Master Plan approach, most aspects of the city, from the larger to the smaller scale, are defined by a single designer/team in a particular moment of time. On the other hand when a city is defined with a General Plan and a set of regulations the result is more flexible and can evolve through time.

When a city is defined with the combination of General Plan and regulations:

- The Plan delineates the basic distribution of public and private space (such as streets and blocks) and defines the hierarchy of streets and open spaces. It can be a very simple document that sets the base of the urban fabric. The Plan prevails through time and must be designed with the future in mind.
- The regulations define all the desirable aspects of buildings and public spaces and define city form. They can be consolidated in four main groups: those that regulate construction, vicinity, public ornament and hygiene. Regulations are defined by a variety of actors and are a representation of the culture of the city and its time. Regulations tend to evolve through time, reflecting the changing needs of the population and altering the city.

The General Plan and Regulation approach provides a flexible framework for the creation of the city. The General Plan is elaborated generally by a single designer/team (such as Idelfons Cerda in Barcelona, James Oglethorpe in Savannah and Miguel Romero Sotelo in Villa el Salvador) but it can generate many possible cities.

The case studies in this paper illustrate how different regulatory approaches have produced very different cities:

In many North America cities, such as New York, the General Plan was laid out in a time of

regulatory void. The original grid was filled in with housing that was fundamentally homogeneous due to the initial constructive and technical limitations. When the city evolved and the initial buildings were replaced, technical innovations and materials such as the elevator and steel structures produced very different buildings. The absence of regulations permitted the construction of skyscrapers adjacent to two-storey buildings and resulted in visual anarchy. Additionally, North American cities developed their regulations as they went along and did not accept an intrusive definition of private property. This did not happen in Europe where older cities, in an effort to repair their previous mistakes, had put in place strict regulations before their 19th century city extensions were constructed. The result was a much more homogeneous city.

North American cities have extensively regulated zoning which has produced cities with little mix of uses and delimited areas for business and residence. On the other hand many cities in developing countries (such as Villa el Salvador) do not have a regulation in place, and the only control of urban form is the economical limitations, which results in simple, low rise constructions. When these populations evolve economically, regulations should be put in place to avoid economical speculation and visual chaos.

### The introduction of density and mixed use

An adequate urban density is essential in order to create civic life and economic activity in the city. Urban density allows the installation of infrastructure and services at a reasonable cost and must be considered as a basic parameter to define the economic viability of future urbanization. A reasonable mix of uses combines urban activities that benefit from proximity, such as residence, commerce and business and contributes to the creation a vibrant local economy.

### The introduction of variations in the grid

Variations in the grid structure remove monotony and create interesting cities. We have seen many examples of this aspect in these case studies, some of these variations are:

- The modular grid which is represented by the case studies of Savannah, Villa el Salvador and, to a certain extent, Bahir Dar. This model is based on a double hierarchy which works at the local and city scale. The modules are frequently configured as neighbourhood units with a central core of open spaces and/ or facilities that serve as gathering spaces for the community and create group identity. This model can be very useful and has been profusely used in developing countries where government intervention in civic and public spaces is scarce such as with 1980s *Lotissements massifs* in Ougadougou, Sites and Services project in Dakar. A sense of neighbourhood identity and belonging facilitate the preservation and maintenance of public facilities. This model has proved extremely successful in Villa el Salvador where it translated directly to the administrative and political organization of the district. On the other hand, this model can be too rigid for a changing society, and the repetition of the module can generate monotony.
- The introduction of quality public spaces in the grid can generate variety and provide multiple civic spaces that activate city life. This is the case of Back Bay in Boston where a variety of street widths and treatments creates a neighbourhood that is livable and harmonic.
- The consideration of territorial preexistence is also an essential factor of urbanization. Cities that are built with a grid plan generally discard pre-existing topography and natural features in order to install the grid in the most efficient and extensive way possible. The interruption or delimitation of the grid with relevant landscape features, and the adaptation of the grid to existing city fabrics creates variety and a unique city image. It has taken Barcelona more than a century to open the city to the seafront, since the configuration of the Eixample did not factor the coastline as a prominent or central feature. In a similar way, Manhattan has only recently started the refurbishment of the Hudson and East river docks as prominent urban spaces. On the other hand Bahir Dar, with its Special Planning Areas, is starting to configure future open spaces and facilities around its most prominent natural features, such as the Blue Nile River and Tana Lake.

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# Planned City Extensions: Analysis of Historical Examples

The Analysis of Historical Examples of City Extensions takes a retrospective look at how various cities in the past have grown and evolved using the approach of planned city extensions. This retrospective reflection allows us to draw lessons that only the passage of time can allow; lessons which can be useful in guiding future urban growth so as to generate cities that are more sustainable, socially inclusive, and economically viable.

The analysis examines the development of ten cities from different parts of the world: rich and poor cities; cities built in different time periods – from 17th to 21st century; and at different scale – from neighbourhood

to city scale. Various aspects of each city related to physical configuration, process, phasing and regulation are examined. The analysis results in the following conclusions: The grid as a basic organizational structure has proved valid and useful in the development of large and small cities all around the globe and through all periods of time; a General Plan with regulations rather than a Master Plan is proposed because it is more flexible and can evolve through time; an adequate urban density is essential in order to create civic life and economic activity in the city; and variations in the grid structure are important to remove monotony and create interesting cities.

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