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2. THE ELEMENTS OF URBAN FORM

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Urban Morphology

An Introduction to the Study of the
Physical Form of Cities

Springer

2. The elements of urban form

2.1 The concept of urban tissue

2.2 The natural context

2.3 The streets system

2.4 The plots system

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2.1 The concept of urban tissue

Urban tissue is an organic whole that can be seen according to different **levels of resolution**.

These different levels correspond to different elements of urban form.

The higher the level of resolution the greater the detail of what is shown and the greater the specificity of morphological description.

At a very low level, the urban tissue includes only the streets and street blocks. At a high level of resolution the tissue might include a number of details such as the construction materials of an open space or building.

Figure. Urban tissues of nine different cities, approximately at the same scale: Brasilia, Djenné, Venice, New York, Barcelona, Paris, Rome, Sana'a and Beijing
(Source: Google Earth)

Figure. Brasília.

Figure. Djenné.

Figure. Venice.

Figure. New York.

Figure. Barcelona.

Figure. Paris.

Figure. Rome.

Figure. Sana'a.

Figure. Beijing.

Figure. Different urban tissues in New York city, approximately at the same scale: Downtown, Soho, Harlem and Stuyvesant Town (Source: Google Earth)

Figure. Different urban tissues in New York city, approximately at the same scale:
Downtown, Soho, Harlem and Stuyvesant Town
(Source: a, b, c – author, d – Joel Raskin).

2.2 The natural context

The natural context is the first condition for the establishment and organization of the different elements of urban form.

The land relief, the quality and suitability of soil and subsoil, the climate, the solar and wind exposure, the type of natural landscape – all these factors influence how a settlement is established…from its foundation, from the first paths and streets (and, subsequently, from all the infrastructures that will be built in the streets) to the way land is sub-divided into a number of different parts, to the various buildings that are built in these plots, and even to the materials that – at least, until the last century – will gave expression and surface to all these forms.
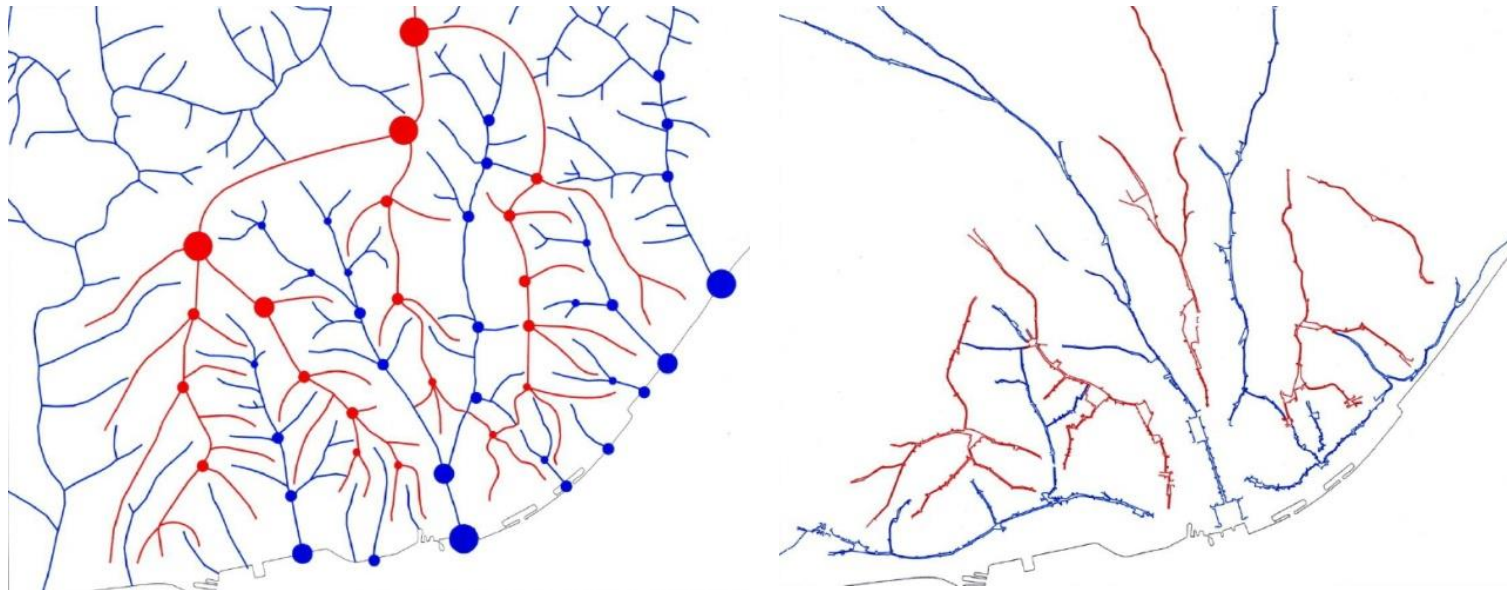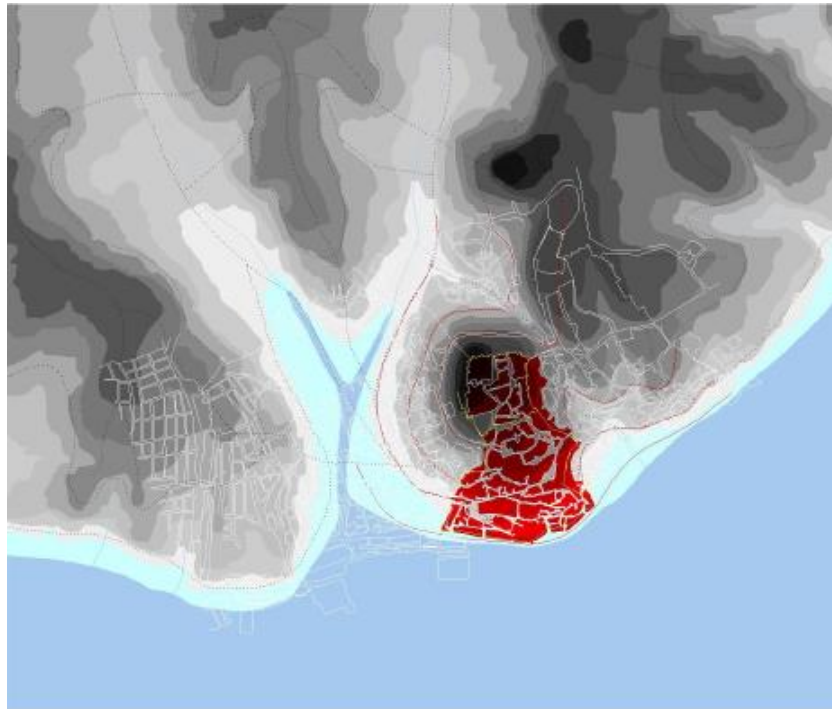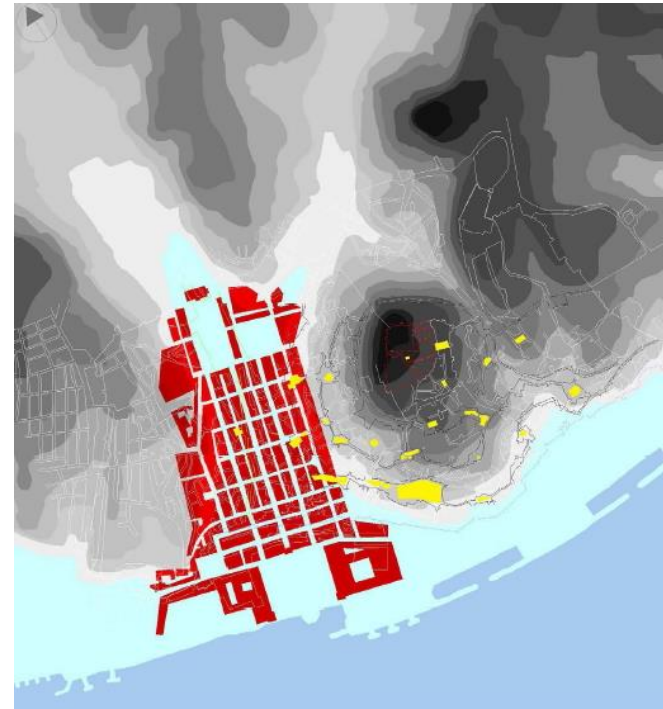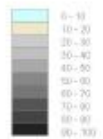
Figure. Physiography of the physical support (ridges in red, thalwegs in blue; distribution centers in red and encounter centers in blue) and of the street system (ridge streets in red, thalweg streets in blue) of Lisbon (Source: Guerreiro, 2011)
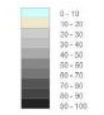
Figure. The importance of the relief: Muslim Lisbon and Iluminist Lisbon
(Source: Guerreiro, 2001).
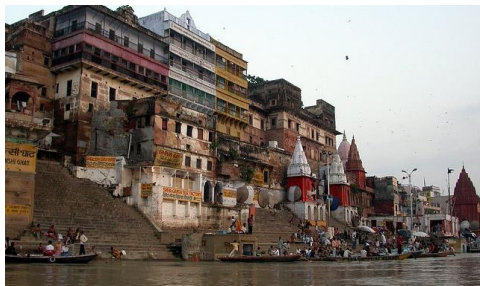
Figure. Relationships between urban forms and natural context :
a. Machu Picchu; b. Masada; c. Saint-Michel; d. Lhasa; e. Groningen; f. Venice;
g. Varanasi; h. Hong-Kong (Source: UNESCO / Silvan Rehfeld; NG / Michael Yamashita;
UNESCO / Francesco Bandarin; NG / Maureen Greco).
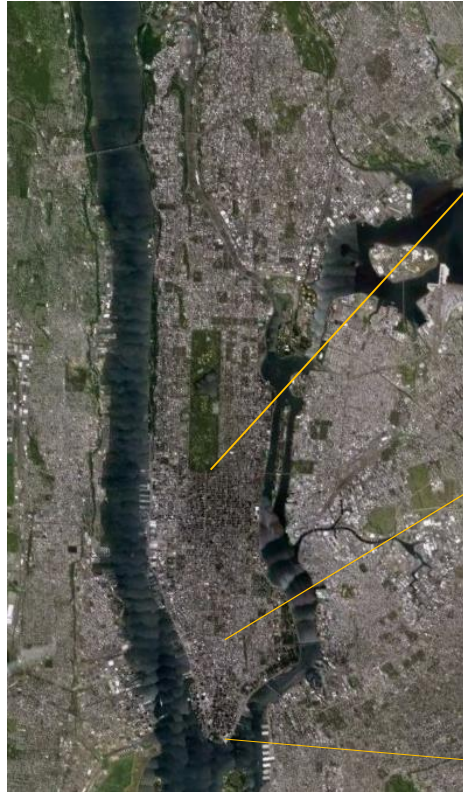
Figure. The different characteristics of the natural context within the same city – New York
(Source: Google Earth; author).

2.3 The streets system

Different types of streets (and of squares).

The importance of each street (and of each square) in the urban system.

The relation between the height of buildings and the width of the street.

The alignment of buildings along the street.

Figure. Different streets in different cities, approximately at the same scale: Broadway, intersection with the 5th Avenue, in New York; the Champs Elysées in Paris; the Via *Rinaldini* in Siena and the *Reguliersgracht* in Amsterdam
(Source: aerial views – Google Earth; photographs by the author)
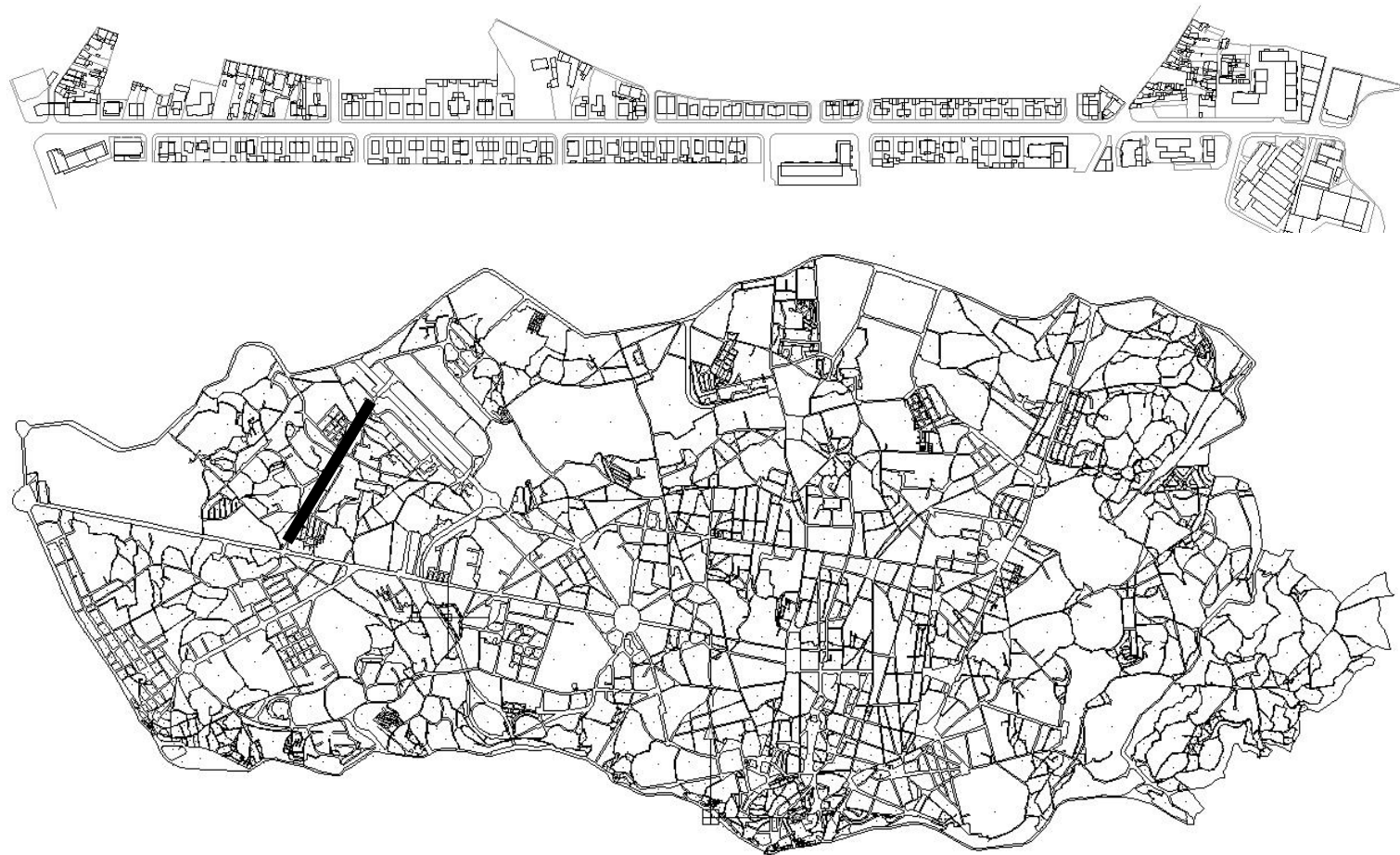
Figure. The *Rua Antunes Guimarães* taken on its own and included in the streets system of Porto (Source: author).

Figure. Different squares in different cities, approximately at the same scale: Times Square in New York, *Place Georges-Pompidou* in Paris, *Piazza del Campo* in Siena and *Meidan Emam* in Isfahan (Source: aerial views – Google Earth; photographs b, d and f by the author, photograph h by Jorge Correia)
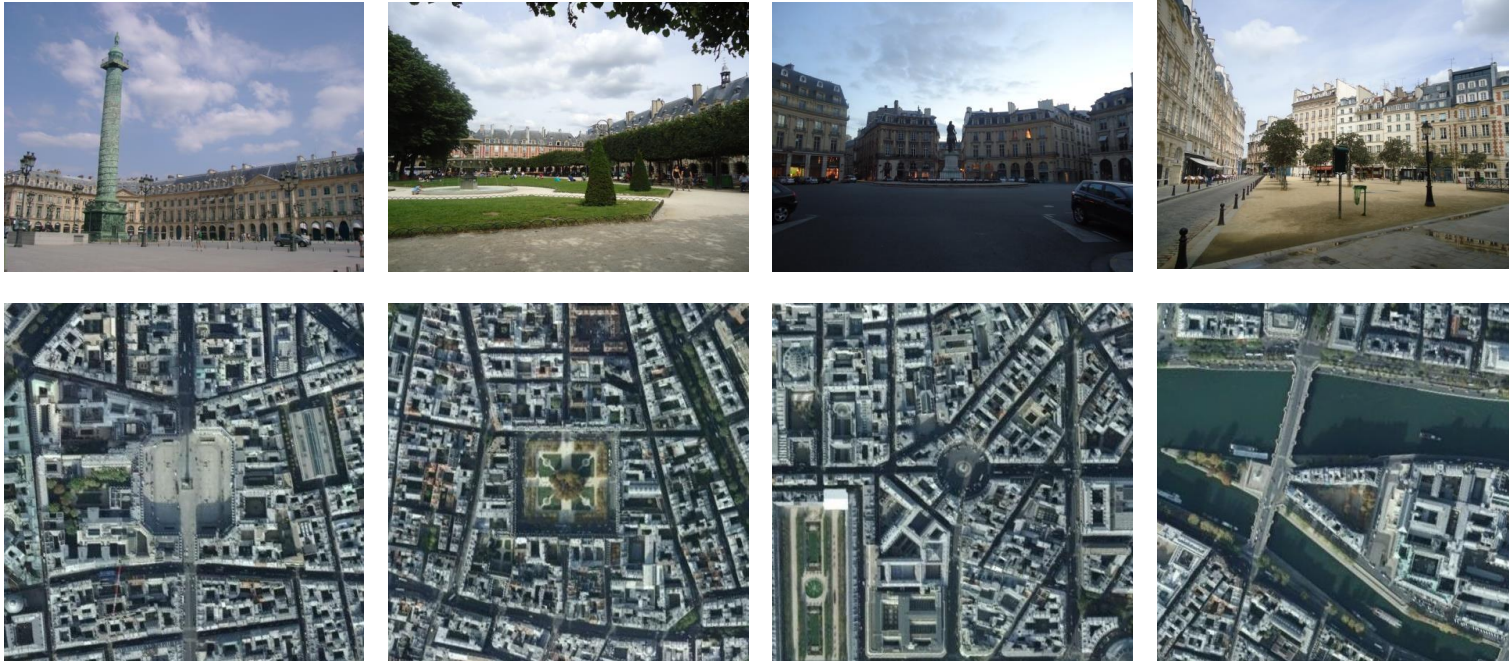
Figure. Different squares in Paris, approximately at the same scale: *Place Vendome*, *Place des Vosges*, *Place des Victoires* and *Place Dauphine*
(Source: aerial views – Google Earth; photographs by the author)

Figure. *Place Vendome.*

This square was built in the early eighteenth century (it is the latest example of this set).
It has a rectangular shape (octagonal cut in the corners) with 140 m long and 120 m wide, it is
crossed by one street only – the *Rue de la Paix*, and it is composed of a group of buildings with a
great homogeneity in terms of architectural language and of the number of storeys.
In terms of urban functions, *Place Vendome* is the home of a number of fashionable shops.

Figure. *Place des Vosges.*

The *Place des Vosges* was built in the early seventeenth century in the *Marais* area.
With a dimension that is slightly higher than *Place Vendome*, *Place des Vosges* is a square of 140 m,
and it is configured by an extremely homogenous group of buildings comprising 36 houses (nine in
each of the four sides) containing an arcade around the whole perimeter of the square.
The centre of *Place des Vosges* is a green space.
The access to the square from the *Rue de Birague* is made through the arcade.
As such, the square is delimitated by one important street only, the *Rue du Pas de la Mule*, at north.

Figure. *Place des Victoires.*

The *Place des Victoires* is located in the *Tuileries* area, nearby *Place Vendome*.
This square, with a circular shape, has smaller dimensions than the previous two (approximately
75m diameter) and, as in these two cases, it is defined by a set of buildings, of four and five storey,
with great homogeneity in terms of architectural style.
The square was built in the seventeenth century in order to frame the statue of Louis XIV.
Although it is a very interesting example in terms of urban form hosting a number of important
fashion shops, the square is not much more than a roundabout.

Figure. *Place Dauphine.*

The *Place Dauphine* is located in the oldest part of the French capital, the *Ile de la Cité*.
It is clearly different from the previous three cases: the square has a triangular shape (with an area that is larger than the Place des Victoires and smaller than the other two cases); and the buildings shaping it have a higher diversity than the previous ones, both in terms of numbers of floors and of architectural language.

Figure. Different squares in Rome, approximately at the same scale: *Piazza S. Pietro, Piazza del Campidoglio, Piazza Navona* and *Piazza della Rotonda* (Source: aerial views – Google Earth; photographs by the author)

Figure. *Piazza S. Pietro*

The *Piazza S. Pietro*, with a dominant religious nature, is located east of the *Tevere* River, within the Vatican territory.

The square, and the *basilica* and the colonnade (four columns deep) shaping it, were built in the 16th and 17th centuries.

The square has a complex shape, composed of two different shapes, an ellipse (of 200 m long and 150 m wide) and a trapezoid (where the parallel sides have approximately 100 m and 115 m long and are distanced 100 m).

The square is part of a wider composition, being the western limit of a strong axe defined by the *Via della Conciliazione*, which is bounded at east by the *Castel Sant'Angelo*.

While the exact centre of the square is marked by an obelisk, two different fountains appear to be the two centres of the ellipse.

Figure. *Piazza del Campidoglio*.

The *Piazza del Campidoglio* is located in the historical kernel of Rome.
The square and the three surrounding *palazzo* were built or restored in the 16th century, constituting then a new civic centre for the city.
It now gathers civic and museologic functions.
The *Piazza del Campidoglio* has a trapezoidal shape; the bases of the trapezoid have approximately 55 m and 40 m and are distanced about 75 m (it is substantially smaller than *Piazza S. Pietro*).
The square has a notable pavement with an oval geometric layout and, in the centre, an equestrian statue.
Limited at east by the *Pallazo Senatorio*, the axial composition of this set includes, at west, a wide-ramped stair (the *cordonata*) connecting the square to the *Via del Teatro di Marcello*.

Figure. *Piazza Navonna*

Piazza Navonna, located north of *Corso Vittorio Emanuelle II,* has an intense social life.

The square as we know it, was established in the 17th century.

Its peculiar shape, a long rectangle of about 250 x 50 m with round ends (a proportion of about 5:1, where the largest dimension is higher than the largest dimension of *S. Pietro*), draws on the ruins of a stadium erected in the first century.

Three notable fountains (*Nettuno*, *Quatro Fiumi* and *Moro*, from north to south) have a central role in this remarkable baroque set.

Besides the numerous cafés, restaurants and shops, the building set of *Navonna* includes the church of *Sant'Agnese in Agone*.

Figure. *Piazza della Rotonda*

Piazza della Rotonda is located 250 m east of *Navonna*.
The square was defined in the 15th century.
Yet, the surrounding building fabric dates from earlier periods.
That is the case of its main building, the Pantheon (the church of *Santa Maria Rotonda*, giving the name to the square), dating from the 1st century.
The square is considerably smaller than the other three examples.
It has an irregular shape near to a trapezoid; the bases of the trapezoid have approximately 45 m and 35 m and are distanced about 60 m.
It has a fountain with an obelisk in the centre.
The square has a large number of cafés and restaurants.
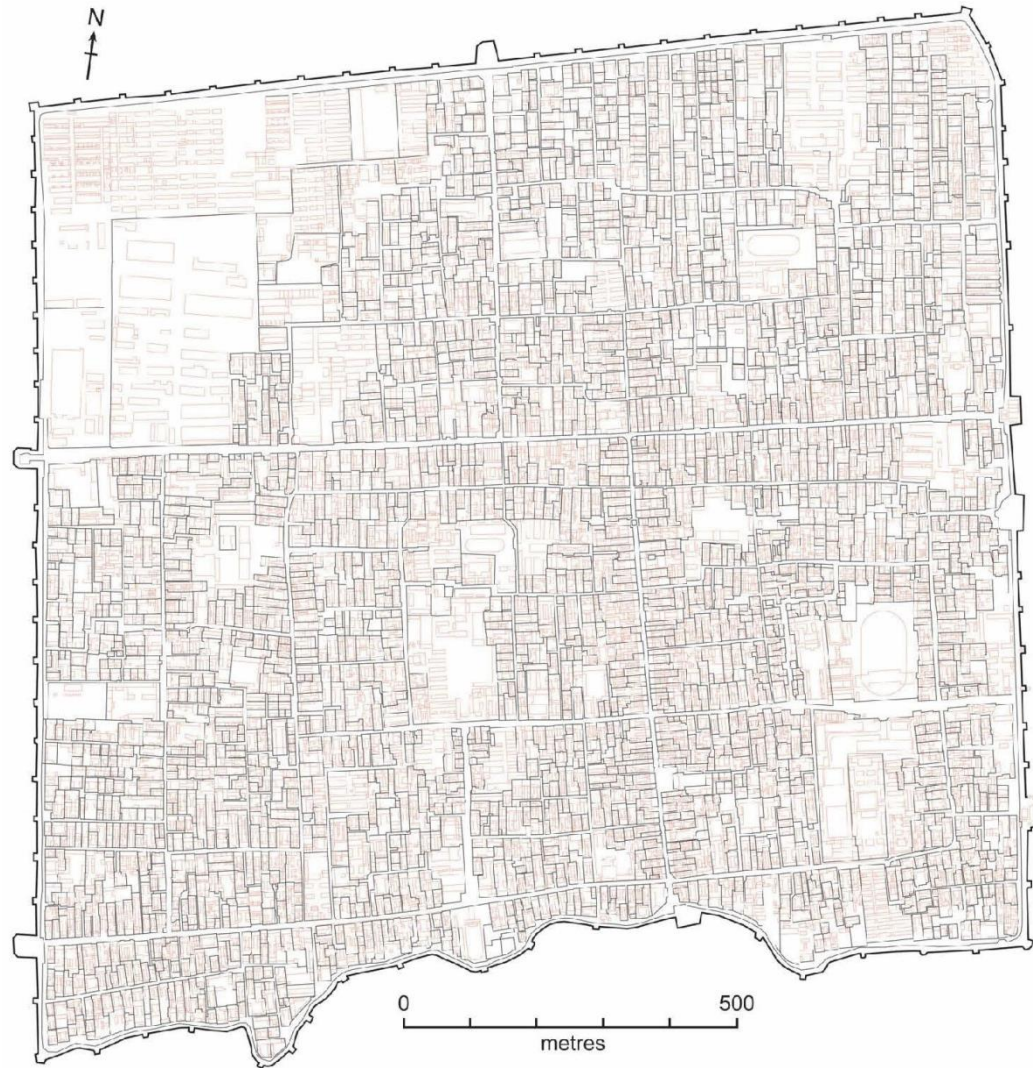
2.4 The plots system

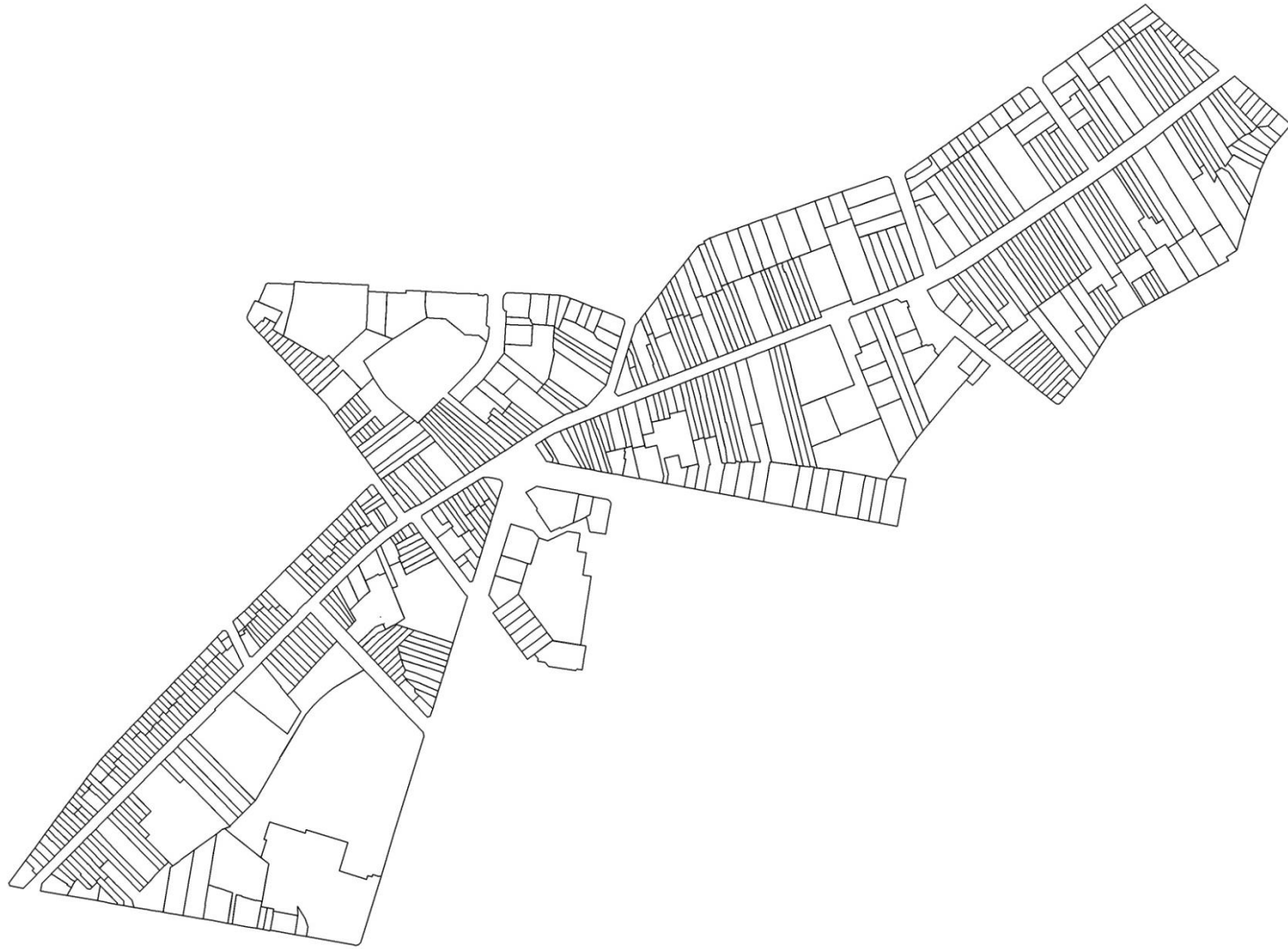Figure. The different plots in Pingyao, 2000 (Source: Whitehand and Gu, 2007).

Figure. The different plots in *Rua Costa Cabral*, Porto (Source: author).
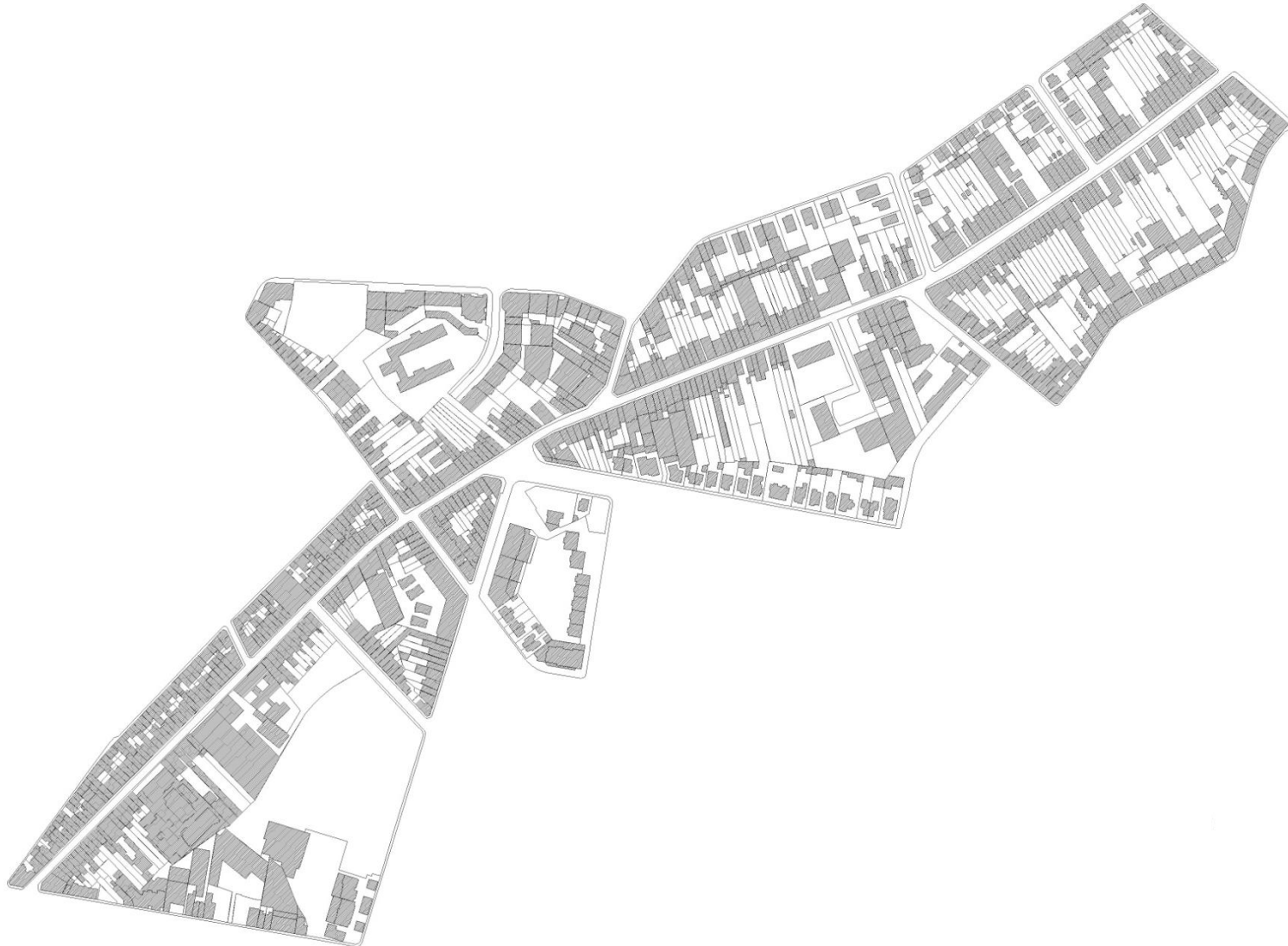
2.5 The buildings system

Figure. The different plots and buildings in *Rua Costa Cabral*, Porto (Source: author).

Figure. Succession of building types in the same cultural area, Porto.

The first row displays the transformation of single-family houses: from the terraced houses built in narrow frontage plots (a), in medium frontage plots (b) and in large frontage plots (d) to the semi-detached houses (f) and the detached houses (h).

The second row presents the transformation of multi-family buildings: from terraced buildings erected on narrow and large plots (c and e) to semi-detached buildings (g) and detached buildings (i)

Figure. Different buildings in different cities and villages, in five continents: Chicago, Djenné, Samosir, Stockholm and Taumaranui (photographs by the author (a and d), Sandra Garside (b), Allamandalah (c) and Bryan Woodhead (e))

References

Guerreiro, R. (2001) *O território e a edificação: o papel do suporte físico natural na genese e formação da cidade Portuguesa*, Unpublished MSc Thesis, ISCTE-IUL, Lisbon.

Guerreiro, R. (2011) *Urbanismo orgânico e a ordem implícita: uma leitura através das geometrias da natureza,* Unpublished PhD Thesis, ISCTE-IUL, Lisbon.

Whitehand , J. and Gu, K. (2007) 'Extending the compass of plan analysis: a Chinese exploration', *Urban Morphology* 11, 91-109.