Big city life: **high density pleasure**

an international study of high-density
housing projects that get the work/
live/play balance right, bringing joy
as well as amenity to the city

Byera Hadley
Travelling Scholarships
Journal Series
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Byera Hadley, born in 1872, was a distinguished architect responsible for the design and execution of a number of fine buildings in New South Wales.

He was dedicated to architectural education, both as a part-time teacher in architectural drawing at the Sydney Technical College, and culminating in his appointment in 1914 as Lecturer-in-Charge at the College's Department of Architecture. Under his guidance, the College became acknowledged as one of the finest schools of architecture in the British Empire.

Byera Hadley made provision in his will for a bequest to enable graduates of architecture from a university in NSW to travel in order to broaden their experience in architecture, with a view to advancing architecture upon their return to Australia.

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Kieran McInerney was awarded the Byera Hadley Travelling Scholarship in 2011.
Cover image: Summer morning scene 2012 Prenzlauerberg, Berlin; 220 dwellings per hectare. Photo by Kieran McInerney

An international study of high-density housing projects that are highly desirable places to visit, work and live: from Venice to Copenhagen, Perugia, Barcelona & Amsterdam.

Using European cities (old and new) as precedents, this research aims to show that denser urban environments have more capacity to enrich social life. It also seeks to show that 'high-density' does not have to mean 'high-rise'.

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Introduction

High-density environments have the capacity to solve current crises of international housing shortage, housing affordability, lack of infrastructure and loss of arable land. But high-density developments are often unwelcome. Many are so poorly designed and serviced that they are routinely used as a backdrop for stories of urban strife and degradation. They are commonly seen as a necessary evil; a technical solution to a numerical problem and not as ideal human inhabitation.

On the other hand there is a desire common to citizens of Western Europe and the English speaking countries to live in cities where one can walk or bicycle to restaurants, cafes, parks, markets and museums. And scenes of big city life are also the chosen setting for movies depicting complex relationships of family, belonging and identity. In short, we want a high density of culture and services but are apprehensive of possible outcomes from high-density developments.

High density pleasure is an international study of high-density housing environments that are highly desirable places to visit, work and live. I visited ancient, twentieth-century and contemporary precedents in Venice, Perugia, Barcelona, Amsterdam and Copenhagen, which challenge many current perceptions of high-density environments to show rich and satisfying places of human inhabitation.

Selected projects have densities that exceed accepted measures of high-density (100 dwellings per hectare) and all projects are "mid-rise", having an average height of five to six storeys (because high-density is not necessarily high-rise.)

Characteristics common to the selected projects are:
   • Strong identities; a spirit of place formed by
   nature and urban design over centuries or by
   well managed design in only a few years

   • Powerful, place-making architecture
   • Clearly defined limits, both natural and
    man-made that maintain the spirit of place
   • High population densities that contrast
   with open spaces and landscape adjacent
   • Careful and continuous management of
   regional, local and detailed urban design
   • Environments where vehicular traffic is
   controlled and pedestrians are primary
   • Appropriate contemporary infrastructure
   that serves but does not dominate
   • Zero-lot building alignments that clearly
   delineate between public and private space
   • Mixed use programmes incorporating retail
   and/or commercial uses
   • Apartment design which permits flexibility
   of occupation for different users.

These projects show that denser environments have more capacity to enrich social life by bringing amenity, coherence and belonging to more people. I have studied and made several study tours of housing projects, but I am not an academic. I am an architect living in Sydney and working primarily in residential design and construction. I travelled to experience these places and investigate why they are such great places in which to live.

The intention is that the projects selected and the accompanying report, analysis and metrics will establish these places as useful precedents for new high-density urban projects. To show, rather than explain, I used time-lapse photography, which speeds up time – like high-density photography, if you will. Time-lapse photography shows how things work and encourages viewers to draw their own conclusions. The complete study and time-lapse photography can be seen at: http://highdensityliving.wordpress.com/

Venice
High-density urban environment

Net density	**275-300 dwellings per hectare (plus retail)**
Height	**4-6 storeys**

[Vimeo http://www.vimeo.com/62913844 w=500&h=281]

Arrival at Venezia Santa Lucia
Our train has passed through unremarkable countryside and rolled over the vast and calm lagoon where the light is brilliant. Santa Lucia station sits on the banks of the Canal Grande; colour, noise, sunshine, a throng of bobbing boats, opaque limestone coloured water, the temple opposite, people peeling off right and left. And the exotic rich facades of the buildings lining the canal like a Canaletto with speedboats.
"Railway termini ... are our gates to the glorious and the unknown. Through them we pass out into adventure and sunshine, to them, alas! We return." [1]

Piazza San Marco
Swarms of tourists do a great job animating this grand and beautiful space. San Marco's exotic asymmetrical domes puncture the heavens. The curtains in the arcade move in the breeze.

Campo San Salvador
Sitting on the cool marble steps of the church in Campo San Salvador. Three streams of people merge in this delta. The sounds of strings comes from the Scula Gradea' Cordeiro. Students gather and separate.

Rio Terra dei Assassine
Above the restaurant, washing is being put out. Geraniums are bright in window boxes. Pretty fabric awnings flutter and shade the high windows. At empty tables, flowers are ready in vases and umbrellas sit in stands. Swallows fly overhead, a crushed can lies on the footpath. The murmur of diners, an air conditioning condenser rumbles next to my ear-discharging through a dusty screen at eye level. A radio is audible. T-shirted diners take their places. A pleasant cool breeze passes.

Corte Specheria I
This calm court is a well cut into the stone of Venice. People sit outside the bar, sheltered by the building above.

Corte Specheria II
Quiet in the courtyard. A few people pass through on their way to the city. The brightly lit court contrasts with the narrow streets.

Calle Seconda de Obei
Just off a busy square; this quiet, narrow alley is a fissure in the stone of Venice. Its walls are a typical Venetian montage of materials; exposed soft brick, crumbling cement render, stone plinths, electrical wiring and plumbing installed at the most convenient and obtrusive location. Also, vegetation spilling out through a high steel screen and immaculate name and intercom plates carved from stone. Light creeps along the stone paving.

We have moved through Venice from the vast lagoon to grand public spaces, under and through buildings to the small intimate streets where people live. Public and private domains are clearly defined.

Why Venice was chosen to study
Venice is a dream city to which tourists and photographers flock. Yet is has a density that is far higher than most developers would dare propose.

The most beautiful city
"Venice itself looms like a mirage, a dream city in the ether, (made of) coloured phantoms of buildings. When every self- respecting town was surrounded by... impregnable fortifications ... the first impression of this metropolis must have been of an earthly paradise where fear was unknown...graceful arcades swarming with carefree people (and) large, lively market places opened out towards the sea." [2]

It remains a magical city of faded brilliance, the most beautiful and most romantic city in the world. Made of costly stones and floating, mirrored, above an azure lagoon; Venice, "La Serenissima", appears in many stories. Ruskin and Italo Calvino exalted it. Thomas Mann, Evelyn Waugh and Henry James used it as a romantic and raffish backdrop for dissolute characters. And Muratori painstakingly mapped minor shifts in its canals and bridges.

History

Venice was founded in the 6th century AD, built entirely on timber piles in a lagoon at the head of the Adriatic Sea. It became a major centre of trade and marine power.

By the 18th century trade was in decline and tourism was growing. Its natural and built environment has been under threat for centuries. It is inexorably subsiding into its own reflection in the lagoon. Population has shrunk to 60,000 at present from 120,000 in 1980. Tourists are rampant; the living museum has become "Veniceland" and it is the subject of dire predictions.


Urban Design

Throughout the centuries Venice has been subject to foreign interventions and landlubber's misconceptions; attempts to keep slippers dry and permanently moor or even drydock Venice. The Austro-Hungarian Empire insisted upon a bridge to connect it to the profane mainland. Napoleon filled in canals to create streets (those ones with the prefix "Rio Terra" i.e. "Rivers of Earth")" [3]. Venice couldn't resist these interventions but managed to stymie the proposals of Frank Lloyd Wright, Louis Kahn and Le Corbusier. Few urban designers would promote Venice as a model.[4]

Nonetheless, this miraculous mirage also possesses the attributes required of a city by traditional and "new" urbanists. It is less than four kilometres long and two kilometres wide; about 725 hectares in area, approximately twice the size of New York's Central Park. It is possible to walk the length of Venice in 40 minutes. It has defined limits and suburban sprawl is impossible. It has a uniform height. The style and materials of new and restorative construction are strictly controlled. Venice is divided into 38 parishes each with its own church and square. Venetians belong to their neighbourhoods and speak dialect, yet are in touch with the outside world.

This is a pedestrian city, with separate vehicular traffic. It is free of highway furniture; signage, bollards, traffic lights, New Jersey kerbs, lane markings, parking meters, kerbs and gutters, speed cameras and towering glary street lights. Venice does not even have bike paths; bicycles are banned. The only wheeled vehicles permitted are trolleys. Thus public space is made up of pedestrian components, squares, bridges, and ramps, stepped ramps and raised footpaths. All is made legible with dark stone and white marble edges.
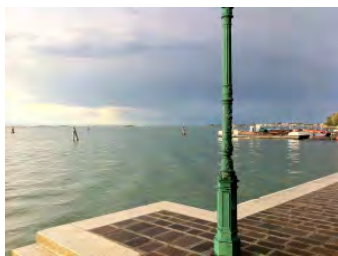
Comments and conclusions

There is nothing on earth like Venice; a substantial high-density city without cars, their noise and pollution. The land is for people and the water is for boats. The absence of cars allows a quiet and calm presence of human culture and interaction. Venice has city limits defined by nature and suburban sprawl is impossible. Building has been well managed and beautiful buildings grace each parish. It may be a living museum but Venice is also the very image of a livable city.

Density Comparison Table

	Barceloneta	El Born	Piraeus	Hornbaekhus	Tallet 8	Venice	Perugia	Paris
Net Density (dwellings per hectare) "The ratio of the number of dwellings to the area of land they occupy (precinct or a block), including internal public streets and half of the width of adjoining streets that provide access to the dwellings"	350	150	221	138	240	275-300	250-275	225
Site Density (dwellings per hectare) "The ratio of the number of dwellings to the area of the site they occupy"	700	271	289	183	298	-	-	-
Habitable Rooms (habitable rooms per hectare)	1400	1626	-	855	-	-	-	1100
Floor / Space Ratio "The floor space ratio of buildings on a site is the ratio of the gross floor area of all buildings within the site, to the site area"	5:1	4.4:1	4.65:1	1.73:1	-	-	-	-
Footprint (%)	100%	72%	69%	35%	61%	-	-	-
Rise (Storeys)	4-6	4	4-9	5	1-10	4-6	4-7	4.2:1
Site Area	705m²	6082m²	10550m²	15800m²	15977m²	-	-	72%

Footnotes

1   E.M. Forster, *Howards End*, Ch. 2
2   Steen Eiler Rasmussen, *Experiencing Architecture,* MIT press, 1959, p.83
3   http://www.rpa.org/2011/06/spotlight-vol-10-no-10-how-venice-italy-resembles-any-old-city-usa.html
4   http://www.doorsofperception.com/sustainability-design/venice-from-gated-lagoon-to-bioregion/
5   http://www.treehugger.com/urban-design/what-its-live-city-without-cars.html

There is a wonderful plan of Venice here from "Continuity of Architecture"
http://www.flickr.com/photos/cia_msa/284520554/lightbox/

This is a time-lapse of watery splendour on Vimeo, quite unlike my streets and squares
Jorg Niggli, Venice in a Day, 2012 (Vimeo)

http://www.vimeo.com/40977797 w=500&h=281]

Perugia
High-density Hill town/city

Net density	**Approximately 250-275 dwellings per hectare (plus retail)**
Height	**Four to seven storeys**

[vimeo http://www.vimeo.com/63360053 w=500&h=281]

At the Augustan gate
 A sliver of light passes over the enormous stone battlements that defend the historical city of Perugia. A fountain by the Etruscan gate. Cars circle the walls.
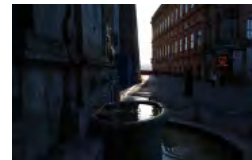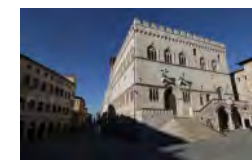

Early morning
The city is quiet. Shadows move across stone.

The Palazzo dei Priori
A scattering of people pass from Corso Vanucci through the Piazza 14th Novembre.

Piazza 14 Novembre
It's going to be a hot day and an exhibit of electric cars is arranged with free drives offered around the upper streets of Perugia.

Cathedrale di San Lorenzo
Stallholders lend a hand to erect the market stalls as the devout pass down the steps of the Cathedral.

Corso Vanucci
The market is complete and the ridge road of Perugia is thronged with pedestrians. Clusters of people sit on the walls to watch the passing parade.

The steps of the Palazzo dei Priori
People are sprawled over the steps, a newly married couple passes from the cathedral across the square to climb the steps of the

splendid Town hall.
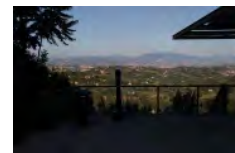
The arcades
Soccer is played in the arcades.

On the terraces
People rest and talk on the shady green terraces.

A view of Assisi
At the top of an escalator which climbs the daunting slopes there is view of Assisi 19 kilometres distant. The plains seem endless.

A distant view of the plains
Assisi is a dense stone coloured patch visible at the foot of Mount Subasio. After the proximity of busy stone streets, the view of manicured vineyards and fields in the breathless calm of this day imparts a blissful feeling. Nothing moves...it is warm and all is calm and serene.
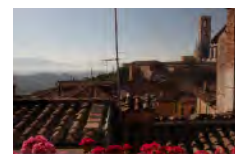
Sunset on a Templar church
The sun withdraws through the arches of Perugia.

Rooftops
Sun on soft brick and piles of baked roof tiles. House-martens circle. The distant plains are equal parts mist and green. The vertical church spire contrasts with the housing and city walls that ramble along the hill's contours.

View of the countryside
A veritable Claude Lorrain. The only thing moving is time.

Night
The glowing embers of the city are reassuring.


Why Perugia was chosen
Perugia is a hill town on a grand scale, which has become a hill city. It was founded more than 2200 years ago and is now the capital of Umbria and a centre for university education. Perugia is popular with urban designers, tourists and also with writers and readers of the "My Year in Umbria" lit.

Urban design, open space and landscape
Massive stone battlements ring the crown of the hill rising 500 metres above the Umbrian plains. Seven gates in the city walls lead to five ancient quarters within. Corso Vanucci runs along the ridge of Perugia linking the primary civic and cultural spaces. At one end is the Piazza 14 Novembre on which the Town Hall and the Cathedral stand; at the other green terraces overlook the plains.

In Perugia built form works with landscape. The viewpoints on top of the city walls have been placed where the bands of green rise up from the plains below. Tall apartment buildings below have been formed into spokes radial to the hill.
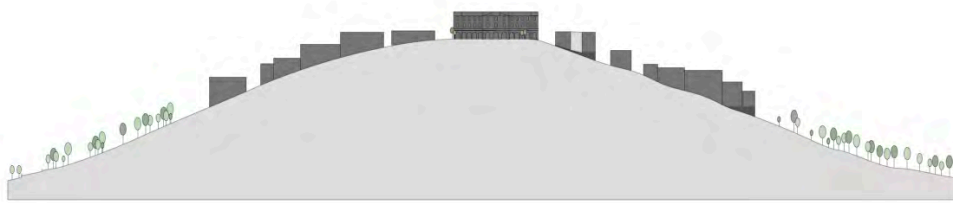
The hilly topography is used to improve environmental conditions within the buildings. As per modernist town planning principles; taller buildings are on the top of the hill, with lower buildings further down giving all buildings more access to light, ventilation and views.

Materials and architectonics
The use of two types of marble for the major buildings in Perugia's civic areas support the harmonious environment. The unfinished bulk of the cathedral's pink and white marble flank wall faces the Palazzo die Priori in its uniform white marble. The Palazzo Dei Priori is a fascinating building; town hall, art gallery, a stock exchange. It adapts to the sloping square with grace and appropriateness. Its flush jointed stonework and crenellated parapets are fortress-like. Pierced with cast iron remnants of obsolete adornment and crowned with a magnificent cast bronze griffin and a lion, it is the symbol of Perugia.

Events

Perugia is an important cultural centre. The week before I arrived there was an event by the architecture magazine Abitare. While I was there a blues festival and an energy conference were held in the main street. There are film, jazz and chocolate festivals. Events occur in the main square and in the Corso Vanucci by day and night. No venues are needed, it all happens in public. And because of the lack of vehicle traffic when you have a conference in the main square, you can hear the discussion.

2013 Perugia Festival of Energy

Having expelled cars from the city centre, Perugia ensured transport connections by installing escalators and a carefully routed Mini-Metro.

[Vimeo ; http://www.vimeo.com/63378505 w=500&h=281]

Comments and Conclusions

Perugia possesses the attributes required of a city by urban designers. It has defined limits and local and regional urban design and has been managed aesthetically. This is a pedestrian city with controlled vehicular traffic. Street furniture, signage and lighting do not deface its beautiful aspect. Pedestrian infrastructure is handcrafted. The absence of cars in Perugia allows vibrant human and cultural interaction. Anchored by magnificent ancient architecture, served by modern infrastructure, graced by a rich programme of cultural events; Perugia is a symbolic and actual landmark. The dense, tall, ancient centre of Perugia has been maintained and integrated into the province, and is part of the bigger world, not a living museum. This ancient high-density living city glows with the polish of ages.

Density Comparison Table

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Net Density (dwellings per hectare) "The ratio of the number of dwellings to the area of land they occupy (precinct or a block), including internal public streets and half of the width of adjoining streets that provide access to the dwellings"	350	150	221	138	240	275-300	250-275	225
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Footprint (%)	100%	72%	69%	35%	61%	-	-	-
Rise (storeys)	4-6	4	4-9	5	1-10	4-6	4-7	4.2:1
Site Area	705m²	6082m²	10550m²	15800m²	15977m²	-	-	72%

Barceloneta, Barcelona, Spain
High-density urban design and housing

Net density	**349 dwellings per hectare**
Site density	**700 dwellings per hectare**
Height	**four to six storeys**
Urban planning	**Prosper Verboom**
Built	**1750-1900**

Living Layers - BARCELONETA_v2

01:50

[Vimeo - http://www.vimeo.com/62849473 w=500&h=281]

You approach Barceloneta from the broad avenues of the Eixample or the dark passages of the Gothic. Beyond a zone of road and rail corridor, Barceloneta rises like an impenetrable wall and suddenly you are within.

Barceloneta – morning
It is quiet, dim and sheltered.

There is an almost impossible density of housing which is very ordered and repetitive; a draughtsman's lesson in perspective. Haphazard layers of window boxes, washing, external services, satellite dishes and antennas do not manage to disguise the underlying order. This teeming density is not unbearable perhaps because of its strict order, but also because it is finite. The east-west streets are illuminated at their ends by vast open spaces.

Outside the shop in Carrer Andrea Doria.
And all is at human scale. On the streets between these habitable walls the locals behave as though they are at home. A small amount of car traffic picks its way around people chatting in the street. People bring seats and sit on the footpath. Small spaces are claimed in the street with plants, washing lines, a chained bicycle, children's toys, seats and small tables. Barceloneta is like a one apartment building, with the streets its corridors.

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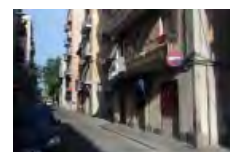
Street to beach

A short walk and you are on a palm tree lined boulevard, then down a ramp to a hard packed beach lined with activities.

Barceloneta beach

The sunlight on sand is dazzling and exhilarating. A view of masonry facades has been replaced with a view to the horizon. Sailing boats waft by.

Beach activities

Passive and vigorous activities are spaced along the beach. Bars, restaurants, concrete chaise-longues for sunbaking, a jungle gym and children's playgrounds. The small-scale facades of Barceloneta are set back amongst trees. It is easy to forget the city itself.


Retail and commercial

Shops and restaurants are scattered through Barceloneta but are found mainly on the shorter cross streets. Many of the bars can be walked through to the next street, increasing the feeling that Barceloneta is like one building, with the streets its corridors. At nighttime one becomes more aware of the bars and restaurants in Barceloneta. Inside, the small rooms are sliced into even smaller spaces. One popular bar, El Vasa de Oro, has a seating area no more than 1.6 metres wide. Chefs and barmen have more space than the diners.

Satellite photo and section through Barceloneta
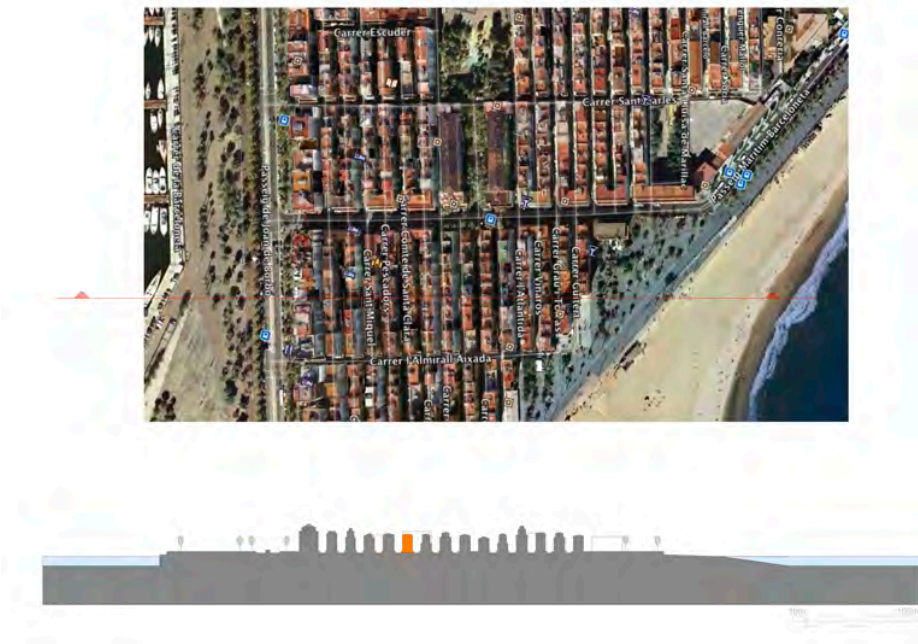
Plan of Barceloneta

Why Barceloneta was studied
Barcelona has been a successful city quarter for 250 years and is very dense. A unique combination of low scale, mid-rise and very high density is evident.

Urban design
Barceloneta is a small quarter appended to the city of Barcelona with the Mediterranean Sea and Barcelona Harbour as it's other boundaries. It was designed as a model city sited prominently at the harbour mouth and housed longshoremen, fishermen and other essential workers.

Barceloneta has an audaciously simple and repetitive layout of long shallow blocks on narrow streets crossed by slightly wider cross streets.

Barceloneta and the Citadel adjacent were designed by a Flemish military engineer[1] as part of Philip V's plan to improve and control his new possession Barcelona. When completed, its orderliness was a stern contrast to the medieval Gothic quarter adjacent.

A street in the Gothic

In the mid nineteenth century the Citadel was demolished and replaced with roads, railways and the Parc di Ciutadella. This new infrastructure combined with population growth resulted in Barceloneta being extended upwards. The original buildings had been two storey row houses. These were replaced with four to six storey apartment buildings. This work was largely completed by the beginning of the twentieth century. Today, the bulk of Barceloneta's urban fabric is mid-nineteenth century.

Public buildings include a sports school, swimming pool, a major fish market, a Naval School and its residential quarters. An artificial beach, grand avenue and boardwalk were built for the 1992 Barcelona Olympic Games.

Landscape
There is no green landscape within the buildings themselves. Squares and east-west streets are planted with slender trees, while some streets have been pedestrianised. The Mediterranean and the harbour are the major landscape elements.

Open space
The only open spaces are the small balconies overhanging the street. These afford incidental views down streets and give some privacy to the rooms.

Apartment planning
The apartment buildings of Barceloneta have no open space within the lots and rely on the streets for light and ventilation. The method of achieving density in Barceloneta is simple; delete anything that consumes space. The buildings themselves have no courtyards or corridors. The ground floor lobby is typically minimal in size. The stairwell serves one apartment on each floor entered from a small landing. Apartment planning is efficient in layout and permits a mix of studio, 1, 2 and 3 bedroom apartments. Many ground floor accessible apartments are provided. Apartment sizes are small compared to contemporary standards.
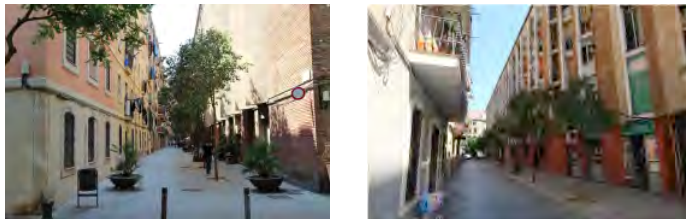
This mid-twentieth century building has a row of squint windows which effectively reduce overlooking but also reduce daylight access and connection with the street

Environmental
The 90 metre long and 8.4 metre wide blocks permit some solar access to the apartments while protecting them from the sea breezes. However daylight access, solar access, natural ventilation, visual and acoustic privacy are generally poor in Barceloneta. The design of newer residential buildings has attempted to solve some of the problems of the existing 1850s type but with uncertain success.

Materials and architectonics
There are no two storey or colossally scaled elements, all is at human scale. All storeys have the same height; there is no extra height for the ground floor where there may be shops or services. Ground floor shops adapt to the regular domestic sized windows and doors; there are no grand shop windows.
The traditional detailing of painted cement render dados, windows, door reveals and corner quoins are uniform through Barceloneta. Doors and windows are modelled equally. Ground floor individual apartment entry doors and communal lobby doors are identical in detail.

Shared facilities
There are no communal facilities within the apartment buildings but there are many
public facilities within Barceloneta. Playgrounds, a sports school, a swimming pool, a major fish
market and beach activities are within easy reach.

Shared services
Garbage and recycling bins are located in designated bays in the street.

Comments and conclusions
Very clear natural and man-made boundaries define Barceloneta as a distinct quarter within the
city of Barcelona. The entire quarter sits within the 400 metre, 5 minute walking radius that urban
designers promote as the optimal size for a walkable city. Cars and their infrastructure are
generally absent. Each apartment block has no shared facilities, but there are many facilities
available nearby. A strong local community is evident. The street grid ensures good orientation
and an easy navigation through the streets.

In Barceloneta there is an extreme juxtaposition between seashore and street, of exposure and
enclosure in which one becomes a refuge from the other. Barceloneta is a unique environment
that works because of its size and its site. Many apartments however have levels of light,
ventilation and privacy that are unacceptable for contemporary housing codes. Barceloneta is an
housing experiment which rewards study; and it offers possibilities for particular types of housing
for users with shared experiences or values such as student, workers or institutional housing.

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Footnotes and Bibliography
1. Prosper Verboom- progressive urban designer and military engineer (and a splendid example
of nominative determinism).

Carrer Princesa, El Born, Barcelona, Spain
High-density urban design and housing

Net density	**150 dwellings per hectare (plus retail)**
Site density	**271 dwellings per hectare (plus retail)**
Height	**Four storeys**
Built	**1850s**

[Vimeo - http://www.vimeo.com/62913660 w=500&h=281]

In the Gothic
A summer afternoon in the Gothic. People have gathered to this small closed square to talk and enjoy the smattering of sunshine. The buildings are those of a village; simple and crudely made.


In the Carrer Princesa
History frames daily life. Street as public living room. Hot sun strikes the beautiful stone façade rising above the London Plane trees. Precise cast ironwork and drop glass street-lighting adorn the arcade storey. Upper storeys are modelled with massive brackets and cornices to form a solid articulated continuous street façade. This stately metropolitan street could be in Paris or Buenos Aires.

Lobby
Vestibule as meeting place. The lofty lobby is worn and cracked but well maintained.
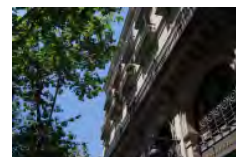
Stair
It is darker and cooler in here. The stair is a room of its own. Light spills from above.

Lobby floor
Delicate steel grilles throw shifting shadows onto the worn marble floor.

Court

A place of peace and quiet. People are sleeping. Delicate timber and steel balconies are fitted with ornate glass bi-fold doors. Matchstick blinds shade balconies. Washing flutters in the breeze. Birds fly around the court.


Court detail

Time passes peacefully. The transparent balconies are identical; traces of occupation are everywhere.

To street

Apartments opposite are screened by the moving treetops. The city is hidden below the tree canopy. Potted cacti are bathed in sun. Shadows shift very slowly through the balcony. Sagging shutters. The balcony doors are held open by a table. Light moves across the vivid tiled floor. Relaxed domestic order reigns.
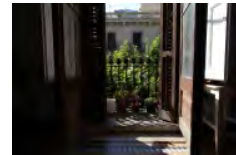
Plan and section
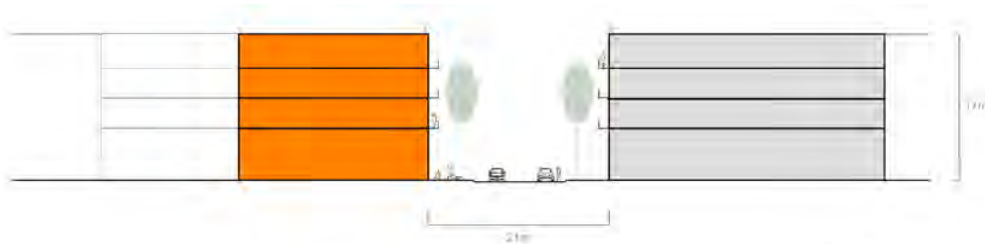
Why Carrer Princesa was chosen
The generous amenity of this apartment block on Carrer Princesa is worth examining. While it has the lowest net density of any of the projects studied (refer Density Comparison Table), it has the highest density in terms of habitable rooms per hectare. Its density figure is also lower because the lower floors are commercial and not residential.

Urban design
The Carrer Princesa is part of a small quarter built at the time of the demolition of the Citadel and the building of the Parc de Ciutadella and the Market. It occupies a triangular block left over from the void between the old El Born and the new rectangular Park.

The dark passages of the Gothic and the miniature city of Barceloneta nearby are another world. The width of the Carrer Princesa is greater than the height of its buildings. It is a splendidly metropolitan and urbane place and was an area for the wealthy middle classes when built.

Planning
The apartment planning is similar to the Eixample plan shown in *The Urban Housing Handbook*[1]. The splendid naturally lit and ventilated stair serves two apartments off each landing. A mix of apartment types and sizes is not possible with a plan this deep without compromising cross ventilation. These large (175m²) 4-5 bedroom flats can however be occupied by families or by multiple occupants. Each apartment has one bathroom only.

Environmental
These big apartments are also very deep; 20 metres from north to south external walls. All rooms are naturally lit and ventilated by two large light wells that also cause acoustic problems. Under Australian Building Codes these light wells would be required to have fire protection measures. On a hot summers day in Barcelona the rooms lit by light wells are cool and quiet (perfect for a siesta)

Materials and detailing
The rich and beautifully resolved ornament of the façade is reminiscent of the more splendid streets of Hausmann's Paris.

Landscape and open space
Street trees have room to grow high, broad and healthy. The vast Parc de Ciutadella is nearby. Street balconies give privacy and permit incidental views up and down the street. The big private balconies facing the courtyard can be enclosed by the glass doors and permit indoor/ outdoor living.

Shared facilities and services
There are no communal facilities within the building. The El Born area though is rich with are shops, museums, markets, the park and other facilities.

Comments and conclusions
The apartments along Carrer Princesa contribute to the street and are a refuge from it. Lightwells are employed to provide good light and ventilation within a deep and inherently dark block. The beautiful and continuous facade is another example of quality architecture "anchoring" a neighbourhood.

Because of its generous proportions and amenity this apartment type is applicable over large areas of the city; it is a sustainable density.

Density Comparison Table

	Barceloneta	El Born	Piraeus	Hornbaekhus	Tallet 8	Venice	Perugia	Paris
Net Density (dwellings per hectare) "The ratio of the number of dwellings to the area of land they occupy (precinct or a block), including internal public streets and half of the width of adjoining streets that provide access to the dwellings"	350	150	221	138	240	275-300	250-275	225
Site Density (dwellings per hectare) "The ratio of the number of dwellings to the area of the site they occupy"	700	271	289	183	298	-	-	-
Habitable Rooms (habitable rooms per hectare)	1400	1626	-	855	-	-	-	1100
Floor / Space Ratio "The floor space ratio of buildings on a site is the ratio of the gross floor area of all buildings within the site, to the site area"	5:1	4.4:1	4.65:1	1.73:1	-	-	-	-
Footprint (%)	100%	72%	69%	35%	61%	-	-	-
Rise (Storeys)	4-6	4	4-9	5	1-10	4-6	4-7	4.2:1
Site Area	705m²	6082m²	10550m²	15800m²	15977m²	-	-	72%

Footnotes
1 - Firley, Eric & Stahl, Caroline. *The Urban Housing Handbook*, John Wiley & Sons Ltd (England), 2009

"Piraeus", KNSM Eiland, Amsterdam, NL
High-density urban design and housing

Net density	221 dwellings per hectare (plus retail)
Site density	289 dwellings per hectare (plus retail)
Height	four to nine storeys
Architects	Hans Kohloff and Christian Rapp
Built	1989-1994

[Vimeo http://www.vimeo.com/63360129 w=500&h=281]

From the ferry
On the uncluttered dockside, people dismount from bikes and embark on ferries with no fuss. The ferry's course to the other shore is obvious and signage is clear.

Dockside "Piraeus"
A couple rest from their efforts welding in the bowels of a steel hull. They are living in one barge and working on another. The barges on the next island line up beneath "The Whale" housing. Pleasure boats pass at displacement speed, usually with a flag on the stern. More occasionally a sailing boat is seen making use of the steady breeze.

Home on a barge
Barges nosed into the docks show signs of habitation; bicycles, trolleys, greenery, potted plants and bins. Other necessaries are lashed to the decks. The inhabitants may be absent, but their pride and *joie de vivre* is evident. The strong wind keeps the flags streaming in a shipshape fashion.

Plunging into in the Ijhaven
This being the Netherlands, the sea is not permitted to be inconveniently tidal; streets and building can connect directly to the water. A swimmer rejoices in diving from the boardwalk. Refreshing, I was told. Work on the barge continues.

"Piraeus" dockside

Cars and many bikes line the broad footpaths and narrow one-way street. On a summer weekday, people are drinking beer under flapping Heineken umbrellas. Two restaurants serve the ample outdoor spaces. Because of the boating, barge life and the working harbour, the dockside edge is lively, unlike other new dockland re-developments the world over.

Dockside façade

A big plain facade with little colour variation. No string-courses, sills downpipes, vents or expansion joints are visible. No attempt is made to cast shadows or relieve the mass and large scale. It is scaled to the body of water, the other islands, the "Whale" and the history of the docklands.

Internal street

The flush windows throw no shadow when shut, effectively reflecting the clouds above. The steel framed folding windows and fixed lower panels suppress the balustrade scale, reduce signs of occupation and preserve the facade as a flush element. When they are folded and operated, one is reminded of human presence. The materiality of this building has a strong impact upon its environment.


Walk to main street

This neutral facade could conceal housing, offices or even light industrial activities within. This neutrality lends the street a civic quality. One doesn't feel as though you are intruding upon someone's private domain.

Main street

The street façade is reminiscent of a scaled up 19th century residential streetscape. Traditional timber casement windows are used in the austere brick façade. Two elegant and colossal lobbies mark the corners of the megablock. Serrated pale Baltic-pine facades house letterboxes, intercom plates and a massive electrically operated door. They are detailed in a style reminiscent of Berlage and Frank Lloyd Wright. A fence of bikes line the street.
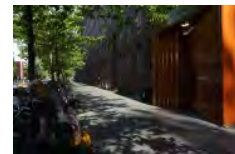
From a high apartment

From eight storeys street life is still legible. People wait and gather.

Above the trees

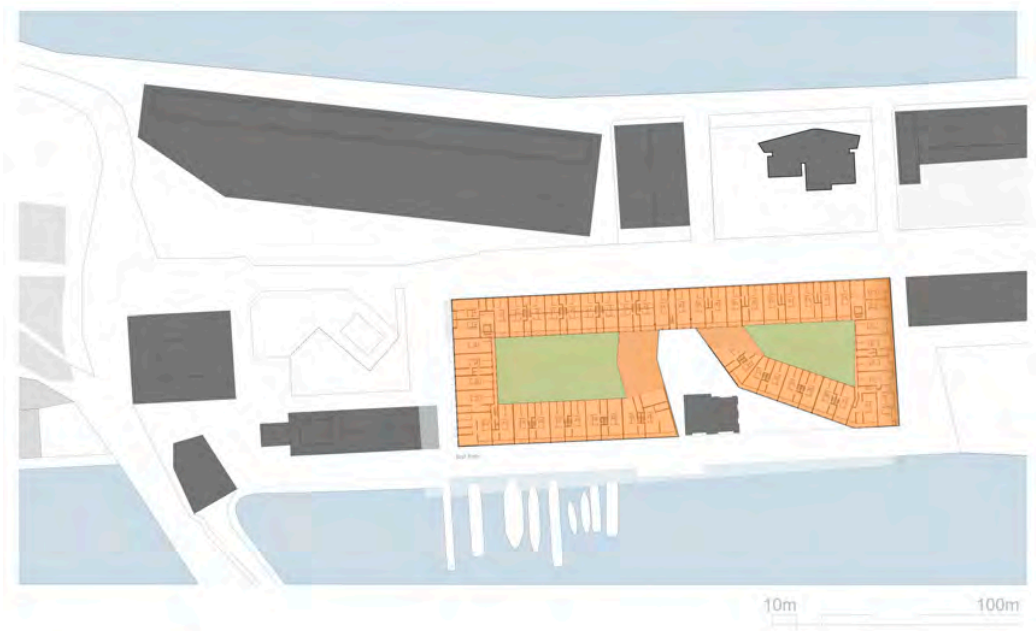The city looks patterned and miniature, noise becomes a not unpleasant buzz.
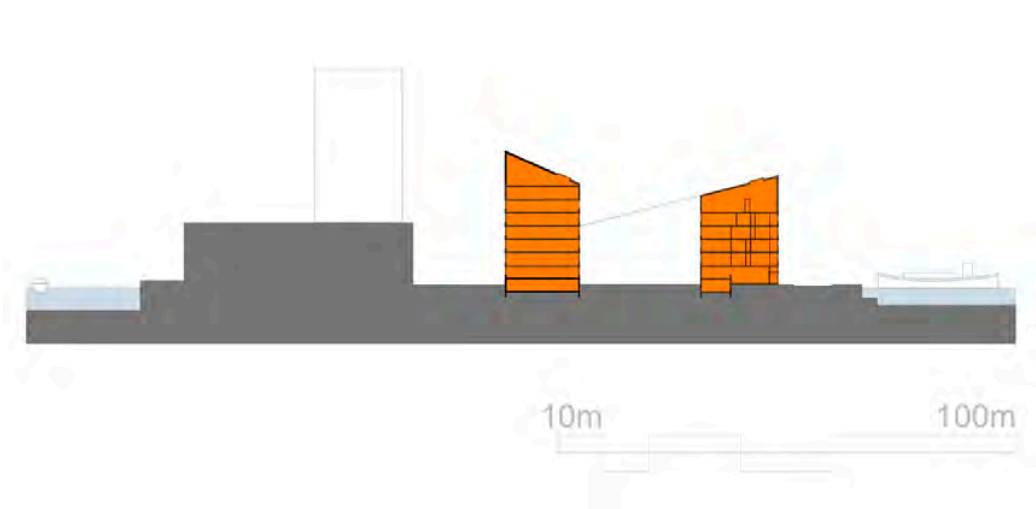

Views to the trees and water

From this tall building by the river, the patterns of the waves, the straight lines and gyrations of barges and boats, the even fringe of trees, all becomes a pleasant, blissful, soothing view.
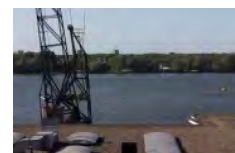
Plan

Section

Why "Piraeus" was chosen

I visited Piraeus in 1995 shortly after it was completed, and again in 2007. It is an exemplary building and a rich subject of study. In 1995 it felt as though the building had already been there a long time. Since that time the bright Dutch architecture of the 1980s has faded. The "architectural petting zoo" of neighbouring Java Eisland seems a little neurotic and diffuse. Piraeus seemed old when built and hasn't deteriorated since. As soon as it had been completed it was shaping a living neighbourhood in a new area.

Urban design
"Piraeus" is a mixed-use housing block on KNSM Eiland in the former docklands of Amsterdam. The "islands" are (this being the Netherlands) artificial quays that were formed in the 18th century and named after significant places in Holland's trading empire. KNSM Eiland is about 15 minutes from Amsterdam Central Station by bicycle and is also served by a tramline. "Piraeus" comprises 304 apartments, eighteen shops and an underground parking garage. A major sculpture is incorporated into the southern courtyard.

Scale and massing
"Piraeus" is built at the scale of a huge dockside warehouse and is visible from far away; "a sort of gentle giant relaxing by the dockside."[1] It occupies a block 170 metres by 60 metres wide. Its megablock form is moulded and broken in plan and manipulated in height permitting an internal street through the block and providing the setting for a 19th century dock building. It is modelled from nine to four storeys to suit both street and dockside terrace and improve solar access to courtyards and apartments.

Public and private
"Piraeus" is built to the boundary and there are no street or side setbacks. Courtyards are not accessible from the street. All building entrances are clearly marked by deep recesses or flush timber and glass lobbies. Major entrances are double height in size and lobbies are generous in size.

Ownership / client
All apartments are rented to a mix of private and social housing tenants.

Apartment planning
The Piraeus building has 56 different apartment layouts within. To quote Gerald Maccreanor *again "and that's one of the things that makes this building so successful. The building seems to house all the differences you find in the street, and this variety makes it part of the street, and a part of the city".* Level accessible apartments are thoughtfully placed in the less busy internal street. Apartments are served by vertical stairwells, glazed façade corridors and external gallery circulation.

Open space and landscape
The harbour is the primary landscape element. The main street has a regular avenue of trees. The southern courtyard is not used as occupiable open space; instead it provides separation and a green aspect.

Environmental
The block is sculpted to improve solar access. The buildings to the dockside are lower and roofs are angled allowing further solar access to the courtyard facade of the tall street block. The southern courtyard is open to the west and lowered to the east to permit further solar access. All apartments are **dual aspect** and no more than twelve metres deep, permitting cross ventilation. Apartment balconies can be closed with bi-fold glazed windows providing an outdoor space adaptable for windy and wintry conditions.

Materials and architectonics

The building is made of sober, traditional, durable materials and standardized elements. Raw **brick** is the traditional building material of the muddy Netherlands and Amsterdam in particular, but was an unconventional choice in the1990s.

The use of **steel framed** glazed bi-fold windows gives the building a 19th century industrial appearance. The fragile, human scaled slender framing and small glass panes are a counterpoint to the expanses of brickwork. It is currently not possible to use this type of glazing as part of a facade because it does not comply with insulation requirements. The architects have instead employed it as an additional layer of environmental protection; making a façade that sits comfortably in its historical dockland setting.

Steel is also used in large paving panels in the internal street and in the suspended operable steel fire escape. Detail, colour, variation and texture reserved for the entrance points of the building where people touch and use it.

Density Comparison Table

	Barceloneta	El Born	Piraeus	Hornbaekhus	Tallet 8	Venice	Perugia	Paris
Net Density (dwellings per hectare) "The ratio of the number of dwellings to the area of land they occupy (precinct or a block), including internal public streets and half of the width of adjoining streets that provide access to the dwellings"	350	150	221	138	240	275-300	250-275	225
Site Density (dwellings per hectare) "The ratio of the number of dwellings to the area of the site they occupy"	700	271	289	183	298	-	-	-
Habitable Rooms (habitable rooms per hectare)	1400	1626	-	855	-	-	-	1100
Floor / Space Ratio "The floor space ratio of buildings on a site is the ratio of the gross floor area of all buildings within the site, to the site area"	5:1	4.4:1	4.65:1	1.73:1	-	-	-	-
Footprint (%)	100%	72%	69%	35%	61%	-	-	-
Rise (Storeys)	4-6	4	4-9	5	1-10	4-6	4-7	4.2:1
Site Area	705m²	6082m²	10550m²	15800m²	15977m²	-	-	72%

Footnotes

1 - http://www.bdonline.co.uk/buildings/technical/gerard-maccreanor-revisits-the-piraeus-building-in-amsterdam/3149918.article

Le Quartier de l'Europ, Paris
High-density city quarter

Net density	**225 dwellings per hectare (plus retail)**
Site density	**240 dwellings per hectare (plus retail)**
Height	**mid-rise; 5-8 storeys**
Planner	**George-Eugene Haussmann**
Built	**from 1826**

[vimeo http://www.vimeo.com/62913711 w=500&h=281]

[vimeo: http://vimeo.com/63378504]
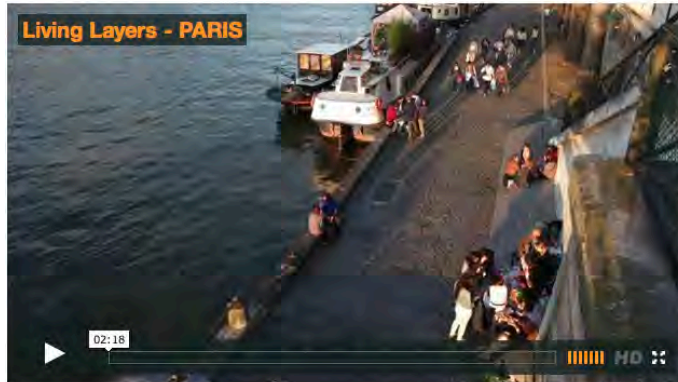
Below the Pont Des Arts

Long summer evening shadows by the Seine. A small party is taking place. Houseboats move in the wash. Places for conversation.

On the Pont Des Arts

People sit, talk and watch comfortably in the midst of this beautiful, busy metropolis.

At the Boat Pond in the Tuilleries
Children tend the wooden yachts as they criss-cross the broad raised pond. Huge fairground machines gyrate in this vast formal space which is walled by regular stone and zinc facades.

At the fountain in the Tuilleries
There is a cold breeze, but its warm in the sun. Heavy chairs are shifted to catch sun and be companionable. The pond is a huge disc in this vast space.

City forest
The ground is pale, tree trunks dark, grass and foliage green and clipped, regular and endless. An abstract painting of a forest.

Place du Dublin
Relentless traffic, all is man-made and enclosed by the repetitive ornamented facades.

Place du Dublin
The star shaped plan gives multiple views down the long streets. Clouds are spun overhead. Traffic streams past, pauses and starts again. People queue for the Boulangerie.

Rue de Clapeyron
Without sun the street walls are uniform in colour: pale stone, charcoal slate and steelwork and zinc. Even at the attic level, the enclosure is still strong.

Facades and Sky
The stone shows its discreet warmth as the sun passes from behind the rolling clouds. Habitation is also discreet; there are many different dwellings behind these facades but it is not clear where they start or finish. Modestly sized glazed doors armed with shutters and curtains effectively maintain privacy.

Rue de Clapeyron night
The city is projected onto the facades. The sky glows. Apartment doors are open. Slivers of private life are revealed.

Why Paris was chosen

Paris is one of the densest big cities in the world. It is also the favourite city of many. The Quartier de l'Europ is an early and extreme example of the effects of the type of planning Haussmann later implemented for Paris. It has been studied and discussed in "Urban forms: Life and death of the Urban Block" by Samuels, Panerai, Castex and de Paule, and in the work of Yona Friedman.

Urban design

With Napoleon III as client and Hausmann as planner, medieval Paris was transformed. The insalubrious, narrow, crooked central city was razed and the whole of Paris was pierced by a new star-shaped layout of boulevards and roads. Paris became more homogenous in appearance, with stone and zinc buildings of a uniform height built along the edges of the new "percees". The topography and the monuments differ, but the streetscape of the twenty arrondissements is remarkably homogenous. The Quartier de l'Europ is part of this vast artefact, although more dramatic in perspective; the streets are narrower and the intersections of the star shaped plan more dramatic.
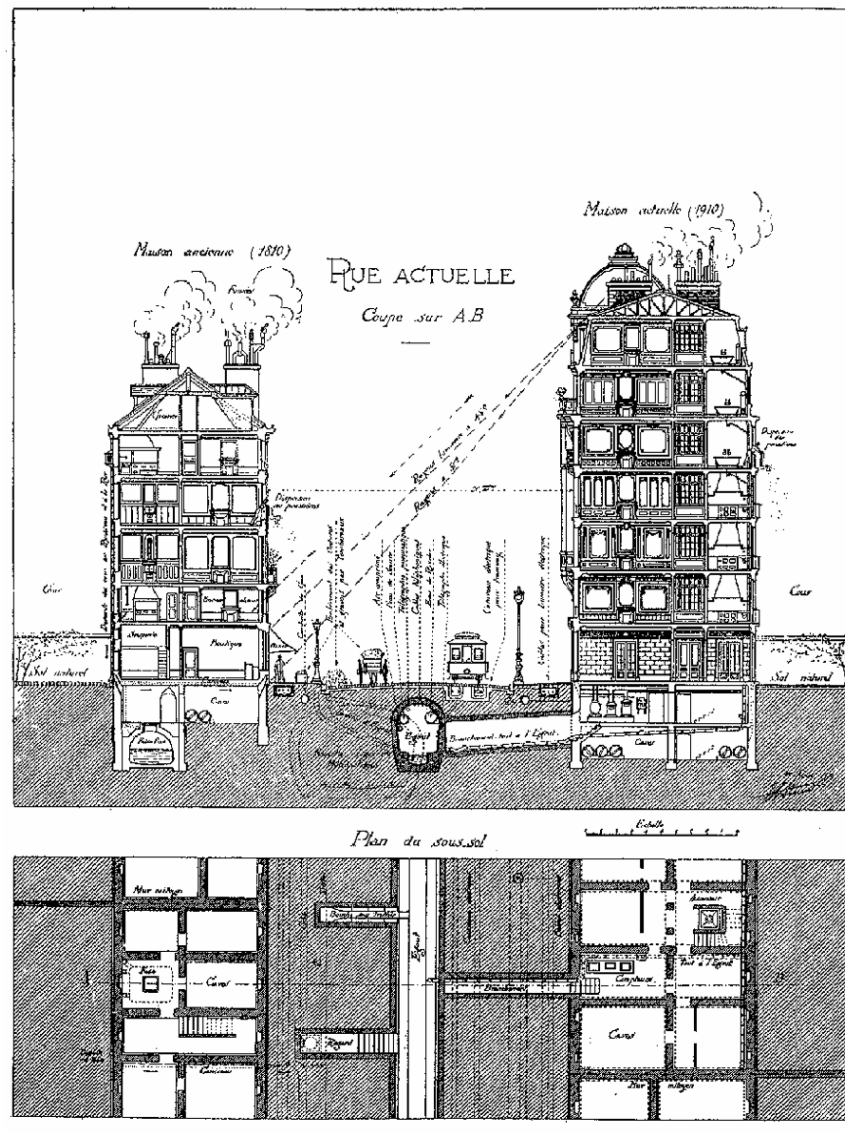
RUE ACTUELLE

Coupe sur A.B

Maison ancienne (1810)

Maison actuelle (1910)

Plan du sous-sol

FIG. 1.

Open space and landscape

Within the arrondissment there is little public open space. The Place du Dublin is typical; at an intersection of roads buildings are terminated to increase footpath width. Shops serve these spaces, which also accommodate motorcycle and bicycle parking.

Paris itself however is ventilated by public spaces unmatched in size by other cities. The Tuilleries, the Jardin du Luxembourg, the Bois du Vincennes and Le Parc des Buttes Chaumont are spaces on an imperial and metropolitan scale. Thus the ordered high-density of the city blocks is matched by the openness of the grand spaces,

Apartment planning and mix

There is generally little open space within blocks. Small courtyards function as lightwells to ventilate service rooms and stairs but are generally not occupiable. There is very little private open space. The street functions as an open space for light, ventilation and views. The repetitive facades conceal the broad range of apartment sizes behind served by one lobby.

Environmental amenity
Because the blocks are generally not very deep, the streets are broad and the apartment ceilings are high, the environmental performance is generally satisfactory.

Materials and architectonics
Stone, wrought iron balustrades and details, glass shopfronts and zinc roofs are used to form the street facades.

Ownership/client
The first Haussmann projects were partly government, partly private developer funded. The government helped to establish financing systems to support private developers.

Shared facilities and services
Shared facilities and services are negligible.

Conclusions
Paris is structured on multiple scales. There are medieval remnants and small pedestrian areas but Haussmann's boulevards are daunting on foot. They indicate the need for a horse and buggy; and seem to predict the invention of the motorcar. The boulevards connect this beautiful, roaring metropolis and have as their counterpoint vast, serene open spaces.

	Barceloneta	El Born	Piraeus	Hornbaekhus	Tallet 8	Venice	Perugia	Paris
Net Density (dwellings per hectare) "The ratio of the number of dwellings to the area of land they occupy (precinct or a block), including internal public streets and half of the width of adjoining streets that provide access to the dwellings"	350	150	221	138	240	275-300	250-275	225
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Footnotes:

http://www.youtube.com/watch?v=Wkt8T38aaMw
"Ravel - Le Tombeau de Couperin, orchestration complete" Published on May 2, 2012. Youtube. Accessed on 22nd March 2013. (8:00 to 10:53)

"Hornbaekhus", Copenhagen DK
High-density apartment building

Net density	**138 dwellings per hectare**
Site density	**183 dwellings per hectare**
Height	**5 storeys**
Architect	**Kay Fisker**
Landscape	**G.N.Brandt**
Built	**1922- 1923**

[vimeo http://www.vimeo.com/62913712 w=500&h=281]y

Bicycles over the lakes

This was one of the most glorious days of the year, positively hot at 29 degrees Celsius. These grand, shallow lakes are threshold to and mirror of the turreted, decorated, coloured facades of the 19th century buildings that wall the city perimeter. Streams of bicycles return home from the city streets.

People watching on Dronning Louises Bro

The bridges are lined with people talking, enjoying the sun and watching the passing parade.

Borups Allee, people, bikes, street, buses

"Hornbaekhus" is three kilometres from central Copenhagen. One approaches up the gentle but relentless gradient of Borups Allee. This major route into Copenhagen incorporates a bus route and is thick with cyclists. And Hornbaekhus provides a large scaled backdrop for street activities. The plain bitumen cycle way is a step down from the concrete and granite footpath.

The bitumen street emblazoned with traffic signage is a further step down. People group at apartment lobbies, arriving and departing on the bikes that are lined up along the brick wall.

Street wall and entry

This is a long, long, tall facade. It has the scale and appearance of a nineteenth century brewery, factory or prison. (Building types that have proved excellent for apartment conversions in the twentieth century). The overall impression is of an ordered and substantial city wall.

Courtyard

The street facade sits on it own boundary with no street setback. Ground floor level is approximately 1.2 metres above the footpath giving privacy to the ground floor apartments and light and air to the basement. The large portal is one of only two entrances from the street. A brisk woman on a bicycle let me in, saying "tell them Susan from 16 let you in! Lots of people come to see this building". I speak to a Canadian resident who is resting after a Rosskilde Music Festival performance. " When I first came here I thought; Wow this is a housing complex? It looks like a museum!"

At 9AM on a weekday you are aware of the calm and the courtyards vast green limits. There is plenty of space for amenities.

Courtyard and trees

The large delicately detailed wall forms a backdrop for the movement of irregular foliage.
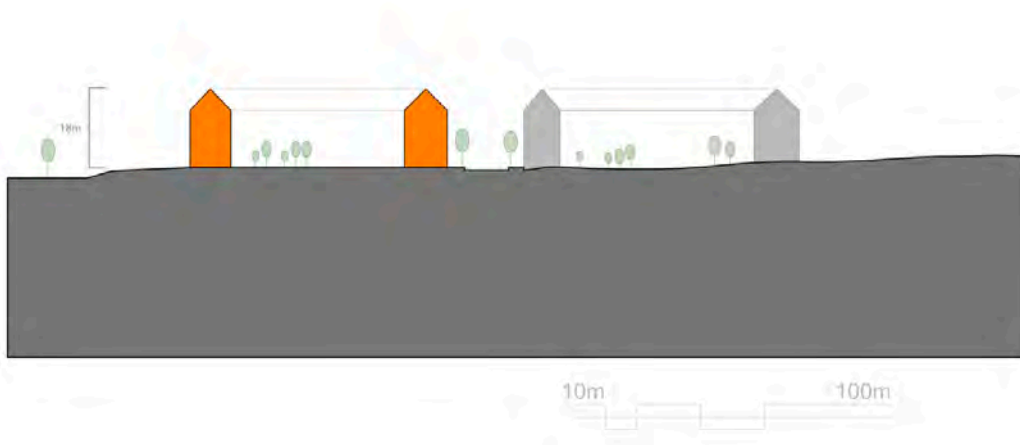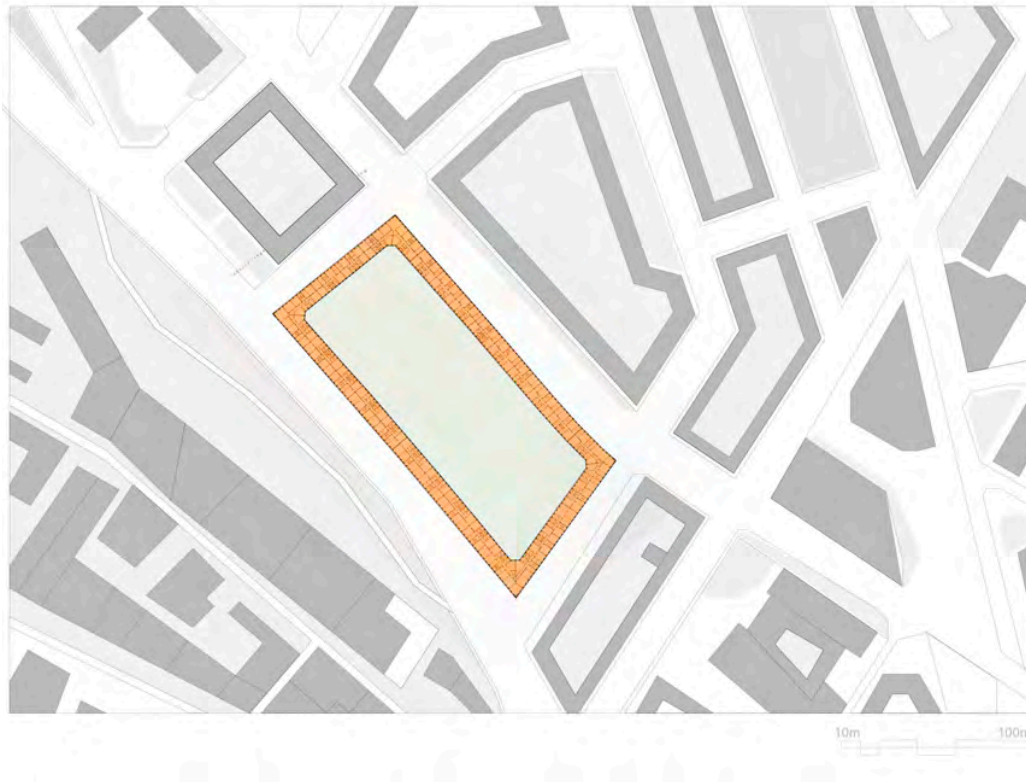
Park bench

A rough timber park bench with views of sky, trees, hedges and lawns dotted with flowers. There are no balconies and one does not feel overlooked. It is modest and safe place for contemplation and calm.

Street section

Site plan

10m   100m

Why Hornbaekhus was chosen for study
Hornbaekhus is high quality architecture that has been successful as housing and is considered an exemplary perimeter block. It has many shared facilities and services.

Urban design
Hornbaekhus occupies an entire block, providing a uniform street façade to four streets. In the four bridge areas of Copenhagen, Christianshavn, Vesterbro, Norrebro and Osterbro there are many large buildings of this type. This type of building can be a significant part of a city. Hornbaekhus is 185 metres long and 75 metres wide, making its courtyard 165 metres by 55 metres. A building of this scale transforms empty land into a part of the city; and its courtyard is at the scale of a park. But they are separated. The courtyard is a green refuge from the city, and its walls fortify against the city while forming both the street and the courtyard. Street and courtyard are both important but quite separate.

The Danes liked doing things big in the early twentieth century– big was good. At a time when megablocks had been recently completed in Berlin and Amsterdam and there was migration from rural areas to the city; this building is resembles a very large traditional Jutland courtyard farmhouse.

The building is within walking distance of the city and is close to bus stops.

Apartment planning
The apartment planning is efficient in layout and permits a mix of studio, 1, 2 and 3 bedroom apartments. Floor plans and areas are comparable with contemporary standards.

Environmental

As in flat, coastal Jutland, the courtyard catches the winter sun and deflects harsh winter wind. Tiled roofs, sober details and hand-pressed brickwork and simple landscaping add to this impression.

Materials and architectonics

Despite its 19th century appearance this building is still less than a hundred years old and its limited and sober palette of materials has aged well.

The building is divided into bays of either five or seven identical windows placed symmetrically around lobby entry doors. Delineating the borders of these bays and running in one straight line down from the gabled roof and eaves, are downpipes which discharge directly into typically Copenhagen open half pipes that cross the granite lined concrete paved footpath.

The brick facade is well made, repetitive and unadorned. Unpainted cement render reveals surround the typical Copenhagen window arrangement of two large casements, with two smaller casements above. These windows are set flush with the brickwork, forming one big plane. Richer detail and ornament is focused on the lobby doors, letterboxes and lights that mark the building entrances.
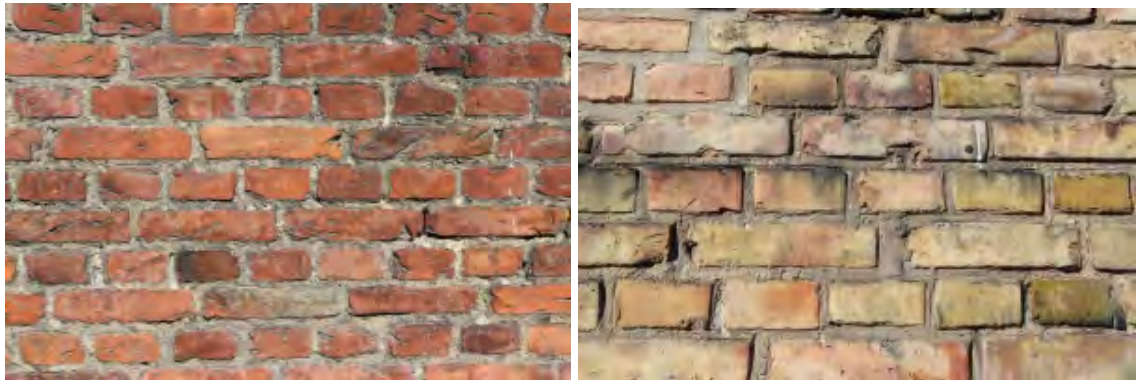
The detailing of the courtyard facade is simpler and more rustic. The brick used to the street facade is a darker red, to the courtyard façade a lighter yellow.

Landscape
The large courtyard is like a park or village green in appearance and detailing. Trees are planted in deep soil and not squashed into planters above an underground car park. There is much scope for landscape design and shared facilities. The four walls of the courtyard create a hidden oasis of calm. The identical windows and lack of balconies allow you to feel comfortable there and not overlooked or affecting someone's privacy.

Shared facilities
 In Hornbaekhus's vast courtyard there is a small-netted soccer court and a basketball court, sandpits, and a BBQ area with individual barbeque units lying around on the turf. It is easy to monitor children's play the three different playgrounds in this courtyard, accessed from the street by only two large gated portals. There are also pathways for children to ride on, and the essential infrastructure of any Copenhagen courtyard, generous bicycle sheds. These are roofed and secure with storage areas and an area for repairing your bikes.

Shared services
The cobbled pathways also serve as a maintenance access; a hydraulic cherry picker was being used to replace some windows while I was there. Shared amenities can be maintained efficiently due to good access and ample space. There is infrastructure for what is probably a full time gardener including a shed that accommodates two small tractors. Garbage and recycling bins have are placed regularly adjacent to lobbies. The naturally lit and ventilated basement has shared spaces for work and recreation.

Comments and Conclusions
Hornbaekhus is a European perimeter block type uniquely Danish in its fusion of fortress and farmhouse. Its grand scale and detailed craftsmanship create a robust and reassuring built presence. The façades which protect the secluded yet communal garden courtyard also serve define the street beyond. This building makes density desirable.

Density Comparison Table

	Barceloneta	El Born	Piraeus	Hornbaekhus	Tallet 8	Venice	Perugia	Paris
Net Density (dwellings per hectare) "The ratio of the number of dwellings to the area of land they occupy (precinct or a block), including internal public streets and half of the width of adjoining streets that provide access to the dwellings"	350	150	221	138	240	275-300	250-275	225
Site Density (dwellings per hectare) "The ratio of the number of dwellings to the area of the site they occupy"	700	271	289	183	298	-	-	-
Habitable Rooms (habitable rooms per hectare)	1400	1626	-	855	-	-	-	1100
Floor / Space Ratio "The floor space ratio of buildings on a site is the ratio of the gross floor area of all buildings within the site, to the site area"	5:1	4.4:1	4.65:1	1.73:1	-	-	-	-
Footprint (%)	100%	72%	69%	35%	61%	-	-	-
Rise (Storeys)	4-6	4	4-9	5	1-10	4-6	4-7	4.2:1
Site Area	705m²	6082m²	10550m²	15800m²	15977m²	-	-	72%

Tallet 8 ("House 8") Copenhagen, DK
High-density urban design and housing

Net density	**240 dwellings/ha (plus retail and commercial)**
Site density	**298 dwellings/ha (plus retail and commercial)**
Height	**One to ten storeys**
Architects	**B.I.G.**
Built	**2006-2010**

[Vimeo http://www.vimeo.com/63360155 w=500&h=281]

Across the lake
Tallet 8 crouches by the lake, sphinx-like. Colour is restrained, silvers, greys. Form is complex. The "hill" walkway loops around the courtyards, rises to the height of the building and drops again to the ground. It's both a hill and a hill town; it is built topography. One is aware of a phalanx of balconies pointed towards the water. The motion of people animates the facades.


At the point café
The end of the building drops down to a single storey café. The graphic pattern of the paving is strong, both from ground level and from above.

Looking south to the farmland
The "hill town" looks out to the mottled green-brown plain of Amager Common beyond. House 8 is at the city limits of Copenhagen. Beyond this is farmland. A childcare centre populates the open space at the "waist" of the 8. It is like a Lego sculpture park from above. Kids buzz around the coloured surfaces.
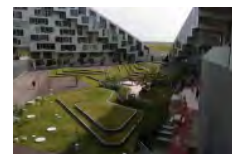
Looking out the opening
The kids have followed the light to the other side of the building. Green platforms throw low shadows.
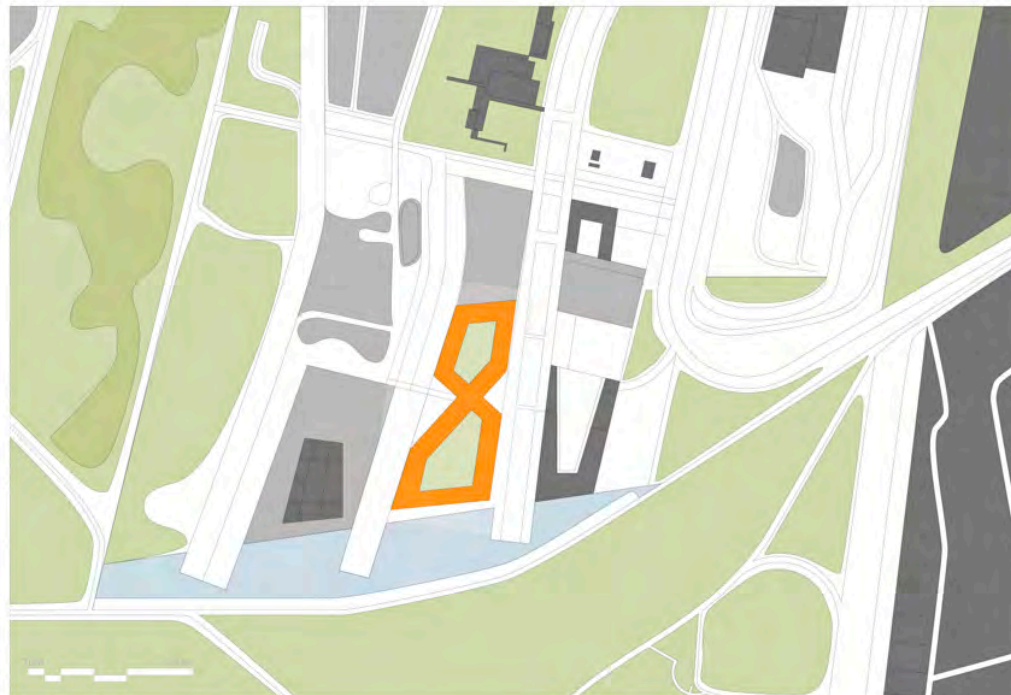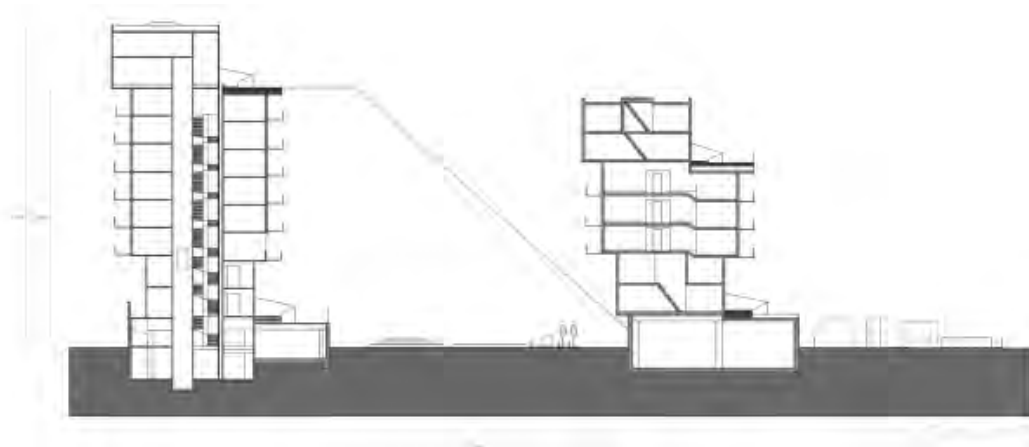
Looking out the opening
The paving is carried up the "hill". Each entry has a timber door and window and a small garden.
Private open spaces are angled towards the view of clouds rolling over the plain.

Back at the lake
Men exercise in the open-air gym while boats skim across the reflected
House 8.

Section and Plan

Why House 8 was chosen
Tallet 8 (House 8) is perhaps the most celebrated housing block since Le Corbusier's Unite d' Habitation of 1947-1956. This building is a celebrity. Bjarke Ingels describing it:

[youtube http://www.youtube.com/watch?v=In9tU2VLbLI&w=420&h=315]

It is an ambitious design on a large scale, which has provoked publicity and debate about housing design.

Urban design
"Tallet 8" or House 8 is in Orestad at the city limits. Copenhagen is a dense and compact city, thus House 8 is only about 12 minutes from Copenhagen Central Station via the new mini metro or about 25 minutes by bicycle. It is also less than 10 minutes train journey to Copenhagen airport and about 30 minutes via train to Malmo in Sweden. Orsetad is a new planned city extension and includes many facilities including a major university.

Urban design
Scale and massing
The building occupies a block 125 metres by 48 metres and is visible from far away.

The two courtyards are squeezed at their join permitting an internal street through the building and the building is manipulated in height from one to eleven storeys optimizing solar access to and views from courtyards and apartments. The building is made up of 476 apartments and 10 000 m² of office space. The apartments are located where they can gain solar access. The office space is connected to the ground and located in the shady parts of the site.

Public and private
House 8 is built to the boundary and there are no street or side setbacks. The access galleries, both courtyards and the perimeter of the building are accessible from the building itself to the public.

Apartment planning
The broad external walkways or "access galleries" ramp gently around the building connecting a series of row apartment. Thomas Cristofferson (the project architect) sees the layout of these row apartments as being ideal for families with young children; "many people in Demark have grown up in row houses with a small street out the front to play with neighbouring kids close to home."

As the access gallery reaches the top of the building it serves penthouse row apartments. Conventional lift lobbies serve other apartments. There are many level accessible apartments in this building.

Open space and landscape
The quiet northern courtyard is surrounded by office space and has less solar access than the southern courtyard.

The southern courtyard is more active and has several circulation routes through it. It is also the setting for the childcare centre.

Just to the south of the building there is extensive farmland through which there are walking and cycling trails. All balconies are protected from the weather by roofs and sidewalls. The front courtyards to the row apartments are walled and incorporate a large planter.

Environmental

Sculpting of the building mass improves solar access as well as views.

All apartments are dual aspect and no more than twelve metres deep, permitting cross ventilation. The artificial lake is part of stormwater system and there is an extensive green roof (mainly planted with red-coloured plants…)

Materials and architectonics

The building is clad in a matt grey aluminium cladding, with a similar cladding in a gold colour at major entries. Some timber is used at apartment entries. Granite with strong grey and white streak is used for ground floor paving. The access galleries are paved in a bold "zebra-stripe" charcoal and white paving.

Shared facilities and services
There are many facilities in the Orestad area accessible by metro or bicycle. While services around House 8 are as yet rather sparse there is much commercial space available for future businesses.

Comments and conclusions
House 8 has also won major international awards. Within Denmark though, it is often criticised as being isolated, without services and the cosy, sheltered, convenient village atmosphere that the Danes value. These criticisms are largely criticisms of Orestad itself. In small "c" conservative Denmark where tradition is honoured, House 8 will be discussed and monitored carefully by architects and the public. The privacy of the heavily glazed apartments and the row apartments in particular will be assessed.

House 8 is an ambitious and exciting development that has achieved for housing the sort of international media exposure usually reserved for "iconic" art museums or Opera Houses. It is an exuberant mix of hill town row house and many apartment types. It is the biggest apartment development in Denmark and it is well connected to the city centre, to the airport and the bridge to Sweden. It may well be big enough and bold enough to create its own success.

Comparative Density table

	Barceloneta	El Born	Piraeus	Hornbaekhus	Tallet 8	Venice	Perugia	Paris
Net Density (dwellings per hectare) "The ratio of the number of dwellings to the area of land they occupy (precinct or a block), including internal public streets and half of the width of adjoining streets that provide access to the dwellings"	350	150	221	138	240	275-300	250-275	225
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Footprint (%)	100%	72%	69%	35%	61%	-	-	-
Rise (Storeys)	4-6	4	4-9	5	1-10	4-6	4-7	4.2:1
Site Area	705m²	6082m²	10550m²	15800m²	15977m²	-	-	72%

Comment on Density

House 8 is a large building containing a substantial amount of office space; if all of this volume was dedicated to housing the density achieved may be about 350 dwellings / hectare,

House 8 is the tallest building I studied for this project; at a maximum of ten storeys it is at the lower limit of the definition of high-rise.

Footnotes:
8 house by BIG // Bjarke Ingels Group // pt 2 Channelbeta. Uploaded on Apr 28, 2009. Youtube. Accessed on 17th May 2013.

http://youtube/In9tU2VLbLI

Biking Down 8-House in Orestad **christinemgrant.** Uploaded on Jun 11, 2011. Youtube. Accessed on 17th May 2013. Youtube
http://www.youtube.com/watch?v=I81ePRs5edk&w=560&h=315]

Windswept house 8
http://youtube/YUlo_YZwvak

Selection Criteria

A range of ancient, twentieth-century and contemporary environments were considered. Venice was chosen; the most beautiful city in the world. Italian hill towns are currently very popular in mid-life travel literature, thus Perugia was selected as an ancient Italian hill town with an important regional and ceremonial role. Barceloneta is a compact and astonishingly dense district in Barcelona. An 18th century building in the El Born district in Barcelona was also chosen. A study of the Hausmannesque Quartier de L'Europ in Paris was undertaken. "Piraeus"; a late 20th century dockside building in Amsterdam was selected as an exemplary large urban project. "Hornbaekhus" an early 20th century vast courtyard block in Copenhagen was selected for its serene nature. And finally, "House 8"; a recent, ambitious and well-publicised block in Copenhagen was selected.

Definitions
Rise

High density is not only new high-rise. Low rise is considered to be three storeys or less., while high-rise is more than eight storeys. All selected projects are **mid-rise**, having an average height of four to eight storeys.
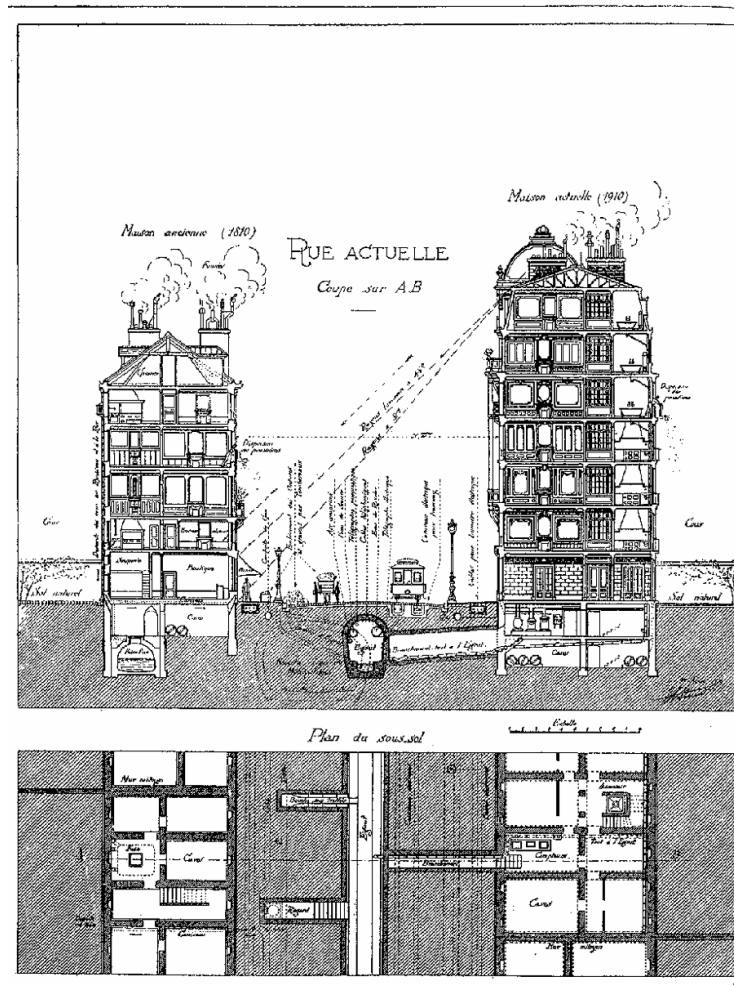
Mid rise in Paris; 1810 and 1910.

FIG. I.

Eugène Hénard, Royal Institute of British Architects, Town Planning Conference London, 10-15 October 1910, *Transactions* (London: The Royal Institute of British Architects, 1911): 345-367

Housing density
Housing density is a relative term for which different units of measurement can be used. I have used the generally accepted unit of measurement **dwellings per hectare**.
The projects selected for this study have densities that significantly exceed 60 dwellings per hectare the lower limit of the definition of **high-density.** This compares with a density for the Australian "quarter acre block" suburbs of 9-15 dwellings per hectare or a typical density for inner Sydney suburbs composed mainly of terrace (or row) houses of 40- 70 dwellings per hectare.
All projects have been measured using the term **net density**; being the ratio of the number of dwellings to the area of land they occupy, including internal streets and courtyards and half of the width of adjoining streets that provide access to the dwellings. **Site density** is also provided; being the ratio of the number of dwellings to the area of land they occupy (site area).

Documentation
Time-lapse photography has been used to show the experience of high-density living. A photographic still image is static and can be controlled, but time-lapse photography shows how a city is used in time, and narrates the story of daily life.

Time-lapse photography first harvests then speeds time up to explain how things work. People respond strongly to still images, and a series of stills make the passing of time appreciable. Lights turning off and on, shadows passing, the grouping and ungrouping of people, loading and unloading; all of these actions read strongly in time-lapse photography. Swift movements of cloud, light and water contrast with the immovability of buildings.

Time-lapse photography abolishes the typical architectural travel mode of passing across a city to see three or four projects. Long European summer days were spent standing next to a clicking camera. I used some of that time to ponder the characteristics of these places and buildings. To consider how they have been formed and why they are such satisfying places to be.

Analysis
I describe what I saw when filming and also what I see in the completed pieces. From this documentation common attributes of the selected environments were noted and analysed. Comparative densities, floor/space ratios and footprints are provided. Plans and sections of critical aspects of the projects have been drawn.

The time-lapse photography for this study shows successful high-density environments; places where one can lead a comfortable, satisfying and meaningful life. I intend that these time-lapse photos of cities and buildings show what density looks like and tell stories of the pleasures of living close together.

These projects show that denser environments have more capacity to enrich social life by bringing amenity, coherence and belonging to more people.

I have studied and made several study tours of housing projects, but I am not an academic. I am an architect living in Sydney and working primarily in residential design and construction. I travelled to experience these places and investigate why they are such great places in which to live.

I intend that this selection of projects and accompanying documentation, analysis and metrics will assist assessment of these places as precedents for new high-density urban projects.

Time-lapse photography encourages viewers to make their own conclusions.

Comments and Conclusions

Population density confers the feeling that one is part of the bigger life of the city and the world. Passing through your neighbourhood gives the opportunity of meeting and being influenced by other people's lives. Well-designed high-density environments enable people to enjoy the benefits of the city. A large population within a defined space can give benefits to all. All selected projects are places that confer identity and belonging to their inhabitants and neighbours and are adjacent to important urban or natural elements.

The densities of the projects selected for this study significantly exceed the figure of **80 dwellings per hectare**, which is commonly agreed to be a lower threshold for high-density. Barceloneta has a density of 349 dwellings per hectare.

All projects are **mid-rise**, having an average height of four to eight storeys. Low rise is considered to be three storeys or less. While high-rise is more than six storeys.

All projects are compact. The entire very dense quarter of Barceloneta sits within the 5 minute, 400 metre walking radius promoted by urban designers.

Density of inhabitants makes the provision of shared services and facilities economical. Of the projects studied, Hornbaekhus has the most facilities; a netted soccer court and basketball court, sandpits, a BBQ area, three playgrounds, pathways for children to ride on, generous bicycle sheds, garden sheds and many different seating areas. There are also basement workshop and storage areas. Buildings like these can create opportunities for **multi-generational family living and flexible work practices.**

High-density environments also offer **quantitative benefits**. They are generally better designed than single houses and maintenance is greatly reduced. Planning and services are more efficient. Time is saved by this efficiency. Travel time to work and to other facilities is reduced.

All of the selected projects have **strong identities**; a spirit of place formed by nature, mankind and **urban design** over centuries or in a just a few years.

The regional, local and detailed urban design of the selected projects has been **continuously managed** and integrated into provincial and national culture. In Perugia a millennium of incremental implementations are evident, and a history of unsuccessful or unpopular buildings being removed and replaced. In contrast, House 8 is only four years old but forms part of Copenhagen's master plan incorporating workplaces, housing, a new Metro and bicycle paths, the airport and the Oresund bridge to Sweden.

All of the projects are shaped by **strong, place-making architecture** of high quality construction. The competition plan for the Orestad quarter of Copenhagen stipulated "the intention to give full artistic freedom to architectural form". During the troubled construction of Piraeus the city of Amsterdam provided additional financial contributions to ensure that the building would be completed to the standard required to anchor this new neighbourhood.

All projects are served but not dominated by contemporary **infrastructure.** The Perugia min-metro is a triumph of carefully sited and appropriate scaled infrastructure tailored to suit the steep and complex site.

Strongly **defined limits**, both natural and man-made, maintain the spirit of place. The walls of Perugia and of Hornbaekhus; the lagoon in Venice and the beach in Barceloneta, the farmland surrounding Perugia and House 8. Limits define the place and physically prevent extension.

Vehicular traffic is controlled and the pedestrian is primary. The most extreme example of this is in Venice where there are no wheeled vehicles. Freight and servicing is by boats only. Barceloneta's narrow streets are effective traffic control. Piraeus has wide promenades that provide ample bike parking, café seating and access to the water but its dockside road is narrow and one-way.

When motor vehicles are not primary, public space can be made of pedestrian components, squares, bridges, ramps and footpaths. Vastly scaled floodlights and signage barriers, speed cameras, bollards and parking meters are absent. **Highway furniture is replaced by street furniture**; human crafted and scaled. Lighting and signage become more intimate and appropriate in scale.

All of the projects are built to the street boundaries and have **zero-lot alignments;** drawing a **clear delineation between public and private space**. Semi private/ semi public spaces are avoided. Once you pass across the boundary of these projects you are in private space. This signals that the interiors are unambiguously private and helps to make the street a public room.

Reduced glazing areas and the **relative opacity** of the studied projects limits overlooking of the public domain by the private, and also limit intrusion of the public upon the private domain. Traditional vertically oriented windows and doors protect the integrity of interior spaces. Small balconies further improve privacy and serve to embellish the façade; but do not occupy the public realm with strictly private elements such as outdoor furniture and other possessions. Thus the **building facades form the walls of the public rooms; the streets and squares**

The density of these projects is contrasted with big **open spaces and landscape** adjacent. Barceloneta bounded by the sea to one side and the calm sheltered harbour on the other, Venice in its lagoon setting, Perugia and Piraeus amongst seas of pasture, El Born adjacent to the vast Parc di Ciutadella and Hornbaekhus with its park-sized courtyard.
High densities can free up land and form a building substantial enough to be placed in significant open spaces and strong enough to shape those spaces.

The design of all apartment buildings studied (with the exception of the building on Carrer Princesa) permit **flexibility of occupation and choice of apartment design.** House 8 and Piraeus offer many apartment types as well as retail and commercial space. Simpler buildings like Hornbaekhus offer retail space and four apartment types while maintaining a very simple and repetitive design. The typical Barceloneta block has shown its adaptability also. **A choice of apartment types allows for people with differing wishes and needs- enabling the building to be a microcosm of the city and not an enclave.**

All projects studied are **mixed use**: incorporating retail or commercial units.

The environmental amenity of all selected projects chosen have potential for good cross ventilation, day-lighting, solar access and visual and acoustic privacy.

Almost all the selected projects have ordered planar walls and are homogenous in materials, typically of brick, with standardised window types and sizes. These walls are more solid than void, glass is minimised and balconies are minimised in extent. These simple walls do not compete for attention; they form the public space and are a backdrop for the life of the street. Simple and repetitive facade elements are accentuated by **architectonics** that emphasizes the flushness of surfaces.

Attention is paid to **detail and decoration** at building entries with rich coloured, textured and hand crafted material used at the parts of the buildings that are touched.

A new euphemism
Perhaps we need a new name for density. So many housing terms are marketing euphemisms; terrace housing is a term for row housing implying landscape qualities. Semi-detached villas could equally be described as attached. Mansion houses for flats and so on. We need a charming new euphemism that describes a rich and complex layering of life and culture. The layered city, the connected city?

Precedents
The projects described in these texts, time-lapses and blog are not intended to be reproduced elsewhere. They are precedents to reflect upon and to refer to.

Super-impositions
- Nonetheless, a vision of Venice in Botany Bay or Brooklyn appeals and instructs.
- Perugia in Katoomba, and Assissi in Byron Bay would be more than sensible.
- The chronic emptiness of the Walsh Bay wharves arts precinct could be animated by a strip of Barceloneta to house the lively essential workers of the city.
- A thoughtful but non-reflective building like Piraeus would fit handsomely into Baranagaroo.
- It would be satisfying if the general fabric of the Sydney were made of buildings as grand and amenable as Hornbaekhus and those of the Carrer Princesa.
- Finally, Sydney loves a Danish icon; and we have surfeit of golf courses on the ocean- so Denmark might make us a beautifully wrapped gift of a House 8 in Christo's Little Bay.

Conclusion
How dense is dense enough? How can we live together and enjoy the daily pleasures of the high-density city?

We need to choose appropriate sites, and look at densities that approach the densities cited in this report. Higher densities, applied locally stimulate and create urban life and commitment must be made to regional, local and detailed urban design to be continuously managed paying attention to the attributes cited above.

The selected projects show that environments of higher densities have more capacity to enrich social life by bringing amenity, coherence and belonging to more people.

I intend that this selection of projects and accompanying documentation, analysis and metrics will assist assessment of these places as precedents for new high-density urban projects.

Time-lapse photography encourages viewers to make their own conclusions.

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