

An Introduction to Urban Housing Design

AT HOME IN THE CITY

Graham Towers



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- 0- In the long term there is a need to reach an equilibrium where energy consumption is in balance with the capacity of the environment. This requires a dramatic reduction of the 'ecological footprint' of the developed world and sustainable development everywhere else.
- 0- Increased demand for housing means that 3.8 million new homes are need in Britain in the first quarter of twenty-first century. Eighty per cent of new households will be single people, many of them young, but with a growing proportion of the elderly.
- 0- Housing demand varies considerably between different areas of Britain. Low demand in the north needs to be countered by regeneration. High demand in the south needs to be tempered by more 'affordable' housing, particularly for key workers.
- 0- To reduce land take, concentrate people in existing cities, and assist their regeneration, a new policy target requires at least 60 per cent of new housing development to be built on previously developed ('brownfield') land.
- 0- To meet both environmental concerns and increased demand, new housing needs to be higher density with its residents less reliant on cars. New communities should be mixed in terms of household size, age groups and social structure, and they should be provided with a high-quality environment.
- 0- Disused industrial sites and buildings provide many opportunities for redevelopment. There are numerous small sites and empty buildings which can be brought into housing use. Studies show there are enough 'brownfield' sites to meet or exceed the 60 per cent target.

2

STANDARDS

DIVIDING THE SPACE

SUMMARY

Environmental and social problems caused by overcrowding in the industrial cities generated reform leading to new standards in housing space and layout. These new standards emerged from a series of official reports and resulted in high internal space standards and increased levels of self-containment. These were, however, designed for individual houses rather than flats. Design standards for multi-storey housing now needed re-assessment. At the same time, there was a concern to drive down densities which resulted in the housing sprawl of the last 80 years. A new emphasis on higher densities needs a better understanding of the implications. The measurement of density causes considerable confusion. Both the units of measurement and the land areas to which they apply vary considerably and need clarification. A number of factors can affect density: levels of occupancy are important, as is child density; intensity of use can have an impact in determining the success of housing schemes. Alongside confusion about the measurement of density there is also misunderstanding of the form which high-density housing takes. Commonly it is associated with tower blocks. This is largely a misconception – many familiar forms of housing can be built at relatively high densities. Finally, high densities have important benefits in generating a wider range of services and facilities, and improving access to them.

THE DRIVE TO RAISE STANDARDS

The concerns about housing and health which arose during the nineteenth century were critical in bringing about the regulation of house construction and planning. But the general aversion to life in the industrial cities was to prove instrumental in shaping urban development for much of the last 100 years. Better construction might have solved the problems caused by dampness and poor ventilation but better building alone

did not address the issue of overcrowding. People had flocked to work in the new factories spawned by the industrial revolution at a rate which made it impossible to provide places for them to live in. Existing housing quickly became heavily overpopulated. As new housing was built this, too, rapidly became overcrowded.

This new housing took various forms. In the new industrial cities, which grew rapidly in the Midlands and the North, it was poorly built 'back-to-back' houses. These would be two- or three-storeys high with a single-small room on each floor. Sometimes there would be a cellar room separately entered and occupied. The houses were huddled close together in courts – cramped inside and outside with several families sharing a common toilet. In Scotland it was the tenements. Built as self-contained flats they were let and sub-let, each 'made down' to provide lodgings for several families. In London and some other cities, speculators built generous houses designed for prosperous families with servants. Many of these were never sold but were let in multiple occupation. In each house several families occupied the living space and shared communal facilities.

The masses of people packed together stigmatised the Victorian cities and created housing stress which, in many areas, was to persist well into the second half of the twentieth century. Such conditions were a major stimulus for reform, which then drove up standards on two-related fronts. One was the effort to improve conditions within dwellings by increasing living space and more self-containment to reduce the need to share facilities. The other was to reduce overcrowding by lowering population densities.

Official reports on housing standards

A key concern over conditions in the industrial cities was the low standards endured by many urban dwellers. Whole families would commonly occupy a single room and share inadequate cooking and toilet facilities with many others. Even in the early philanthropic housing, where standards and management were generally good, kitchens and bathrooms were commonly shared. The main focus – and achievement – of housing reform in the twentieth century was to move from this situation to one in which almost every household has a self-contained dwelling designed to good space standards.

The mechanism for progress was a series of influential reports on housing standards. The Tudor Walters Report of 1918¹ was the first official intervention to improve new housing. Generous space standards for new houses were set. Separate living rooms and kitchens were recommended, together with a bath and an integrated toilet for each house. Layout was

Table 2.1 1944 Housing Manual. Minimum room areas

	Minimum room area (square metres)
<i>The kitchen-living room house</i>	
Kitchen-living room	16.7
Sitting room	10.2
Scullery	4.7
<i>The working kitchen house</i>	
Living room separate dining space	16.7
Living room plus dining space	21.0
Working kitchen	8.4
<i>The dining-kitchen house</i>	
Living room	14.9
Dining kitchen	10.2
<i>Bedrooms</i>	
First bedroom	12.5
Other double bedrooms	10.2
Single bedroom	6.5

to be open and spacious allowing the penetration of sunlight and fresh air.² These recommendations were for new social housing but they set the pattern for all new housing for the next 20 years.

The Tudor Walters Report established the goal of a generous self-contained house for each family. This was followed by the Dudley Report of 1944 which spawned new Housing Manuals of 1944 and 1949 to give guidance on housing design.³ The report identified three types of homes which varied according to the use made of the kitchen. In the first, the kitchen was also used as the living room with a separate sitting room – an arrangement which was common at that time. The other two types were homes with a separate dining room or with a dining kitchen. Standards were set for the sizes of rooms in each type of dwelling (see Table 2.1). Though the breakdown of space is out of kilter with modern living patterns, these standards are still a useful guide to appropriate room sizes.

The third, and last, of the official housing studies was the Parker Morris Report of 1961.⁴ This addressed changes in living patterns, particularly new expectations in the standard of heating, the greater use of electrical appliances and higher car ownership. In contrast to the earlier reports, it recognised that housing needed to accommodate a variety of living patterns. Rather than set room sizes, Parker Morris established standards

Table 2.2 Parker Morris Report 1961. Minimum dwelling areas

	Minimum dwelling size (square metres)	
	Flats and single-storey houses	Two-storey houses and maisonettes
1 person	30.0	
2 person	44.5	
3 person	57.0	
4 person	67.0	72.0
5 person	75.5	82.0
6 person	84.0	92.5
7 person		108.0

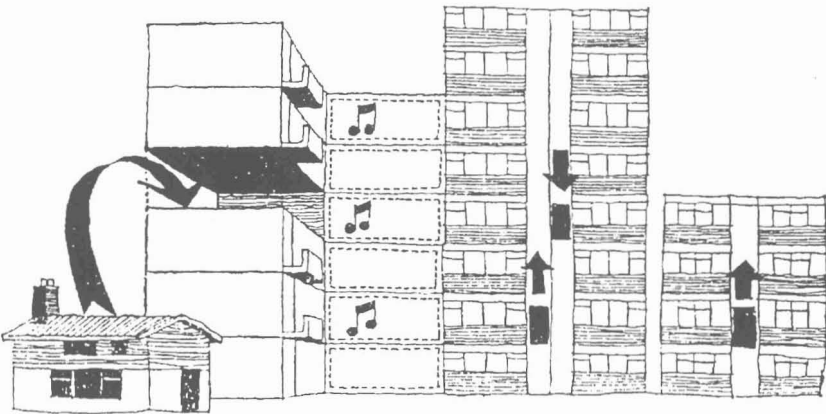
In addition, all types are entitled to storage space of 3.0–6.5 square metres.

for the overall size of dwellings for different households. This allowed greater flexibility and choice in the planning of new homes (Table 2.2). These standards were subsequently made mandatory for all new social housing. The report was accompanied by a design bulletin – *Space in the Homes*.⁵ This took a terraced town house with integral garage as a model home. Taking each room in turn it established notional patterns for furniture and circulation space. The clear guidance it gave to good internal planning made *Space in the Home* the housing designers’ bible. This first bulletin was later supplemented by detailed guides for the layout of kitchens and bathrooms.⁶

Standards for flats

In the main, the official reports were primarily concerned with setting standards for houses rather than multi-storey dwellings. They generally recommended that space and equipment standards in flats should be the same as in houses of an equivalent size. The 1949 Housing Manual does, however, consider flats at some length. Model layouts were given and the planning of blocks discussed, including such issues are access systems, means of escape, refuse provision and sound insulation. The following recommendations were made:

- Lifts are necessary in all blocks of flats or maisonettes where the entrance to the top dwelling is three or more storeys above the ground floor level.
- Each flat should have a deep balcony on the sunny side at least partly recessed and accessible from the living room or kitchen.
- Communal gardens should be provided and made accessible to tenants of upper floor flats and maisonettes.⁷



▲ 2.1 The Parker Morris Report regarded flats as stacked-up houses

While they were not always followed, these recommendations set high standards for the design of flats in the 1950s.

However, the Parker Morris Report was a step backward. Flats were barely mentioned. The planning of blocks and the provision of outdoor space was not discussed. As the illustration shows the report effectively regarded flats as stacked-up houses (Figure 2.1). The new space standards, together with a requirement for a minimum of one car space per dwelling, became mandatory for houses and flats alike. This had some severe consequences for multi-storey flats. The high standards of space and facilities for flat interiors were rigidly enforced, which meant that economies were increasingly sought elsewhere. Communal facilities, essential to good-quality multi-storey housing, were often omitted. The design and quality of the access systems became poorer, with lifts, stairs and walkways being made to serve more and more flats. The lack of control of these public spaces and the large numbers of people using them led to abuse and degradation, which did more than anything to stigmatise multi-storey housing. The mandatory imposition of 100 per cent car parking in inner city areas also had unfortunate consequences. Public transport was good in these areas and car ownership low. The result was the extensive construction of underground and multi-storey car parks which were largely redundant from the start.⁸

In the past, there has been insufficient recognition that flats are not simply stacked-up houses. However, living off the ground has certain advantages and can be successful. If appropriate lessons can be learned from the mistakes of the past and re-applied, more careful consideration of the design of multi-storey blocks can ensure that success.

The decline of standards

Parker Morris standards were a high point in housing quality; at least as far as internal standards were concerned. But they only ever applied to social housing. Space standards of many private developments were often lower. In 1988 the mandatory application of Parker Morris standards to new social housing was abandoned. Under a more stringent funding regime housing associations were often obliged to adopt lower standards for their new developments. A reduction in standards may seem regrettable, and it may impact badly on some households, particularly large families. On its own, though, a modest reduction in space standards may not be of critical importance. The greater problem, perhaps, was the sharing of kitchens and bathrooms and it may be more important to maintain the principle of separate and self-contained dwellings.

A review of standards may well be due in the context of changing lifestyles. Now that there is increased demand for single-person dwellings, new forms are emerging, such as foyers and rented blocks for young singles. So is the concept of the 'micro-flat'. This is a new type of single-room dwelling designed as a starter home for single people. Taking full advantage of the miniaturisation of furniture and equipment, its single space can quickly be adapted for living, eating or sleeping and even provides a small balcony. At 29 square metres it is only slightly below the Parker Morris dimensions but its efficient organisation may make it a useful innovation.⁹

Space standards were particularly influential in eliminating the overcrowding of shared houses of the past. The actual size of self-contained dwellings, though, has limited impact on the quality of housing developments. What can have more influence is the level of ancillary facilities. On the negative side, car parking provision, if set too high, can use up large amounts of ground area or built space. More positively, good standards of outdoor space, both public and private, and high levels of community facilities can greatly improve the quality of urban housing.

CHANGING ATTITUDES TO HOUSING DENSITY

Alongside space standards housing reformers of the twentieth century considered density to be a critical factor. There was a conscious drive to reduce the density of new development as a counterweight to the crowded conditions in the old cities. In the Tudor Walters Report¹ a *maximum* density of 12 houses per acre (30 per hectare) was laid down for building in towns. In the 1940s a series of plans was produced for the development of large cities. These tackled the problem of overcrowding

by moving people out into new overspill development and setting density standards for new housing. Patrick Abercrombie's plans for London and Glasgow were particularly influential. These set up New Towns to take people from the inner cities, and a hierarchy of maximum densities for new development. In London these were 200 people per acre at the centre (450 people per hectare); 136 people per acre in the inner areas (340 per hectare); descending through 100 people per acre (250 per hectare) and 75 people per acre (188 per hectare) to 50 people per acre (125 per hectare) at the periphery. This last was the maximum density in suburban areas and is even lower, at about 10 houses per acre (25 houses per hectare) than that set by Tudor Walters.

The aim of these measures was to drive down densities. New development in outer urban areas would be at relatively low densities. The overcrowded and discredited courts, terraces and tenements in the inner cities were redeveloped. But the stigma was not removed. Much of the old housing was replaced by new housing estates built by local authorities. These were built at lower densities than the housing they replaced but they quickly developed social and management problems. The opprobrium which had attached to old high-density urban housing was quickly transferred to the towers and slabs of the new estates. As a result, planning authorities have continued to seek solutions in lower densities, even in urban areas, and set maximum limits on the density of new development. If we are now to move to an era of increasing urban population a better understanding is needed of the implications of housing density.

Defining density

As may already be apparent, one of the key confusions is the way in which housing density is measured. Essentially, density is a measure of the number of people living on a given land area. This may be a large or small area. It can be an entire country, a region, a town or a major part of a city. When applied to an urban area the population is divided by the land area, measured over all land uses, to calculate what is called *Development density* (also known as 'town' or 'district' density). These large-scale measures are used in international or regional comparisons and are factors in determining the distribution of industry or the location of major developments such as airports, shopping centres or sports stadia. At the smaller scale, density may measure the population of a neighbourhood or an individual estate or development. At this level the measurement of housing density becomes important and this determines the demand for services essential to the residential environment.

There are two common measures of housing density – *gross residential density* measures the population of any area which consists predominantly of housing; and *net residential density* measures the population of a site exclusively devoted to housing. A government publication produced in parallel with Planning Policy Guidance Note No. 3 (PPG3) helps to define the difference between these two measures:¹⁰

- 1 **Net residential density** includes, as well as the area occupied by the housing itself, any services and facilities for its immediate benefit – private gardens, communal gardens, children's play area and incidental open space. It includes parking spaces, access roads within the site and half the width of surrounding roads. Small-scale facilities such as a few local shops or a community centre may also be included.
- 2 **Gross residential density** (or neighbourhood density) includes, in addition to the above, open spaces serving a wider area and other landscaped areas: primary schools; local health centres; distributor road and transport networks; and small-scale employment, services and mixed use. It does not normally include large industrial and commercial areas or major roads and transport interchanges.

Net residential density is the key measure used in calculating the housing capacity of a development site and in planning the housing that will be built on it. Gross residential density can become important. In a mixed-use area the gross density may be much lower than the net residential density. This could threaten the viability of a good public transport system or other key communal services such as schools and health centres. Defining the area over which housing density is to be measured is relatively straightforward when considering an individual site. For wider areas there may be considerable variation as to what is included, making cross comparisons difficult. These difficulties are made more complex by the range of different units used in measuring density.

For density measurement the land area is measured on a level plane with no account made of sloping or hilly land. What complicates the measurement is the units used. The traditional unit of land measurement in Britain was the acre and this is still used in some countries. With metrication, the hectare is now the standard unit of measurement which brings Britain into line with Europe. Densities measured in acres must now be translated. Accurate translation at 2.47 acres per hectare can produce some very unwieldy figures so, commonly, an approximate equivalent of 2.5 acres per Hectare is used. The need for translation complicates comparison between old and new density standards and between countries using different units. However, this complication is insignificant when compared with complications in the measurement of people.

While the aim of density measurement is to find the numbers of people living in an area, there are no less than four different measures in use, none of which directly totals the numbers of people. These are:

- 1 **Dwellings per hectare/acre.** This simply measures the number of houses or flats. It has been the main measure since density standards began. However, dwelling sizes can vary considerably and this is a poor guide to the number of people, particularly in high-density housing.
- 2 **Bedspaces per hectare/acre.** This is simply measured by totalling single and double bedrooms which can usually be readily identified on design drawings. It was the common measure of density in the 1960s and 1970s. Measuring bedspaces is an accurate guide to the number of people any particular development can house.
- 3 **Habitable rooms per hectare/acre.** This totals habitable rooms in each dwelling which includes living rooms and bedrooms. It does not include kitchens but does include dining-kitchens and is thus open to misinterpretation. This measure was used in the post-war period and has recently been re-introduced. It is supposed to approximate to people but is, in fact, a fairly inaccurate measure.
- 4 **Housing floorspace per hectare/acre.** This is a relatively straightforward and unambiguous measure. It is used in parts of continental Europe but not normally in Britain. It would not be helpful in measuring numbers of people.

It is regrettable that the most useful of these measures – bedspaces – seems to have fallen into disuse. Most publications now give densities in dwelling units and habitable rooms. It is useful to compare these three. Dwellings are a useful measure when considering individual houses. A typical house has five bedspaces and five habitable rooms which makes comparisons simple. However, it is less useful when applied to mixed schemes where dwelling sizes may vary considerably. To cover this difficulty it is common to apply a ratio of four bedspaces per dwelling. Even this approximation may be misleading when dealing with high-density housing. A study for the London Housing Federation looked at eight high-density social housing schemes. The number of bedspaces per dwelling in the schemes ranged from just under two to just over 3.5. In the same study the number of bedspaces per habitable room ranged from 0.85 to 1.3.¹¹ These figures are considerably at odds with the approximations of four bedspaces per dwelling and one bedspace per habitable room.

It is these variations from one type of housing to another which make the measurement of housing density hazardous. Dwelling units per hectare is a useful yardstick, but in applying it to high-density housing it must be

supplemented by other measures – most usefully by a count of bedspaces. Knowing the potential population of a housing development is a valuable measure of density. However, the actual number of people living in an area will vary considerably depending in the way housing is designed and used.

Occupancy and use

The levels of occupancy and intensity of use can have a significant impact both on the quality of life in urban housing and the density of population. Density calculations in bedspaces per hectare are a measure of the housing 'capacity' of a given area. But once the housing is built it may be occupied to a higher or lower level. It is commonly assumed that most housing is under-occupied and that most households have one or more spare bedrooms. In translating housing capacity into population an assumption needs to be made about occupancy levels which some studies have taken to be as low as 60 per cent.¹² Generally, the levels of occupancy tend to be higher in new communities. Social housing is usually let, initially, at levels equal to housing capacity. In the private sector, too, financial constraints tend to ensure that newly acquired housing is likely to be fully occupied. As communities mature household structures change and finances ease. The spare bedroom becomes more common.

Levels of occupancy in social housing, however, tend to be higher, particularly in areas of high demand. Housing that is fully used when first let becomes over-occupied as families grow, and the shortage of alternative accommodation makes it difficult to match households to housing capacity. For instance, the levels of overcrowding in local authority housing are high in some parts of London; this is indicated by the large numbers of households on transfer lists, most of whom want larger accommodation. Conversely, overcrowding seems less problematic in housing association stock. Figures for lettings in inner London showed that only 2.3 per cent were overcrowded. While 83.4 per cent matched housing capacity, 14 per cent had spare space.¹³

Levels of occupancy can affect both the quality of life and the provision of services and facilities in an area. Levels of occupation which are too high can cause family strife which can spill out into the public realm. A degree of spare space in each home is a useful safeguard against housing stress and the problems it often causes for urban management. On the other hand, significant under-occupation can cause the population density of an area to fall to a level where some communal services become unsustainable.

The level of child density is now recognised as a key issue in how the intensity of occupation and use can affect the quality of life in a housing

development. The association between concentrations of children aged 6–16, and high levels of vandalism was first identified in a seminal study of the 1970s.¹⁴ Since then there have been widespread incidences of gang culture developing on estates with large numbers of teenagers. At the same time statistics show that a high proportion of petty crime is committed by a small proportion of young men. While not all this is necessarily the result of high child densities, there is evidence that this does lead to a pattern of escalating antisocial behaviour.

The *Capital Gains* study of inner London housing estates found that the most successful high-density schemes had low child densities. The report recommended that the proportion of children (aged 0–18) should not rise above the range 35–45 per cent of total population and that '...preferably ratios should not rise beyond 25 per cent'.¹⁵ While it is important to keep numbers of children relatively low it is also important to make sure they are well provided for. Good provision of open spaces, play areas and community buildings for organised activities, are necessary for the well-being of children. But they also help to channel energies and counter misbehaviour.

One final factor affecting housing density is the amount of use people make of their homes. In an area populated largely by professional households without children most people will be out at work all day. They may well be out during the evenings and away at weekends. The area will not feel heavily populated and will not be intensively used. On the other hand, in an area which houses large numbers of children and/or high numbers of people who are not employed, more people will spend a lot of time at home and there will be much more daytime activity. Figures from the National Housing Federation show that in housing association estates almost 65 per cent of households were headed by someone not employed.¹⁶ The same is true of areas where significant numbers of people are employed or working at home. It can be argued that a true measure of housing density should include the numbers of people employed in the area.

A greater intensity of use has both positive and negative aspects. It generates higher use of local shops and communal services such as libraries and sports centres. This, on its own, involves significant levels of social interaction. On the other hand, it puts higher demands on the environment. Common areas will be more heavily used and suffer more wear and tear. Public spaces will be more subject to damage, both accidental and deliberate. There will be more dropped litter and more noise. All these things put higher demands on the management of housing and the urban environment. Therefore, in assessing the quality of a residential area

measuring the housing density is only a starting point. The levels of occupancy and activity are important as is the intensity with which the area is used.

DENSITY AND HOUSING FORM

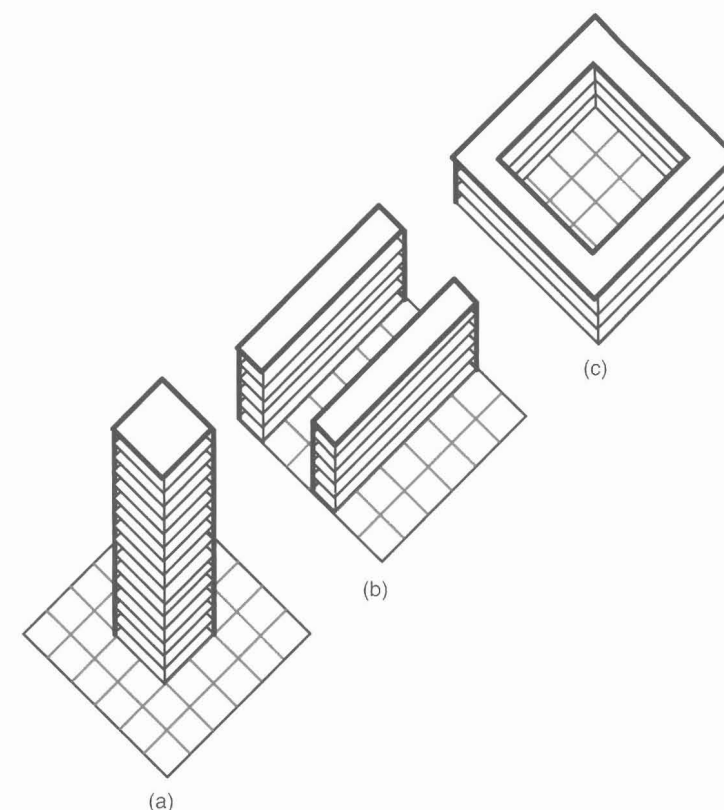
A key area of confusion is the common association of 'high density' with 'high rise'. This is partly an elementary word association. But it is also due to the continuing poor reputation of the multi-storey estates built in Britain's inner cities in the 1960s and 1970s. Many of these comprised high-rise tower and slab blocks. Many of the later ones were not so high but composed of warrens of blocks linked by labyrinthine access systems. The social problems evident on many estates, coupled with their run down and abused common areas and the poor surrounding environment, made these forms of high-rise housing understandably repellent. It is a mistake, though to confuse them with high density.

Many of the multi-storey estates were built at relatively low densities. Most of the multi-storey estates in inner London were built at the standard zoned density of 136 people per acre (340 per hectare). The tower blocks in Glasgow, which are numerous, were built at a density of 100 people per acre (250 per hectare). Such densities were the same or lower than the Georgian terraces of London or the prosperous middle-class tenements of Glasgow. The difference lies in the way these different building forms related to the space they were built upon.

Basic forms of urban development

In 1972 Leslie Martin and Lionel March published a cogent analysis of the key forms of urban development. They postulated that on any given site development can take three basic forms which they called 'pavilion', 'street' and 'patio'.¹⁷ These forms cover different proportions of the ground area. If developed with buildings of the same height and depth the pavilion form would provide the lowest density and the patio form the highest. On the other hand, constructing a given amount of floorspace would need buildings of different height depending on which form they took. Figure 2.2 illustrates this principle. It shows that the same amount of floorspace could be built on the same site as a fifteen-storey tower block, five-storey linear blocks or a three-storey perimeter block.

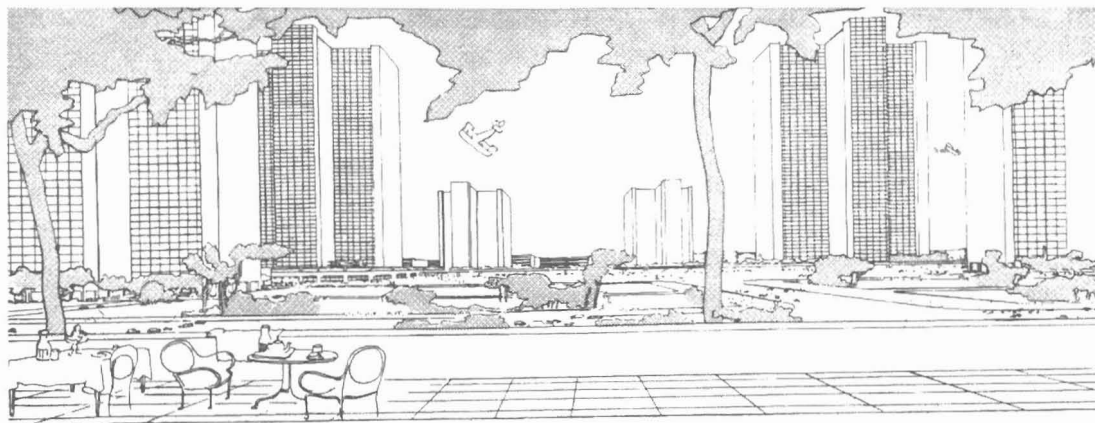
These basic forms correspond to traditional types of housing. The pavilion corresponds to the detached house set in generous grounds; the linear form to the traditional street; while the perimeter block takes the form of urban blocks in continental cities and in Scotland; these higher-density



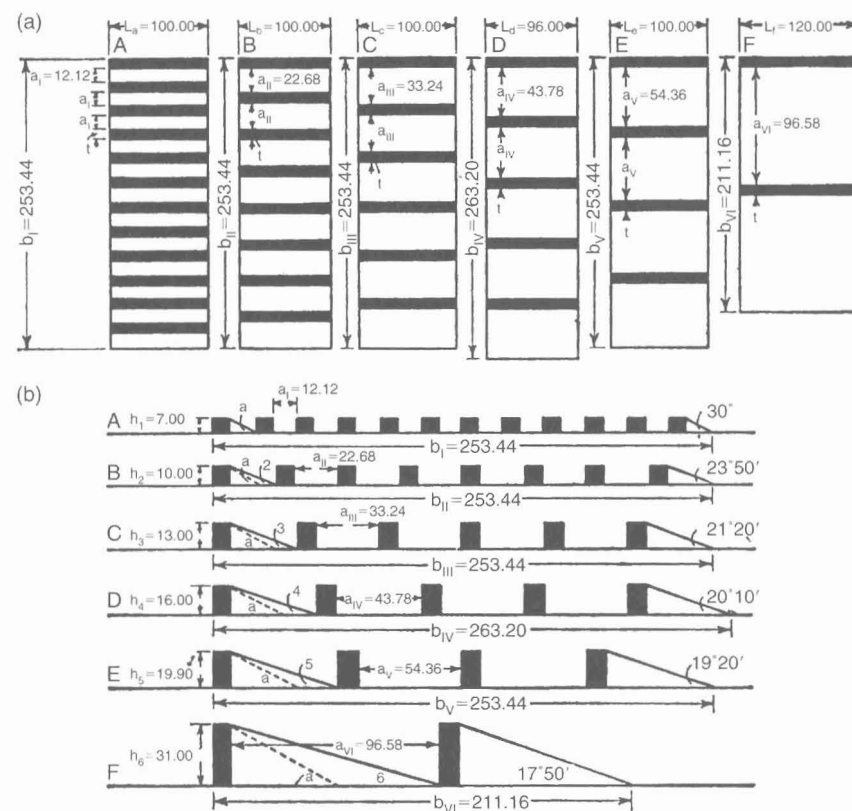
▲ 2.2 Basic forms of urban development. The same amount of floor-space built as 'pavilion', 'street' and 'patio' forms

traditional forms were objectionable to reformers because of the high proportion of land they covered. In Britain, the Garden City pioneers regarded terraced housing as cramped and dark. They preferred small blocks of houses more generously spaced – a version of the pavilion type of development.

The Modern Movement similarly objected to the layout of the continental urban blocks with their deep plans and dark internal courts. They consciously sought housing types which would provide more light and air and which would release more of the ground as open space. Le Corbusier worked up several ideas for cities composed of huge tower blocks set in parkland, including *La Ville Radieuse* and a plan for the redevelopment of a large area of central Paris (Figure 2.3). Walter Gropius investigated linear blocks (Figure 2.4). He calculated that eight-storey slab blocks provided optimum conditions of fresh air, sun, views and distance from neighbours. These blocks would best be orientated east/west in parallel rows – a formation known *zielenbau*.



▲ 2.3 La Ville Contemporaine – Le Corbusier's vision for a city of towers



▲ 2.4 Walter Gropius' analysis of slab block layout to maximise sunlight and daylight

These concepts were highly influential and formed the basis for the design of many of the multi-storey housing estates built in the latter part of the twentieth century. Estate composed of tower and slab blocks did free up more open space, though most of it was ineffectively used. The tall buildings did not provide successful housing particularly for families with children. The plethora of problems associated with them gave high rise a bad reputation. But they were, essentially, a large-scale re-interpretation of the 'pavilion' form. The twentieth century search for openness, light and air ended; on the one hand in the suburban house and on the other in the tower block estate. The search for successful urban housing must look to the basic forms which are inherently high density.

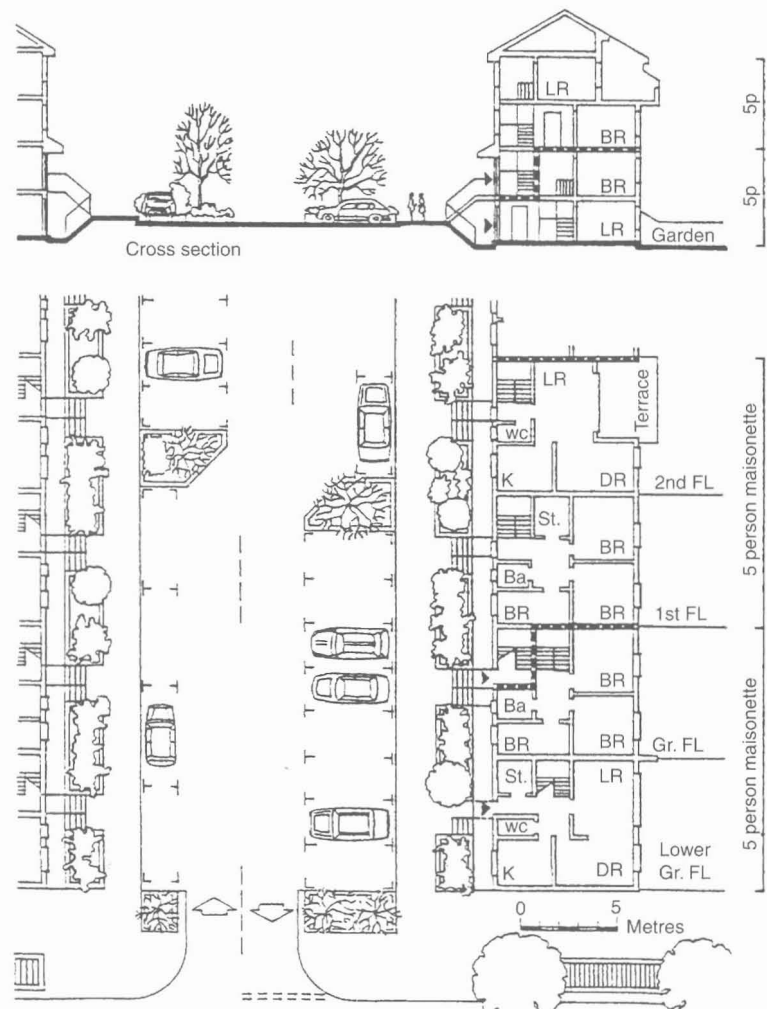
Higher densities with modest forms

Most multi-storey estates were built at a density of 340 persons per hectare or less and yet they did not succeed in providing satisfactory forms of housing. Harley Sherlock, an architect with long experience of urban housing design, turned to the traditional street for comparison:

...let us look at the Victorian street pattern typical of inner London. We find that it is made up of houses three storeys in height, with two-storey back additions and back gardens on plots about 25 metres deep and 5 metres wide. Goodness knows how many people such buildings might have housed in the past, in overcrowded and unsanitary conditions but, rehabilitated, each building could comfortably accommodate a four-person dwelling on the lower two floors (using the basement entrance) and a two-person dwelling on the top floor (using the original front door). The existing back addition would provide a kitchen and bathroom for each dwelling and the road could be adapted on a pedestrian priority basis to provide one car parking space for every two dwellings.¹⁸

Sherlock calculated the density of such housing which works out at 385 bedspaces per hectare (129 dwellings per hectare). So the modest three-storey Victorian terraced house is capable of providing densities which are substantially above those of multi-storey estates and more than twice as high as the new density recommendations of PPG3. Many such houses in the inner cities have been modernised and converted in this manner and now provide successful and valued homes both for tenants and owner-occupiers.

Based on his studies of older terraces, Harley Sherlock devised a notional form for new housing. This is shown in Figure 2.5. It is based on four-storey buildings spaced slightly further apart than the three-storey terraces described above. This allows more open space and wider streets



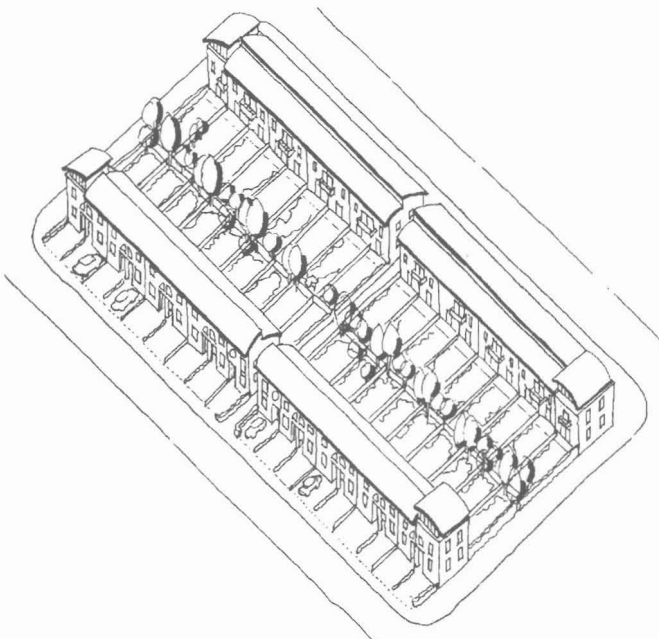
▲ 2.5 Harley Sherlock's model for high-density housing at modest scale

which can provide one parking space per dwelling. The model provides two family maisonettes, each entered separately. The lower maisonette has a private garden and the upper one a generous terrace. It could equally well be planned as a maisonette topped by two flats which might better suit the pattern of demand expected in the future. The density of such housing would be approximately 400 bedspaces per hectare – equivalent to 90–135 dwellings per hectare depending on the size mix. At this level it would exceed the maximum density standards in force until recently, and would not have previously been permitted. In the changing climate it provides a model for the future based on proven success.

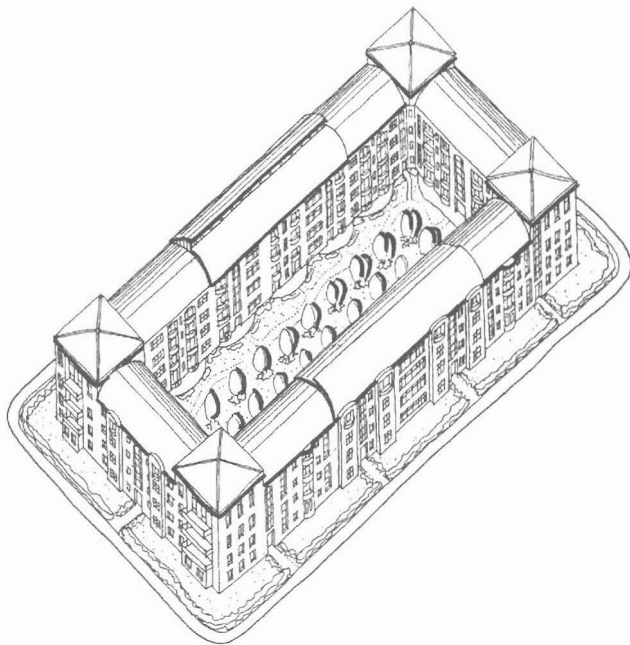
A range of options

A major study was carried out by consultants Llewelyn Davies on types of housing suitable for redevelopment sites in London.¹⁹ This gives a good indication of the densities which different forms of housing can achieve. The housing forms fell into three basic types:

- 1 **Detached and semi-detached houses.** These are the predominant types of housing in most developments of the recent past. The densities of this form of housing generally fell in the range 10–20 dwellings per hectare though tightly planned semi-detached houses could reach 30 per hectare – the threshold of PPG3 standards.
- 2 **Terraced houses.** These are capable of significantly higher densities. Even generous terraced houses with a wide frontage of 8 metres and large gardens could achieve a density of 44 dwellings per hectare. More commonly, terraced houses have a frontage of about 5 metres. Even with integral car parking, two-storey terraced housing of this type can achieve densities of well over 50 units per hectare (see Figure 2.6).
- 3 **Flats.** Flats can be built at much higher densities. Modest blocks of four-storey flats set in their own grounds can be built at 67 units per hectare. Four-storey flats in perimeter block form, with on-street



▲ 2.6 Two-storey terraced houses at a density of 53 units per hectare



▲ 2.7 Four-storey flats in perimeter block layout at a density of 155 units per hectare

car parking, can achieve densities of 155 dwellings per hectare (see Figure 2.7). Flats in this form can be built up to eight or nine storeys and at very high densities of over 400 units per hectare.

The study looked at a range of urban and suburban locations with variable access to public transport. It suggested suitable densities for each starting with 30–50 units per hectare for the more remote sites. This could be achieved with a mix of house types with some small blocks of flats. Urban sites with good public transport could be developed at densities from 50 to over 200 units per hectare. This would mean a mixture of terraced houses and flats – the housing forms which characterise many inner city areas. Sites in central areas, on waterfronts or surrounding open spaces were considered suitable for large blocks of flats at densities from 240 to 435 units per hectare (refer to Case Studies A and B for examples of high-density social housing, and high-density commercial housing).

THE ADVANTAGES OF HIGH DENSITY

The key concern which lay behind the setting up of the Urban Task Force and subsequent policy changes was the large amount of land which would

be taken by the new housing required to meet greatly increased household formation. Reducing land take became the main motivation for seeking higher densities and this is an objective which is relatively easy to achieve. As land take diminishes progressively as densities rise, the greatest savings can be achieved with relatively modest increases. It has been estimated that an increase in density from 24 to 40 dwellings per hectare saves ten times as much land as an increase from 160 to 220.²⁰ While the land saving threshold can be crossed with relatively modest increases in density, there are advantages to be gained by building to considerably higher densities. Many of these are central to the other key policy objective – reducing carbon dioxide emissions.

The advantages of high-densities fall broadly into three areas:

- 1 **Economic.** Essentially, high-density areas are easier to service. The cost of providing infrastructure services such as gas, electricity, water and sewage disposal progressively reduces as more and more homes can be served by each kilometre of pipeline. The same applies to the distribution of food and other goods. These can more easily be distributed to large concentrations of population. Perhaps the most significant economic benefit is the more efficient transport systems which can be developed in high-density areas.
- 2 **Environmental.** Greater economic efficiencies have environmental benefits. More efficient transport and distribution uses less energy. High-density housing is inherently more energy efficient. In terraced houses and multi-storey blocks dwellings are joined together and provide mutual insulation which means that less energy is used in heating. This reduction in energy consumption causes less pollution. This not only means lower carbon dioxide emissions, it also produces improved air quality.
- 3 **Social.** Larger concentrations of people create greater demand for communal facilities. A larger number of customers makes more services viable and means that a more diverse range of minority requirements can be met. High-density areas often have a wide range of shops serving both general and specialised needs and a good choice of leisure facilities from cinemas and restaurants to sports clubs and swimming pools. They also have large numbers of social and community organisations through which people can become involved in child centred activities, services for the elderly, or political and environmental campaigns.

Of course there are disadvantages, too, not least the higher cost of urban management necessary to make high-density urban areas function well. But this is a price which must be paid to gain the considerable economic

Case Study A (p. 209)
Case Study B (p. 215)

and environmental advantages. The greatest of these is, perhaps, the possibility of more efficient transport systems.

More efficient transport

People living in high-density urban areas travel less than those in smaller settlements – estimated at between 30 per cent and 50 per cent fewer miles each week. This is important in the context of an overall increase in travel of 33 per cent between the 1970s and the 1990s and the need to reduce greenhouse gas emissions.²¹ Equally important is that high densities make more efficient transport possible. People in low-density areas are highly dependent on the motor car for transport. Hardly anything is within walking distance and bus services are few and far between. As densities increase more effective public transport becomes viable.

The Local Government Management Board estimates that a density of 100 people per hectare is necessary to support a viable bus service – that is one which is frequent, reliable and low cost. This is a gross figure and would translate into a net density of 200–330 people per hectare or 50–100 dwellings per hectare depending on size and occupancy. This is at the margin of the higher densities recommended by PPG3. Even higher densities would be needed to support a tram system – 240 people per hectare gross, 480–550 net or 120–250 dwellings per hectare.²² The existence of good public transport means greater efficiency in fuel use and significant reductions in the use of cars. But the transport advantages of higher densities do not end there.

It is estimated that people will walk up to one and a quarter miles reasonably happily, although half a mile – a 10 minute walk – is a more comfortable distance.²³ In high-density areas many more preferred destinations are within reasonable walking distance. Cycling also becomes more viable. Many people will happily cycle a distance of 3–5 miles and this puts a great many more destinations within reach. Travelling smaller distances does not, then, mean visiting fewer people or places – and many more of these journeys can be completed with little or no consumption of fossil fuels.

A cultural divide

The move to higher housing densities is necessary to both reduce land take and preserve more of the open countryside, and to meet international agreements on the reduction of harmful gas emissions. Higher densities do have clear advantages in meeting these objectives and they also generate economic savings and efficiencies. But between one form of living and the other there is a clear cultural divide.

Someone living in a low-density development typical of most built during the past 40 years will probably live in a detached or semi-detached house with a reasonably large garden. They will probably work a long way away, often 30 miles or more. This will entail a long drive on increasingly congested roads, or a long-time standing in a crowded train. Evening and weekend leisure and shopping trips will also involve driving, though not so far, and there is the compensation that countryside walks and amenities are within relatively easy travel distance.

The urban dweller will live in a terraced house or a flat. He or she may have a small garden or a balcony but will probably have a small park within a short walk and a substantial one a little further away. The workplace will probably be reasonably close, usually less than 4 or 5 miles away. The journey will involve a walk or cycle ride or walking to a bus stop or train station. The train may well be crowded, but the journey will be mercifully short. At evenings and weekends there is a good choice of shops and other facilities within a short walk, and restaurants, clubs and theatres a short ride away. If high-density development is to succeed more people will have to choose this side of the divide.

KEY POINTS

- 0- The development of improved housing standards through a series of official reports during the twentieth century resulted in most people being housed in self-contained accommodation with high standards of space and facilities.
- 0- The misapplication of standards designed for houses to multi-storey flats was the root of many of the problems which led to deterioration and stigmatisation of multi-storey estates. Standards for flats need to be reviewed in the light of new demand from small households.
- 0- For much of the twentieth century it was an aim of public policy to reduce housing densities. Now that aim has been reversed. The measurement of density is complicated and has been much misunderstood. Clearer definitions and a common method of measurement are needed.
- 0- Density calculations can establish the notional housing capacity of a site. The impact of new development will also be affected by levels of occupancy and the intensity with which it is used, including the number of people employed. Child density can also be a significant factor.
- 0- 'High density' is not the same as 'high rise'. Multi-storey housing forms were developed by the Modern Movement primarily to improve

standards of light, air and communal open space. As built they are often lower density than traditional urban streets.

- 04 Housing of similar densities can be built in different forms. Individual houses with gardens can be built to quite high densities, while the highest desirable densities can be achieved with flats of relatively modest scale in 'perimeter block' form.
- 04 High-density residential areas have clear advantages. They are more economic to service; they have a lower impact on the environment; and they provide a wide choice of facilities within easy reach. Above all they make transport systems of high energy efficiency possible.

3

INFRASTRUCTURE

THE URBAN NEIGHBOURHOOD

SUMMARY

It is widely recognised that housing is not just an aggregation of homes. It must include all the services and facilities necessary for domestic life and good access to the wider community. Successful housing must be integrated with its essential infrastructure and in cities this relationship forms a clear pattern. The idea of neighbourhoods has an extensive history and has long been recognised as a basic concept in planning new urban developments. Existing cities, too, commonly have distinctive social and physical subdivisions. At the end of the twentieth century this established pattern gave rise to the concept of the 'urban village'. This provided a model for development and regeneration based on the successful urban neighbourhoods of the past. Government policy progressed the idea further with the establishment of major new settlements – the 'millennium villages'. With the new recognition of the impact of climate change, there is growing realisation of the need to integrate housing with workplaces and support services to make sustainable urban neighbourhoods which would aim to be neutral in their environmental impact. At the same time, most new developments will be in existing built-up areas. New housing needs to be integrated into the older urban fabric in a manner which makes it more suited to the needs of its residents and less wasteful in the consumption of resources.

COMMUNITY FACILITIES

It is an essential concomitant of any housing development that its residents have easy access to a range of community facilities. These include open spaces and meeting places, education and health services, and shops providing goods and services. In many of the low-density developments of the past scant attention was given to such considerations. The provision of facilities was left to others – the local authority or the private market. In new estates which consisted of houses with their own gardens, where