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FOR A BETTER URBAN FUTURE

A NEW STRATEGY OF SUSTAINABLE NEIGHBOURHOOD PLANNING: FIVE PRINCIPLES

UN-Habitat supports countries to develop urban planning methods and systems to address current urbanization challenges such as population growth, urban sprawl, poverty, inequality, pollution, congestion, as well as urban biodiversity, urban mobility and energy.

In recent decades, the landscape of cities has changed significantly because of rapid urban population growth. A major feature of fast growing cities is urban sprawl, which drives the occupation of large areas of land and is usually accompanied by many serious problems including inefficient land use, high car dependency, low density and high segregation of uses. Coupled with land use speculation, current models of city growth result in fragmented and inefficient urban space where urban advantage and city concept are lost.

Cities of the future should build a different type of urban structure and space, where city life thrives and the most common problems of current urbanization are addressed. UN-Habitat proposes an approach that summarizes and refines existing sustainable urban planning theories to help build a new and sustainable relationship between urban dwellers and urban space, and to increase the value of urban land. This approach is based on 5 principles that support the 3 key features of sustainable neighbourhoods and cities: compact, integrated, connected.

THE FIVE PRINCIPLES ARE:

1. **Adequate space for streets and an efficient street network.** The street network should occupy at least 30 per cent of the land and at least 18 km of street length per km².

2. **High density.** At least 15,000 people per km², that is 150 people/ha or 61 people/acre.

3. **Mixed land-use.** At least 40 per cent of floor space should be allocated for economic use in any neighbourhood.

4. **Social mix.** The availability of houses in different price ranges and tenures in any given neighbourhood to accommodate different incomes; 20 to 50 per cent of the residential floor area should be for low cost housing; and each tenure type should be not more than 50 per cent of the total.

5. **Limited land-use specialization.** This is to limit single function blocks or neighbourhoods; single function blocks should cover less than 10 per cent of any neighbourhood.

HIGH DENSITY URBAN GROWTH vs. URBAN SPRAWL

A compact city. Paris, France
© UN-Habitat/Laura Petrella

Urban sprawl. Uberlandia, Brazil
© UN-Habitat/Alessandro Scotti

Objectives of the Five Principles

In supporting sustainable neighbourhoods, the Five Principles seek to:

1. Promote high density urban growth, alleviate urban sprawl and maximize land efficiency.

2. Promote sustainable, diversified, socially equal and thriving communities in economically viable ways.

3. Encourage walkable neighbourhoods and reduce car dependency.

4. Optimise use of land and provide an interconnected network of streets which facilitate safe, efficient and pleasant walking, cycling and driving.[1]

5. Foster local employment, local production and local consumption.

6. Provide a variety of lot sizes and housing types to cater for the diverse housing needs of the community, at densities which can ultimately support the provision of local services.[2]

Malian street, Beijing, China
© *UN-Habitat/Jimin Zheng*

Bute Street, Vancouver, Canada
© *UN-Habitat/Shan Zheng*

Key features of sustainable neighbourhoods

The Five Principles promoted by UN-Habitat are meant to foster sustainable urban development by creating livable and efficient neighbourhoods. Sustainable cities are prosperous, convenient, livable, and safe. A sustainable city would possess the following key features, which the Five Principles contribute to:

1. **A vibrant street life:** Supporting and promoting street life by enabling a variety of activities, conducive frontage and street width, and reducing the presence and role of private transport. The Five Principles encourage high density and mixed land use which boost a lively street life. A high population density generates sufficient industrial and commercial service demand while mixed land use provides adequate manufacturing and service space. Cities consistent with the Five Principles are able to link demand with supply and thus stimulate a prosperous city street life which satisfies people's material and spiritual needs and creates a safe and vibrant city life. This is a key feature of sustainable cities.

2. **Walkability:** Promoting walkability as a key measure to bring people into the public space, reduce congestion and boost local economy and interactions. A vibrant street life encourages people to walk or cycle around, while a rational street network enables necessary city administrative services to be offered within walking or cycling distance and ensures security. High density, mixed land use and a social mix make proximity to work, home and services possible. Walkability helps to reduce automobile reliance and thus alleviate relevant congestion, air pollution and resource depletion issues. It is healthier to "walk more and drive less"! Pedestrians add an incredible amount of vibrancy to city life.

3. **Affordability:** Supporting affordability of transactions and economic activities, as well as of services and housing, by promoting proximity and reducing costs and building services for a diverse group of users. Proximity, brought about by applying the Five Principles, helps to reduce wastage of time and resources and thus brings down general service costs. Furthermore, the social mix principle tries to promote a rational distribution of urban public resources and provides adequate housing for different revenue groups through city planning regulations - ensuring social equity and promoting economic efficiency. An affordable and accommodating city is a core feature of a sustainable city.

Adequate space for streets and an efficient street network

The street network should encompass at least 30 per cent of the land with at least 18 km of street length per square kilometer.

Principle 1 aims to develop an adequate level of street network that not only works for vehicles and public transport but also specifically aims to attract pedestrians and cyclists.[3] It will include a street hierarchy with arterial routes and local streets based on traffic speed differences. The street network will also shape the urban structure which, in turn, sets the pattern of development blocks, streets, buildings, open spaces and landscape.[4] Principle 1 provides the material basis for sustainable urban development.

To design the street network in a high density city, the amount of land needed for roads and parking needs to be determined. According to research on urban impervious surface coverage (Figure 1), complex functions and high population density require high street coverage. The research indicates that 20-30 per cent of urban land and 40-60 per cent of commercial centre land is used for roads and parking. In high density mixed-use urban areas, it is recommended that at least 30 per cent of land is allocated for roads and parking, and at least 15-20 per cent is allocated for open public space.

Figure 1: Surface coverage (Arnold and Gibbons 1996) [5]
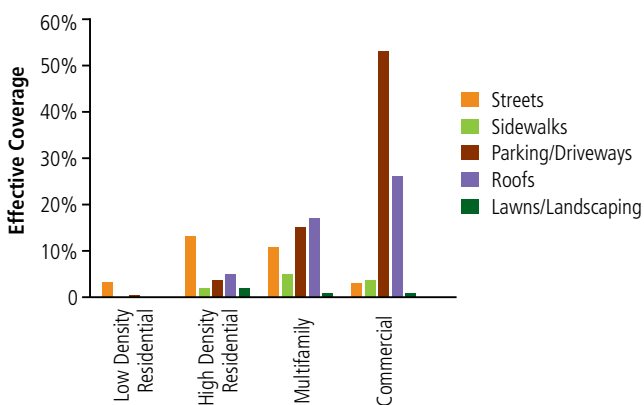
To develop sustainable mobility, the design of the street network should differ from the modernist practice in the following aspects:

• Streets are walkable and cyclist friendly
• Public transport is encouraged
• Road hierarchy is highly interconnected
• Sufficient parking space is provided

These characteristics should be reflected in the street design and construction.

Walkability in a neighbourhood can be measured by the walking distance to key services; this is usually from 400 to 450 m. Public

transport catchment is another important factor in designing a street hierarchy. (See Figure 2).

**Figure 2: Catchment areas for several transport forms**

	Stop interval	Corridor width area served	Catchment per stop
Minibus	200M	800M	320-640
Bus	200M	800M	480-1,760
Guided Bus	300M	800M	1,680-3,120
Light Rail	600M	1,000M	4,800-9,000
Rail	1,000M+	2,000M+	24,000+

Source: Urban Design Compendium (ww2.newham.gov.uk/Documents/UDC.pdf)

Combining walkability and public transport catchment, the suggested distance between two arterial routes is between 800 to 1,000 m. This distance is the constraint for the street grid design, urban structure design and neighbourhood size.

To help explain the reason for the 18 km street length per square kilometre, Figure 3 shows a simple street network model. In an area of one square kilometre, nine vertical and nine horizontal streets are designed to form a street network. The distance between two adjacent streets is 111 m, and the total street length is 18 km. In this street network model, both street hierarchy and block size are considered. This simple model demonstrates the balance between street and other land uses. City management and urban planners could "adjust" the design pattern of the street network, but a street density level similar to the one recommended in the model should be maintained.

Figure 3: Street network model design
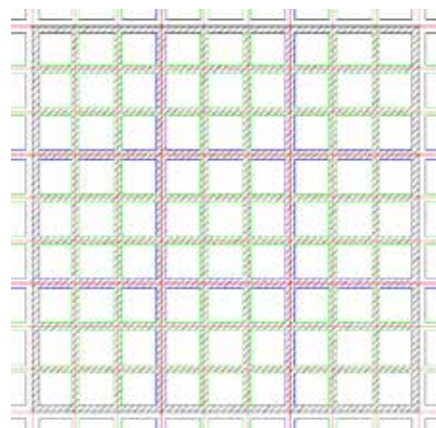
Principle 1 encourages efficient traffic, sustainable accessibility, social interaction, public safety and access to amenities.

High density

At least 15,000 people per km²; that is, 150 people/ha or 61 people/acre.

Principle 2 addresses population growth and is a direct response to the global population explosion and rapid urbanization. To prevent urban sprawl and promote sustainable urban extension, it is necessary to achieve high density, which is the foundation of a sustainable neighbourhood. High density essentially means a concentration of people and their activities. Figure 4 below shows the density of the built-up area of some select cities.

Figure 4: 16 cities listed by population density

Rank	City / urban area	Country	Population	Built up area (in km²)	Built up area density (people per km²)
1	Dhaka	Bangladesh	9,196,964	165.63	55,530
2	Hong Kong	China	5,179,089	97.63	53,050
3	Mumbai	India	16,161,758	370.90	43,570
4	Rajshahi	Bangladesh	599,525	20.26	29,590
5	Milano	Italy	17,335,085	635.17	27,380
6	Casablanca	Morocco	3,004,505	114.31	26,280
7	Cairo	Egypt	13,083,621	569.17	22,990
8	Seoul	Korea, Republic of	14,546,082	706.14	20,600
9	Ho Chi Minh City	Vietnam	4,309,449	210.33	20,490
10	Singapore	Singapore	4,309,797	245.24	17,570
11	Mexico City	Mexico	17,224,096	1,058.53	16,270
12	Santiago	Chile	5,337,512	438.51	12,170
13	Bangkok	Thailand	9,761,697	1,025.93	9,510
14	Beijing	China	11,866,211	1,576.38	7,530
15	Paris	France	9,519,527	1,482.08	6,420
16	Castellon	Spain	268,712	82.03	3,280

Source: A Global Sample of 120 Cities, 1990-2000 (http://www.lincolninst.edu/subcenters/atlas-urban-expansion/global-sample-cities.aspx)

Figure 4 shows that high density is a feature of cities at different development levels and contexts. According to the same source, in 2000, cities in developing countries had an average built-up area density of 129 p/ha.[6] To promote a high population density and stop the downward trend worldwide, Principle 2 defines a minimum of 150 p/ha for a sustainable neighbourhood – which is feasible, though slightly above the average density mentioned above. Cities in land rich or developed countries, however, may set a lower target and work progressively towards increased density.

Compared with low density, high density has economic, social and environmental benefits as follows:

- Efficient land use slows down urban sprawl because high density neighbourhoods can accommodate more people per area.
- Reduced public service costs. High density neighbourhoods tend to decrease the costs of public services such as police and emergency response, school transport, roads, water and sewage, etc.[7]
- Support for better community service.
- Reduced car dependency and parking demand, and increased support for public transport.
- Provision of social equity.
- Support for better public open space.
- Increased energy efficiency and decreased pollution.

People may worry about the perceived connection between density and social problems, such as crime, poverty and depression, but studies show no such correlation when factors such as income are accounted for.[8] A well-designed and organized high density neighbourhood can be safe and comfortable, but a good quality design is essential to achieve viable high density areas.

In the context of fast urbanization, high density is a smart choice and is at the core of sustainable urban planning.

High density neighbourhood - Churchill Gardens, London, England.[9]
© Greater London Authority. Used with Permission.

Location: Churchill Garden, London
Density, parking and site area:

Site area (hectares)		12.48
Parking (space per unit)		0.5
Tenure	Private	843
	Social rented	940
Density (Dph)		142
Density (Hrh)		557

Note: Dph- Dwellings per hectare
           Hrh- Habitable rooms per hectare

Mixed land-use

At least 40 per cent of the floor space is allocated for economic use in any neighbourhood.

Principle 3 is aimed at developing a range of compatible activities and land uses close together in appropriate locations and flexible enough to adapt over time to the changing market. The purpose of mixed land-use is to create local jobs, promote the local economy, reduce car dependency, encourage pedestrian and cyclist traffic, reduce landscape fragmentation, provide closer public services and support mixed communities. Mixed land-use can be applied at different spatial levels: city, neighbourhoods, blocks and buildings. Principle 3 focuses on the neighbourhood and block level.

At the end of the nineteenth century, with the introduction of modern urban planning concepts, the land-use zoning approach was applied and single function areas came into existence in cities all over the world. The adoption of single-use zoning strategies has resulted in serious problems for cities. Urban sprawl has increased, the quality and vitality of many urban centres has declined, and car dependence and traffic congestion affect everyone. To solve these problems, new urbanism promoted the core concept of mixed land-use. Mixed land-use requires some combination of residential, commercial, industrial, office, or other land-use. When different functions are mixed in one neighbourhood, economic and residential activities should be made compatible and well balanced by careful design and management.

The compatibility of different land uses depends mainly on the noise and pollution levels. A careful study on land use compatibility should be carried out to protect the community wellbeing and area livability.

According to research done in the 1950s on land use in Central Business Districts (CBD), 68 per cent is the optimum floor area allocation for economic uses, 22 per cent for residential use and 10 per cent for public service use.[10] Figure 5 gives a summary of floor area allocation in several CBDs.

Figure 5: Allocation of floor area in five CBDs.

		Beijing Chao yang CBD	Shang hai Lujiazui CBD	Shen zhen CBD	Paris la Defense CBD	Tokyo's Water-front Subcen-tre
Area (km²)		4.02	1.7	4.13	1.6	4.48
Total floor areas	Mm²	10.72	4	7.8	3.5	7
	%	100	100	100	100	100
Economic uses floor areas	Mm²	7.19	3.27	4.8	2.9	3.8
	%	67	81	62	82	55
Public ser-vice floor areas	Mm²	0.55	0.43	100	6	1.15
	%	5	11	13	2	16
Residential floor areas	Mm²	2.97	0.3	200	54	2.05
	%	28	8	25	16	29

Source: CBD规划策划重点分析研究
http://wenku.baidu.com view/1c07d5630b1c59eef8c7b42f.html
Note : Mm²- Million square metres

However, if too little area is for residential use, the CBD or neighbourhood will decline. For example, in the 1990s, the inner city of Los Angeles was on the wane. By applying a mixed-use concept to reform the city, people were drawn back to the city centre. In 1998, downtown Los Angeles was home to around 18,000 people, now, it houses nearly 50,000 residents. [11] Downtown Los Angeles has shifted from a 9 to 5 CBD to a 24-7 prosperous neighbourhood.

Based on the above research and analysis on CBDs, the suggested floor area distribution for a sustainable neighbourhood is: 40 to 60 per cent for economic use, 30 to 50 per cent for residential use and 10 per cent for public services. The set of recommended standards is a range to allow for flexibility so that different cities can adapt them to their own situations. Mixed land-use is an inherent part of the nature of cities and is a pillar of sustainable urban development.

Land size	501,800 m²
Residential floor area	436,600 m²
Dwelling	4,800 Units
Density	95 Du/Ha
Economic use floor area	557,400 m²

***High density mixed-use neighbourhood - Addison Circle, Addison, Texas, United States.**[12]*
© Town of Addison. Used with permission

Principle 4

Social mix

The availability of houses in different price ranges and tenure types in any given neighbourhood to accommodate different incomes; 20 to 50 per cent of the residential floor area is distributed to low cost housing, and each tenure type should be no more than 50 per cent of the total.

Principle 4 aims to promote the cohesion of and interaction between different social classes in the same community and to ensure accessibility to equitable urban opportunities by providing different types of housing. Social mix provides the basis for healthy social networks, which, in turn are the driving force of city life.

Social mix and mixed land-use are interdependent and promote each other. Mixed land-use and appropriate policy guidance lead to social mixing. In a mixed land-use neighbourhood, job opportunities are generated for residents from different backgrounds and with different income levels. People live and work in the same neighbourhood and form a diverse social network. Social mix is a socio-spatial concept, with the following objectives:

- to promote more social interaction and social cohesion across groups;
- to generate job opportunities;
- to overcome place-based stigma;
- to attract additional services to the neighbourhood;
- to sustain renewal/regeneration initiatives; [13]

Although social mix is a socio-spatial concept that is difficult to analyse quantitatively, it is still possible to set a numerical standard from the empirical evidence based on good practice in Europe. In Holland, areas regulated by the VINEX policy are earmarked for new housing, 30 per cent of which must be affordable. In Ireland, new "set aside" policies stipulate that 20 per cent of all new development must be set aside for affordable housing (inclusionary zoning). In the United Kingdom, the system is known as planning gain and the thresholds for affordable housing are

information, it is recommended that between 20 and 50 per cent of the residential floor area is allocated to affordable housing, and one single tenure type should not exceed 50 per cent of the residential floor area. The recommendation has a wide range to enable urban planners and city management to follow the national or regional owned-to-rented ratio. When implementing this recommendation, market factors should not be overlooked.

To ensure the smooth implementation of the above criteria and achieve social mix there are many possible policy options. Depending on their social and economic development stage, cities should select proper policies to create a package that promotes a balanced, developed local community. Possible policies include:

- promoting social mix by mixing tenures and developing sales programmes within public estates;
- achieving social mix through allocation policies and the spatial distribution of poor households.;
- investing in and improving public housing;
- achieving social mix by urban and housing design;
- promoting multi-level employment within the community;
- working with private developers to increase public housing supply;[15]
- providing plots in different sizes and with different regulations, to increase the diversity of housing options.

Social mix is not an urban planning panacea for social problems such as poverty and social segregation, but it can contribute significantly to their solution. Combined urban planning approaches are needed to tackle these urban challenges. This social mix principle is not a short-term concept, but should be