

Nine Criteria

for Livable Urban Density

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There has been much research and writing about the potential to deliver the same density of buildings in quite different ways. All of this work shows that buildings of lower and medium rise consistently perform surprisingly well, demonstrating that you don't need higher rise to get higher density. However, few are willing to question or judge the social or environmental consequences of the different built forms.

Measurements like FAR (Floor Area Ratio) and other such formulae are not necessarily useful indicators of success since they only measure size or quantity. The performance of higher-density urban form needs to be measured in a more complex and complete way. Qualitative criteria are needed. We need to ask how the built form supports everyday life. The success of urban form must be measured in its delivery of a higher quality of life for the people who live with it and its resilience and adaptability to constant changes in society, environment, and economy.

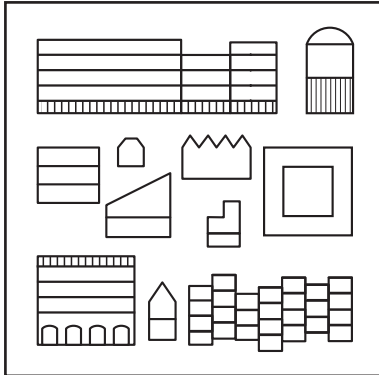
A key focus should be on the relationships with the surroundings that a certain built form makes possible. How well does a built form connect people to the physical resources of the city, accessing the useful facilities and amenities, the things and the places? How well does a built form connect people with the forces of nature, living more in tune with the weather? How well does the built form connect people to other people, for convivial encounters and social opportunity?

Nine Criteria

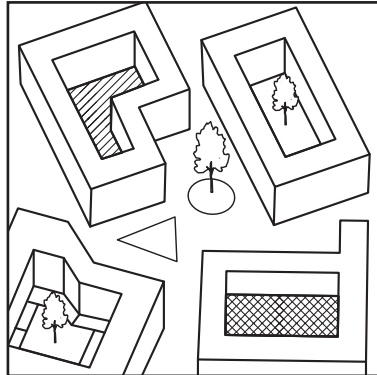
When considering the potential livability and sustainability of a dense built environment, I have come up with nine criteria to assess quality.

A livable, resilient, high-density area should have: a diversity of built form and of outdoor spaces, flexibility, a human scale, walkability, a sense of control and identity, a pleasant microclimate, a smaller carbon footprint, and greater biodiversity.

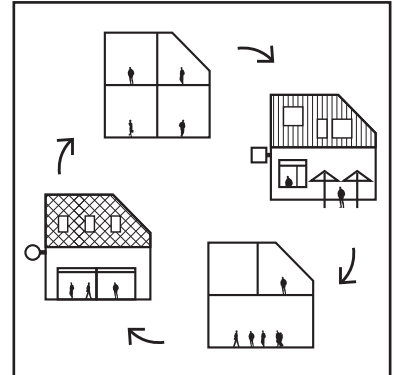
Nine Criteria for Livable Urban Density



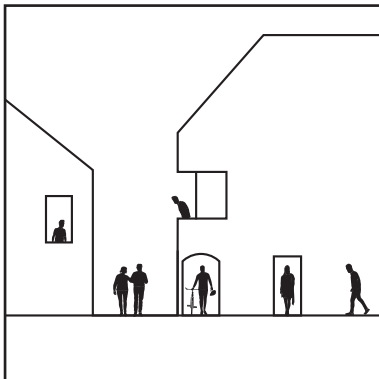
1. Diversity of Built Form



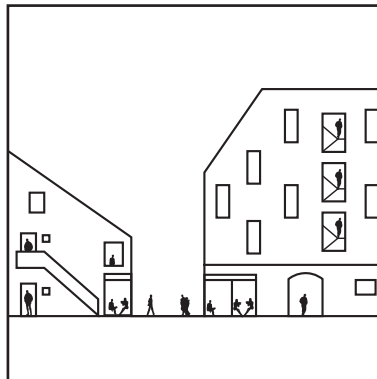
2. Diversity of Outdoor Spaces



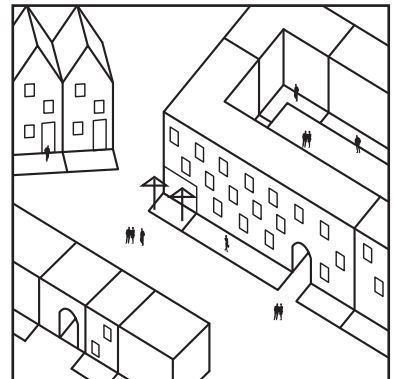
3. Flexibility



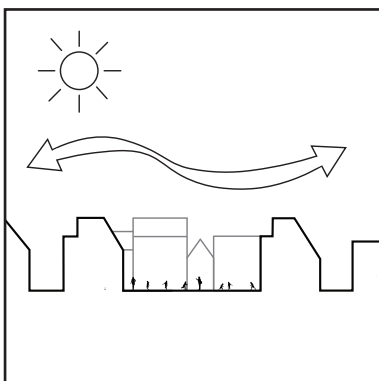
4. Human Scale



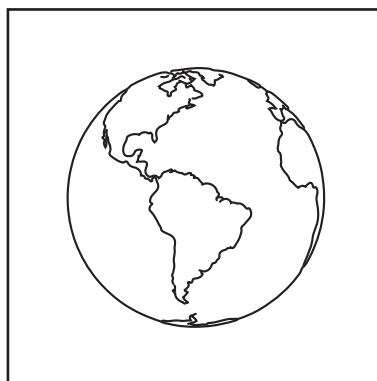
5. Walkability



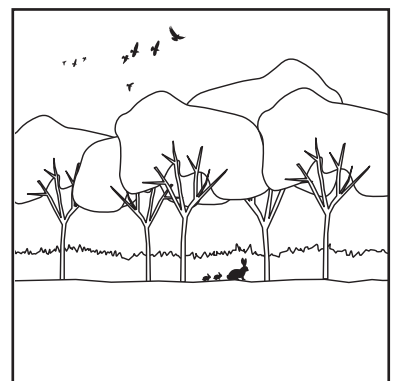
6. Sense of Control and Identity



7. A Pleasant Microclimate

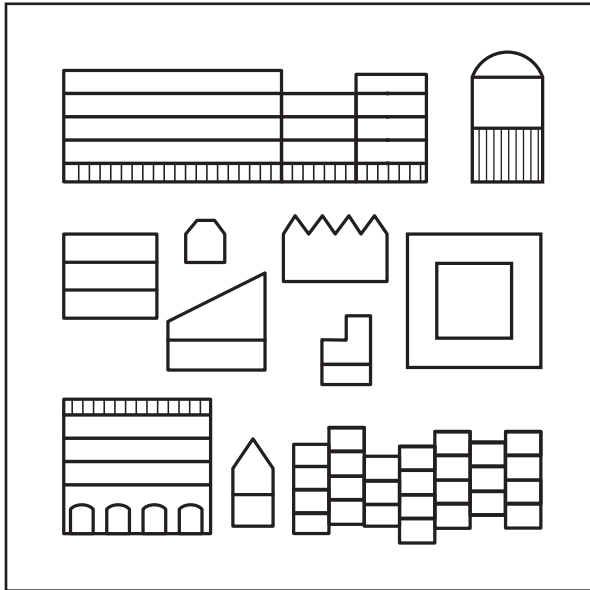


8. Smaller Carbon Footprint



9. Greater Biodiversity

1. Diversity of Built Form



Having different activities coexisting is both useful and more sustainable. Dwelling, working, learning, and recreating in close proximity allows us to live more locally. To accommodate the broadest range of different, useful activities in a neighborhood, we need to accommodate the broadest range of building types. Since usefulness in everyday life comes from the proximity of different activities to each other, we need an urban form that accommodates different volumes and shapes of building. The different types should fit together in a connected whole, where one building and its activities does not overbear its neighbors.

For a sustainable and resilient society, we need to accommodate different kinds of people, and balance public- and private-sector activity. We need an urban form that accommodates different kinds of tenure and management. Subdivision of land into smaller properties allows for a broader range of ownership and control.

The urban form should accommodate different sizes of buildings, with only a few large and extra-large components, to leave room for greater diversity of building types and activities. There should be more extra-small, small, and medium components. There should be different typologies including small houses, apartment buildings, office buildings, larger industrial sheds, production spaces, and specialized buildings such as sport halls and houses of worship.

Ideally, different dimensions will be accommodated in close proximity, such as small houses and large houses. The buildings could also be subdivided in different ways to vary the density. For example, a large apartment building may contain many smaller apartments, and a small apartment building may house only a few larger apartments. An office building could have large, single-space floorplates or many small rooms. The urban form should be able to comfortably accommodate social housing alongside private housing, public institutions alongside commercial ventures, and corporations alongside cooperatives. Small but significant components such as “granny flats” and home offices should also be accommodated.

The different buildings must be respectful and not overlook or overshadow one another, respecting the overall pattern of fronts, backs, and sides, as well as access to public or common infrastructure. The greater the diversity of space within a building, the greater the likelihood of accommodating a diversity of neighbors. The independent components should function as a greater whole.

Each individual building has the potential to create spatial difference within itself. In particular, the built form should acknowledge that some parts of the building are connected to the ground plane, which

gives certain affordances such as easier access. Other parts of the building are connected to the sky, and this affords more light. And then there is the part of the building in the middle, between these two, that will be different again. Some buildings, like big single-story sheds, might have all three aspects at once. There might also be basements, which are conveniently close to the ground plane for access but obviously have less natural light.

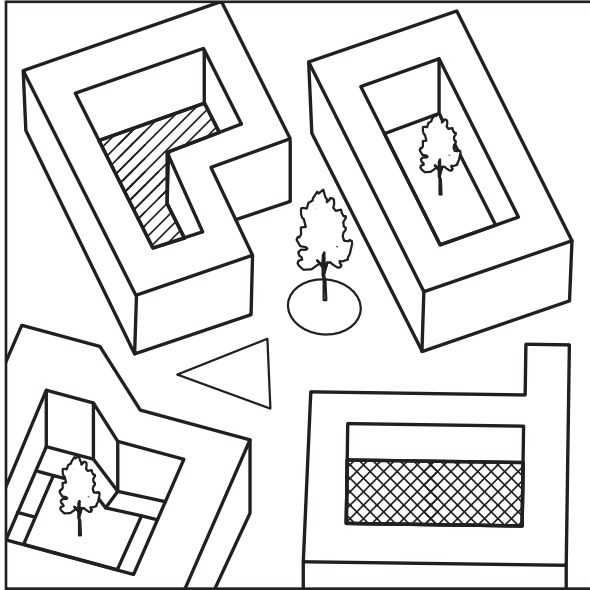
The diversity of buildings and their combination should create visual variation. The juxtaposition of different appearances can contribute a sense of place, making for more interesting sensory experiences and a greater feeling of identity, both for individuals and for a community. These visual differences make a street or neighborhood more distinct and recognizable, which aids orientation and makes walking more enjoyable.

Densely built, urban form should accommodate a broad range of building types (different typologies, shapes, dimensions, and spatial conditions) in close proximity to each other. Buildings should be physically respectful of each other while remaining organizationally independent.

What to look for

- Different kinds of buildings
- Different dimensions
- Different typologies
- Smaller plots
- Smaller subdivisions
- Smaller and more-diverse ownership
- Balance of building component parts: ground floor, middle, and top
- Visual variation

2. Diversity of Outdoor Spaces



It should be easy and enjoyable to spend more time outdoors. Spending time outdoors can connect people to their surroundings and to each other. It's about having more kinds of outdoor space to accommodate more kinds of outdoor life.

The outdoor spaces of a town or city are important because they provide vital, extra, useful living space in the otherwise more compact and confined urban environment. The greater the diversity of the spaces, the greater the potential for activities to take place as well as the greater diversity of such activities. Using outdoor spaces should be part of everyday life, which means putting a higher value on the space right outside your front door. It's not just the pleasure of gardening or trips to the park, but all of the everyday things that have to be done; waiting for the bus or putting out the garbage should be opportunities for pleasurable encounters.

Spending time outdoors means fresh air, physical activity, and meeting people, all of which can contribute to better physical and mental health.

The outdoor spaces of the city should make up a system of diverse public and private places, joined up or juxtaposed. The combination and interconnection of different types of space makes for a complex system, the nuances of which allow more activity to happen.

Public spaces like streets, squares, and parks offer something different than private spaces like gardens and courtyards. If both types can exist in close proximity to each other and complement one another, greater choice and opportunity can be delivered to more people in everyday life. As with other aspects of the city, the whole is greater than the sum of the parts.

The urban form needs to accommodate not only both public and private outdoor spaces, but also different kinds of public spaces and different kinds of private spaces in close proximity. There should be different dimensions—small spaces and large, intimate and grand—along with different access arrangements and levels of privacy, from the highly visible to the completely hidden.

Between public and private, there are subcategories such as “semi-public” and “semi-private,” common and shared, the exact definitions of which could be discussed at length. What is important is that there should be a range of these different types of spaces.

There should also be robust, flexible, multipurpose spaces with flexibility to allow different things to happen at different times. There should also be spaces dedicated to specific activities such as sports, games, and performances.

There are also different kinds of hybrid “inside-outside” spaces that connect the buildings to the outdoors. These might include colonnades, arcades, decks, balconies, porches, verandas, loggias, terraces, and roof gardens.

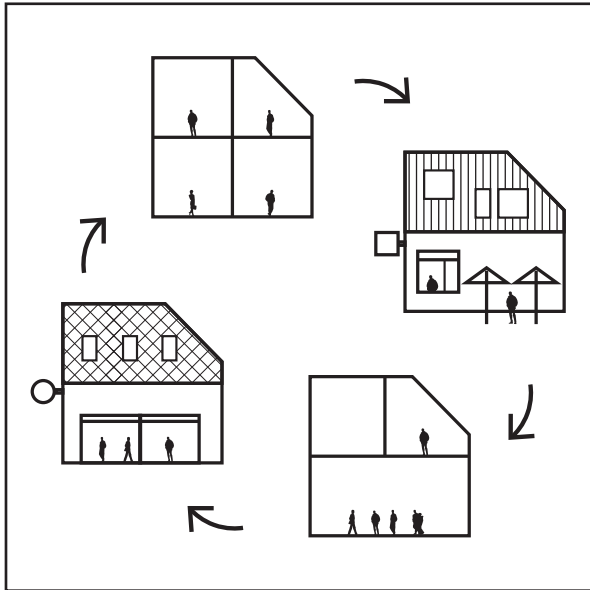
Finally, streets are also public spaces. There are different kinds of streets, from boulevards, avenues, and main streets to side streets, back streets, mews, alleys, and laneways, all of which can support outdoor life in different ways. Streets that have been planned as traffic conduits may, in fact, be important places for people, in which standing, staying, and sitting are as important as moving through. In the same way, other outdoor spaces might be places of movement. For example, a city park or square might be part of someone’s route to work or a shared courtyard garden might be a shortcut for someone else.

Dense, urban form should accommodate different kinds of outdoor spaces, in close proximity to each other, in response to the wide spectrum of needs for public and private life.

What to look for

- Different kinds of public outdoor spaces
- Different kinds of private outdoor spaces
- Different kinds of shared/common outdoor spaces
- Shared/common outdoor spaces
- Different typologies of space that respond to different needs and activities, from the very general to the most specific
- Hybrid spaces that connect inside and out
- Streets as public spaces
- Public spaces as places for mobility

3. Flexibility



Life is in constant change, and the town, city, or neighborhood is never finished. If a place is to be truly resilient, its urban form must be responsive to and capable of change. It must adapt to changing demographics and economic cycles, densification, new activities and functions, new people, and established residents with new and changing needs. A neighborhood has to be able to respond to change in the shorter, medium, and longer term.

Shorter-term changes might depend on the day (weekday or weekend), the time of day, the season, or the weather. A flexible space is multipurpose to accommodate these changing needs—a school playground that becomes a public park on the weekend, a market square that can also be used as a carpark, a church hall that is used by the scouts during the week, or a hotel or office lobby that becomes a pop-up store.

Perhaps the most modest and fleeting potential for change is when the ground floor has the potential to spill out. This can be very valuable for spaces such as cafés or restaurants with tables and chairs spilling over onto the sidewalk or into the courtyard, a shop displaying goods outside, or residents invading the edge zone around the door with potted plants, outdoor furniture, and parked cycles.

Courtyards are particularly flexible spaces. There is something about the simple containment of enclosed spaces that makes accommodating change easier. Because they are visually hidden and acoustically muffled, enclosed spaces like courtyards change easily since they don't disturb the surroundings.

In the medium term, changes might mean a building changing use, a renovation, or a small extension, responding to the need for growth or for greater personalization. A small, local increase in density may allow a growing family or an expanding business to stay in the same location.

Having direct access from the public realm to a space increases the potential for a change of use. Neutral access can be walking straight in from the street, or having an independent, private staircase only serving the premises in question, or in the case of a building inside a courtyard, access through a passageway would also work. Ideally, the new uses and users will not directly disturb existing uses and users (see also criterion 5 on walkability). Ground floor spaces are the most likely to change use as they have direct access to and from the public realm. Importantly, with this direct access, the ground floor can change use without disturbing rest of the building. In very general terms, the larger the proportion of a ground floor with direct access, the more flexible the building is and the greater potential

to change uses. If the ground-floor space is subdivided with independent units, it will have greater flexibility. The more independent spaces there are, the greater the opportunity for spontaneous change.

Ancillary buildings and spaces are particularly useful in accommodating change, including densification, as there is no controversy of introducing new volumes. It's only a question of reclassifying the existing buildings or spaces, perhaps with minor physical changes and upgrading. Basements, attics, and outbuildings are all useful spaces for accommodating densification, from the inside. Outbuildings have the advantage of having direct, walk-straight-in ground-floor access, albeit most likely from a courtyard space rather than the street. Attics, in particular, are interesting as the roof space offers the potential for different type spaces, in terms of light and layout, to be added. The basement is not as attractive as the attic floor since it cannot accommodate as many uses. However, proximity to the ground floor and the street means commercial uses are possible. The more attic, the more basement, and the more outbuildings can mean greater potential for change of use.

A clear structure with backs and fronts can be more tolerant to change over time as there is perceived room for growth. In an already built-up area, extensions to the rear are more readily accepted, as the visual impact of the changes are not visible to many.

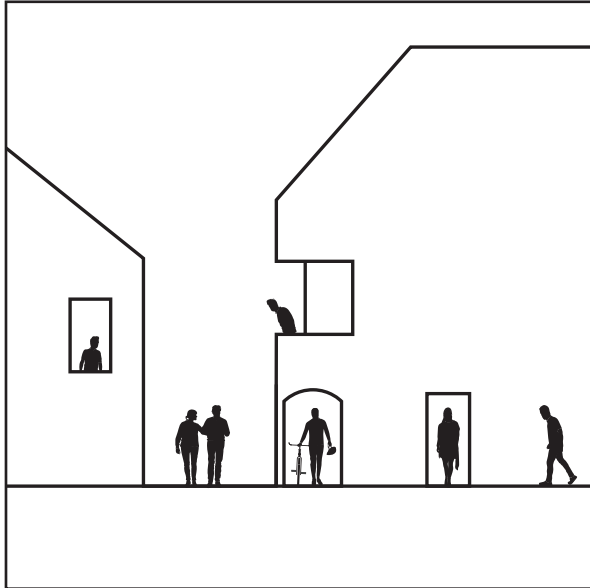
In the longer term, flexibility should allow for the removal and replacement of larger components such as entire buildings without disturbing the built form as a whole. Therefore, urban form that is made up of multiple, independent constructions or *fractals*, which allow local demolishing and replacement, can accommodate larger, more-significant changes.

Dense and diverse urban form, with both buildings and spaces, should be flexible and responsive to change (including densification), at all scales, in the short, medium, and long term.

What to look for

- Multipurpose spaces, indoors and outdoors
- A greater proportion of built volume is ground floor
- Independent access to different parts of a building (especially direct access from the public realm)
- Ancillary spaces such as outbuildings, basements, and attics
- Backs with room for growth
- Enclosure spaces that can contain activities
- Room on the edge of buildings for temporary overflow
- Independent fractals

4. Human Scale



If we recognize the needs of people in urban spaces, taking care of the environment with protection, comfort, and pleasure in mind, we can make neighborhoods that people will want to go to, go through, and spend time in.

Human scale in general terms means dimensions rooted in the human senses and behavior, resulting in smaller built components and lower heights. In particular, it means designing with attention to the experience at eye level, including appealing to sensory stimuli, and using dimensions that relate to the human body.

Smaller spaces bring people closer to each other and closer to things. Being in close proximity to the sensory system, close enough to see small details, close enough to distinguish small sounds, close enough to smell, and close enough to touch, intensifies encounters and experiences. The smaller dimensions can also

deliver better microclimates in the in-between spaces, meaning a more pleasant bodily experience. Smaller spaces also give a greater sense of security as people have a comfortable overview of a place.

Walk-up-height buildings help maintain a connection between the ground plane and the upper floors. This is the distance at which your eyes can focus and gain useful information, your voice can carry, and your hearing can distinguish different sounds. Buildings up to five stories usually meet these criteria.

Smaller spaces can be secure and comfortable places in which to spend time and meet people. There is a kind of psychological coziness that comes with certain smaller spaces, something comforting and calming that promotes intimacy and sociability.

Smallness can humanize a larger-scale environment, as if people are somehow programmed to focus on the smaller things because we know that they are most likely to be the most rewarding. Therefore, the presence of smaller built elements among larger ones is important.

An urban environment should appeal to all the senses. It is not just about what you see, although visual stimulation is important. The more opportunities to observe living phenomena the better—seeing other people doing activities, viewing the big sky, shadows and light, flowers and trees, and birds and animals. Seeing a diversity of color and materials, as well as a variety of patterns and decoration, is also important.

The human being is designed to walk and has the greatest capacity to interpret, engage with, and respond to the surrounding environment at eye-level. The face is where the human senses are concentrated and also

where we communicate and express the most emotion. What happens at eye level as we enter a space on foot, as we meet our surroundings, is the most significant. Therefore, the urban form has to perform best at the level of the ground floor.

What happens in the first three vertical meters (ten feet) of experience connects us to the place. It connects us to the buildings with the windows and doors, the materials, textures and colors, but also to the people, where they walk, stand, and sit. Since the eye-level experience is a continuous one as we move through space, it is important that the scene is constantly changing, and we are continually presented with new stimuli.

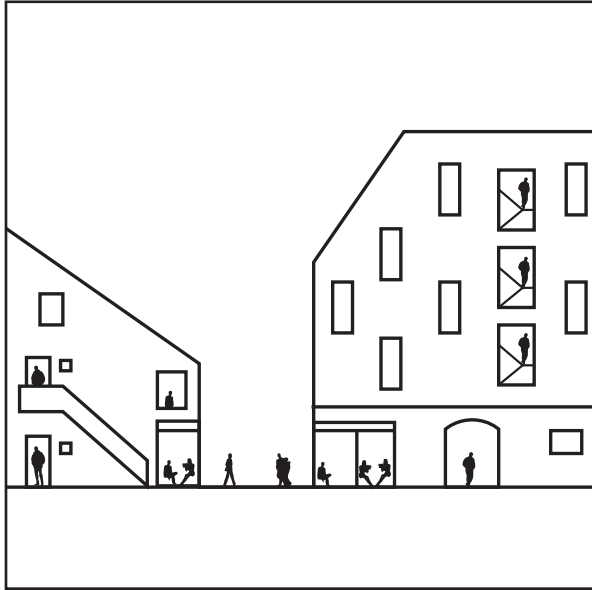
Human beings are highly sensitive to unpleasant physical and climatic phenomena. When there is an interruption or disconnect between one place and another because of a bad experience, patterns of behavior are lost, and people are much less likely walk or spend time in that place. The quality of human-scale elements such as smaller dimensions, sensory experiences, and care at eye-level, should be consistent through a neighborhood and not just exist in isolated spots.

Urban form should deliver density at a human scale, meaning at dimensions and with details that can offer comfort and well-being to people living in and around the buildings and the spaces in between.

What to look for

- Smaller dimensions
- Smaller spaces
- No higher than six stories—ideally four or five
- Multi-sensory experiences
- Particular care for the eye-level experience
- Consistent quality at eye level

5. Walkability



Walkability refers to the smallest, but perhaps most important, movements that people make every day. Designing for walkability is about connecting people to the life of their neighborhood, seeing what is available, and having options to access it. The goal is quick-and-easy access, convenience, spontaneous participation, and being able to get from one situation to another quickly and easily.

Within buildings, it is about the seemingly simple things such as frequency, position, and function of windows, doors, halls, passages, and staircases, which create options for complex movement. It is about making a walkable neighborhood that is protected, comfortable, and pleasant, with easy movement from building to building, from building to block, from block to block, and from neighborhood to surroundings. Walkability is also about relationships—getting to

know people and places and experiencing the forces of nature on the way.

The ground floor is extremely valuable because it is the most accessible. It allows everyone to enter or exit directly, which is the easiest application of universal access. This inside-outside mobility is useful for the busiest uses such as shops, workplaces, institutions, and even homes.

Every building with a shared staircase should have access to the front and to the back, to give choices. Every individual house should have a front and a back door. The pend, or passageway, creates a dynamic connection between the public and the private of the city.

The value of the walk-up is being able to access as much of a building as possible without being dependent on an elevator, as well as retaining a sensory connection to what is happening at ground level. A good test question for any built environment is what proportion can be reached without requiring the use of an elevator.

A small but significant detail is the location of common staircases. Ideally, they will be on the outside wall of buildings and have windows, giving natural light and ventilation, as well as a constant connection with the outside. Dog-leg stairs, which shift direction every half floor, break both physical and visual tedium, as you are given a little rest and are spared the view of the long flight of stairs.

Windows are important for light and to make people aware of the life outside, connecting people to climate. The shape of the window can affect the relationship with the outside. Not only does a vertical window opening take up less useable space on the inside, it

lets light penetrate more deeply into a room, affords views of the sky, the surrounding buildings and trees, and life down on the ground.

While windows are valuable, doors are the real connectors, as they make physical access possible. There is a vital connection that comes from street-watching, being able to get straight outside, and to participating in what is happening on the street. More-frequent doors mean more easy and spontaneous movement from one kind of space to another, between inside and outside, and from private to public realms. Front doors and back doors are equally valuable. Bonus openings like French windows and patio doors, or extra, eccentric features like private outdoor staircases, add to the probability of more frequent inside-outside movement. My own simple rule for buildings is that if you can see the window of the apartment, you should be able to see an entrance door of some kind.

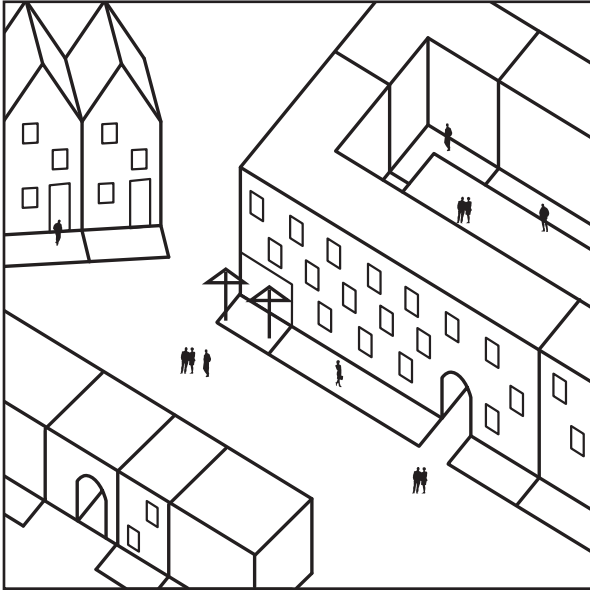
The urban form should allow for a small but useful space right outside dwellings and workplaces, so that you can literally step outside. Balconies, loggias, roof terraces, porches, verandas, front stoops, back steps, small front and back garden zones all fall into this category.

The built form should allow for easy accessibility and connectedness. In the simplest terms, accessibility is about being able to move quickly with the least amount of effort, in, out, and through buildings and between as many different spaces and places as possible. It also means walkability at a neighborhood scale, with walking as the most comfortable and convenient option for short distances.

What to look for:

- Walk-in buildings
- Walk-through buildings
- Walk-up buildings
- A higher proportion of ground floor
- Visual connection and physical access between inside and outside
- Direct access to useful outside spaces
- Walkability at the neighborhood scale

6. A Sense of Control and Identity



The built form should be made up of identifiable, distinct places, physically defined, that belong to or are controlled by an individual or group.

It could be as small as a recessed step in front of a doorway where the resident can put a potted plant. It could be a small, private garden in front of a house or a ground-floor apartment where the resident can have some furniture and plant some shrubs. It could be a common staircase shared by eight families, where everyone knows each other well enough to be able to ask for help in a minor emergency. It could be a back courtyard shared by a few buildings where play equipment is shared and common activities can take place. It could also be a local street with a sense of identity or a public square that is accessible to all.

The hierarchy of territories starts in the home, which might have some subtle layering, with common zones

including living rooms and kitchens, and more-private ones including bedrooms and bathrooms.

The next layer is the group of apartments sharing an address and the people living around a common staircase, making a small, exclusive group with the very specific shared interest of living in the same place, balancing acquaintance, respect, tolerance, and strictness.

The next layer is a shared, common outdoor space, such as a garden or courtyard. This is a larger and more-diverse group than the staircase neighbors, made up of people who have some common interest in cleanliness, safety, security, and quietness at night. Then, there is the identity of belonging to a group of people who live and work along a certain street or around a certain public space.

The next level is the neighborhood. This is the real test of success. If there is no sense of identity there, it may be necessary to jump to the next layer of the town or city.

The structure of the built environment can make defined spaces, which can be recognizable places. For example, on a larger scale, a block of joined-up buildings may have a clear outside and inside, with fronts and backs, and a clear differentiation between public and private. This creates distinct courtyards and gardens on the inside and public spaces, streets, and squares on the outside that are clearly identifiable places. At the small scale, devices such as small walls or hedges, gates, and gateways might be enough to define a territory.

Social phenomena like public and private can translate very easily into the spatial phenomena of fronts and

backs. The front, the more exposed side, has a certain formality. It is generally tidier, more strictly controlled, and there is an understanding and acceptance of rules and a certain kind of behavior. The back, because it is more hidden, is generally much more informal and relaxed. There is greater freedom and acceptance of individual, personal expression. A shop window display and a neat flower garden might be on the front while the garbage cans, cycle storage, and hanging laundry are hidden at the back.

Edge zones, particularly those outside homes, are important for expressing identity. For example, a small, private garden or deck allows the resident to use the space as they want—whether for planting, storage, decoration, or as a social space. Every household has different specific needs. A private edge zone allows and even celebrates these differences.

Corners are important as significant and recognizable nodes in the spatial system of the neighborhood. The corner is a place where two or more paths meet, a significant intersection in the mobility network, where you can change direction. It seems universal that corners are favored places to meet, valuable locations for successful commercial activity (like cafés and popular local shops), and opportunities for architectural expression in buildings, thanks to the multiple views they afford. The combination of all of these—network location, significant business activity, and memorable architecture—make corners potentially more useful places, and help orientation in a neighborhood.

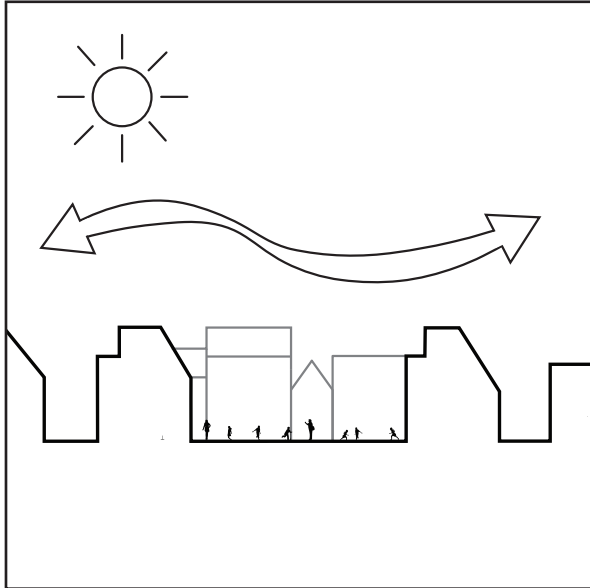
Finally, it is important that the public spaces feel genuinely public and people feel welcome to come and spend time there.

The built form should offer people, as individuals and in smaller and larger groups, better control over the spaces around them. The spaces should foster a sense of identity as well as aid orientation and navigation.

What to look for:

- A hierarchy of identifiable territories
- Clarity between public and private
- Fronts and backs
- Enclosure and spatial clarity
- Smaller units and subdivisions
- Common/shared spatial focus
- Useful edge zones
- Significant corners

7. A Pleasant Microclimate



The physical comfort from good microclimate is particularly important for public life, encouraging walking, cycling, and spending time outdoors. It is also important for public transport use, as this also entails walking and spending time outside waiting. As already mentioned in criterion 2 addressing living outdoors, spending time in the spaces between buildings can compensate for the more confined living conditions typical of urban life.

Working with built form and microclimate is about softening the weather, not denying or changing it. It is a process of filtering out the extremes. Similar to the notion of “dressing for the weather,” it is about helping people to be more at one with their climate by bringing them closer to it. It also means less reliance on mechanical heating and cooling.

In order to make a livelier neighborhood and to encourage more sustainable behavior, and in particular active mobility, the pleasant microclimate should start right outside of your front door. This is the place where you start your walk, the route that takes you to the bus stop (or wherever you are going), and even the place where you wait. It is important not just to create exceptional pockets of pleasant climate, but to create a pleasant climate throughout the urban form. Jan Gehl often observes that this quality was built into most older city districts.

An urban form that is consistent with lower building heights almost always creates a better microclimate because there are no tall structures to cause turbulence. Taller buildings frequently catch stronger and colder winds, and divert them down toward the ground, making the in-between spaces unpleasant, colder, and windswept. Additionally, tall buildings cast longer shadows, keeping places in the dark and cold.

Buildings with aerodynamic roof shapes such as pitched, hipped, rounded, or mansard can help to divert the stronger winds away from the ground plane and let the sun penetrate down into the in-between spaces.

When sunny edges and wind protection are combined, such as in courtyards, sun traps are created, which are particularly useful places for outdoor life when the weather is colder. Interestingly, enclosed spaces like courtyards can also be useful in hotter climates, providing shade as well as thermal storage for the colder nights. Semi-enclosed spaces such as recessed balconies can have a longer useful season.

Small details such as openings can be significant for microclimatic experience. French windows and Dutch barn/stable doors can effectively turn a whole room

into a balcony, and connect people indoors to the fresh air and life outside.

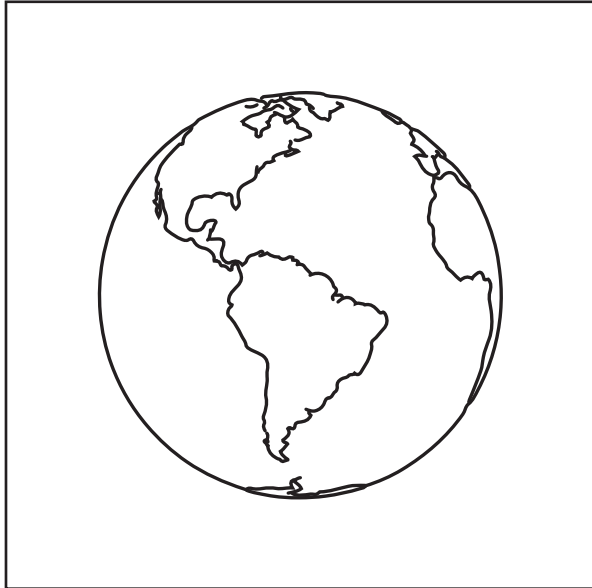
Rain shouldn't stop the daily movements of neighborhood life. Smaller and larger features in the built form can allow movement and spending time outdoors to continue even when it is wet. This type of protective building architecture includes smaller interventions like overhangs, canopies, awnings, and generous projecting eaves along the edge of a building, as well as larger-scale options such as colonnades, arcades, and covered walkways.

Creating a pleasant microclimate with a built form allows people to spend more time outdoors.

What to look for:

- Consistent microclimatic conditions throughout a space
- Protection from strong winds and avoidance of turbulence
- Solar penetration and avoidance of shadows
- Aerodynamic roof shape
- Protected or enclosed outdoor spaces
- Useful openings
- Rain protection at edges

8. Smaller Carbon Footprint



The built form should have a minimum negative effect on the environment. The layout, size, and shape of buildings can translate into lower energy use, less pollution as well as saving natural resources and materials (and money).

There are immediate benefits from lower building heights and enclosed spaces, which create better local microclimates. Reduced exposure to strong wind and sun can mean less maintenance, as well as reducing the need for artificial heating and cooling in the whole area. Having more joined-up buildings means that there are not as many exposed sides, reducing construction costs, and, over time, reducing heating and cooling costs in the individual buildings.

There is no substitute for natural light. There are considerable energy savings and benefits to health and well-being when indoor spaces have natural light.

Ideally, all rooms and communication spaces will be naturally lit. Smaller building dimensions allow for more spaces to be lit from more than one side, greatly improving the indoor light experience over the course of the day. It is important to consider the quality of light throughout the day and not just the quantity of light at a specific hour, as many building codes and standards do. With narrower buildings, there is a greater possibility of having natural light everywhere indoors. With lower buildings, it is more possible to use skylights to greater effect.

With thinner and lower buildings, natural ventilation is possible up to a certain height—generally, up to eight stories using conventional technology and building systems. And with natural light, there are considerable energy savings and benefits to health and well-being. Countless books have been written about sick-building syndrome and the societal costs of people suffering from spending time in unhealthy buildings because of artificial lighting and ventilation.

In an urban form with greater ground coverage, there is also more roof, and potential for solar harvesting and greening to reduce heat-island effect. The sunny rooftops also make ideal positions for greenhouses for local food production.

An urban form based on lower and smaller buildings can be built with simple (lighter) construction. The use of a healthy and renewable material such as wood is possible using conventional and common building practices. This saves on embedded energy as well as pollution involved in the production of materials like concrete and steel. The lower and smaller scale also works well for prefabrication, which, thanks to precision building, has generally far better environmental performance than standard construction methods.

Lighter buildings have lighter, shallower foundations, which mean less damage to subsoils and the water table, and savings on embedded energy.

Lower buildings mean there is less reliance on elevators. Less elevator use means less energy in production and building operation.

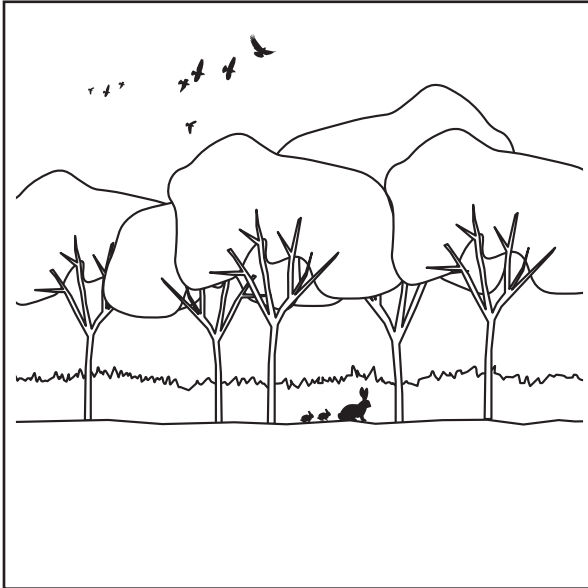
However, the real environmental benefit is the energy savings that come from everyday behavior with a more walkable neighborhood—with people being able to access what they need every day, without relying on an automobile.

The built form should use fewer resources in construction and operation while promoting behaviors and lifestyles with a smaller carbon foot print, such as walking and cycling.

What to look for:

- Fewer exposed facades (thanks to joined-up buildings)
- Smaller dimensions to allow natural light and ventilation
- Simpler construction and foundation systems
- Less reliance on complex technology and heavy engineering
- Layout promoting active mobility (especially walking)

9. Greater Biodiversity



The built form should allow green spaces and natural life to thrive. There are many benefits of biodiversity, both to people and to the planet. This is mainly about vegetation, but considering a more holistic biodiversity. This also affects insect, bird, and animal life.

There are clear benefits to health and well-being for urban dwellers with richer and more-diverse nature in otherwise built-up areas. Vegetation has an acoustic effect, absorbing and masking amidst the many hard surfaces of walls and paving in the urban context (and hence reducing stress). It also has the ability to help mitigate pollution, cleansing the air by absorbing dangerous nanoparticles, which is important considering the frequency of respiratory diseases in urban areas. Vegetation is also practical as visual screening, increasing privacy as well as reducing and mitigating wind, and protecting from strong summer sun. Vegetation can help to mitigate the heat-island effect.

A greater number of property subdivisions can lead to greater biodiversity because of potentially different kinds of control, standards, and approaches to gardening and wildness. Each property can have characteristics to potentially make a unique micro-ecosystem. But when put together, all of these individual plots make for even greater biodiversity. There is a local climax of biodiversity at the threshold where two different systems meet, for example along the hedges, fences, and garden walls between subdivisions. In this way, both the different conditions of each subdivision as well as the climax along their edges makes for biodiversity. The whole is greater than the sum of its parts.

Balancing solar access and wind protection, enclosure or partial enclosure helps create a favorable microclimate (see also criterion 7) for growing conditions and reduces disturbance from human footfall. Physically protected spaces like courtyards and walled gardens allow flora and fauna to flourish. They are also places where people can enjoy nature less disturbed. For example, the acoustic effect of vegetation and wildlife noise (trees rustling and birds singing) is much stronger in a more protected space.

Consistently lower building heights create a better microclimate for green roofs (from roof gardens with potted plants to sedum and planted roof surfaces) and green walls (from simple creeper plants to complex planting systems). The whole range of small, plantable spaces from window boxes to balconies work better in the milder microclimate created by lower building heights.

The built form should generate spaces to accommodate soft landscaping as well as local water management and filtration of rainwater. There should be numerous and frequent places with deeper soil to allow natural

drainage. Too often, underground structures such as carparks eliminate the possibility of natural drainage or tree planting over large areas. With a smaller scale of buildings and hard surfaces, the quantity of stormwater run-off is reduced and is therefore more manageable.

The closer nature is to your everyday life, the more relevant it becomes. As mentioned in criterion 6, the thoughtful arrangement of the buildings in relation to their surroundings and in-between outdoor spaces can increase a sense of control, responsibility, and community.

The more easily accessible the outdoor spaces are, the greater the likelihood of frequent and regular use, and, in turn, a sense of care that invites tending and nurturing behaviors, perhaps resulting in shared community-garden work and even community harvesting. Therefore, a scale and division of land that makes courtyards, gardens, and allotments possible, with clearly defined private and shared spaces, allows for responsibility and connection to the natural world.

Urban form should accommodate natural life. The layout, size, and shape of the buildings and use of spaces should accommodate natural life and make greater biodiversity possible.

Things to look for:

- Multiplicity of smaller, individual outdoor green spaces
- Many protected spaces and edges
- Smaller dimensions of buildings to allow green walls and roofs to thrive
- Smaller scale for water management with slower water filtration
- Soft landscaping where possible

