

EGCA 2018, Umeå, Sweden

3. Green urban areas incorporating Sustainable Land Use

3A Present situation

Umeå, the city of birches by the river, is northern Sweden's node and most highly populated municipality, 120.000 citizens (1). Umeå is characterized by its position near river and sea surrounded by forest and cultivated plains and changing seasons with snowy winters and sunny summers (Figure 3A1). This geographical context, with very accessible green spaces, is central in Umeå's sustainable urban planning providing a variety of possible activities and experiences in the municipality (Table 3A1, Figure 3A2).

Land use within the city, 2015	Inner city 619 Ha	Overall city 3626 Ha
Public green area (including urban forests)	17 %	24 %
Private green area (information not available)		
Blue	11 %	5 %
Residential	28 %	32 %
Industrial/economic	5 %	10 %
Mixed (infrastructure areas, schools, university, hospital etc)	29 %	19 %
Brownfield	1 %	0
Other (open land, ski slope, gravel pit etc.)	9 %	10 %
Total	100	100
Percentage of people living within 300 m of green urban areas $\geq 5000 \text{ m}^2$	89 %	58 %
Percentage of people living within 300m of green urban areas of any size	98 %	61 %
Soil sealing	55 %	45 %
Area sealed per capita	200 m^2	170 m^2

Table 3A1: background information on the character of Umeå, including soil sealing percentage

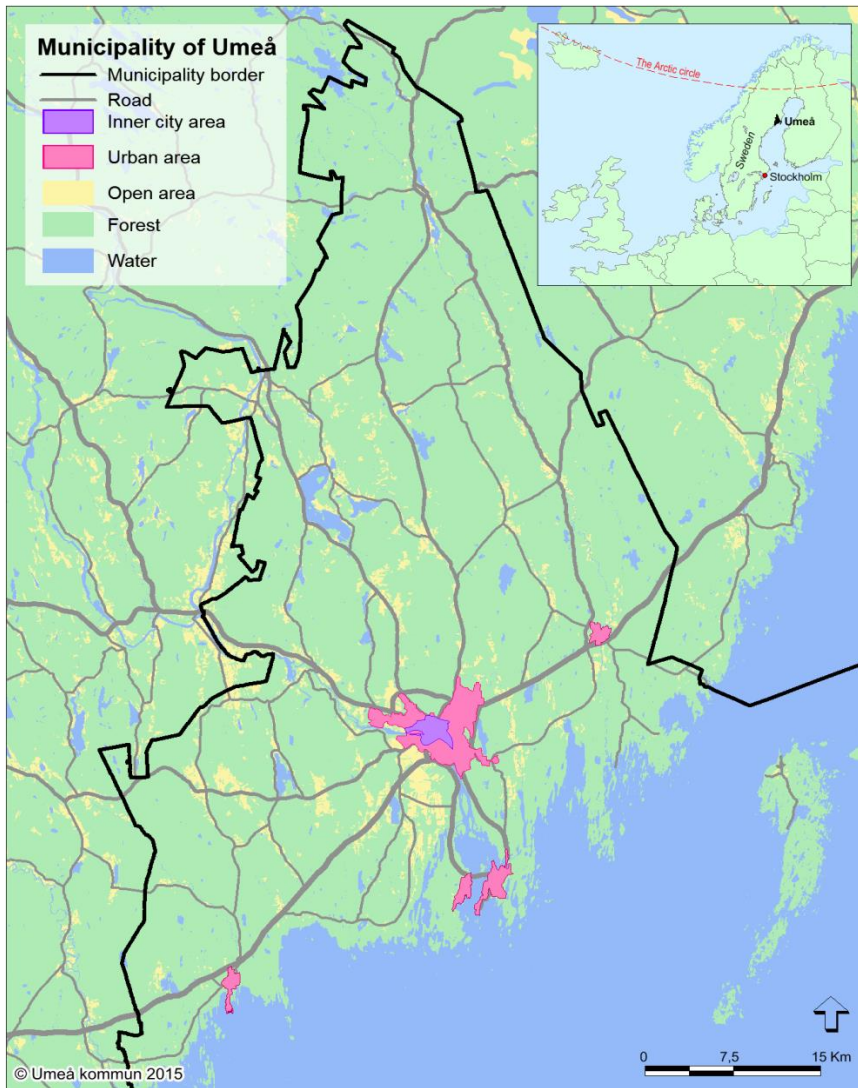


Figure 3A1: Land use map of the municipality of Umeå, outlining the overall city area and the inner city area.

The historical context is:

- Early city expansion by the river with shipping and trading as important businesses.
- 1888 an enormous fire devastated main city areas. When Umeå was rebuilt, the existing city structure with the river and wide avenues with birches as fire stoppers was set. Today citizens are annually offered birches to plant as a symbolic gesture (2).
- Since the establishment of the university in year 1965 the population has more than doubled, become younger (average age 38) and there has been a tremendous expansion of the city, amongst the citizens and in land-use. The population has grown from 5000 citizens in year 1910, 50.000 in 1965, and today 120.000.

- By using culture as a driving force in regional development since the mid-1970s, Umeå was selected European Capital of Culture 2014 with keywords as co-creation and the empowerment of people.

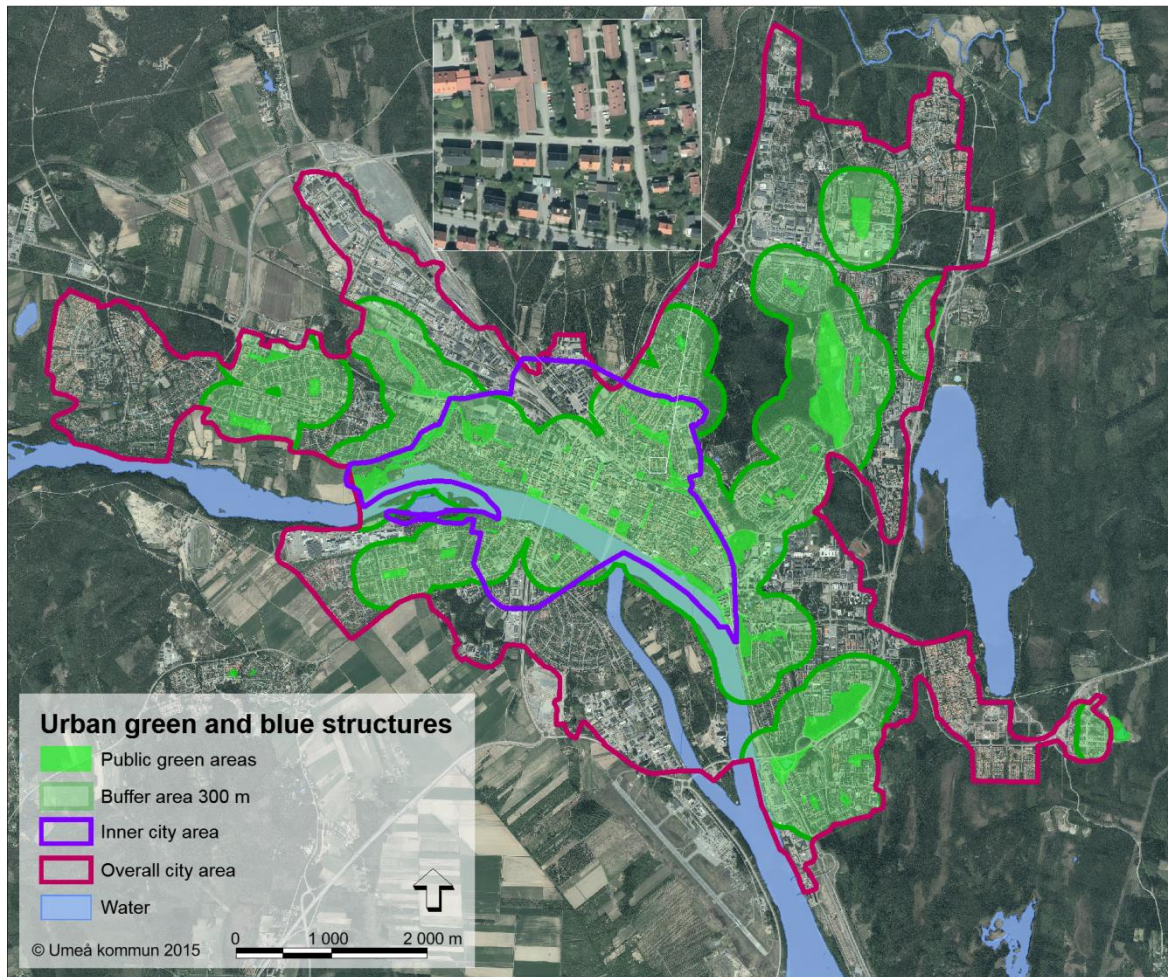


Figure 3A2: Map illustrating the urban green and blue structures in the city of Umeå. Umeå is a very outdoorsy city, where the parks and nature are frequently used and highly valued by citizens and visitors.

Now, as one of Europe’s fastest growing cities, Umeå comprehensive plan (3) with six development strategies (3B, 3C) is the main tool to secure a sustainable growth in which a green infrastructure has a crucial role. The comprehensive plan provides strategic foundation for detailed plans, which are drawn up for the use of land and water areas, or to regulate the design of the built environment. According to the prizewinning comprehensive plan, Umeå will become green, dense and more sustainable by focusing on accessibility, usefulness and participation. Additionally, the inhabitants’ commitment is a key driver for continuous improvement of the urban environment. The Swedish Planning prize emphasizes

Umeå's planning culture where extensive dialogue and cooperation with the citizens' is unique by Swedish standards (4). Further, the long tradition of internal collaboration is evident in contemporary planning, where new planning models focusing on urban climate are tested in order to investigate natural conditions for e.g. storm water management (see indicator 1). This democratic tradition of using various forms of citizens' dialogue and internal consultation was underlined in Sweden's ratification to The European Landscape Convention (5) in 2011.

Everybody is included

One of the development strategies in the comprehensive plan is "Everybody shall take part (Co-creation of the city)" deriving primarily from the strategic long-term objective adopted by the City Council regarding gender equality (see indicator 12). With funding from the National Board of Housing, Building and Planning (6) the project Free-zone (Figure 3A3), focusing on young girls experiences, is one targeted measure to implement this strategy (7).



Figure 3A3: The project "Free-zone" is focusing on groups of young girls and women's experiences of equal public places in the urban environment. Several methods for dialogue are tested, workshops, photographing, actions on school etc.

Their visions about planning a physical environment from a gender equality perspective will be realized and built in the Seasons park (Figure 3A13) during summer 2016. An important part of the project is to highlight and raise awareness regarding norms and gender issues in planning public spaces. Umeå has been working actively with gender equality for more than 20 years, for example gender budgeting and mapping social landscape values when exploiting new or existing residential areas.

Public health and movement are two other areas Umeå invest in with a long-term everyday perspective. A green corridor of pedestrian and cycle paths is under constant construction in order to facilitate public access to a coherent and green urban landscape promoting good health on equal terms (Figure 3A4).

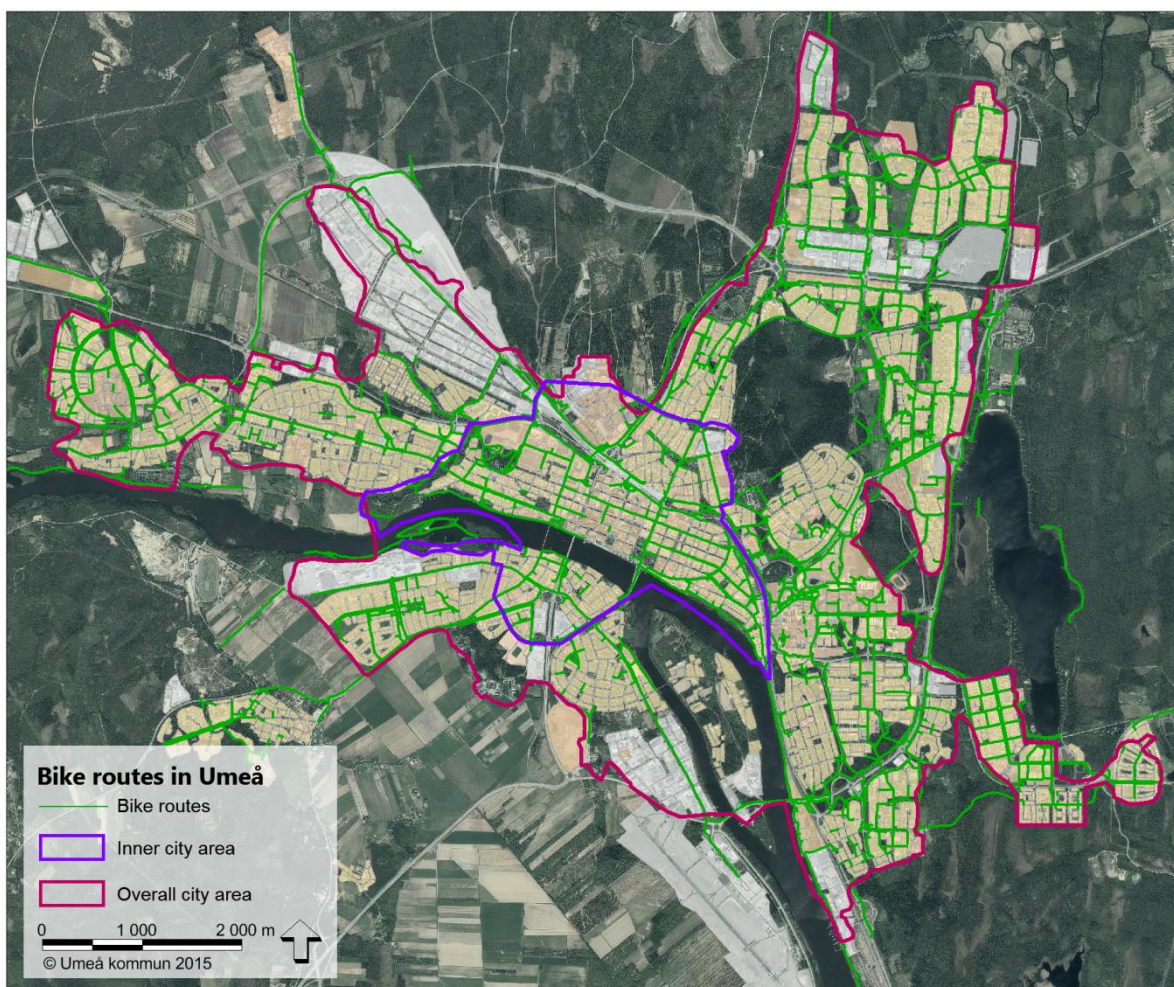


Figure 3A4: The green network of bike routes. It provides activities all year round, in winter for instance a 300 kilometre lightened skiing and jogging track is available. The network is effectively maintained and the main bike routes are first priority to make accessible in the winter season.

Cultivation plots and allotments have a long tradition in Sweden. In Umeå city-dwellers have chance to rent cultivation plots which are managed by local associations. Public initiatives and interest in urban farming are encouraged and the municipality provides i.a. land in public spaces for temporary projects – all in line with the development strategies.

Land use

Volvo Trucks (8) is one of the larger industrial areas in Umeå (Figure 3A5). In the planning process considerations has to be taken to the industry’s position in the urban landscape. Beyond, there are several commercial areas in the overall city with service companies, clothing and grocery stores.

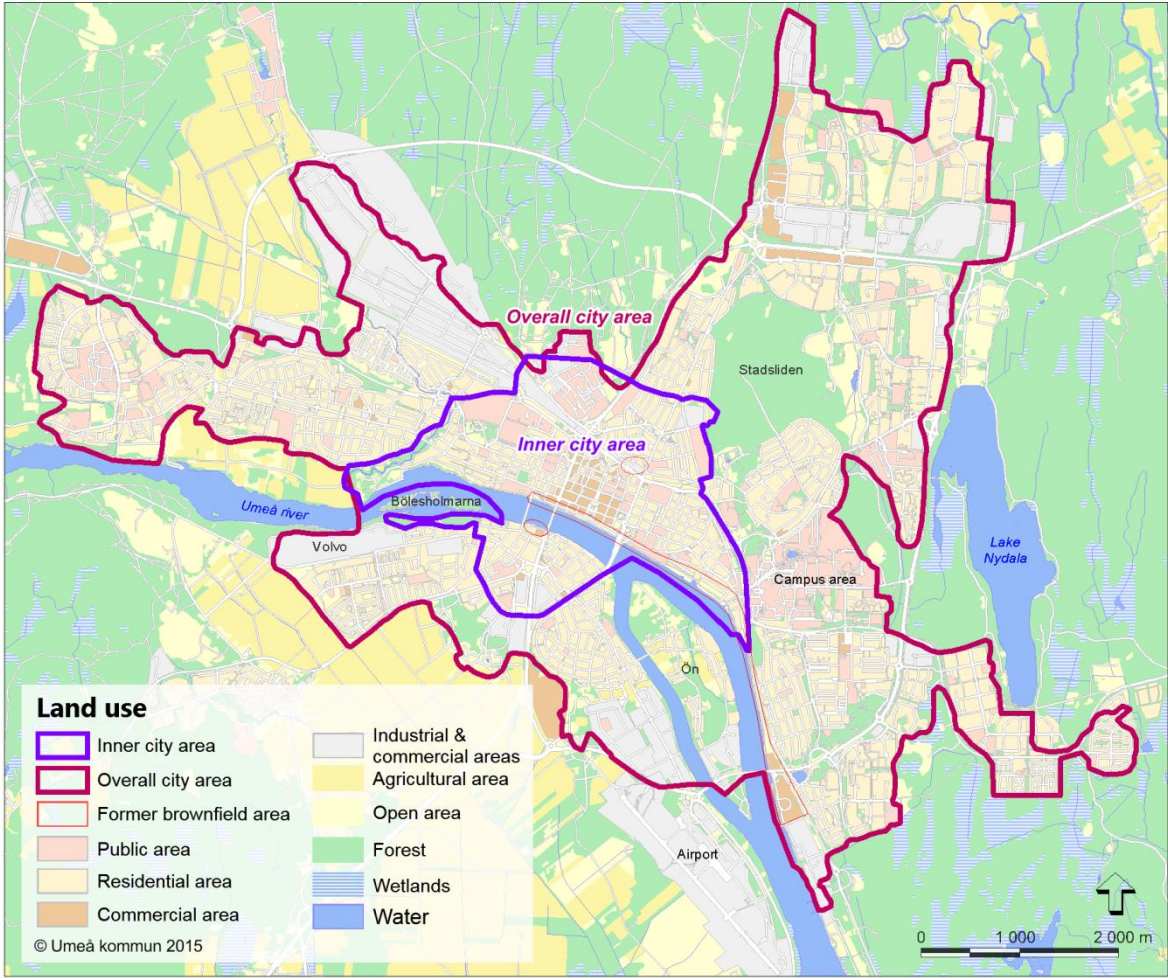


Figure 3A5: land use map of the city area of Umeå. The qualities in central parts have been substantially improved over the last decades: a former saw-mill and grindery situated along the river is now the Arts Campus of Umeå University and a residential area with low-energy buildings and former brownfield areas once containing a wood industry, a shipyard, a brewery and a freight yard are today an attractive recreational area (Figure 3A11).

New developments and population

In order to counteract urban sprawl the urban development process is implemented in a well-defined city limit within 5 kilometres or in appropriate areas where public transport lines can be extended (Figure 3A6).

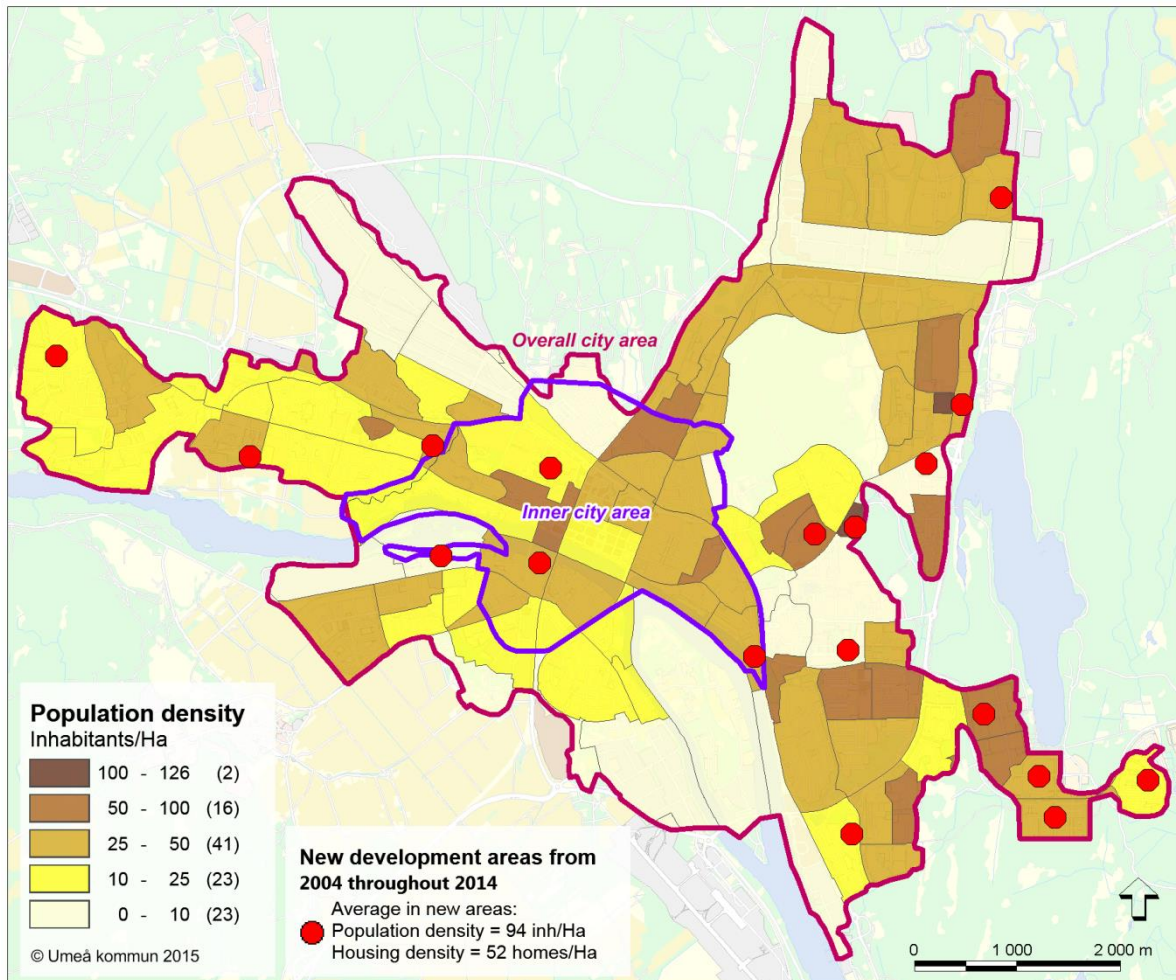


Figure 3A6: average population density in 2015 and in new urban development areas from year 2000 to 2014. The new developments in the city are in line with the development strategies in the comprehensive plan, especially “The city of 5 kilometres” (see more in 3B, Implementing the vision).

Today the average population density in the built-up areas of the inner city (450 ha) is 41 inhabitants/ha and within the overall city (2565 ha) 32 inhabitants/ha.

Valuable green and blue areas

The river area, linking green areas and paths for walking and biking, is important for recreation and a habitat for different species. The river offers many experiences, upstream steep river banks and downstream lush hardwood forest slopes. A design program from

2009 guides the overall structure of the park system by the riverside in the inner city area (see 3B). €8,2 million has been invested in green areas and is still ongoing.

The urban forests on the islets Bölesholmarna, to where a pedestrian bridge will be built in 2016, and in Stadsliden, which is accessible to disabled citizens, are both highly used recreational areas for different activities, both in winter and summer (Figure 5).

Maintenance plans are gradually developed aiming to ensure the forests conservation and recreational values with particular focus to sustain quiet environments near residential areas (see indicator 6). In this, the citizens participate and influence with their experiences and opinions. The investment program regarding maintenance and safety measures in the municipal forests is €0,22 million/year.

The playground policy ensures that all children obtain a satisfactory play environment in their everyday lives. Three adventure playgrounds were constructed between 2002 and 2013 in urban forests, one is under construction and one more is planned (Figure 3A7). In planning playgrounds citizens' dialogue is highly prioritized – €0,55 million annually is deposited in the park budget for this.



Figure 3A7 shows an adventure playground in an urban forest situated close to residential areas. The playground is a popular informal meeting place for different generations with a variety of activities all seasons. These playgrounds are expected to encourage movement between different residential areas and able social interaction.

The 2.300 birches along the inner city streets (9) are a characteristic green structure and a national interest for cultural heritage (Figure 3A8). The City Council's goal of a greener Umeå acts as a protector of the city trees. €0,65 million in investment funds are annually set in order to replace outdated birches and maintain the population.



Figure 3A8: The birches along the inner city streets are an important green urban structure. They improve the air quality and help drain and cool the city.

Quality control

The green target (Figure 3A9) is used as a quick glance on desirable activities. It is also used in the impact assessment for comprehensive or detailed plans.

Green areas in close vicinity to housings offer a diversity of activities

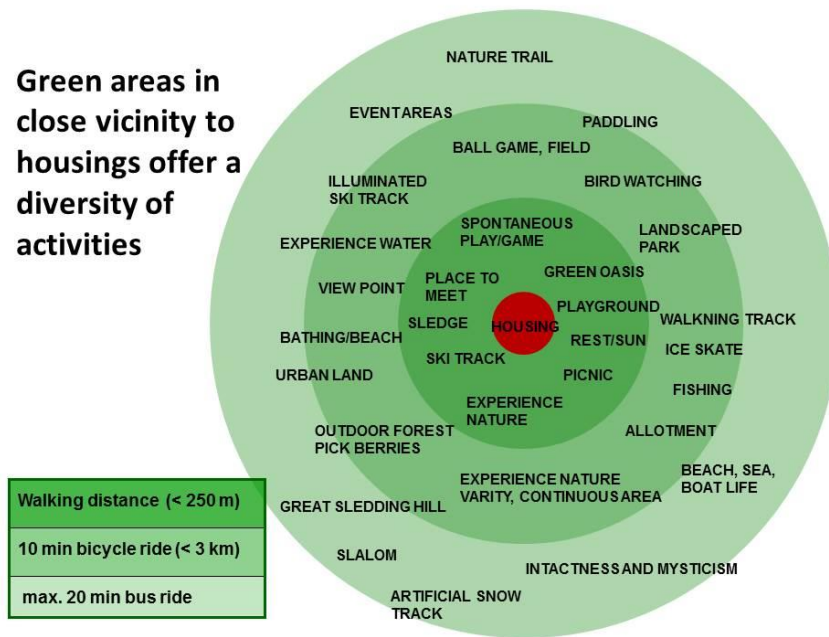


Figure 3A9: The green target is used in planning as a quality control regarding available green urban areas and activities in residential areas. The green target is adopted in the comprehensive plan.

3B Past performance

Strategies and challenges

Umeå's vision is to increase the population to 200.000 by 2050. A vast majority of this increase is proposed to take place by densification within the city boundary. The ongoing densification process is to be implemented in utilized land, neighbourhoods and traffic impediments. The challenge is to densify and create urban quality i.e. develop or balancing the valuable green areas, develop variety and diversity, linked paths, skilled operation and maintenance using mechanical weed control that sustain values despite increased pressure from a growing city.

The six strategies in the comprehensive plan regarding the municipality's sustainable development, all based on Umeå's agreement with The Aalborg Commitments (10), are (Figure 3B10):

- 1) the city of 5 kilometres; a dense mixed city, car reduction, promoting walking and cycling
- 2) a coherent urban landscape, increased flow of people and activities;
- 3) high density in new neighbourhoods
- 4) growth in public transport routes, conversion of traffic routes to urbanity
- 5) invest in green spaces and parks; vibrant public spaces provides attractiveness, beneficial for trade and service
- 6) everyone is included; urban planning will be informed by openness, democracy and equality

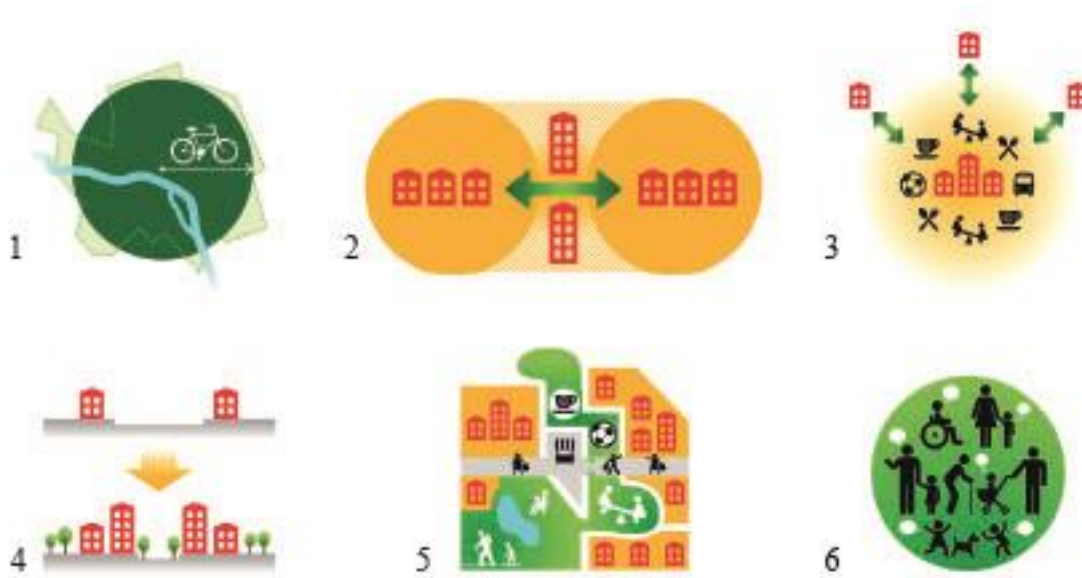


Figure 3B10: the six development strategies in the comprehensive plan regarding Umeå's sustainable urban development.

Implementing the vision

A good practice of citizens' dialogue is the redesigned inner city park Broparken (Figure 3B11), where the new design is the result of a long collaboration and a collective learning process between Umeå Municipality and young people. Representatives of parkour, snowboarding, stage and dance have contributed with their ideas. They have also been involved in the design of details and technical solutions in order to make an attractive park for all citizens. When redesigning the city esplanade (11), there was a thorough collaboration and negotiation processes with businesses, property owners, and citizens. The City Hall axis ends up in the grand City Hall park, recently redesigned and renovated, embracing the river and the connected park system (Figure 3B12).

A long-term vision for the city of Umeå is facing the river, i.e. turning the river into focus has been a strong driver for developing a green infrastructure. The old underused quay and brownfield area is gradually being redesigned and renovated within the frame of "The city between the bridges" (12), which is the most effective measure of sustainable land use. This satisfies the increasing numbers of city dwellers and the following extended pressure on land use and the urban environment is transformed to high quality park systems and squares providing activities and recreation (Figure 3B11).

As a part of "The city between the bridges" and a positive effect of implementing the strategy "a city of 5 kilometres" is that the rebuilt promenade along the river is frequently used. During four months of registration 260.000 pedestrians and cyclists were passing through the area.

Currently, the new urban environment along the river attracts people from all parts of the city including interested visitors. The planning was preceded by extensive cooperation with various public groups, politicians and involved actors where the intention was to create an attractive city centre, vibrant and flexible public spaces of high quality with social and cultural events and activities all year round. When the park system is completed within about 5 years, the former sterile asphalt quay area will be a green coherent system of attractive parks thematically designed with various functions and qualities (Figure 3B11, Table 3B2).

Generally, new residential areas are planned and built close to green urban areas in order to create sustainable environments satisfying social needs and ecosystem services. Adventure playgrounds are planned and built in urban forests located near new residential areas and the green network of bike routes are expanded in order satisfy public health. According to the comprehensive plan all people should be able to reach larger neighbourhood parks and urban forests within 500 meters from their residence and parks within 250 meters which so

far is accomplished. Consequently, coordination for shared use of green space and/or compensation measures is central. In practice, common use of schools and residential areas playground environments require increased maintenance for sustained green qualities.



Figure 3B11: The vision of coherent green accessible high quality areas along the river will be implemented in coming years, at a total cost of €19,2 million – more than half of this to “the city between the bridges”.

Park, green area	Opened/planned	Budget
1., 2. Brosparken and the Parkour park	Opened 2013	€1,7 million
3. Sparken the skate park	Opened in 2010	€1,3 million
4., 5. Young and active (the courtyard of the House of the Young) and Skeppsbron (a new city square)	Planned in 2015-2016	€0,4 million
6. The City Hall Park, the part close to the river	Opened in 2014	€1,8 million
7. The City Hall Park, the upper park and adjacent streets	Planned to be rebuilt 2015	€2,2 million
8. 9. The Seasons park, the east and west part	East part opened in 2014, west part opened in 2015	€3,6 million
10. Djupbäcksterrasserna and The East Station Park	Opened in 2010	€1,7 million
11. The transformation of Ön will contain a bridge and also a few parks in the future	No info	No info
12. Varvsparken	Renovated in 2010-2011	€0,1 million
13. Tjärhovsparken	Planned 2015-2016	€0,7 million
14. The Cherry Bloom Park – Körsbärsdalen	Opened in 2012	€0,3 million
15. Bölesholmarna, urban forests	2009-2013	€0,2 million
16. Bölesholmarna, new bridge	Planned 2016	€5,2 million
Numbers above referring to numbers in Figure 3B11.		Total €19,2 million

Table 3B2: Coherent green accessible areas along the river, timetables and budget



Figure 3A12: the city facing the river with the recently redesigned grand City Hall park in the end of the City Hall axis. Right by the Umeälven riverside, to the left is the new Culture centre where, among other things, the Umeå City Library and Sweden's first and only Museum of Women's History are housed.

Limiting urban sprawl and environmental impacts

The County Administrative Board (13) is the authority responsible for more sustainable green planning limiting urban sprawl on a regional level across municipal boundaries. On a local level, in-depth comprehensive plans are adopted by the City Council for new large residential areas. In practice, these plans represent the strategies for action discussing a diversity of aspects to consider in the densification process. New neighbourhoods are achieved by joint planning of settlements and green areas, coordination and collaboration with involved actors are important.

There is an increased awareness of the need of limiting the impacts of soil sealing and alternatives to impermeable surface are always considered for new urban areas. Wherever possible, soiled sealed areas are removed in the overall city and green spaces and permeable materials are proposed, for example, permeable or semi-permeable materials are often used on pathways, in parks and playgrounds. A green-area factor is used to increase or maintain the proportion of green areas in property land. Green areas, trees and generous walk- and bicycle paths are prioritized in the ongoing reconstruction of oversized urban streets.

The effectiveness of management measures

Overall guidelines to promote and develop the green infrastructure are given in the comprehensive plan. Reconstruction and modernisation of existing parks are focusing on meeting the demands of a growing city.



Figure 3B13: The Season's park (14) along the river side was opened in June 2015. The park is built on 5.000 m² old traffic areas in the inner city.

Umeå's vision for the green urban areas close to the river is clearly pointing towards a variety of activities and experiences. To achieve the vision various architects in each project has been working towards goals as, for instance, temperaments and flexibility and in consultation with different users. Based on the vision, each project has in advance been mapped regarding its future function and type of activities or events aiming to better control operation and maintenance. Implemented projects are monitored by public meetings with user groups and the municipal operational section. Overall, the positive feedback from citizens, local media and other Swedish municipalities is a valuable support giving credit for successful urban management beyond the green progress measured and monitored annually.

The Municipality's website provides broader public opportunities to participate in the development towards a more sustainable urban environment in Umeå. The citizens can give

their opinions for feed-back from politicians and responsible municipal officers, participate in lectures and more (15). Guided tours in redesigned parks and green urban areas are popular events and opportunities to reach knowledge about the ongoing transformation of the city.

3C Future plans

Conditions for a green infrastructure

The comprehensive plan (3A, 3B) is the strategic tool in municipal planning for a green infrastructure in Umeå's future growth. The objectives and overall guidelines illustrated in Table 3C3 are supported by The Swedish Environmental Code (16), which constitutes a stringent environmental legislation aimed at promoting sustainable development, and the environmental objectives (17) managed by The County Administrative Board in the regional work with the municipality.

Future investments have been examined regarding the municipality's responsibility: €1,5 million between year 2014 -2018 is set aside annually for investments in trees, parks etc.; €11million in year 2009-2018 regulates future investments related to the city between the bridges of which €2,7 million remains (3B, Figure 3B11).

Long term objectives for a green infrastructure based on the City Council's overall objectives for urban development	Short term objectives - overall guidelines for a green infrastructure	Support General support by the comprehensive plan	Monitoring/evaluation (In general, the political committees monitor and report progress to The City Council)
Local residents should through dialogue and co-creation be able to influence public space design.	Everybody should be included and equally take part in shaping the society and their own life.	Develop innovative methods for citizen-dialogue. The project Free-zone. Budget €2,0 million.	Reporting to The National Board of Housing, Building and Planning.
The public space should be of high quality. They must offer attractive, safe, clean and sustainable environments, every day - for everyone.	Better integrate the green interests in the planning to secure the social and ecological functions.	An interactive web map is developed, mapping recreational and social landscape, information from the citizens. Used in maintenance plans (e.g. urban forests, budget €0,1 million).	Monitored and evaluated by responsible municipal departments.
	Create or develop close nature environments for high-quality, safe and eventful outdoor activities as well as good recreation.	The first sociotope map is finalised.	The map provides foundation for future detailed plans. Evaluation in the regulated planning process.
		The hiking trail (Figure 3C16)	
		Develop maintenance plans for urban forests.	Monitored and evaluated by responsible municipal departments.
		Performance management and the quality management system are constantly improved to ensure	Monitored and evaluated by responsible municipal departments.

		green resources benefit to the city and its inhabitants.	
Umeå's infrastructure will stimulate increased transit ridership, more cycling, more consistently and reduced automobile. The infrastructure must be effective, safe and accessible to all, all year round.	Opportunities to take advantage of nature's ecosystem services, i.e. storm water management, air quality and human health are investigated in the planning.	A storm water strategy plan to be adopted by the Municipal Council in 2016/2017.	The EU water framework directive influences the approach to water issues.
		The first mapping of ecosystem services is in progress. The map will provide strategic foundation for planning residential areas	The report provides foundation for future detailed plans. Evaluation in the planning process (reported to the Planning and building committee).
	Utilization of protected green areas is compensated with similar habitats through management plans.	Currently no action.	The strategy will be reviewed and further developed.
Umeå will become a greener city. A diversity of experience-rich parks, natural areas and green areas ensuring all citizens access to a wide range of activities and recreation.	Availability and accessibility to parks and green areas favouring dispersal of biological species.	The municipality's specific policy program regarding urban trees is in progress.	Monitored and evaluated by responsible municipal departments. Evaluation reports to the Technical committee.
	A clear justification of the design and function of the green areas from a social and ecological perspective in detailed planning.	Guidelines to assure technical function are in progress (technical manual). Guidelines to improve ecological function are in progress (green checklist).	Monitored and evaluated by responsible municipal departments.
	Areas of nature conservation value are updated in a GIS-based database for future assessments of biodiversity affected by future planning.	A biotope map will be available in 2017 (Figure 3C15).	Methods for evaluation will be produced by responsible municipal departments.
	The forests recreational values should be taken into account as far as possible in the maintenance of urban forests and forestry.	An urban forest management plan will be developed in 2016-2017.	
		The municipality's specific policy program regarding urban forests is in progress.	Monitored and evaluated by responsible municipal departments.
	Develop a clear objective of sustainable green cityscape, e.g. a green indicator, to facilitate planning.	Quality program to assure sustainable design and construction and promote high-quality architecture in the development of Ön.	The program provides foundation for future detailed plans. Evaluation in the regulated planning process.

Table 3C3: Illustration of the significant objectives related to change towards a green infrastructure in planning and practice.

In order to achieve the objectives presented in Table 3C3 and for progress in the sustainable urban development discourse additional supporting actions and visions are:

- The objectives and guidelines will be included in a green structure program. The program is an implementation- oriented guide for municipal operations affecting the green structure and a “land-bank”, i.e. a list of areas that could be converted to park land and/or natural environments as well as a system for green indicators.
- The current green park program adopted in 1999 has to be replaced by an updated green park program. The plan will include guidelines, priorities of activities, estimates of costs, stakeholders, time schedule and a monitoring plan for all future municipal activities concerning urban green infrastructure.
- Management plans will be developed for green spaces and recreational areas worth protecting. The plans will control the development of the areas in a long term perspective with respect to natural values and nearby residential areas.
- Involve and inform politicians, private/market stakeholder’s in the future sustainable discourse. The standpoints in the comprehensive plan set the standards regarding urban planning.
- Sociotope maps are important tools in urban green planning showing how people use and values public spaces in the city. The mapping will be continued for new urban developments based on investigations with citizens, systematic site observations and surveys, meetings and interviews.
- There are ongoing collaboration projects with a variety of actors and stakeholders regarding plans of future urban development and to strengthen the city core, for example a lighting program for the winter, summer and autumn, winter city (Figure 3C14), application to become The city core of year 2017.



Figure 3C14: There are continuous developments of outdoor activities in winter e.g. linking skiing tracks with lightning and other possibilities for recreation. Depending on good access to snow, winter activities as snowboarding is often possible in the inner city park area.

- There are increasing demands for plots and allotments in varied forms in the urban area which has to be satisfied. An overall goal is that allotments should be located in or near all residential areas outside town centre, which should be secured in the detailed planning, and plots preferably in the transition between residential areas and cultivated land.
- The densification strategy is implemented in the plan but yet not realized on the urban island Ön (18), a rural environment with a sparsely populated area (Figure 3A5). The comprehensive plan for the island shows how the urban landscape will provide a diversity of green qualities.
- A biotope map will be available in 2017 (Figure 3C15) showing different kinds of green, blue and sealed biotopes in the city (see indicator 4).



Figure 3C15: current land-use map to the left incorrectly illustrating green urban spaces compared with the real distribution of green urban spaces shown to the right. The forthcoming biotope map will be an important basis in planning urban environments providing data regarding soil sealing, green structures and different biotopes.

- The comprehensive plan provides visions addressing the green structures with specific targets to be implemented, i.a. a hiking trail (Figure 3C16). This easier-to-reach hiking trail would facilitate the use of the diversity of natural experiences in the urban nature environment around Umeå supporting outdoor activities as skiing, bird watching and more, but is not yet realized in the plan.



Figure 3C16: Illustration of the vision of a hiking trail with several green corridors linking the city of Umeå to the surrounding urban nature environment.

- The ongoing redirection of the thoroughfare of the E4 European highway (19) around Umeå provides new opportunities (Figure 3C17). At present, the municipality is working on an action plan for future reconstruction of the derelict land. The former infrastructure areas will be transformed into attractive residential areas with green urban environments adjacent to the city.

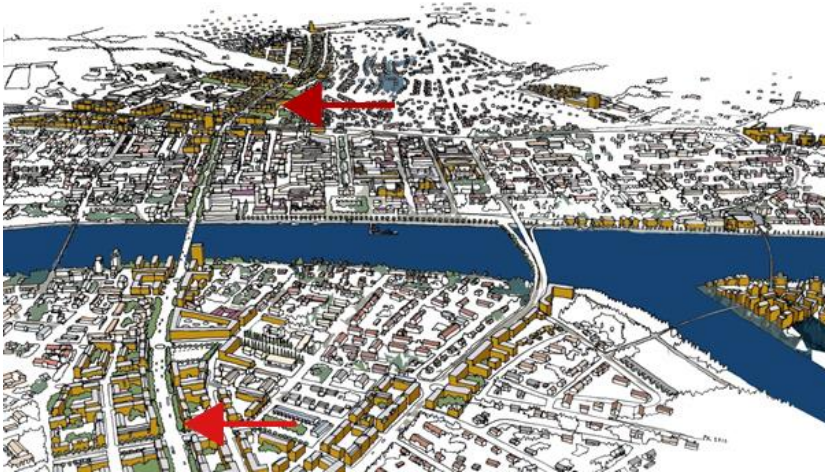


Figure 3C17: illustration of the E4 European highway, which today is a strong barrier through the city landscape, below the vision of Umeå in 2050. The planned transformation of the E4 European highway illustrated with new residential areas mixed with green spaces creating a city street favouring pedestrians and cyclists on former infrastructural areas.

Balancing consequences of future climate change

The EU Water Framework Directive adopted into Swedish law in 2004 influences the approach to water issues in Sweden (20). According to the Framework Directive Umeå is developing an action program regarding how the municipality shall work to achieve and promote water quality standards. This program together with environmental quality standards, implemented in The Swedish Environmental Code for water, influences storm water management regarding when and how much treatment is required and the planning of a green infrastructure.

The action plan for climate change adaptation adopted by the County Administrative Board 2014 coordinates the regional effort to adapt society to a changing climate (Indicator 1). The action plan focuses on measures to prevent future problems where the importance of more sustainable storm water management in physical planning which is a strong incitement for a green infrastructure. The action plan implemented in local action plans together with ecological and social values will form the basis for a green infrastructure in urban planning.

3D References

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(14) The Seasons' park.

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