06.05 Availability of Public, Near-residential Green Spaces (Edition 1995)

Overview

Densely built-up urban space is characterized by high structural exploitation of land and a low proportion of remaining open space. In the inner city and in the densely built-up outskirts, only few useful open spaces are available for recreational purposes. The large near-urban recreational areas lie on the outskirts of town and/or further outside the city and are too difficult to reach for many recreation-seekers.

Within the densely built-up spaces, **public green spaces**, i.e., generally accessible areas under the legal responsibility of the Conservation and Green Space Agencies, as places for regeneration and physical/emotional adjustment, assume an important role for the recreation of the population.

Green spaces should fulfill different demands with regard to the attainability, size, equipment and form, according to the different recreational needs of the population.

For instance, the distance acceptable for reaching a green space (entrance area), is essentially determined by the free time which the individual has available for open-space-related recreation. If that time is limited, the green space must not be too far away. Good attainability of a green space is an important criterion for open-space leisure for less mobile sections of the population, such as senior citizens. Thus, near-residential green space is of great significance.

The demands of recreation seekers on the **size** of the open spaces and the multiplicity of its **equipment and form** grow with the duration of the time spent on the green space. Thus, on weekends, larger parks with an abundant array of use possibilities are much frequented. For instance, groups with children prefer non-regulated park areas, such as open green spaces, while senior citizens tend to prefer more generously equipped areas (cf. Gröning 1985).

The distinction is made between near-residential open space and near-development open space, whereby assignment to a category depends on area size.

Near-residential open space is associated with the direct residential area, its intake area being limited to 500 m. It can be reached in a short time (approx. 5-10 min. by foot), and with slight effort, and serves predominantly for short-term and after-work recreation. Because of its proximity to housing, this type of open space has a particular significance for less mobile sections of the population, such as children, senior citizens and handicapped persons. Near-residential open space is also of high value for employed persons, who can use it in their free time for a short stay outdoors. As a rule, green spaces of small size (as little as 0.5 ha) suffice for the demands of short-term and after-work recreation.

Near-development open space, which includes all green spaces of over 10 ha, is also designed to serve half and all-day recreation. Higher demands are associated with it, both in terms of size and of equipment diversity. Near-development green spaces of more than 50 ha in addition assume the function of superior-quality open spaces with multi-borough significance for the recreation of the Berlin population (e.g. the Great Tiergarten, Wuhlheide Public Park). The intake area of near-development open spaces ranges from 1,000 to 1,500 m, depending on the size of the facility. Fundamentally, a near-development open space should always also fulfill the function of a near-residential open space (for the break-down, cf. Tab. 1).

The following standard values are targeted in Berlin for the **availability** of open spaces to the population:

near-residential open space: 6 m^2 per inhabitant (m^2/inh.),

near-development open space: 7 m^2/inh. (cf. “Richtwerte für Frei- und Grünflächen” der Senatsverwaltung für Bau- und Wohnungswesen, Sept. 1973, from Schindler 1975 and 1976, from Kellermann 1979 and from AG Freiraum und Ökologie 1982).

Tab. 1: Breakdown of the Berlin Open and Green Spaces			
Type of open space	**Near-residential open space**	**Near-development open space**	
Minimum size	0,5 ha	10 ha (neighborhood park)	50 ha (borough park)
Guideline	6 m^2/inh.	7 m^2/inh.	7 m^2/inh.
Intake area	500 m	1,000 m	1,500 m

Tab. 1: Breakdown of the Berlin Open and Green Spaces

For the assessment of the availability of near-residential open space, only those green spaces suitable for recreation were considered. Thus, only such facilities count as useful, which fulfill corresponding minimum requirements with regard to area size, area shape, accessibility and also noise and air pollution (cf. Methodology).

The degree of availability (in m^2/inh.) in a residential areas is calculated on the basis of spatially-defined intake areas, and derived from the size of the facility in relation to the number of inhabitants in the intake area. Residential areas outside the defined intake areas are considered as in principle non-provided.

The **construction structure of the residential buildings** constitutes a further criterion for the evaluation of open space availability (cf. Methodology). If deficits exist in the availability of public green spaces, it can be assumed that private / semi-public open space will compensate in part for the need for public areas. In fact, the availability of open spaces in single-family-dwelling developments with private yards, in which a large portion of open-space-related recreation can occur, is better than in densely-inhabited pre-war apartments which offer no possibilities for leisure in private open spaces. The construction structure thus counts as an indicator for the available share and/or need for private open space. Only a combination of the calculated degree of availability and the existing construction structure provides a differentiated picture of the actual situation.

The quality of the equipment of a green space, upon which the number of users that can use the facility essentially depends, was not considered in the availability analysis. If green spaces are lacking in proximity to a residential area, increased pressure is generated upon further-removed facilities, which contributes to sometimes major impairment of the quality and to limitation on the usefulness of the latter green spaces.

Statistical Base

The statements about **size and location** of individual green spaces are taken from Section III B of the Green Space List of the Berlin Department of Urban Development and Environmental Protection (SenStadtUm) (for East Berlin: June 1991, update of August 1992; for West Berlin: September 1992). When the data situation was not clear, the Conservation and Green Space Agencies of the respective boroughs were approached.

The basis for the estimate of **noise pollution** in green spaces near heavily-traveled streets and for traffic-based limitations on the intake areas was the traffic data from the SenStadtUm “Traffic Noise Map of Berlin” (status for East Berlin: December 1991; for West Berlin: March 1993) (cf. IVU 1993).

The assessment of the statistical residential blocks or segments in the **intake areas** of the green spaces was accomplished using the digitalized map of the Berlin Environmental Information System at a scale of 1:20,000, in which both the residential block or segments and the actual uses are shown.

The **number of the inhabitants** per residential block was taken from the residents' file of the State Statistical Agency (as of December 1991) (cf. State Statistical Agency 1994).

The statements about the **use** of the blocks of flats and as to the respective construction structure type are based on the Use Data Base of the SenStadtUm Ecological Planning Bases Team (as of 1990).

Methodology

The **inventory analysis** covered all open spaces listed in the Green Space List, and hence open to the public, with the use type "park and green spaces."

For the East Berlin boroughs, the probable status of the open spaces first had to be determined, since the major part of the areas listed in the Green Space List, at the time of compilation, were still in the hands of the boroughs, and thus under the legal auspices of the Green Space agencies, although a reorganization and/or change of ownership was to be expected for many areas.

Areas which, according to estimation of the Green Space agencies, would remain under their jurisdiction, and would in addition retain their public character, were classified as public. The basis for this estimation was, as a rule, preliminary consultation between the Conservation and Green Space agencies, the Urban Planning Agency, Public Housing Companies and the Trust Holding Agency (*Treuhand*) (as of November 1991). The inventory analysis incorporated all parks and city squares, but also areas within those new residential areas generously interspersed with green spaces, for instance, along the so-called "supply corridors" or in the large residential courtyards, provided these constituted an unbroken area of more than 1 ha, and were generally accessible.

The statements regarding probable status of the areas represent the status as of November/December 1991, and are to be reexamined after clarification of ownership and responsibilities.

Appraisal of the Suitability for Recreation

Since near-development green spaces can also fulfill the function of a near-residential open space, the **appraisal of the suitability for recreation** covered all green spaces over 0.5 ha with regard to the observance of the **minimum requirements** for near-residential open space examined (cf. Kellermann 1974). The appraisal of the green spaces was based on the existing data and map material.

The following criteria were used for the appraisal:

- **Area size**

  Open spaces for near-residential recreation must have a minimum size of 0.5 ha, to make the type-specific use possible. For green spaces cut by streets and for which size data for the individual parts is lacking, open spaces are considered only if one of the segments is larger than 0.5 ha.

- **Area shape**

  The open space must be at least in part broader than 15 m. Areas with embankments must have a level space of at least 15 m.

- **Accessibility**

  Unhindered accessibility to the open space must be guaranteed. Green spaces may not be surrounded entirely by obstacles which shut out the intake area. Obstacles include heavily-traveled streets (more than 10,000 motor vehicle/day), rail lines, bodies of water and enclosures (such as at the Kaulsdorfer Busch / water reservoir). The possible existence of pedestrian footbridges and/or tunnels, or of traffic lights, which could mitigate the barrier effect at isolated points, was not considered.

- **Ecological damage**

  Noise pollution and air pollution diminish the recreational value of a period outdoors. Since detailed measurements and/or prepared data in reference to the situation in green spaces were not available at the time of compilation, the pollution factor is here limited to the element of traffic noise.

For green and open spaces, German Industrial Standard (DIN) 18005, 5.87, Sound Protection and Urban Development for Urban Development Planning, specifies a limit of 55 dB (A). With free acoustic propagation, this limit can be reached on a city street with a speed limit of 50 km/h even at a vehicle load of 2,000 motor vehicles per day. Major thoroughfares are as a rule burdened with far more than 10,000 motor vehicles per day. This corresponds to a noise pollution of more than 60 dB (A), and frequently more than 70 dB (A). Intermittent vegetation in green spaces provides no noise buffer. A reduction of the noise can be ascertained solely at increasing distance from the source of the noise. Due to the location of many green spaces on heavily traveled streets, a large number must be considered heavily noise-polluted, and would not therefore be classified as useful for recreation. As a minimum requirement, it was stipulated that at least a part of the open space had to be unaffected by major ecological damage. This criterion was further specified to indicate that an open space on a

heavily-traveled street - with a noise level of more than 70 dB (A) - would only be classed as suitable for recreation if it had a minimum depth of 100 m from the street, or a minimum size of 1 ha. Minimum size and/or depth should guarantee that a visit to the open space would be possible at a distance from the street. Green spaces with a size of over 1 ha were thus fundamentally classified as useful.

Minimum requirements with regard to the **equipment** of open space facilities were not included in the appraisal, since some open spaces examined, especially in East Berlin, are inadequate in terms of equipment. Deficits in this area can be corrected with the appropriation of sufficient funds, however, so that this was not considered a criterion for exclusion.

The Britz Garden in Neukölln und the former horticultural exhibition area in Marzahn constituted two exceptions in the appraisal. Both green spaces are limited in their accessibility by entrance fees, and they do not fall under the responsibility of the Green Space Agencies. Because of their important recreational functions, and the relatively low entrance fees, they were nonetheless classified as fully useful green spaces.

Altogether, 779 public green spaces had a minimum size of 0.5 ha, and were included in the appraisal. Of these, 557 could be classified as fully useful, while 222 green spaces did not meet the standards, 84 of them because of too-high noise pollution levels (cf. Tab. 2).

Tab. 2: Distribution of Public Green Space > 0.5 ha among the Boroughs, by Open Space Type and Category for Recreational Suitability

	Total open space	Total usable open space	Near-residential open space			Near-neighborhood open space (incl. superior-quality open space)	
Borough			**Evaluation**			**Evaluation**	
			A	B	C	A	C
Mitte	29	17	17	5	7	0	0
Prenzlauer Berg	17	14	12	2	1	2	0
Friedrichshain	21	11	10	4	6	1	0
Treptow	19	15	13	2	2	2	0
Köpenick	36	25	23	2	9	2	0
Lichtenberg	26	19	18	2	5	1	0
Weissensee	11	5	3	2	4	2	0
Pankow	30	22	18	3	5	4	0
Marzahn	41	33	30	1	7	3	0
Hohenschönhausen	11	9	7	0	2	2	0
Hellersdorf	12	11	11	0	0	0	1
Tiergarten	27	13	10	3	11	3	0
Wedding	26	15	12	8	3	3	0
Kreuzberg	32	23	22	3	6	1	0
Charlottenburg	41	28	22	2	11	6	0
Spandau	90	71	60	10	7	11	2
Wilmersdorf	24	17	16	4	3	1	0
Zehlendorf	43	37	29	5	1	8	0
Schöneberg	18	14	13	3	1	1	0
Steglitz	48	32	30	6	10	2	0
Tempelhof	38	29	26	2	7	3	0
Neukölln	46	36	31	5	5	5	0
Reinickendorf	93	61	52	10	21	9	1
East Berlin	253	181	162	23	48	19	1
West Berlin	526	376	323	61	86	53	3
Berlin (total)	779	557	485	84	134	72	4

A fully useful public open space - all minimum requirements are fulfilled

B limitation on recreational use due to traffic noise

C limitation on recreational use due to unfavorable area shape, segmentation of the total area, or conflicting utilization

Tab. 2: Distribution of Public Green Space > 0.5 ha among the Boroughs, by Open Space Type and Category for Recreational Suitability

Survey of Intake Areas

All green spaces which were determined as to be useful were recorded on the basic maps in a scale of 1:20,000, and assigned an intake area.

The intake areas were determined by means of a circle drawn around the respective open space, with the distance determined as the crow flies. To compensate for the difference between this distance and the actual walking distance to the green space, 10% was subtracted from the maximum distance. Thus, a radius of 450 m resulted for near-residential open spaces.

For smaller open spaces, the center was chosen as the point of origin of the radius; for larger spaces, the entrance area was used (approx. 100 m inside the open space).

The intake area of a green space can be reduced by psychological or physical barriers which exist within the intake area. Physical barriers include rivers and canals, railroad lines, airports, and also streets with a traffic volume of over 10,000 motor vehicle per day. The schematically determined intake area was corrected by the consideration of the available barriers.

Wooded areas also were assigned an intake area, provided they fulfilled the minimum requirements for accessibility and size. The assumption was that the edges of forests can assume the functions of a near-residential open space, while for agricultural areas, recreational use is impossible, or is reduced to a few fringe areas.

Calculation of the Degree of Availability

According to the standard value valid in Berlin, the availability of public green spaces to the population at a level of 6 m^2 or more near-residential open space per inhabitant is considered sufficient. On the basis of this standard value, the degree of availability (m^2 of green space/inhabitant) was broken down into four levels.

The categories are: Areas of availability, where near-residential green space is available at a level of more than 6 m^2 per inhabitant (Category 1); Areas of non-availability, which have no useful green space (less than 0.1 m^2/inh., Category 4); and Areas of insufficient availability, including all residential areas with a degree of availability between 0.1 and 5.9 m^2 /inh. Availability of less than 50% of the standard value, i.e. less than 3 m^2/inh., is shown separately (Category 2: 3.0 - 5.9 m^2/inh.; Category 3: 0.1 - 2.9 m^2/inh.). For the calculation of the respective degree of availability, the number of inhabitants in the intake area of a green space was divided by the size (the calculated population by the m^2 of green space). All intake areas of forest edges count as areas of availability.

If statements are necessary on availability in a specific situation, this generalized statement will need to be concretized in order to render a judgment on the possible recreational function of a forest or forest edge.

The superimposition of a matrix of the degree of availability over a map of the construction structure of residential areas provides further insight into the availability situation. It does not, however, provide additional evaluation material.

Deduction of the Housing Type

The construction structure can be examined as an indicator for the available share of private open space. Areas with different construction structures, but with comparable shares of private/semi-public open spaces, were lumped together, and classified into three categories (cf. Fig. 1):

- **extremely slight share of private / semi-public open spaces**

This involves predominantly areas of closed-block development (up to 1914), including all preservation-oriented reconstructed blocks integrated into this construction structure. In addition, core and mixed areas are counted in this category.

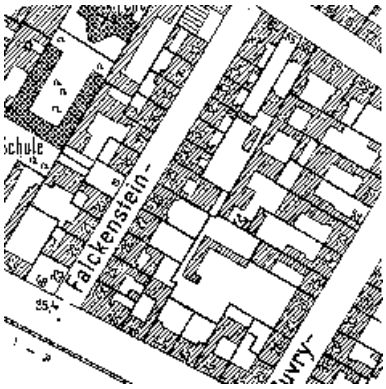
- **slight to medium share of private / semi-public open spaces**

To this category belong all construction structures which display large quadrangles or strips of green space (development from the twenties and thirties and/or from the fifties and sixties), and the high-rise apartment developments on the outskirts of town with generous green spaces (green separators) between the buildings. Furthermore, the redeveloped apartment blocks also include closed block development which was decored completely and thus displays larger open spaces.

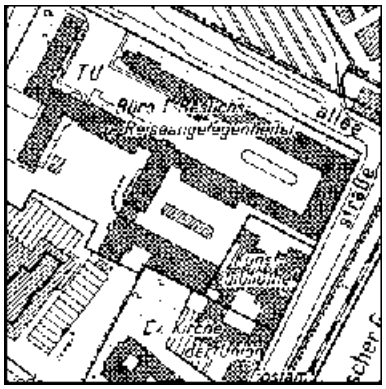
– **medium to high share of private / semi-public open spaces**

This category includes all open development (for instance single-family or row-house development). The buildings to a large extent have their own gardens, so that the share of private green is very high.

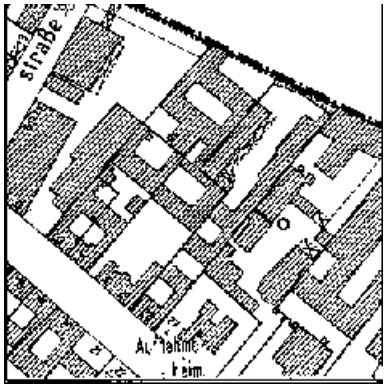
1. Extremely slight share of private / semi-public open spaces



Closed block development (up to 1914) including integrated blocks with preservation-oriented rehabilitation

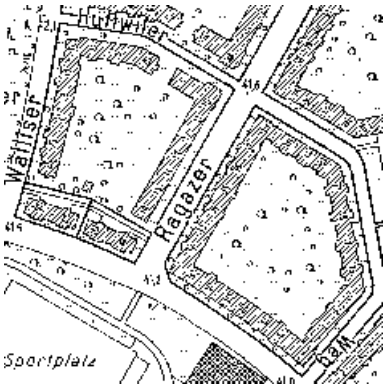


Core area

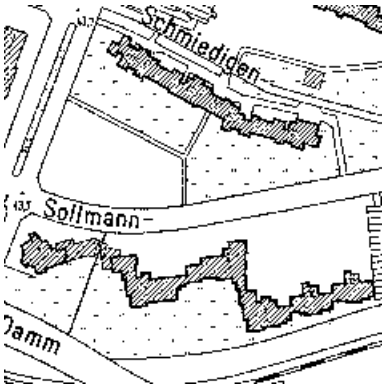


Mixed areas

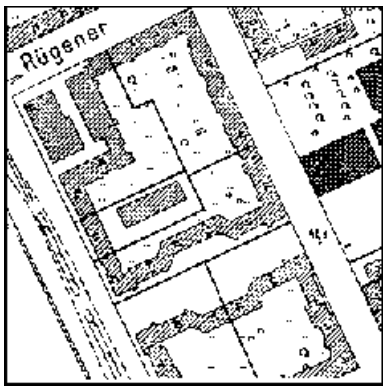
2. Slight to medium share of private /semi-public open space



Large greened quadrangles or with loose rows (development of the '20s and '30s, or the '50s and '60s)



High-rise residential areas on the outskirts, with generously designed green fringes between the buildings



De-cored blocks of redevelopment areas with larger open spaces within the closed block development

3. Medium to high share of private / semi-public open space

Loose development with single-family or rowhouses

Fig. 1: Various Construction Structure Types with Different Shares of Private / Semi-public Open Space

Map Description

The total area at useful near-residential green spaces is differs greatly between the Berlin boroughs. The least amount of area is available in the borough of Weissensee, with 7 ha at its disposal, followed by Hellersdorf with 9.7 ha. By contrast, the borough of Spandau has green spaces with a total area of 180 ha; in Reinickendorf, there are 134 ha.

The degree of availability per borough is derived by taking the population into account. The standard value of 6 m^2/inh. for near-residential green space is reached only in the boroughs of Zehlendorf and Spandau, while Reinickendorf, with 5.3 m^2/inh. barely misses the target. With 0.7 m^2/inh., Hellersdorf has the worst degree of availability value, followed by Friedrichshain, Weissensee, Wilmersdorf and Hohenschönhausen. In these boroughs, availability is below 1.5 m^2/inh. (cf. Tab. 3).

Tab. 3: Availability of Recreation Area (m2) of the Open Space Type Near-residential Green Space per Borough			
Borough	**Population 1)**	**Near-residential green space (in m2) 2)**	**Degree of availability (m2/inh.)**
Mitte	82,061	359,153	4.38
Tiergarten	94,841	165,810	1.75
Wedding	167,683	302,440	1.80
Prenzlauer Berg	145,900	241,879	1.66
Friedrichshain	105,766	115,260	1.09
Kreuzberg	156,668	476,677	3.04
Charlottenburg	183,242	343,760	1.88
Spandau	217,458	1,804,864	8.30
Wilmersdorf	145,239	199,772	1.38
Zehlendorf	99,878	916,901	9.18
Schöneberg	155,408	268,598	1.73
Steglitz	190,244	753,121	3.96
Tempelhof	190,834	675,405	3.54
Neukölln	314,123	936,136	2.98
Treptow	106,271	207,320	1.95
Köpenick	108,743	457,081	4.20
Lichtenberg	165,579	516,294 3)	3.12
Weissensee	52,757	70,736	1.34
Pankow	106,547	295,078	2.77
Reinickendorf	254,793	1,339,752	5.26
Marzahn	163,497	540,947 3)	3.31
Hohenschönhausen	119,271	164,970	1.38
Hellersdorf	134,618	97,013	0.72
East Berlin	1,291,010	3,065,731	2.37
West Berlin	2,170,411	8,183,236	3.77
Berlin (total)	3,461,421	11,248,967	3.25

1) Legally-registered inhabitants in Berlin, as of: 31 Dec. 1993 (cf. *Statistisches Landesamt* 1994)
2) Rated as fully useful, near-residential green space, (cf. *PLANTAGE* 1992a/1992b)
3) The green spaces at Tränkegraben in Lichtenberg and at Springpfuhl in Marzahn are only provisionally counted as near-residential green spaces, because of unresolved delimitation and resulting unclear status regarding area sizes.

Tab. 3: Availability of Recreation Area (m^2) of the Open Space Type Near-residential Green Space per Borough

As can be seen from the map, a large portion of Berlin's residential areas has no near-residential green space available, or has very insufficient availability.

Inner City Areas

An especially extreme situation exists, as is to be expected, in such **inner city areas** as the boroughs of Prenzlauer Berg, Friedrichshain, Schöneberg, and in parts of Kreuzberg and Neukölln.

In the inner city, small green spaces isolated from one another prevail. They are often laid out as city squares, and can thus come nowhere near to covering the need for near-residential green space caused by high population density. Even residential areas in the intake areas of large green spaces have insufficient availability (example: residences in the intake area of the Görlitz Station green space in Kreuzberg).

The dense network of heavily-traveled streets in the inner city hurts the accessibility of many open spaces, so that frequently, even residential areas directly adjacent to a green space have to be considered as having no availability because of the barrier effect of the street (examples: the residential area at the Hasenheide Public Park, the Treptow Park, the Viktoria Park or the Weissensee Public Park).

In the densely built-up areas, green belts have a positive effect on open space availability. Their strip-like shape gives them an expanded intake area. As a result, these near-residential green spaces are

accessible for many recreation seekers, which has positive impact on the availability situation (examples: the Panke green belt in Wedding, the green belt in Britz, the Wilmersdorf Public Park).

Generally, in inner city areas with insufficient availability of green space, closed block development prevails, or else these are core areas characterized by a low level of private and/or semi-public open spaces. In these areas serious open-space deficits exist, both in the private and in the public sector.

Outlying Boroughs

In the **outlying boroughs** the situation is altogether better. The available green spaces are frequently large; in some cases, forest areas come up directly to residential areas. The population density is obviously low, due to the less dense development structure.

Although the level of availability is essentially higher than in the inner city, there are also areas with considerable availability deficits in the outlying parts of Berlin. In Hellersdorf and Weissensee, for instance, the small number of near-residential green spaces means that very few residential areas have green space available. Also, there are parts of Steglitz, Tempelhof and Marzahn which have no green spaces in residential proximity.

In addition, all boroughs with better availability also include local areas of insufficient availability, such as Friedrichshagen ward in the borough of Köpenick, or the residential areas along Obstallee and Heerstrasse in the borough of Spandau.

As a rule, the level of private green space is relatively high in the outlying boroughs, because of the prevailing single-family and/or row house development, so that deficits in the public sector are compensated in part.

The situation is very different, however, in those developments on the **outskirts of town** characterized by single high-rises or high-rise chains, which in some cases have considerable open space deficits. While the availability in the Märkischer Viertel, in Gropiusstadt and in some residential areas of Marzahn is as high as 3.0 to 5.9 m^2/inh., the new residential areas of Hellersdorf and Hohenschönhausen, as well as in northern Marzahn have extremely insufficient availability. Of course, the larger, semi-public open spaces of these residential areas provide a certain open space potential for recreation; however, the leisure quality of these spaces, which are generally conceived as green separators, is frequently too slight to permit them to compensate for deficits in public green space.

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