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## **Buildings and Bridges**

On the 60km long Frankfurt Bridges above motorways, 1.15 million square meters of building space are being created - including around 875,000 square meters of affordable housing and 275,000 commercial space for culture, education, sustainable business and much more.

The "Frankfurt Bridge World" is flooded with light - artistic and beautiful from all sides: greenery on top like the High Line in New York, artistic design or vegetation on their sides and light and bright below them: Light holes in the bridge corpus, covered with walkable glass, flood the area under the bridges with sunlight.

Numerous quarters with different themes and architecture from different eras are being created on the bridges: the youth campus at Platz der Republik, "Little Soho" - the quarter for the homeless at the main bus station, the "North Sea Mile" above Rosa-Luxemburg-Allee, the "Rainbow Quarter" with LGBTQIA+ offerings at Rebstockpark, the IT Campus above Hanauer Landstrasse, and many more. The motto of the whole project is important: EVERYONE should win.

The residents of the bridges win through the green diversity and traffic connections in front of their door - and those of them who are partly shaded by the bridge structures get their warm rent refunded for up to 5 years, depending on the degree of shading - or receive alternative living space, their own allotment gardens on the bridges or other compensation of all kinds. 285 million euros were to be budgeted for compensation payments to residents along the bridges. This may sound exorbitant, but it amounts to less than 1 percent of the construction sum - an investment that is extremely worthwhile because if everyone should win, the most important stakeholders of the Frankfurt Bridges, namely the residents, also have to "win".

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The Bridge World The Frankfurt Bridges are light, green and artfully designed from above, below and from the side



Humane affordable housing near the city centre 875,000 square feet of affordable housing created with humane building concepts



#### **Special Quarters**

Lantern Square, Little Soho and much more: on the bridges there is a colourful variety of neighbourhoods with different focuses



#### **Bridge Diversity**

Steel trusses à la Eiffel Tower, ultra-modern arched bridges or columned bridges with stonemasonry: depending on the section, a suitable construction method will be implemented



#### **Resident compensation**

The bridge corpus is always kept minimal at bottlenecks. Where they nevertheless shade residents, there is an attractive and fair compensation program



#### **Architectural Diversity**

Many eras of architecture are represented on the Frankfurt Bridges, from the historic to the modern

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### The Bridge World

The Frankfurt Bridges are bright, green, flooded with light and artfully designed from above, below and from all sides. They lead in a ring around the city centre and run with their arms in all cardinal directions, so that many points in Frankfurt are directly connected that were previously only accessible door to door by car. At the ends of the bridge arms are small marketplaces where shops, bistros, doctors' offices, etc. are open 24/7. Behind the marketplaces are the maintenance and parking tracks for the bridge vehicles. "Operator kiosks" of the bridge foundation provide organization and information about bridge life, placed at intervals of about one kilometer on the bridges and serve as a contact point for anyone seeking help.

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### Content: The bridges will be integrated into the city and will enhance quality of life in the neighbourhodds along their course

The bridges will be adapted to the surrounding architecture: a bright and artistic variety of architectural styles, with modern sections as well as with reference to earlier architectural styles. The end sections of the bridges will also be designed in a lively and aesthetically pleasing manner so that no loneliness or neglect take place there.

A variety of light holes in the bridges provide sunshine under the bridges: either as actual holes in the bridge with railings around them, or covered with walkable glass. The bridges are a safe street for all residents and neighbouring quarters of the city, with well-lit stairs and elevators

As an on-site management infrastructure and contact point for all people's needs, there are operator kiosks of the bridge company every few hundred meters.

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## While life goes on at the top of the Frankfurt Bridges, traffic continues to flow undisturbed underneath and can continue unimpeded on either side of the bridge

An important principle in the planning of the bridges: no tree along the bridge may fall victim to the construction project, no bicycle path and no sidewalk may be impaired by the bridge columns.



The bridges can be integrated without affecting road traffic or things on the roadside: The bridge height of 5.20m is above the prescribed minimum clearance height of 4.50m for vehicles on German roads.

The distance of the bridge columns of approx. 8m is variable according to the construction statics system up to one meter to the right and to the left, so that trees, car entrances and exits, cables and pipelines in the ground etc. can always be taken into account.

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For special sections, for example with old trees in the middle, special solutions must be found: e.g. the bridge deck can be placed so high that it appears far away (almost like a gondola) - or the entire bridge surface is made of glass and thus flooded with light



No tree should have to give way to the Frankfurt Bridges infrastructure project: Where there are old trees, the bridge section runs above the treetops - with glass inserts in the ground.

On narrower roads, almost the entire bridge corpus is made of high-strength trafficable glass, so that it also remains very light under the bridges.

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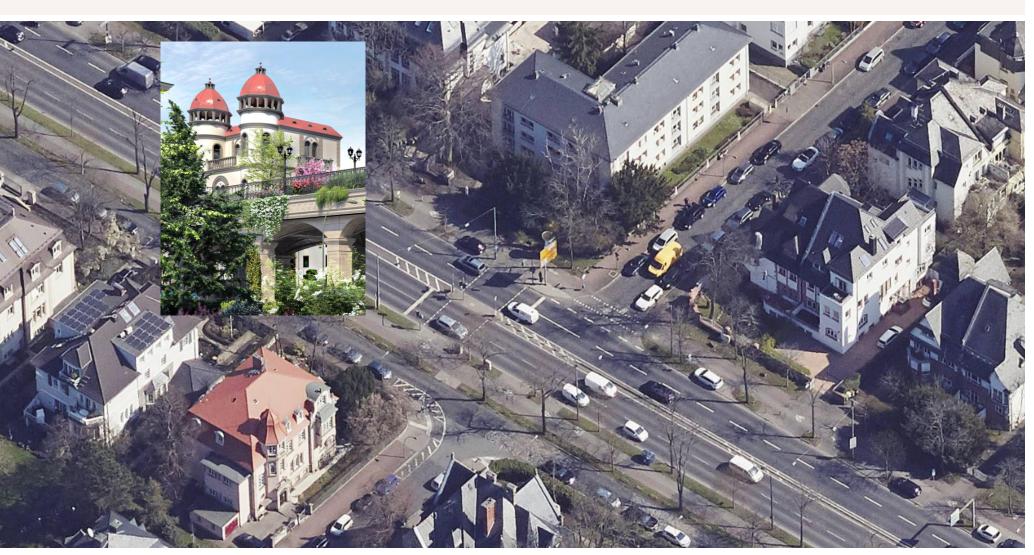
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## IMPLEMENTATION



### The construction of the Frankfurt Bridges and the buildings on them adapts as much as possible to the style of the surroundings through which they pass

The reference points are always the most beautiful buildings in the neighboring area of the bridges, if there are any. Example on a fourlane federal highway in Frankfurt: The beautiful old buildings are the reference point for the architecture of the bridges in the section.



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SEARCH THE TEAM CONTACT & IMPRINT Even functional units such as the "supply centers" at the bridges are aesthetically artful and brightly designed: They look like high class residences, but in fact they only house technology, control cabinets, electricity and digital lines, etc.



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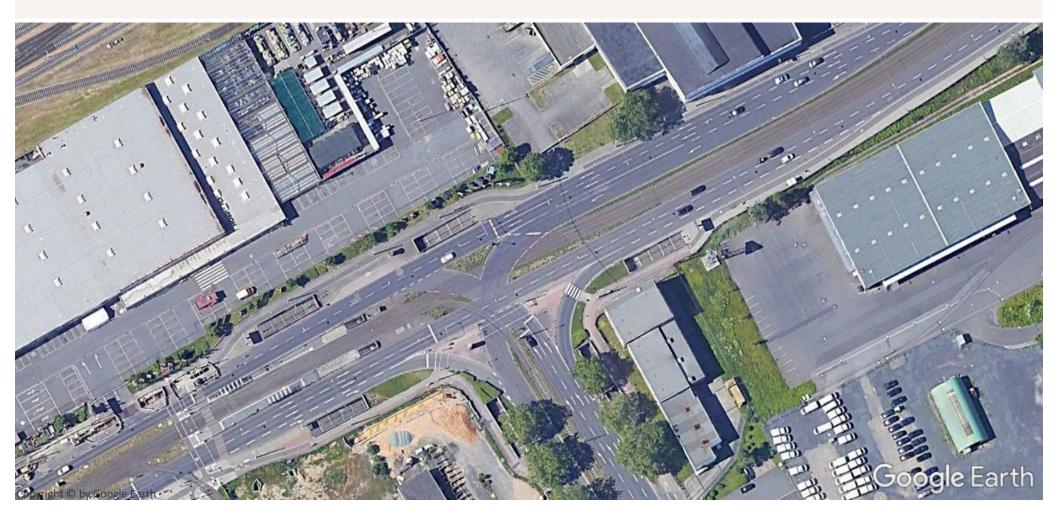
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## While 60 percent of the overall bridge route is based on earlier architectural styles, 40 percent of the route is planned in modern style

The eastern arms of the Frankfurt Bridges run along Gerbermühlstrasse and Hanauer Landstrasse, where there is hardly any spectacular existing architecture to lean on to either side out of town. Therefore, these sections are planned to be constructed exclusively in modern architecture.



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SEARCH THE TEAM **CONTACT & IMPRINT**  In the modern sections, the bridges are bright as well, and with minimalistic design



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**CONTACT & IMPRINT** ~ © (n) (f) (e) (b) If they run through residential areas, the sides of the bridges can be decorated with high-quality modern art



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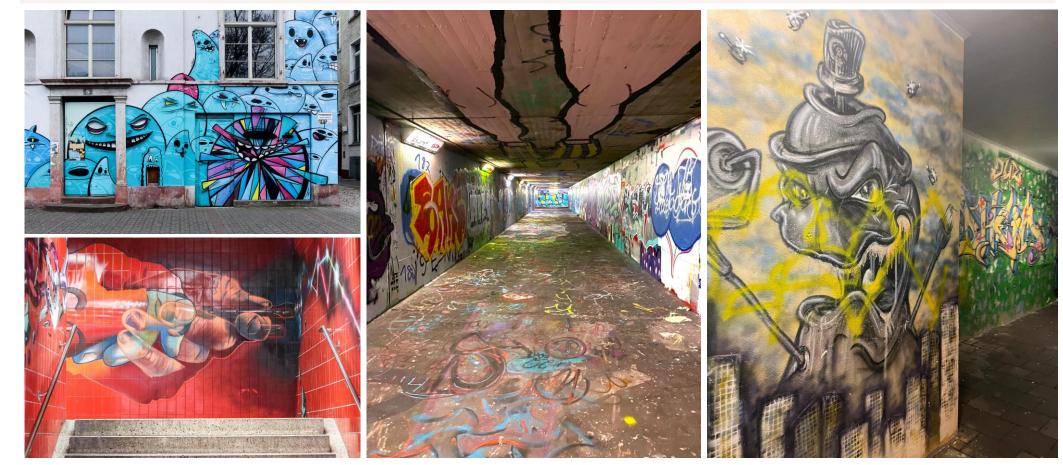
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For the plain modern sections of the bridges there is also, for example, the possibility of inviting Frankfurt street artists and sprayers to design the bridge pillars, bridge sections or even stairways on these modern outer arms of the Frankfurt Bridges

Frankfurt already has a fascinating street art culture whose goal is not to deface but to artistically beautify areas of the cityscape. Similar to the Berlin Wall in the past, there may be designated areas where artists can add fascinating art to minimalist areas in certain parts.



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### For the friends of steampunk there are also suitable bridge sections. Important here too: Sunlight is paramount!

Steampunk is a design style centered arround the nostalgic "industrial shabby look". There are countless visualizations of steampunk designs on the Internet, and video games in particular discovered this world of past industrial beauty for themselves years ago. It is hardly ever realized, as it is dismissed by experts as historicizing retro glorification. The Frankfurt Bridges, however, are there for everyone and take up all kinds of desires of people, including steampunk.



In addition, the basic attitude of steampunk is very modern and sustainable: forgotten and neglected industrial facilities are not torn down and replaced by something new, but are converted into places to stay with a new splendor of their own. It is undoubtedly resource-saving when energy-intensively produced cast-iron pipes and elements or thick walls made with burnt brick are not simply disposed of, but are given their place and a new function in new building worlds. Bright lighting must be ensured in the bridge underside in steampunk design, as well, by a multitude of light holes with walkable glass in the bridge body and by beautiful lighting with steampunk lamps.

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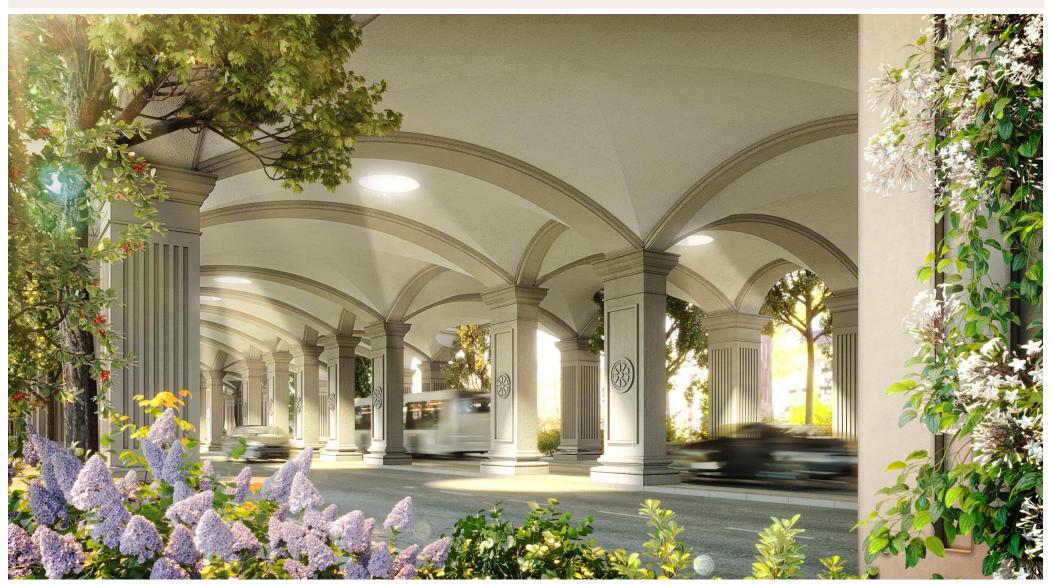
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### All bridges are equipped with a large number of light and air holes

Under the bridges it is relatively bright, because the bridges have a clear height of at least 5.20m and are not closed at the sides, but on average there is only a pier with a diameter of one meter every 8 meters. In addition, as many light holes as statically possible are planned in the bridge deck.



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Everywhere under the Frankfurt Bridges must be bright - as many light holes as possible are distributed on the bridges and mostly equipped with walkable glass



In most cases, the light holes are equipped with walkable glass at the top of the bridge surface and thus allow sunlight to stream under the bridge like light windows in a dome. In addition, light bulbs are installed in between the upper and lower walkable glass, so that these walkable light holes on the bridge surface also shine appealingly in the evening not only downwards but also upwards for individuals strolling on the bridges, like path lighting.

Wherever it is possible to do without accessible glass, the holes are designed as air holes, which only have a railing all around as a fall protection on a small surrounding wall, so that not only people but also small animals cannot fall from the bridge through the hole onto the road below.

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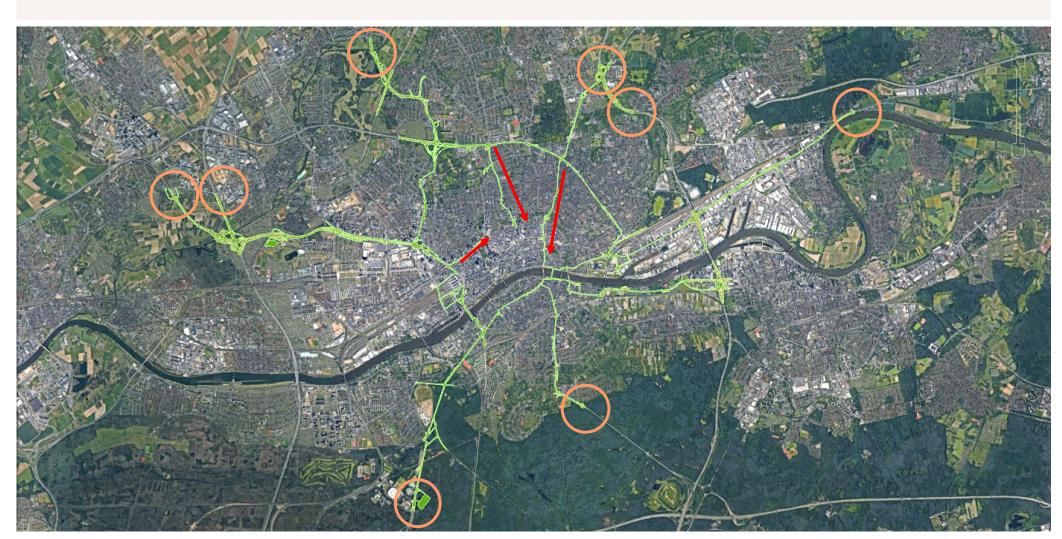
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### Frankfurt's bridges connect the city centre with more remote parts of the city

The ring around the city centre has three arms leading into the city: from Platz der Republik to Taunusanlage, from Adickesallee to Eschersheimer Tor and from Nibelungenplatz via Konstablerwache down to Schönen Aussicht. At the ends of the bridges there are usually houses grouped around a square, as the "Bridge end marketplace".



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## The principle of the "bridge end market place": to keep the outer arms from becoming lonely even during dusk or at night

In addition to affordable housing, the bridges offer an inner-city infrastructure even on their remote outer arms, with shopping facilities of all kinds, cultural and social offerings, educational institutions and much more. As a result, the bridges bring a bit of city life to more remote parts of the city, albeit comparatively quietly and in a green, idyllic ambience. Thus, many settlement areas that were previously cut off from Frankfurt life or could only reach it by car or with sporadic bus connections are suddenly within walking distance of an urban lifeline - and conversely, leisure and sports facilities in the remote areas of Frankfurt suddenly become conveniently accessible for people from the city center or other parts of town. This is particularly important for the parts of the city that lie at the ends of the bridge arms: There you will find marketplace-like groupings of buildings.

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On marketplaces at the end of the bridge arms, the ground floors of the buildings house all kinds of shops, services and offers for daily needs. These are all open 24/7: small supermarkets, doctor offices, snack bars, pharmacies, drugstores, specialty bakeries and much more. This is because life in our society is shifting more and more into the night or early morning hours: whether young people or pensioners and (since the start of the home-office era) even ordinary workers - more and more people are active in the evening or at night and then have nowhere to turn when they need to run everyday errands or feel lonely. You can always find life and warmth at the end-of-bridge marketplaces - but no entertainment, concerts or parties: the marketplaces are lively, but with a relatively quiet atmosphere.

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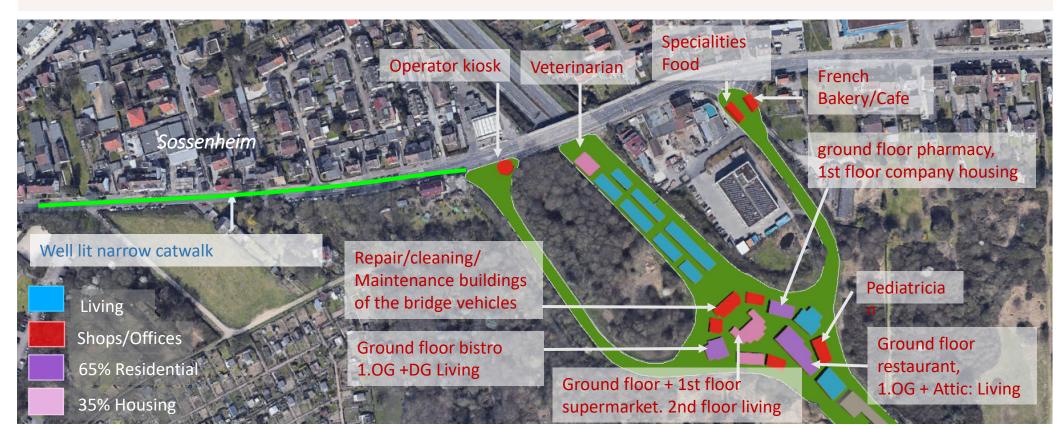
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### Around the bridge end market places there are always also the maintenance and parking tracks of the bridge vehicles

Only about a third of the bridge vehicles are needed at night; the rest are maintained, cleaned and, if necessary, refuelled in three shifts. This alone means that someone is always awake and working at the ends of the bridges. At the market places you can find a doctor, a possibility to shop or a restaurant, a bar or a bistro where you can meet other night owls. In addition, there is another building element at all remote accesses to the bridges: the operator kiosk. The operator kiosks belong to the bridge foundation, are distributed at regular intervals across all bridge arms and serve to provide information to bridge residents and visitors as well as to organize bridge management tasks.



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Well-lit walkways with likewise illuminated stairways



## Frankfurt bridges provide safe routes for women and children during dusk or at night

At the ends of the bridges, well-lit footbridges lead to the residential areas: Especially for women or children, it is unpleasant after dark to wait at lonely bus stops or to use the U-Bahn or S-Bahn. With the autonomous traffic of the Frankfurt Bridges, on the other hand, they can travel unmolested and with appropriate social control to other parts of the city, starting from busy bridge-end marketplaces, which they can reach via well-lit stairways and footbridges. Or they use these footbridges to at least get safely to the nearest public transport station of the city without having to walk along lonely country roads.



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## Staircases and lifts also need to be bright and attractive in order to be perceived by residents as an asset to the street scene

The Frankfurt Bridges have stairs and elevators on both sides about every 200 to 300 meters: If the surrounding area is densely populated, it tends to be every 100 to 200 meters; if it is sparsely populated, it tends to be only every 400 to 500 meters.

Since approx. 15 kilometres of the total 60 km long route run through sparsely populated areas, this results in a total number of about 500 lifts and 500 stairs (excluding small alternative stairs, see below).

Since neither pedestrian nor bicycle paths may be impaired, all staircases and elevators must be individually planned and executed, anyway which means that not only large companies, but also medium-sized businesses can be involved in the construction.

For the elevators, the rule is that wherever possible, double elevators with separate operating rooms are built along the bridges, so that whenever one of the two elevators is defective, the other continues to provide barrier-free access to the bridges.

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In addition, there are a further 300 narrower alternative staircases along the bridges, which can be converted into main staircases at a later date if necessary – in some places they might even be relased for people sitting there in the future, as they are sitting in movies on the fire escapes in the Soho Iron District in New York

These small stairs are located behind the bridge-roadways, and access to them is only gained by unlocking the corresponding gates in the railings by breaking the alarm box window and pressing the emergency button. As soon as the Frankfurt Bridges are established, though, and the narrow stairs no longer have to fulfill a function, at one point or another the stairs can be used as a link between the bridge level and the street at ground level by releasing them for people to rest on, take a lunch break or settle down for a chat.

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### Whether artisan or modern: All elevator cabins are easy to clean and have a fresh air gaps at the top

The biggest problem with public elevators is the smell: Since elevators are often misused as toilets for underhanded reasons, they often smell very bad.

The lifts along the Frankfurt Bridges are therefore all tiled to a height of one metre and have a floor that is also tiled, with a drainage channel running all the way round so that the interior can be sprayed out with a hose at any time by the bridge company's cleaning staff. The waste water is discharged into the nearest street sewer.

The hose is embedded in a locked cabinet in the shaft wall next to the lift and can only be retrieved by the cleaning staff. Biodegradable cleaning agent can be added to the water via a mixer tap.

A circumferential ventilation gap of approx. 15cm height at the upper edge of the cabin ensures that the air in the lift is always fresh and the cleaning water dries quickly.

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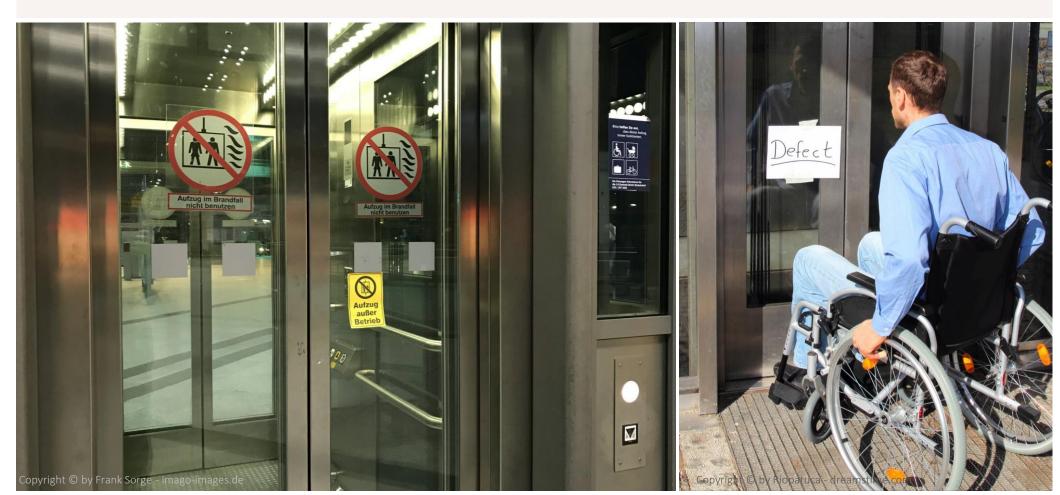
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### Central cornerstone of the overall concept: Inclusion! Barrier-free access for people with walking disabilities to the bridges is core - investments must be made above all in double elevators with separate operating rooms

For all 500 stairways to the bridges, not only one elevator, but two elevators must always be planned. The second elevator in each case must have its own separate operating room so that even if one elevator is defective, the other will still function. This is also in line with the requirements of the Frankfurt Disabled Persons Working Group (FBAG).



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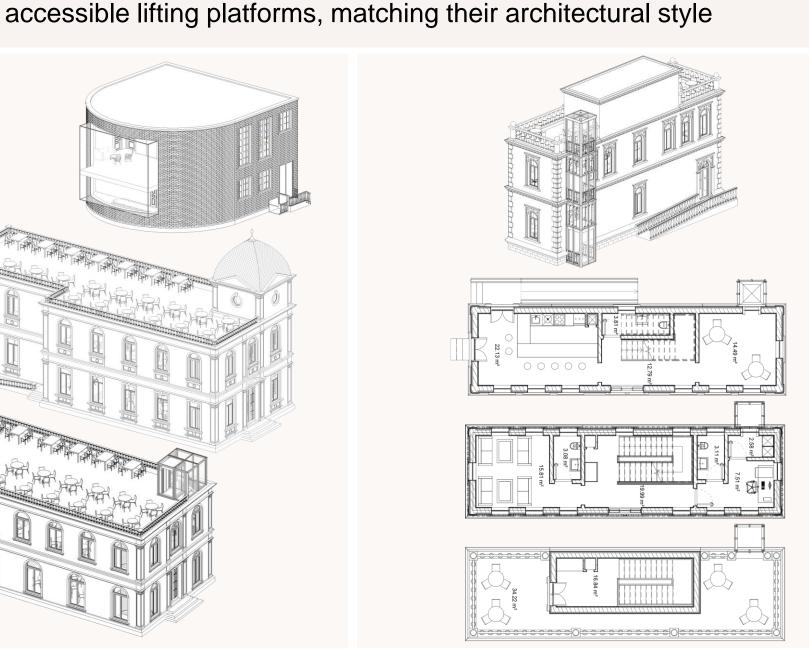
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The buildings on the bridges will be equipped with elevators, ramps and wheelchair-

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Central cornerstone of the overall concept: Inclusion! Information boards at all access points to the bridges have tactile site plans with relief writing, which also gives visually impaired and blind people a comprehensive overview of the respective bridge area

The site plans should be tactilely designed, i.e. all surfaces should be raised and also differently strutted, and they should have relief lettering. Colored like normal lay plans and with relief writing baisering on black lettering, the boards are designed to be appealing and meaningful for all people, with and without visual impairment.



The bridge app for blind people should be scannable at the site plan boards with QR codes and explain the complete offer of the respective bridge area

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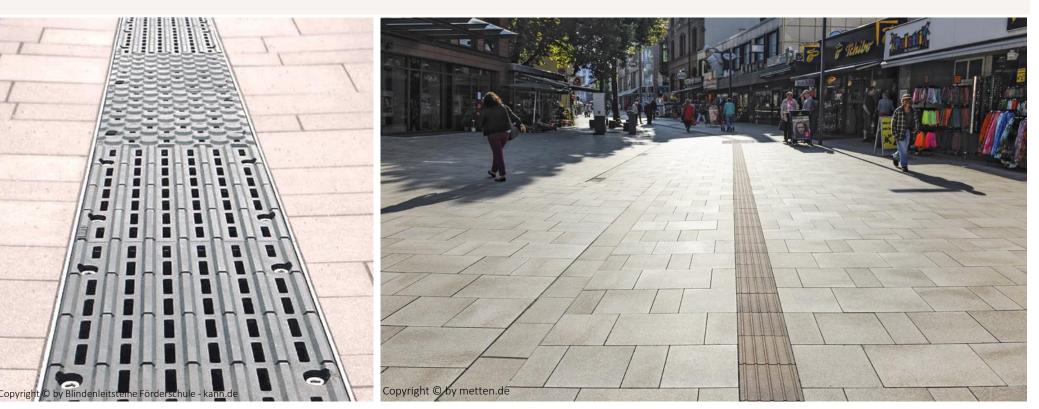
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Furthermore, guidance systems for people with visual impairments or blind people are planned throughout the bridges: The floor structure and color on the bridges' paths helps them to find their way – and theses floor guidance systems can be integrated into the flooring in a separable yet discreet and visually appealing manner

The floor guidance systems on the Frankfurt Bridges are suitable for visually impaired and blind people in terms of both structure and contrasting colors: It is important that they stand out from their surroundings structurally for blind people, and in terms of color that can be easily perceived by people with impaired vision. Since the bridges also have to be drained, drainage channel covers can also be used as guidance systems. However, the covers must be professionally designed by experts to fullfill their purpose.



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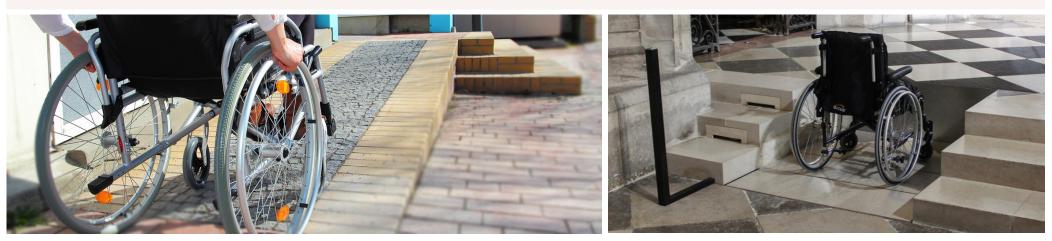


The paths on the bridges are planned without steps or platforms - only the stairways have conventional nub systems to warn of changes

Nub warning systems are often made of plastic and are glued on the ground, which reduces their durability. Since the Frankfurt Bridges are planned to be modern and sustainable down to the smallest detail, glued coverings made of plastic, which can secrete adhesives and microplastics and have a short service life, are not an option. Rather, the plan is to use stone. For example, if the floor tiles are made of artificial stone similar to Jura stone, it is unproblematic to produce these so-called "nub stones".

## Crossings on the bridges will be designed for people with walking disabilities as well as for visually impaired or blind people

While people with walking disabilities would prefer not to have a curb, blind or visually impaired people need the curb to signal the beginning of the roadway. At bridge traffic crossings, visually impaired people are warned by nub systems, and for people with walking disabilities, either ramps lead down or out of the side of the roadway, or outdoor lifting platforms are installed.



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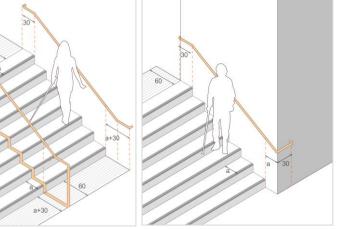
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# Handrails on the bridges are also planned in an exemplary manner

All ascents and descents on the bridges and also on the bridges have handrails on both sides, which are designed continuously, so that no interruptions force to let go.

# Handrails should merge into the horizontal surface at the upper and lower ends by about 30 cm

This ensures that people can hold on before entering and after leaving the facility, and makes the handrails easier to grasp for people with impaired vision using a long cane.

### Handrails must be easily recognizable - by lighting at night or during the day by contrasting with the background in color

Handrails should also be provided with tactile information for better orientation. The indications should be placed at the beginning and end of flights of stairs, placed on the side of the handrail facing away from the stairs.

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### There is an operator kiosk about every 600 meters on the Frankfurt bridges: around 100 kiosks in total

The operator kiosks are small organisational units of the bridge company. They are manned around the clock and perform numerous tasks: Many amenities on the bridges as well as the bridge traffic can only be used with a bridge card or bridge code. These can either be purchased online or at the operator kiosks.

The staff in the kiosks also serve as contacts for bridge residents and visitors with questions about bridge events: There is a rich program in the music pavilions, the concert, opera and theater houses on the bridges or in the hobby pop-ups and on the Manufaktory Mews. The operator kiosks are in contact with each other and are always up to date on everything.

Cleaning crews and gardening crews regularly make their rounds on the bridges. They can stop at the operator kiosks: These unlock equipment rooms for them and carry out checks on the work completed. The kiosk employees are also the contact persons for the cleaning and maintenance crews of the vehicles.

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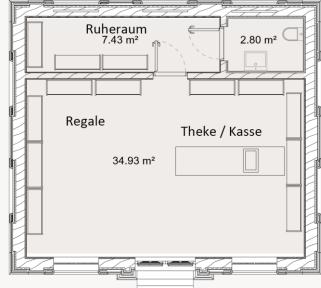
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# The operator kiosks also have their own business activities

Depending on their size and location on the Frankfurt Bridges, operator kiosks also offer a range of drinks or food: Some kiosks in more remote areas, for example, have a basic assortment of food for people in the vicinity of the bridges; other kiosks, on the other hand, have a special offer supplied by the Gourmet Line on the Frankfurt Bridges, for example oriental breads or vegan sandwiches; still others have an organic juice bar or are so large that they can function as a small café at the same time.

The operator kiosks are manned 24/7, which is why some also have a room to rest for the people who work there, either at the back of the kiosk or sometimes in the converted attic: this way there are always bridge company contacts everywhere and at any time on the bridges, even in the middle of the night. When you are on the Frankfurt Bridges, you are never left alone and can always find help.

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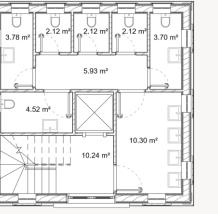
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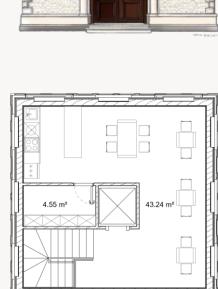
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Ground Floor



**First Floor** 

# In addition, the operator kiosks also have other diverse functions

In central places with permanent operation, the kiosks are often also equipped with free public toilets. The two twin kiosks at Baseler Platz, for example, share the functions: One kiosk has women's toilets on the ground floor, the other has men's toilets, and both have a disabled toilet. In one kiosk you can get sweet food and baked goods on the first floor, in the other one salty food and snacks.

All kiosks are manned by a permanent staff of mini-jobbers, whereby pensioners and students are preferably hired for the night shifts; but also, for example, young parents and other groups who would like to work a few hours a week find here an optimal opportunity to integrate themselves into a network of colleagues and to pursue a varied job that offers contact and communication with other people and a flexible possibility to earn extra money.

People living next to the Frankfurt Bridges as well as people living on the bridges are preferably hired for those mini-jobs, thus creating a community of people who identify themselves with "their" bridges.

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Conclusion: Each section of the bridges is an enrichment and enhancement for the city of Frankfurt

The Frankfurt Bridges are designed well lit and of high artistic quality. Where they run, an atmosphere of safety and liveliness is created. Where it was previously grey or even remote and lonely, there is now a green appealing "lifeline".

City districts are connected with each other, people are interwoven with each other. New things are being created, but integrated into the existing city.

The concept can be transferred to any major city in the world and leads to a positive, integrative atmosphere in the middle of existing buildings.

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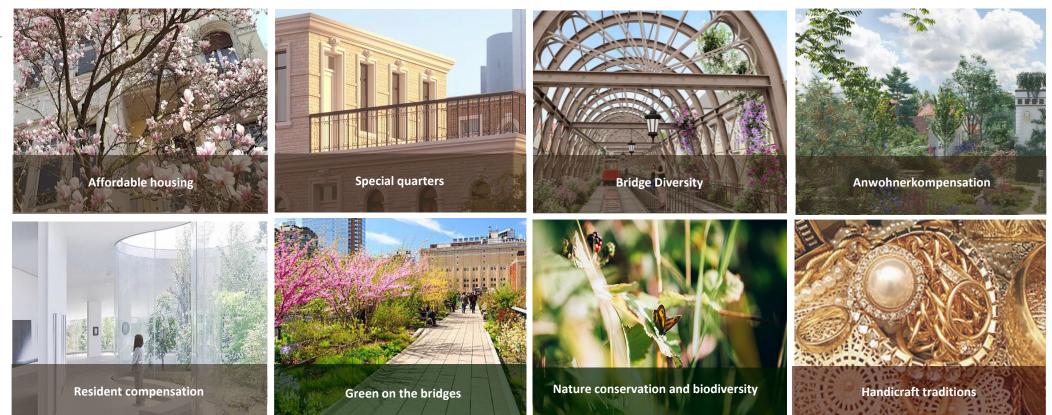
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#### CONTRIBUTING

Architecture	Geoinformation	Urban climate - global climate	Water	Law	Critical sparring partners:
Picture & Photo	Green & Nature	Statics	Packing	Finance	Professors
Bridges	Communication	Transport	Webpage & Design	Implementation	Professionals
Energy	Art & Culture	Technology & IT			Inspirers & Supporters

## Affordable Living-Space

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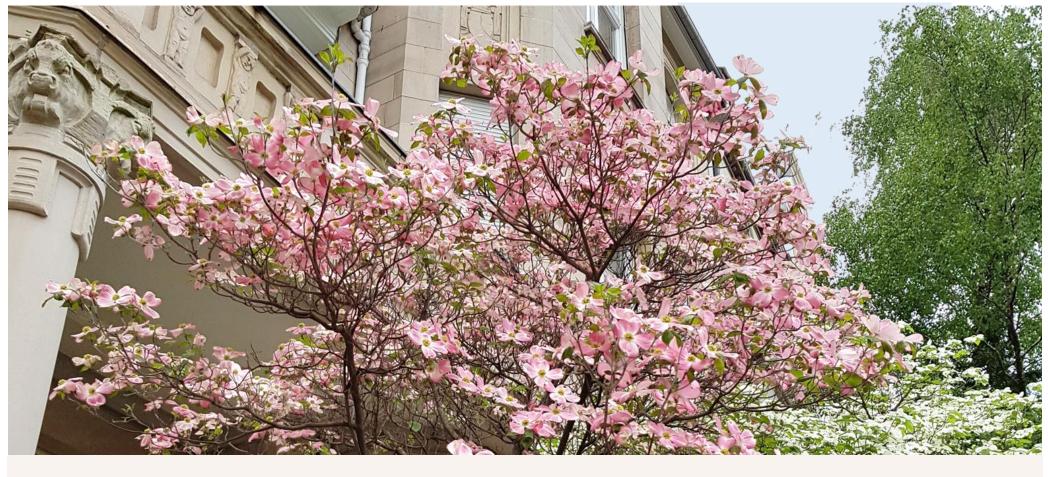
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### Humane affordable housing near the city centre

875,000 square metres of affordable housing are being created with humane building concepts: The buildings are attractively designed, sustainable and energy-saving in their construction, whether modern or in the classical architectural style. Rents are calculated in the same way as for subsidised housing and are even lower for particularly eligible groups - such as pensioners on the verge of old-age poverty or people on disability pensions.

The rental pricing for non-residential space is similarly socially oriented: Space on the Frankfurt Bridges is preferably and affordably rented to shops and businesses that make a positive contribution to society, for example with products from the region, special training programmes for their employees or special ecological standards, etc.

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Content: explanation of rental pricing and the requirements prospective tenants must meet for rentals on the bridges

All the buildings with affordable housing on the bridges are durable and optimized in terms of energy. They are humanely designed taking into account the leisure and work needs of the residents.

The price structure is based on publicly subsidized housing for residential spaces. In the allocation of housing, not only the income classes of the prospective tenants, but also special need or proximity to work are further rental criteria.

There are ecological and social requirements for applicants for the discounted and extremely attractive commercial spaces on the bridges, as well.

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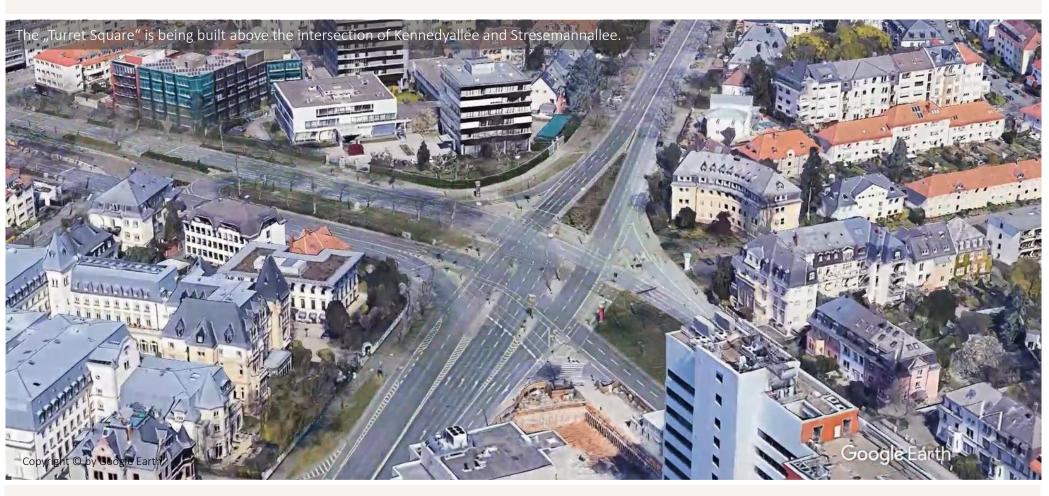
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Affordable housing is being built above Frankfurt's wide driveways and grey intersections - in other words, in "unused airspace" in the middle of the city



There is a possible building site in Frankfurt (like in any other large city worldwide) that is not privately owned but belongs to the public, for which there is no development plan and which is close to the city centre: the air above Frankfurt's large wide entrance roads. The Frankfurt Bridges are carrying a new green neighborhood with 875,000 square feet of affordable housing above this gray, carridden, sealed land.

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Example: Living on Türmchenplatz ("Turret Square") above the Kennedyallee/Stresemannallee intersection: affordable housing on the bridges is right in the middle of Frankfurt life



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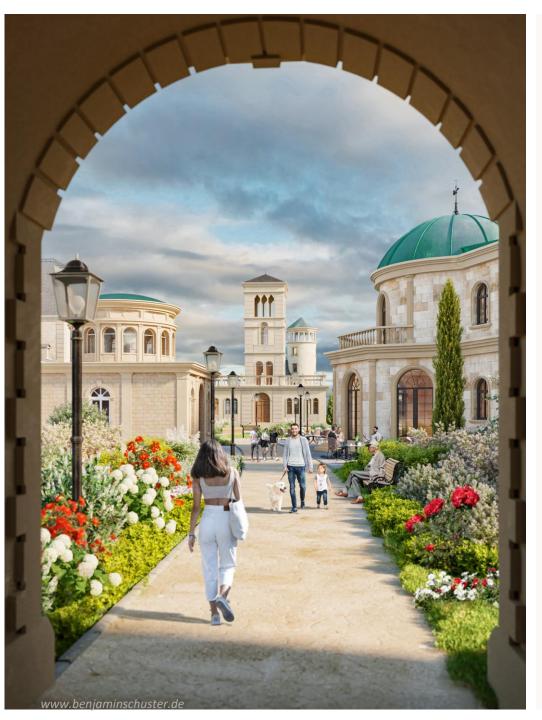
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# The buildings are built to a high standard, the interiors on the other hand are simple

When it comes to affordable housing, shortcuts are usually taken: on the design and quality of the buildings as well as on the interior fittings.

This is different on the Frankfurt Bridges: due to the special financing concept, all structures are designed for an extremely long and thus sustainable service life. Their substance and their design is of high quality, as the architecture of Frankfurt Bridges is built in such an aesthetically sophisticated way primarily for the beauty of the cityscape. And there is no law saying that people on low incomes should not be allowed to live in beautiful homes (instead of the usuals areas of affordable housing that are designed with a certain "tristesse" from the very beginning)

The interior, on the other hand, is decidedly plain and simple, though also planned with sustainability in mind.

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### Affordable housing can also be combined with working sections in the buildings

Beautiful modern architecture often has the disadvantage that the aesthetics of the buildings depend on large window areas - into which, unfortunately, passers-by can easily look.

On the Frankfurt Bridges, a virtue is being made of this: Rooms with large window panes, especially on the ground floor, are being used as offices and workrooms, and in larger residential units also as shared offices.

Considering their exposed location on walkable bridges, all buildings on the Frankfurt Bridges are very well sound-insulated to protect them from the walking public, fitted with electric shutters and equipped with burglarproof windows.

In addition, they each have cooling ceilings in the attic, as they are often less shaded by surrounding buildings and thus more exposed to the sun.

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### Each building on the bridges is assigned a rental price

The 1.15 million square meters of building space that will be created on the bridges would have a market value of approximately 20,000 euros per square meter as of 2022 - not least due to the architecturally aesthetic design and the numerous gardens, balconies and terraces. Similar to penthouses in sought-after locations, bridge properties represent the cream of the crop in Frankfurt's real estate landscape. This would result in a total speculative value of the bridges of 23 billion euros. To ensure that the humane, social and environmentally oriented basic concept of the bridges is not thwarted, building permission for the Frankfurt Bridges should therefore only be granted if the rent structure and mode of calculation for affordabel housing and social rental parameters is fixed for 100 years from the date of approval.



ground floor: 3 rooms 65 sqm 470 cold rent Cash free. Suitability: Single parent with child

1st floor: 3 rooms 60sgm 490 cold rent With 5sqm loggia. Suitability:

2nd floor: 3 rooms 60sqm 480 cold rent

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### The principle of proximity to the workplace is another rental criterion

Even if the increased home office culture has made many commutes superfluous, there are still presence occupations where employees have to commute into the city on a daily basis from affordable more distant residential areas: schools, hospitals, certain offices, care facilities, etc. need their employees live on site. Therefore, preference is given to renting to the low-paid among these employees, as well as to those who have to work night shifts.

PlanNr	Location designation		Building number	Art Abk	Nutzung Abk	Opening hours	Proposed use / suitability for use	Number of parties in the house	Residents/ persons [Number]	Floors	Basic area [m²]	Total area [m²]	Architect usable area (m2)	Cold rent per square meter
1014	Senckenberganlage Sen	nckenberganlage	1014002	W	WSo		Whg für Universität MA - geringere Einkommensstufen	1	2	1	87	87	70	8,10
1014	Senckenberganlage Sen	nckenberganlage	1014003	W	WSo		Whg für Universität MA - geringere Einkommensstufen	2	2	1	79	79	63	8 8,10
1003	Otto-Hahn-Platz Ros	senplatz	1003004	W	WSo		Whg für Referendare	1	4	2	78	155	124	7,90
1011	Friedrich-Ebert-Anlage Bun	ntglas-Häuser	1011001	W	WSo		EG: Wohnung für Nachtschicht-Beruf (Sicherheitsdienst u.ä.)	2	3	1	96	96	77	7,20
1013	Ludwig-Erhard-Anlage	sse-See	1013009	W	WSo		Whg für MA Kindergarten	2	4	2	75	151	121	7,20
1025	Danziger Platz		1025009	W	WSo		Whg für MA Entwicklungswerk Ostend	1	2	1	72	72	58	6,90
1026	Hanauer Landstraße		1026003	W	WSo		Whg für MA EZB mit Nachtschichten	2	4	2	69	137	110	8,00
1026	Hanauer Landstraße		1026005	W	WSo		Whg für MA EZB z.B. mit Nachtschichten, alleinerziehend geringverdien	3	6	2	131	263	210	6,50
1001	Walter-Kolb-Straße Rom	manisches Viertel	1001019	W	WSo		Wohnung für Kunsthandwerks-Shop	1	2	2	35	70	56	5 7,10
1003	Otto-Hahn-Platz Ros	senplatz	1003001	W	WSo		2 Whg für sonderpädagogische Betreuer an Schiller oder Carl-Schurz Gy	4	12	3	183	549	440	0 <mark>6,80</mark>
1003	Otto-Hahn-Platz Ros	senplatz	1003002	W	WSo		Whg für MA Evang. Kindergarten	1	2	1	72	72	57	6,90
1003	Otto-Hahn-Platz Ros	senplatz	1003003	W	WSo		Whg für Referendare	2	5	2	121	243	194	7,90
1003	Otto-Hahn-Platz Ros	senplatz	1003005	W	WSo		Whg für Referendare	1	2	0,5	178	89	71	7,90
1003	Otto-Hahn-Platz Ros	senplatz	1003006	W	WSo		Wohnung für Auszubildende/Studenten	1	1	1	38	38	30	6,80
1003	Otto-Hahn-Platz Ros	senplatz	1003009	W	WSo		Wohnung für Auszubildende/Studenten	1	1	1	35	35	28	8 <u>6,80</u>
1011	Friedrich-Ebert-Anlage Bun	ntglas-Häuser	1011002	W	WSo		1 Whg für MA der Ev Matthäuskirchen-Gemeinde und 1 Whg für MA Kin	2	3	2	99	197	158	3 7,00
1013	Ludwig-Erhard-Anlage Mes	sse-See	1013006	W	WSo		2.OG Whg für MA Kindergarten	1	2	1	81	81	65	7,00
1013	Ludwig-Erhard-Anlage	sse-See	1013024	W	WSo		Theater Dienst-Wohnungen	4	6	2,5	108	270	216	6,90
1015	Zeppelinallee + Miquelalle	e	1015001	W	WSo		Whg für MA Palmengarten	2	6	3	89	268	214	7,20
1015	Zeppelinallee + Miquelalle	e	1015003	W	WSo		Whg für MA Palmengarten	2	4	2,5	76	191	152	7,20
1015	Zeppelinallee + Miquelalle	e	1015004	W	WSo		Studenten-Whg	5	4	1,5	125	187	150	7,00
1015	Zeppelinallee + Miquelalle	e	1015005	W	WSo		Rentner/in - mit Grundrentenzuschlag aufgrund geringer Rente	2	2	1	97	97	77	4,90
1015	Zeppelinallee + Miquelalle	e	1015006	W	WSo		Studenten-Whg	3	3	2	72	144	116	5 7,00
1015	Zeppelinallee + Miquelalle	e	1015009	W	WSo		Studenten-Whg	1	1	1	29	29	23	3 7,00
1015	Zeppelinallee + Miquelalle	e	1015011	W	WSo		Studenten-Whg	1	1	1	35	35	28	3 7,00
1016	Auffahrt zu A66 Fäc	fahrt zu A66         Fächerplatz         1016013         W         WSo         Whg für Artzhelfer/innen         Med. Assistent/innen		3	5	3	72	216	172	7,20				
1016	Auffahrt zu A66 Fäc	cherplatz	1016014	W	WSo		Whg für Artzhelfer/innen Med. Assistent/innen	1	2	2	38	75	60	7,20
1016	Auffahrt zu A66 Fäc	cherplatz	1016015	W	WSo		Whg für Artzhelfer/innen Med. Assistent/innen	1	2	2	39	79	63	7,20

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Even though it is not subsidized housing in a government context, rent assessment on the Frankfurt Bridges still works on the same principle

The subsidized housing on the bridges is only available to tenants with proof of income. However, there is not only housing for extremely low-income groups, but about one third of the apartments are also intended for people with low to medium incomes who simply cannot afford an apartment close to the city centre.

Income serves as the basis of assessment for the initial rental and must be re-documented every two years to be adjusted with increases in income, if necessary. The rent adjustment is always made one year after the need for the increase has been determined, so that tenants have time to save money for a possible move in that year.

If, for example, a student couple lived in a 45 sqm two-room flat with a small garden area for 390 euros rent without and 485 with heating and ancillary costs, then this pricing was reasonable while they were still both studying: However, as soon as both complete their studies and find well-paid jobs, the affordable housing should become available for new tenants in need.

This is achieved by the reduced affordable rent actually being a discount rent: said 45sqm two-room apartment actually already has a rent of 1,125 euros without heating and other costs when rented, as would be the normal case for high-quality housing in Frankfurt city centre in 2022. The two students will be granted a discount of 735 euros as long as they themselves have a low income. This discount will be successively reduced as their income increases. The aim is to ensure that people in need of affordable housing are always given a chance to rent an apartment on the bridges.

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### Examples of rent structure for low-income earners

Exemplarily			Houshold Income		Base Rent	Rent Ancillary		Total Rent	Available Residual Income		
Exemplainy	(sqm)	from	to	from	to		per sqm	Costs			
Trainee/Student											
1. Income	30	540€	680€			180€	6,0€	60€	240 €	300 €	440 €
2. Income	30	680€	890€			230€	7,7€	60€	290 €	390 €	600 €
3. Income	30	890€	1.200€			265€	8,8€	60€	325 €	565€	875 €
Starting Salary	30	1.200€	1.500€			295 €	9,8€	60€	355 €	845 €	1.145€
1. Salary Increase	30	1.800€	2.000€			600€	20,0€	60€	660 €	1.140€	1.340€
Low Inocme Earner (Single)	1 to 2 Bedroom A	partment									
Lowest Income	40	850€	1.000€			250€	6,3€	80€	330 €	520€	670 €
1. Salary Increase	40	1.000€	1.200€			300 €	7,5€	80€	380 €	620€	820€
2. Salary Increase	40	1.200€	1.500€			350€	8,8€	80€	430 €	770 €	1.070€
3. Salary Increase	40	1.500€	1.800€			400 €	10,0€	80€	480 €	1.020 €	1.320€
4. Einkommenssteigerung	40	1.800€	2.500€			800€	20,0€	80€	880 €	920€	1.620€
Low Income Earner (Couple)	2 Bedroom Apart	ment									
Inc. (usually split unevenly)	50	700 €	900€	1.400€	1.800€	320€	6,4€	100€	420 €	980 €	1.380€
1. Salary Increase	50	900 €	1.100€	1.800€	2.200€	380€	7,6€	100€	480 €	1.320€	1.720€
2. Salary Increase	50	1.100€	1.300€	2.200€	2.600€	500€	10,0€	100€	600 €	1.600€	2.000€
3. Salary Increase	50	1.300€	1.500€	2.600€	3.000€	700 €	14,0€	100€	800 €	1.800€	2.200€
4. Salary Increase	50	1.500€	2.000€	3.000€	4.000€	1.000€	20,0€	100€	1.100 €	1.900€	2.900€
Retiree (Single)	1 to 2 Bedroom A	partment								<u>.</u>	
Pension Level 1	40	600€	700€			180€	4,5€	80€	260 €	340 €	440 €
Pension Level 2	40	700 €	800€			200 €	5,0€	80€	<b>280 €</b>	420 €	520€
Pension Level 3	40	€ 008	900€			230€	5,8€	80€	310 €	490 €	590 €
Pesnion Level 4	40	900 €	1.000€			270€	6,8€	80€	350 €	550€	650 €
Pension Level 5	40	1.000€	1.200€			310€	7,8€	80€	390 €	610€	810€
Pension Level 6	40	1.200€	1.400€			350€	8,8€	€ 08	430 €	770 €	970 €
Retiree (Couples)	Retiree (Couples) 2 Bedroom Aparment										
Pesnion Level 1	50	600€	700€	1.200€	1.400€	280 €	5,6€	100€	380 €	820€	1.020€
Pension Level 2	50	700 €	800€	1.400€	1.600€	310€	6,2€	100€	410 €	990 €	1.190€
Pension Level 3	50	€ 008	900€	1.600€	1.800€	330€	6,6€	100€	430 €	1.170 €	1.370€
Pension Level 4	50	900 €	1.100€	1.800€	2.200€	400 €	8,0€	100€	500 €	1.300€	1.700€
Pension Level 5	50	1.100€	1.300€	2.200€	2.600€	490€	9,8€	100€	590 €	1.610€	2.010€

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	Living Space (sqm)	Net Income pe	r Person to	Houshold Incor from	ne to	Base Rent	Rent per sqm	Ancillary Costs	Total Rent	Available Residu	al Income
4 Demonstry 4 Child							· ·				
1 Parent+ 1 Child	1	1		child benefit - onco	e the child move					1	000
Income with limited work ability			1.200€			270€	· · · ·				800
1. Salary Increase	65		1.400€			400 €	- / -				870
2. Salary Increase	65		1.600€			420€	- /				1.050
3. Salary Increase	65		1.800€			450€	- /				1.220
4. Salary Increase	65		2.200€			470€	· · ·				1.600
5. Salary Increase	65		2.500€			700€	· · ·				1.670
6. Salary Increase	65	2.500€	3.000€			850€	13,1€	130€	980 €	1.520€	2.020
1 Parent + 2 Children	4-room-flat	Start: 850 € lowe	r income plus	child benefit - once	the child moves	out, the price	per sqm for "lo	wer income	earners Single" w	vill be applied	
Income	80	1.200€	1.400€			340€	4,3€	160€	500 €	700€	900
1. Salary Increase	80	1.400€	1.600€			370€	4,6€	160€	530 €	870€	1.070
2. Salary Increase	80	1.600€	1.800€			420€	5,3€	160€	580 €	1.020€	1.220
3. Salary Increase	80	1.800€	2.000€			450€	5,6€	160€	610 €	1.190€	1.390
4. Salary Increase	80	2.000€	2.200€			480€	6,0€	160€	640 €	1.360€	1.560
5. Salary Increase	80	2.200€	2.500€			600€	7,5€	160€	760 €	1.440€	1.740
6. Salary Increase	80	2.500€	3.000€			700€	8,8€	160 €	860 €	1.640 €	2.140
2 Adults + 1 Child	3-4-room-flat	Once the child m	oves out, the p	orice per sqm for "lo	ower income ear	ners Single" wil	ll be applied				
Income (usually split unevenly)	80	600€	700€	1.200€	1.400€	320€	4,0€	160€	480 €	720€	920
1. Salary Increase	80	700 €	800€	1.400€	1.600€	380€	4,8€	160€	540 €	860€	1.060
2. Salary Increase	80	800€	900€	1.600€	1.800€	500€	6,3€	160€	660 €	940€	1.140
3. Salary Increase	80	900 €	1.000€	1.800€	2.000€	620€	7,8€	160€	780 €	1.020€	1.220
4. Salary Increase	80	1.000€	1.100€	2.000€	2.200€	670€	8,4€	160€	830 €	1.170€	1.370
5. Salary Increase	80	1.100€	1.200€	2.200€	2.400€	700€	8,8€	160€	860 €	1.340€	1.540
6. Salary Increase	80	1.200€	1.500€	2.400€	3.000€	800€	10,0€	160€	960 €	1.440€	2.040
2 Adults + 2 Children	4-room-flat	Once the childrer	move out, th	l e price per sqm for	"lower income e	arners Single" ۱	will be applied				
Income (usually split unevenly)	100		850€			320€			520 €	980€	1.180
1. Salary Increase	100	850€	950€	1.700€	1.900€	380€	3,8€	200€	580 €	1.120€	1.320
2. Salary Increase	100	950€	1.100€	1.900€	2.200€	500€	5,0€	200€	700 €	1.200€	1.500
3. Salary Increase	100		1.200€	2.200€	2.400€	620€	6,2€	200€	820 €	1.380€	1.580
4.Salary Increase	100		1.300€	2.400€		670€					1.730
5. Salary Increase	100		1.500€	2.600€		690€					2.110
6. Salary Increase	100		1.700€	3.000€		790 €					2.410

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### Renting conditions for business owners: commercial space can only be rented on the Frankfurt Bridges with a positive social contribution

Service providers and restaurateurs have hit the jackpot with space on the Frankfurt Bridges: They get premises that are optimally connected to all areas of the city by the **bridge traffic system**, the buildings are all beautiful, most of the ground floors have terraces or garden space and the **rents** are still comparatively moderate.

The resulting **profitability**, however, does not end up entirely with the respective business owner pockets; rather, they must fulfill certain conditions according to the bridge rental agreement: The most important condition is the use of the **bridge packaging system**, which consists exclusively of reusable packaging and packaging that can be incinerated without emission of residues, as well as 100% biodegradable packaging made from renewable raw materials. This applies to the gastronomy and its **take-away business as well as** to all product packaging, **shopping bags**, parcel cartons etc.

In the case of shops selling foodstuffs or gastronomy, as well as other articles for daily consumption, the products must either be certified organic or come from the region, or serve to create original dishes and baked goods for which it is not always possible to obtain the ingredients from organic cultivation without further hassle (for example, in the case of special dishes or baked goods from other countries).

The following applies to all companies on the bridges: Employees are allowed to pursue further training for up to one and a half days per week, with full pay. The further training usually takes place in other companies on the bridges, which then take over part of the corresponding personnel costs.

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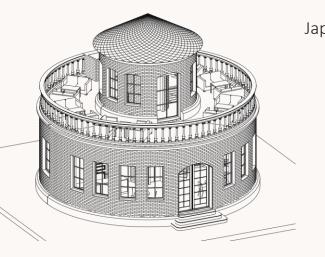
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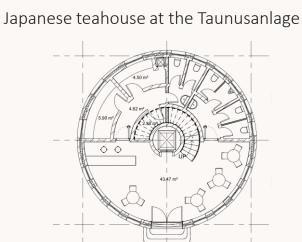


## A positive contribution to society: tradesmen offer their employees the opportunity to continue their education - a win-win situation for all involved

A good example of the positive effect of continuing education is the profession of chef: cooking the same menu for hours every day at the most impossible times of the day is not very satisfying. On the Frankfurt Bridges, chefs can train in the culinary arts of other countries on the gourmet line, learn the art of baking bread, or even further their education in the direction of nutritional counseling. In the training centers or companies, those who continue their training initially receive only an apprentice's or trainee's salary, but compensation for the full salary is provided by their own employer. And companies can also exchange employees for one and a half days per week in this way.

Through further training, people who work on the bridges not only have more variety and greater satisfaction, but at the end of all days such an expanded range of skills also benefits the customers and ultimately the business owner. When cooking, for example, dishes can become even more delicious and healthier.







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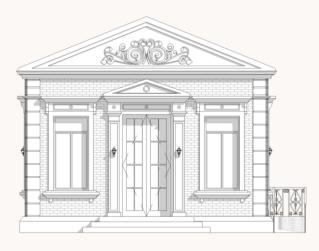


## Many professions include skills that are also central to other professions - one example is hairdressing

If someone works as a hairdresser, numerous skills are particularly well-developed: responsiveness to customers, a trained eye for aesthetics, in-depth knowledge of the human body, etc. Accordingly, it is quite conceivable that many hairdressers continue their education one or two days a week in other more or less related professions: Very close to their own educational spectrum are cosmetics, fashion and styling. But many hairdressers also have excellent prerequisites for further training in talk therapy due to their daily communication with their customers.

Similarly, in many other professions, people have talents or acquire skills that would go unused for a lifetime without further education. Often the interest in continuing education is there, but circumstances, whether financial or temporal, make such an effort impossible for many people in addition to having to earn an income. Through the leasing scheme or rent reduction on the bridges, companies receive the necessary financial compensation through which they can offer their employees such further training opportunities.





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## Another positive potential contribution of the companies: promotion of products from the region - which not only benefits the environment but also customers

For products from the region, there are supermarket spaces that are offered to production cooperatives from the surrounding area for discounted rent. These are usually cultivated products, but they can also be items from small companies in the surrounding area that produce soaps or brushes, for example.

In some supermarket buildings there are market stall areas that can be rented not only by professional businesses from the surrounding area, but also flexibly by people who harvest vegetables or fruits in the context of urban gardening, allotment gardens or also in their own private garden, which they would like to sell in times of abundance. For the latter, the rental is extremely cheap, with rent purely covering the operating costs in the respective time window.

In this way, a seasonal supply of ripe fruits and vegetables is available for the bridge residents and residents along the bridges, which have not been harvested unripe and then transported hundreds or thousands of kilometers like most supermarket produce, but are sold matured and are thus much more delicious.

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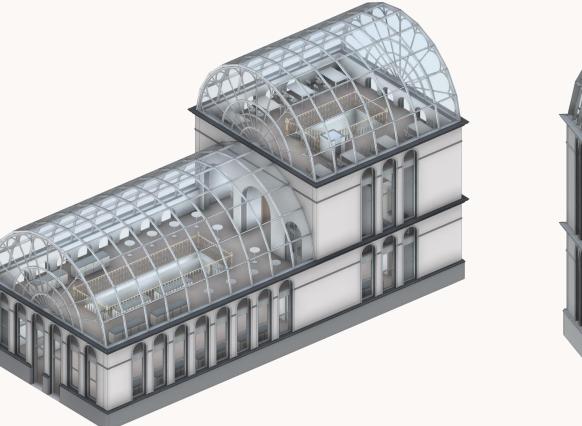
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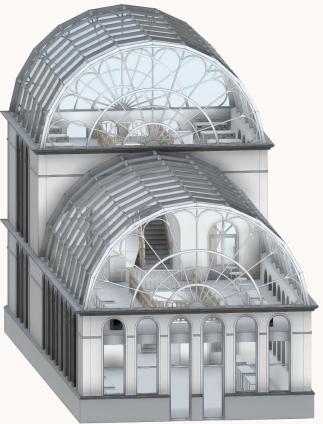
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### Market halls with stands for professionals and temporary sellers from the region are centrally located on the bridges

Example of a market hall for urban gardening products, allotment garden harvests and other seasonal products from the region: On the ground floor and the first floor are the sales stalls, above is a gallery where delicacies that can be consumed with a view down to the action in the hall. The gastronomy of the delicatess gallery is located in the rear part of the hall.







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### The world is also changing for chain and fast food providers: organic McDonalds and real oven-baked sourdough bread from the Heber bakery chain should be available in the city of the future

Due to the current cost structure or pricing, neither organic ingredients fit into the range at fast food providers such as McDonalds nor genuine sourdough oven bread at bakery chains such as Heberer Bäckereien.

However, with their rental price model, the Frankfurt Bridges also offer large chains the chance to position themselves as future-oriented and environmentally conscious or health-conscious by specifically renting out a suitable space on the bridge to each chain at a low price, with the stipulation that they only offer the highest quality products: McDonalds, Burger-King &Co can each offer a completely organic-based menu in the most sustainable takeaway packaging without it damaging the profitability of their other franchises. Germany's bakery chains, with their ready-to-eat baked goods, can all show what they're capable of and offer real bread and baked goods - again, without customers immediately expecting it from their full franchises. Starbucks and the like can score with Fairtrade organic coffee without having to switch to it nationwide in the first step.

A whole landscape of sustainable fairtrade outlets of well-known gastronomy chains has the advantage that these chains can test once, like in a paid laboratory experiment, how they can actually completely change their procurement and manufacturing and sales processes - in order to then transfer scalable aspects from this to their overall franchise system.

Furthermore, the high-quality organic product ranges there can have a certain surcharge despite low rents, in order to test whether and to what extent consumers are prepared to spend more for high-quality food.

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Conclusion: On the Frankfurt Bridges, rental pricing is used to promote social and environmental goals of society

The rental concept of the Frankfurt Bridges makes it possible to combined affordable living with appealing humanely designed architecture.

The variety of buildings also offers suitable living space for prospective tenants with a need for home office options. However, people who cannot work from home and need closer proximity to their workplace, for example, due to night shifts etc., are also considered when renting on the Frankfurt Bridges.

In the case of stores and restaurants, the focus is on promoting regional producers, ecological products and environmentally friendly packaging.

For all businesses, humane working conditions for the businesses' employees by offering continuing education are promoted through rental pricing and tenant selection.

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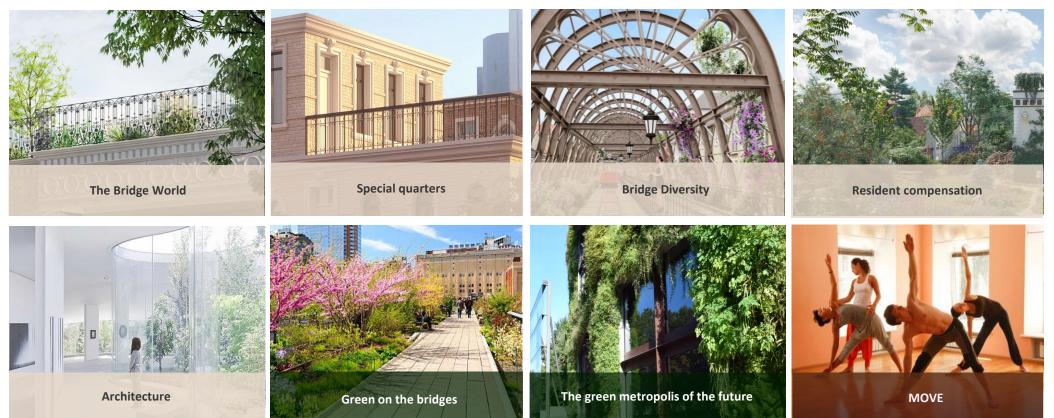
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#### CONTRIBUTING

Architecture	Geoinformation	Urban climate - global climate	Water	Law	Critical sparring partners:
Picture & Photo	Green & Nature	Statics	Packing	Finance	Professors
Bridges	Communication	Transport	Webpage & Design	Implementation	Professionals
Energy	Art & Culture	Technology & IT			Inspirers & Supporters

Special Quarters

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### Special quarters

A colorful variety of different neighborhoods can be found on the Frankfurt Bridges: Little Italy at the Friedensbrücke or the Asia Quarter above the Theodor-Heuss-Allee transfer bridge users into another world; the Youth and Artists Quarter at the Platz der Republik offers a wide range of cultural activities, as does the Theater Quarter above the Westkreuz; in the floating IT college and in the master academy for the preservation and innovation of European arts and crafts, there is excellent education for young and old; in the tile quarter for the homeless, there are numerous social and artistic facilities that might even attract tourists - and on the gourmet and manufactory line, one can spend one's leisure time in the most diverse ways. Thus, each quarter on the Frankfurt Bridges addresses specific social issues and societal problems or needs.

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## Content: On the bridges, each section is its own quarter with a special design - in terms of use and/or in terms of architecture

Some neighbourhoods have a particularly unusual character, for example by solving social problems such as a lack of accommodation for the homeless, or by addressing very specific sustainability issues through the choice of materials used in construction, such as in the quarter of half-timbered houses, where renewable and locally available raw materials are used in construction.

Quarters with a special character are usually created where larger bridge areas allow for the clustering of several buildings - for example, over intersections or large mass car parks. But sections with houses in a row along the route can also have very unusual neighbourhood character, such as the Lobster House Line on the way to the bathing lake or the Handcrafting Manufacute Line above the route "Am Ginnheimer Wäldchen".

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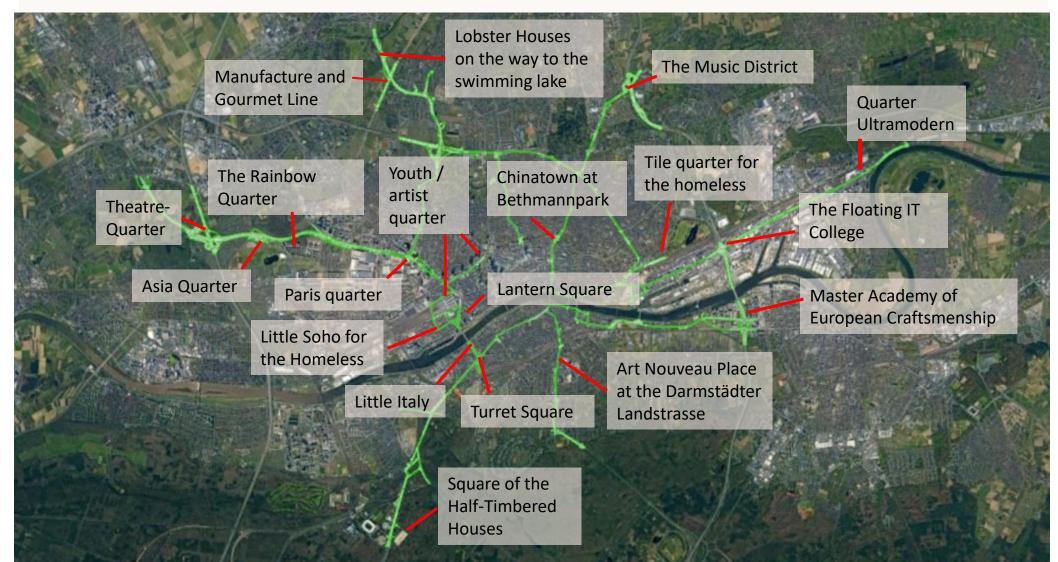
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The colourful diversity of the Frankfurt Bridges: no two sections, no two quarters are alike. Only one thing they all have in common: they are consistently light, airy and green



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### Many quarters differ primarily in their use

Quarters with a special focus of use:

- **The Music Quarter** in the north towards Bad Vilbel: There are not only music pavilions, but also a concert hall, an opera stage and the Music Master School for musically gifted children.
- **The floating IT-College** above the A661 junction Hanauer Ldstr.: A college without any entrance restrictions other than an exceptional ability to program and to code.
- The Tile Quarter for the Homeless on Ostparkstraße: Here, colourful individual accommodation is being built in tile-covered houses for 500 homeless people and 4000 people needing accommodation according to the concept of "housing first"; the quarter also comprises service flats for street workers and social workers as well as artists, therapists etc.
- The Master Academy for Arts and Crafts above the Kaiserlei: An academy for the preservation and innovation of European arts and crafts with training places for around 2,000 students by luminaries from all over Europe.
- **The Youth Quarter** at the Platz der Republik: in loft-like buildings there is a wide range of leisure activities for young people, supplemented by two "Ark buildings" for children and numerous artists' and street workers' flats.
- Little Soho for the Homeless above the bus station: the quarter consists of individual accommodation with external staircases instead of stairwells for over 400 homeless people, with service flats for staff of social organisations.
- **The Rainbow Quarter** above the Römerhof parking lot: The quarter consists of colorful apartment buildings, interspersed with a wide range of offerings for the LGBTQIA community such as consulting services, bars, cafés, meeting places, and much more.
- The Asia quarter above the 648 at Westkreuz: Here you will find mainly Asian supermarkets, Asian restaurants and also shops with non-food products of all kinds from Asia, with a focus on countries in East Asia. Doctors for acupuncture can be found here as well as a Japanese-style garden with a large, shallow pond.

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## Other quarters, on the other hand, gain their individuality primarily through architectural style and/or building materials

Neighbourhoods with a special design style and, where appropriate, special sustainable building materials

- The lobster houses on the path to the lake above Rosa-Luxemburg-Strasse: Here, single-family and multi-family row houses are being built of wood and wood derivatives, built in the North Sea/Baltic Sea style, with bright colors typical of northern German and Scandinavian regions.
- **China-Town at Bethmannpark**: A small collection of houses is built in the northern Chinese architectural style from cedar wood and has organic Chinese restaurants on the ground floor as well as Chinese cookshops with original dishes.
- **The Lantern Square** at Baseler Platz: The Lantern Square consists of late Wilhelminian row houses and free-standing "tile houses" á la Portugal, as well as an above-average number of lanterns to ensure more safety at night.
- **The Turret Square** above the Kennedyallee/Stresemannallee intersection: The buildings have turrets where an additional load from the scattered few piers is permitted, with different construction methods, and lightweight concrete as a building material.
- Little Italy above Stresemannallee in the direction of the Main: The buildings are in the Italian Neo-Renaissance style and are also constructed using various lightweight concrete materials.
- Square of Half-Timbered Houses above the parking lot of the Commerzbank Arena: The multi-family houses on this square are built in the old half-timbered construction method and with renewable material from the region.
- The Paris Quarter at Ludwig-Erhard-Anlage/Messe: The buildings here are based on apartment buildings in Paris, also built from various lightweight concrete materials; the quarter houses a French bakery, French bistros and restaurants and much more.
- The Quarter of Flowing Forms at the Hanauer Landstraße S-Bahn bridge: The buildings here are all being constructed using the Rabbitz lightweight construction method, which makes do with sustainable materials and allows for a wide variety of circular forms.

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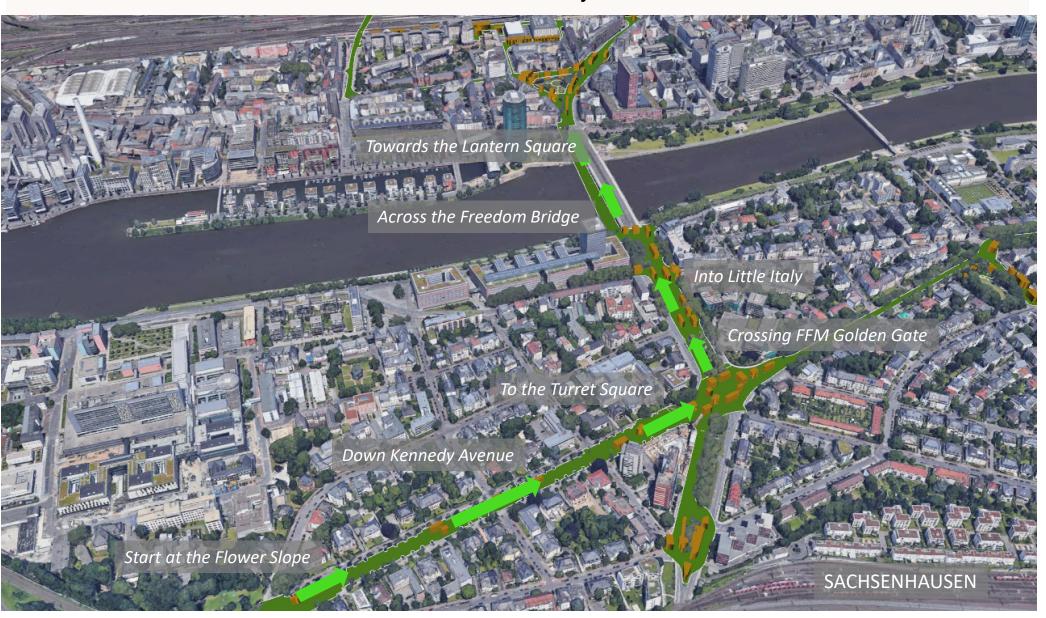
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To start with: a walk in the south through quarters with different architectural styles



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### The walk starts on the Flower Slope above the S-Bahn bridges that cross Kennedyallee

You walk down the slope over wide stairs, past berry pavilions and magnificently overgrown walls on the right and left, kept in the style of a farmers garden.



#### Equipment:

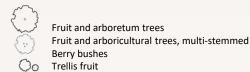
Pergola with pendant lamp

- Benches
- Loungers
- Seating steps
- steps with indirect lighting Trash can
- Signposts
- Railing to the roadway
- transition roadway
  - Garden fence
- Garden gate
- (17) Bird bath
- ÷87 Stone pile and sand area for animals

#### Luminaires:

Pole light Bollard light Indirect lighting Railing with lanterns

#### Woody plants:



 $\bigcirc$ 

Areas:

- Water-bound road surface
- - Roadway
  - Roadway greening
  - Light window



Public green area (decorative bed) Semi-public area Private green area Natural grassed area (not accessible for visitors)

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### From the Flower Slope to the Turret Square

Above Kennedyallee, the bridge features particularly intensive greenery: like a green line, it runs through the city.

You first walk along it past a French bakery serving real handbaked croassoints, flanked by a small hairdressing salon.

The path to the right and left is framed by lush flowerbeds, and behind the roadways are wild meadows where plants and animals can flourish, protected from humans.

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Continuing the walk leads through the greenery, interrupted only by isolated small residential pavilions and somewhat larger passage house





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## At the height of Villa Kennedy you pass an inclusion playground, behind which the Turret Square begins

On the Turret Square there is affordable housing, an organic supermarket with a focus on products from the region, a tea house and a lookout tower with a large terrace. There are benches and little walls to sit on everywhere, and you can also drink from a wall fountain at the supermarket.

If you turn north of the Turret Square toward the Main River, you can walk through the FFM Golden Gate to get to Little Italy.



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## The FFM Golden Gate leads from the Turret Square on one side and Little Italy on the other side

The "Frankfurt Golden Gate" - FFM Golden Gate - bears its name because of the suspension structure, which was specially developed to support the bridge sections through the sycamore trees and is reminiscent of the Golden Gate Bridge in San Francisco. However, should the warming of Northern Europe continue, a similar death is unfortunately expected for currently existing plane trees as in Southern Europe, where an uncontrollable plane tree pest has already spread as far as France. With the special suspension bridge construction, however, space remains for the replacement planting of equally large-crowned trees. One can walk directly along the trees at crown level, like on a treetop path.

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SEARCH THE TEAM **CONTACT & IMPRINT**  Little Italy: The Stresemannallee area towards the banks of the Main comprises up to eight lanes plus tram lines - and is correspondingly grey, empty and draughty



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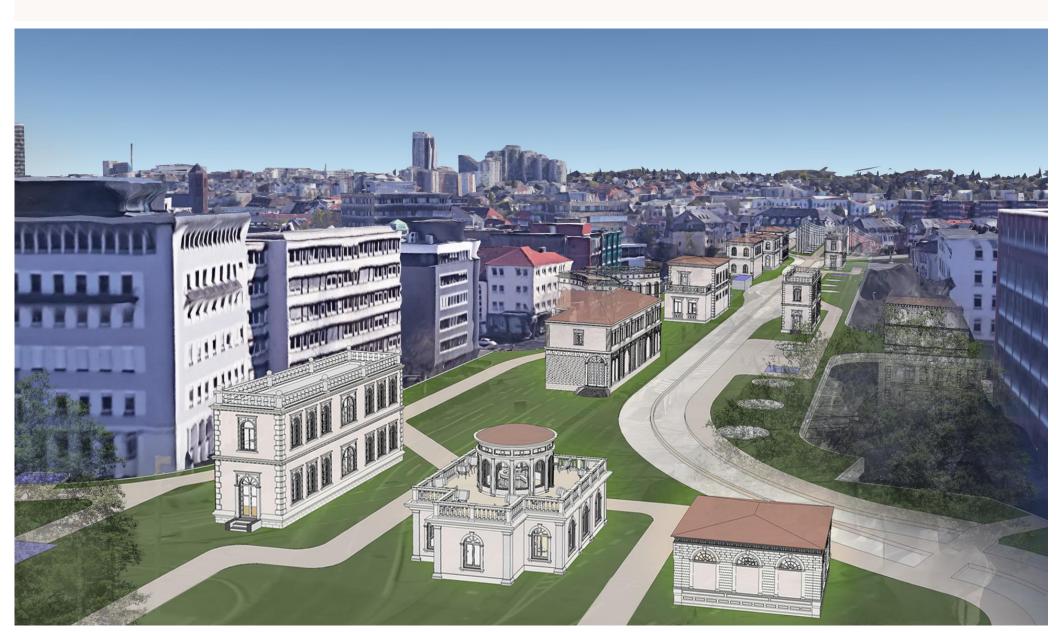
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Above it all, another world is emerging: a quarter with Italian architecture



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Italian design elements have a long tradition in Frankfurt: even today, there are still some buildings here that are modelled on the Italian Renaissance





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## Quality of life in public spaces

While today the section of Stresemannallee in front of the Friedensbrücke has nothing to offer except car traffic, with the Frankfurt Bridges this area will become one of the most beautiful places in Frankfurt:

Above the broad grey world of cars rises a green quarter where you can go for a walk, eat Italian organic ice cream and original organic Italian bakery or enjoy the view of the Main River in a basket swing behind the Italian Palladio restaurant.

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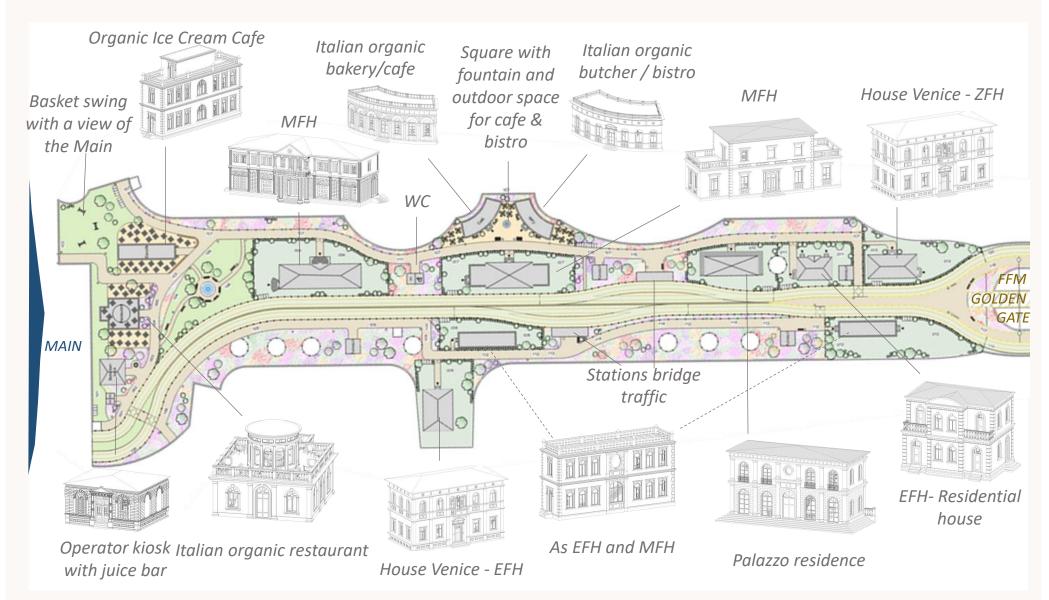
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Little Italy offers affordable housing and original Italian gastronomy picturesquely embedded in a mediterran seeming park arrangement

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# Little Italy is a role model: in a similar way, colorful neighborhoods in the tradition of other countries can also be created in other gray, car-congested areas of the city and underscore the internationality of Frankfurt

The example of Little Italy shows how a piece of Mediterranean living can be created in the middle of Frankfurt: through architecture, planting and also through the offerings with culinary delights from Italy. The other international quarters on the Frankfurt Bridges are also designed according to the same principle: the French Quarter at the Messe around the lake, the Scandinavian Mile above the Friedrich-Ebert-Anlage, China Town at Bethmann-Platz, the Asian Quarter at Theodor-Heuss-Allee and the Oriental Mile just before the Theater Quarter above the Westkreuz, where there are all kinds of genuine nan, small barbecue stands, stalls with oriental specialties and much more.

This concept can be continued when the bridges are expanded: Frankfurt is an international city with expatriates from a wide variety of countries - some with large communities of their own that can actively participate in the design of their "country quarters" on the Frankfurt bridges: Cultural associations can help shape the cultural program in their respective bridge quarters, universities and craftsmen's associations from the countries can contribute to the creation of original architecture, and landscape gardeners from the respective regions can work with the bridge company's horticulture department to define and, if necessary, supply survivable plantings for the country areas.



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SEARCH THE TEAM **CONTACT & IMPRINT**  For Little Italy, not only is the space on the bridges planned in Italian style, but also the underside is to be enriched (in addition to the numerous bridge-typical light holes) by delicate bright Italian fresco ceiling paintings - for residents as well as for people waiting at the tram stations there



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Image Landsat / Copernicus

The Lantern Square: Where today a small park is surrounded by multi-lane grey streets, a warm, green inner city quarter is being created.

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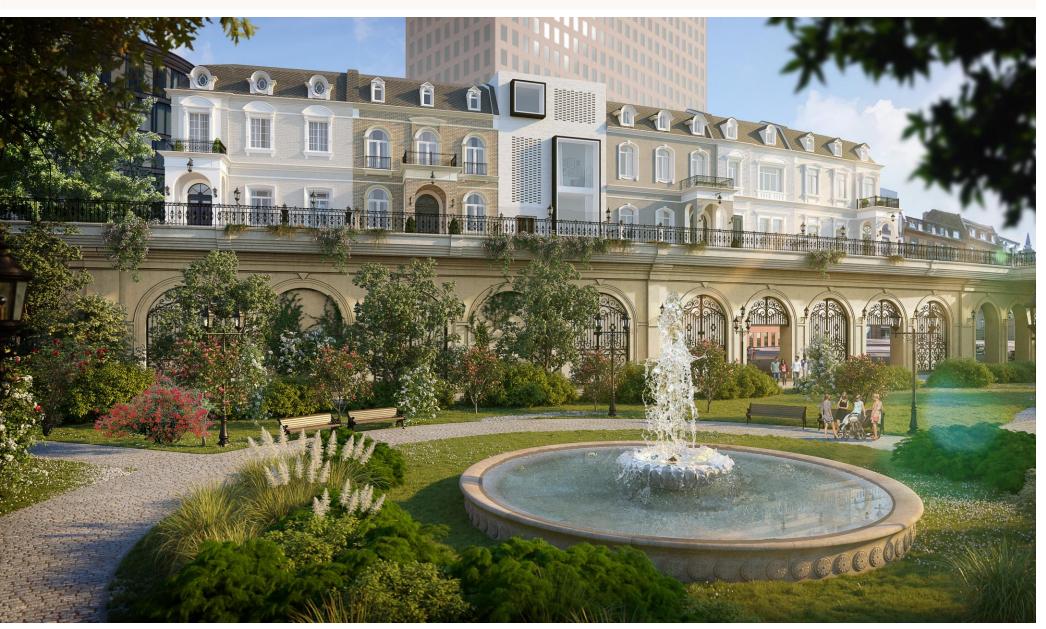
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IMPLEMENTATION

SEARCH THE TEAM **CONTACT & IMPRINT**  During the day, the quarter overlooks a lively little park of paradisical beauty, well protected from the noise of the streets by the surrounding bridge



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**IMPLEMENTATION** 

SEARCH THE TEAM **CONTACT & IMPRINT**  As the quarter is located near the main train station of Frankfurt, it is well lit at night by a multitude of different lanterns - but with insect-friendly amber light: hence the name "Lantern Square"



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Another special feature of the Lantern Square: While almost all buildings are kept in light discreet colours, there are individual solitaires whose facades are artistically tiled



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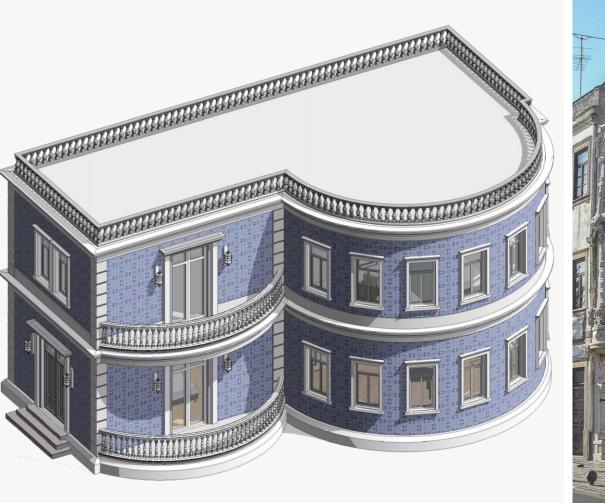
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### Tile houses are found in Europe mainly in Portugal

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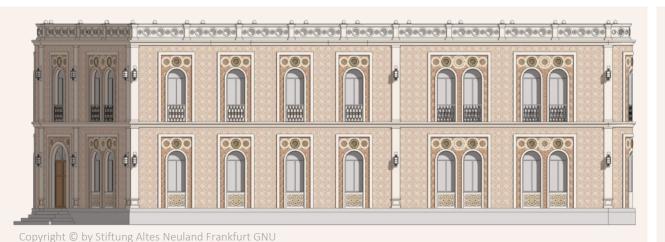
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## But also in other countries buildings are often tiled not only on the inside but also on the outside

Italian cosmati, for example, adorn floors, but also occasionally exterior walls. For the young craftsmen of the Master Academy for the Preservation and Innovation of European Crafts on the Frankfurt Bridges, tile houses represent an opportunity to test their art and develop it further in the direction of sustainability: Because tiles provide useful protection for buildings that can significantly extend their lifespan.



Copyright © by Cosmati Fliesen Santa Maria Trastevere

Tiles on the facade can significantly contribute to the longer life of a building and thus to its sustainability

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#### The tile houses on Lantern Square create a colorful atmosphere



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## The final stop in the south is Little Soho: a group of buildings with innovative housing options for the homeless

Beyond Lantern Square, the main route continues to the train tracks of the main train station, but a footpath leads to a special neighborhood above the bus station near the station: a cluster of individual shelters for the homeless.

Frankfurt recorded about 500 homeless people before Corona in 2018. The number is likely to have increased due to the economic impact of the lock-downs in 2020 and 2021.



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## The challenges of housing homeless people

Although there are numerous shelters for the homeless in Frankfurt, there is often not enough capacity and their services are not always accepted: For one thing, it is a problem for many homeless people that they are not allowed to take their drugs inside, but have to hand them in on arrival. Drugs are often their most precious possession and they are dependent on the consumption.

Another problem arises at night: There is not enough staff to guarantee permanent security for all the people accommodated. The fear of being robbed or beaten up or raped leads many homeless people to prefer the health risk of spending the night in the freezing cold rather than going to the city's specially designated houses for the homeless.

Comparatively popular are therefore the sleeping places in the inner city B-Level at the Eschersheimer Tor, where social control is ensured with little personnel effort. However, homeless people are only allowed to settle there from 11 p.m. and have to clear the field again from 6 a.m., which is a very small time window in winter and still represents a nuisance for passers-by on the B-level, even during off-peak hours.

This is different on the Frankfurt Bridges: In the "Little Soho" homeless shelter, there are only individual chambers with their own toilets, and there is even no stairwell where you could be mugged. This is because that way you can step out of each of the 145 rooms directly into the open air and descend via outdoor staircases. The large number of outdoor staircases that this necessitates is what gives the neighborhood its name, "Little Soho," as it is reminiscent of the variety of fire escapes in New York's Soho neighborhood.

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#### Homeless shelters approached differently: as an upgrade of the neighbourhood

On the Frankfurt Bridges, homeless shelters are also beautifully designed, so that they even become a tourist attraction: Because only if they are of spectacular beauty, they are tolerated in the neighborhood or even contribute to the enhancement of the neighborhood. And this is necessary if one wants to create such accommodations close to the city center. If they are built in remote locations, for example in purely commercial areas, they may not disturb the neighbourhood, but they are also difficult to reach for homeless people and therefore often not an alternative to sleeping outside.

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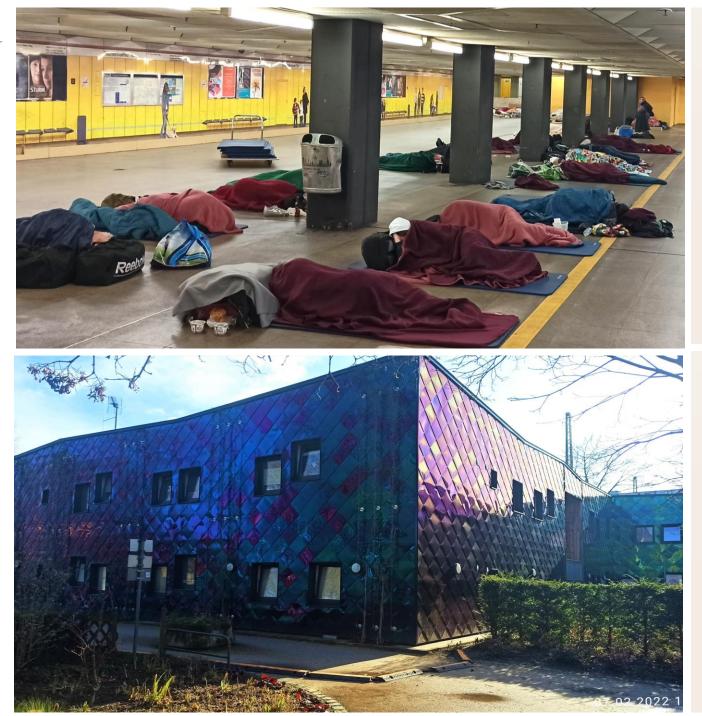
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There were around 500 homeless people in Frankfurt in 2018 -Corona is likely to have increased the number.

Attractive shelter for the homeless, already available in Frankfurt

Designed by architect and professor Michel Müller, the building has space for about 150 homeless people and has already been expanded since it was built in 2017.

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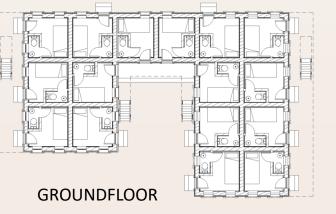


## The principle of Little Soho: individual accommodation instead of a homeless shelter

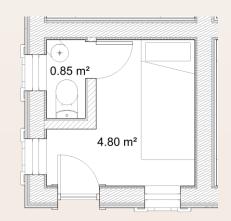
Even though the buildings of Little Soho look so beautiful that you would like to move right in, inside they are still very simple units of about 6 square meters, which fit a sleeping space of 1 meter width, a small area of 50cm width for belongings and a tiny toilet with sink. It is a safe warm sleeping place with daylight windows - but nothing more.

The houses are heated with geothermally stored heat and heat pumps, which means that they have the floor as a thermally activated surface. Accordingly, there is no bed in the room, it is completely empty - but has a warm floor. After admission (in winter from 5.00 p.m.) the homeless receive a sleeping mat on request, which they have to return in the morning when they have to leave the room at 10.00 a.m. at the latest.

Drainage grids are embedded in the floors everywhere, so that the tiled floors can simply be hosed down for cleaning - the water runs down a slope to the drain and the floor dries by ventilation until it is used again. This makes the empty rooms and toilets low maintenance and very easy to clean.







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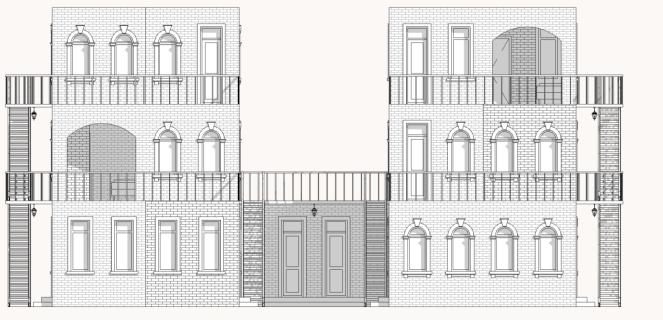
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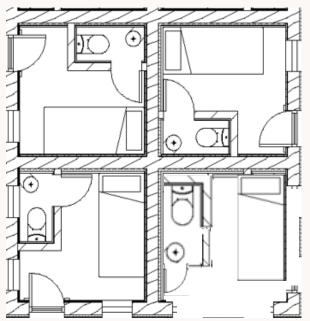


#### For homeless people with claustrophobia there are "rooms without walls".

Some homeless people also don't go to shelters in the city because they have developed a phobia against closed rooms due to the long life on the street. For them there are about a dozen corner rooms at the front of the terraces of the houses, where instead of windows or doors there are large arches in the wall on two sides, so that you are virtually under a roof outside. The floors of these rooms are heated by the geothermal system, and the two remaining walls are also geothermally activated, creating a slightly warmer spot inside the canopy.

However, these overnight chambers also have a toilet, which must also be used. Those who repeatedly fail to observe basic rules such as toilet use will no longer be allocated a place to sleep in Little Soho.





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## The management of Little Soho and other social institutions on the Frankfurt Bridges

It would be a good idea to transfer the management of Little Soho to organisations such as the railway station mission or Caritas and to compensate for the additional staff costs incurred there by having the bridge company offer them low-cost affordable housing on the bridges, which the organisations can make available to their staff as service housing, as a salary component so to say.

In Little Soho itself, there are service rooms in two houses on the upper floors that are available to the organizers: There, the supervisors, who are the contact persons for the homeless during the night shift, can also lie down or prepare food in a small kitchen.



### The Tile Houses: another shelter for the homeless

On the railway lines below Ostparkstrasse, another quarter for the homeless is being built with an additional offer: On the one hand, there is individual accommodation as in Little Soho; on the other hand, large parts of the area are also taken up by buildings in which people who have become homeless can find their feet again and are temporarily given their own living space - similar to the "Ostpark overnight accommodation", but with elements of the American social concept of "housing first".

The houses are all tiled with colored tiles, similar to the Kachelhaus in Bielefeld. Here, too, the rule is: it should be beautiful from the outside to increase acceptance in the neighborhood, but very plain on the inside.

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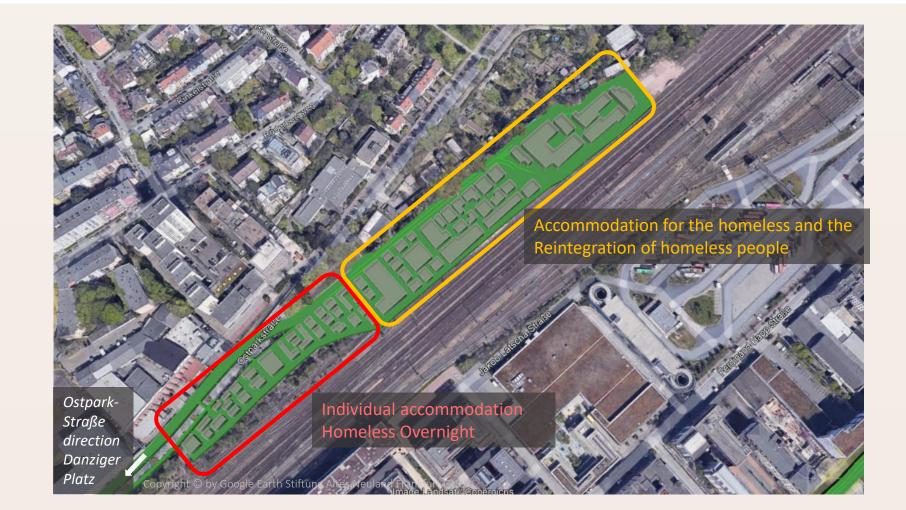
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#### Accommodation and reintegration in the tile houses at the train tracks

Around 250 homeless people will find a place to stay at night in this quarter on approx. 2,000 square metres of building space.
Furthermore, service rooms with a quality of stay and sleeping facilities are provided for organizers and social workers.
The remaining 13,000 square metres of building space are divided into around 200 micro-apartments for people who have lost their homes, i.e. are homeless but have not yet been living on the streets, and homeless people who manage to take up the city's reintegration offer, as well as functions that are needed in the social concept of "housing first" like therapists, social workers etc.

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## The quarter section for homeless people and the Reintegration of homeless people is designed somewhat differently

The overnight accommodation for homeless people is single accommodation with an area of about 6sqm. In the quarter section for homeless people, on the other hand, there are also units for two, three or more people, with about 9sqm per person. Thus, couples or families can also be accommodated.

And while the purely homeless individual shelters without furniture are visited in the evening and vacated in the morning, the micro-apartments here are intended for a stay of a few days or even months until other permanent accommodation has been found.

Each unit has a mini-shower bathroom and a mini-kitchenette with fridge and two hotplates. The furniture includes only one bed, one TV and one table seat per person, so that you can eat or work at the table.

Similar to the VinziDorf in Vienna, there is also a main building in which there is a kind of food distribution and a laundry room for laundry.

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## In the Tile Quarter of Frankfurt Bridges, the "housing first" concept is applied, which primarily takes people off the street without preconditions and then offers them therapeutic care and reintegration as a second step

On the Frankfurt Bridges, the "housing first" concept is applied when allocating the mini-apartments in the Tile Quarter: Whereas conventional homeless concepts first require the "housing ability" of those in need as a prerequisite for housing allocation, housing first assumes that people first need their own four walls unconditionally, so that they can then voluntarily accept further reintegration offers such as drug rehab, therapeutic and medical care, self-help groups, and the like, if necessary. People living on the street therefore do not first need to fulfill any requirements or go through programs or become abstinent in order to be assigned a mini-apartment, but they are given permanent housing in order to then perhaps have the strength to take advantage of other opportunities.



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The quarter of the tile houses is not a pure homeless quarter, but is as a potential tourist attraction also interspersed with a little gastronomy, shops and artist life

Ground floor: small supermarket with point of the Tafel. apartments Ground floor: coffee/tea Men kitchen and laundry showers room 1st floor social worker office & counseling center 2nd floor service apartments Women showers

products from the region & distribution 1st floor therapy and counseling center 2nd floor: Streetworker service

> Artist Factory Ground floor: bistro & gallery & small stage 1st floor artists' studios 2nd floor artists' apartments

Ground floor: Alcohol-free kiosk & bakery 1st floor drug counseling center/ first aid room 2nd floor service apartments

Ground floor: store with handicraft products, newspapers, etc. produced among others by odachless people

Family units

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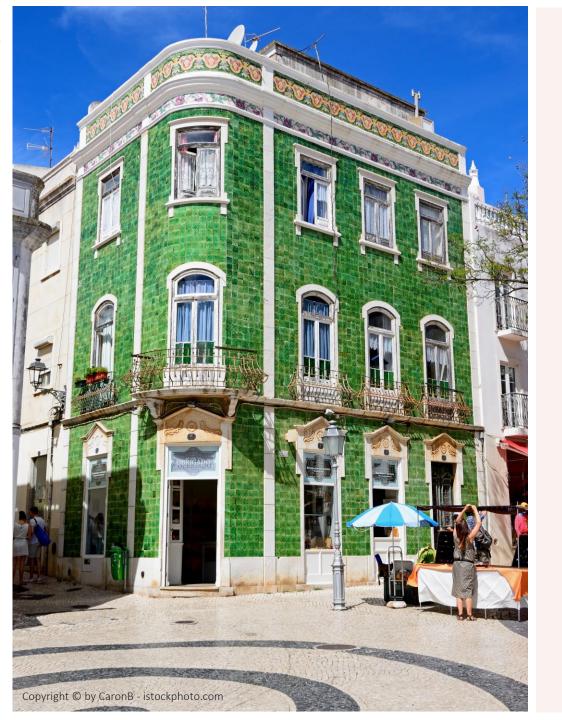
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## Why does the quarter consist of tiled houses?

Like Little Soho and the homeless shelter in Frankfurt's Ostpark, the neighbourhood is designed in such a way that its beautiful or spectacular buildings achieve greater acceptance among the nearest residents.

In addition, the huge amount of beautiful colorful tiles needed are painted and fired in the hobby pop-ups on the bridges over the years by the citizens of Frankfurt. Artist can apply the tiles to the houses in a sophisticated design manner, and thus tile houses provide a great stage for this art as more and more facade walls are decorated and protected with it over the years. In this way, the people of Frankfurt are 'permanently involved' in shaping the tile quarter, and acceptance of social housing will rise.

In addition, tiled walls are very easy to clean, especially indoors, and also provide additional protection for the facade outdoors.

But that is not the only sustainability aspect: a large proportion of the tiles, especially for the interior, are made from recycled construction waste.

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## Aesthetically beautiful Shards tiles made from 100% recycled material are an important sustainable building material in the Tile Quarter

These beautiful tiles in pleasantly subtle shades can be made purely from construction waste and without additives or the addition of colour, using special mixtures of recycled bricks and glass specifically for a particular look.

Reusing construction waste to "up-cycle" rather than "down-cycle" is an important principle when using sustainable building materials made from recycled materials.

These and similarly manufactured tiles are not only used in the Tile Quarter, but in numerous buildings on Frankfurt Bridges.



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#### Frankfurt becomes a pioneer in helping the homeless

Frankfurt is a rich city, and yet the number of homeless there is growing, not only since the Corona crisis. The situation is exacerbated by inflation and a traditionally high rent level.

With Little Soho and the Tile Quarter, humane housing options are being created for people who are not helped by greenfield development areas: They need inner-city life and social institutions such as soup kitchens, charity offices etc. in their vicinity to survive.

Despite their proximity to city life, the sites for the two homeless neighborhoods are not valuable building sites that would be taken away from other citizens: After all, the Little Soho site above the bus parking lot in front of the large parking garage is not an attractive place to live. Nor is the Tile Quarter, which is right next to the federal railroad tracks and thus sometimes has noisy trains in close proximity at night - a rather undesirable residential location.

The two quarters will provide a permanent remedy for an inhumane plight, and at the same time Frankfurt will gain two more tourist attractions.

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## Another inner city district: the Youth and Artists' quarter at Platz der Republik

Teenage years are a critical time in the development of young adulthood, which is why there can't be enough recreational opportunities for youngsters. But usually, there are hardly any attractive offers in the inner city, since locations there are usually too expensive for youth centers. This will change on the Frankfurt Bridges: The youth quarter at the Platz der Republik should be exemplary for further cool places of this kind right in the middle of the city.



Preferably, these areas are created in places - or, in the case of the Frankfurt Bridges, "over" places - that today seem grey and not very lively. The Frankfurt Bridges at the Platz der Republik, between the main railway station and the trade fair, run over such a place.

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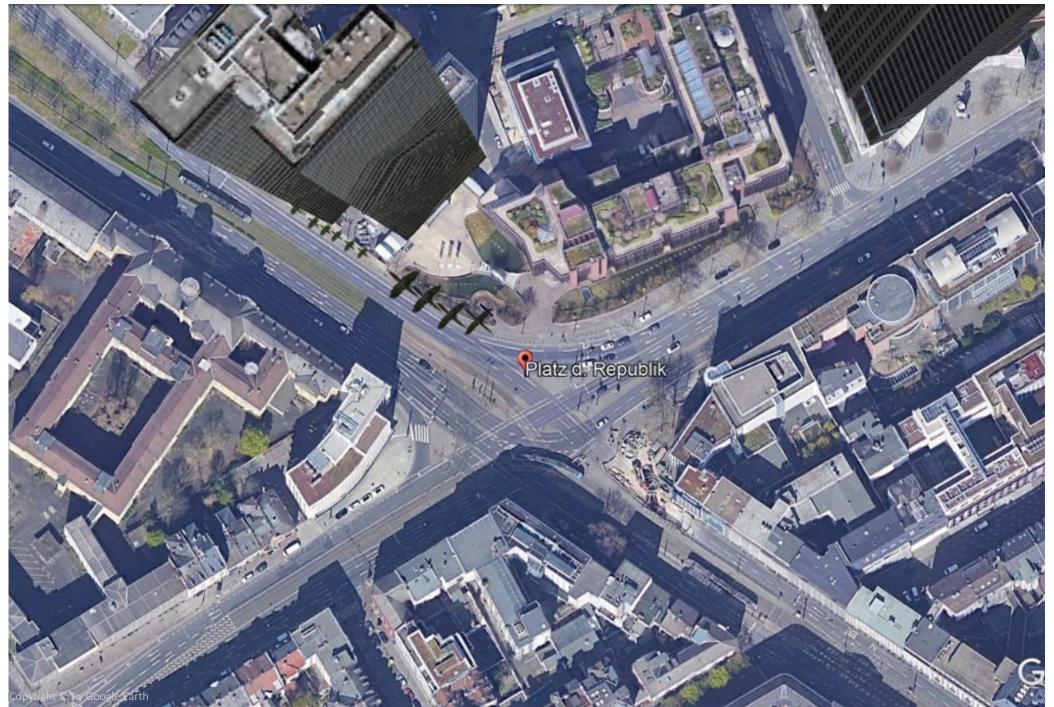
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#### The Platz der Republik lies in the middle of completely different worlds

On one side lies the Westend, the most expensive residential and office area in Frankfurt, on the other side is the Main Train Station Quarter, an area which, despite all the city's efforts, is characterised by drugs, prostitution and crime. Through all these areas runs the Mainzer Landstrasse, which functions like a border between the Westend and the Main Train Station Quarter, from the Platz der Republik up to the noblest areas of the city around the Alte Oper.



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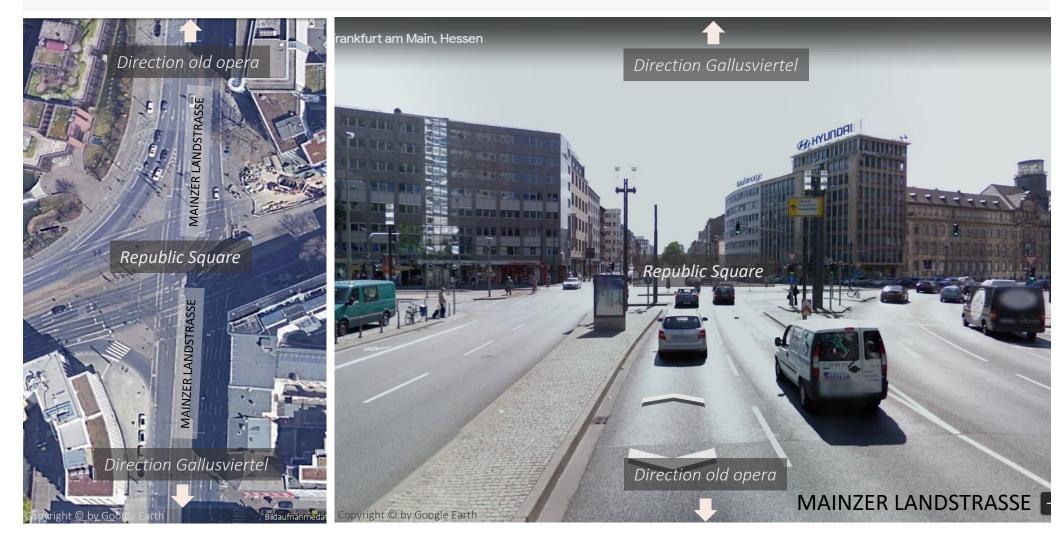
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## And actually, the Platz der Republik is not even a square, but one big, busy traffic junction



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SEARCH THE TEAM **CONTACT & IMPRINT**  Above this desolate car intersection rise the Frankfurt Bridges with an open and cool district for young people



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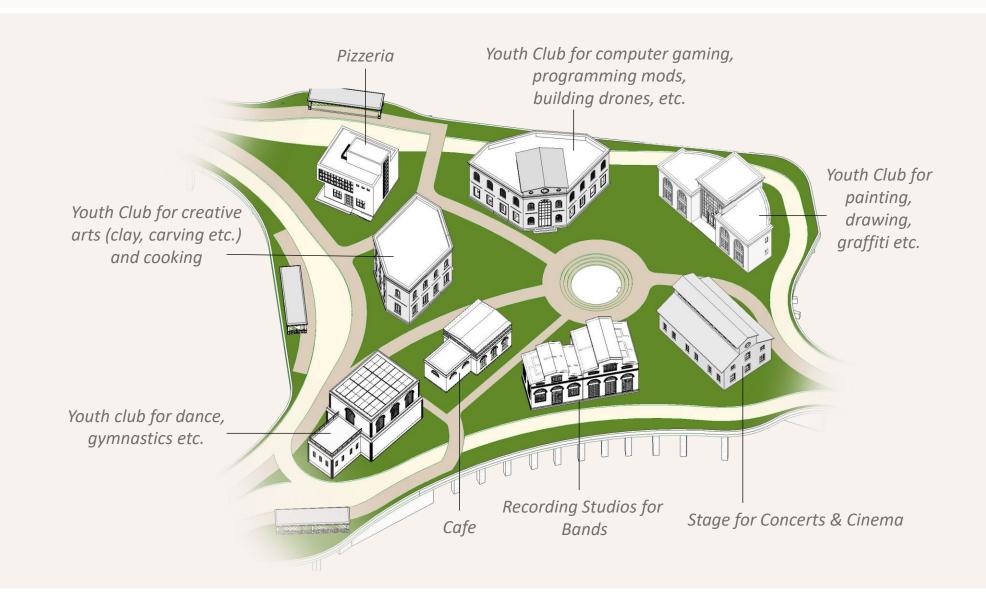
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## The loft-like buildings are surrounded by green spaces and are equipped for a wide range of activities



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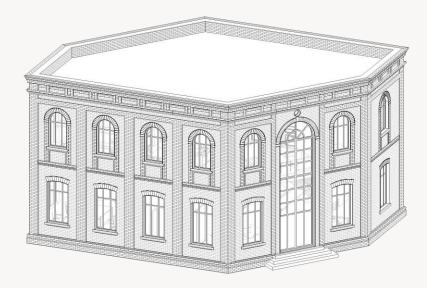
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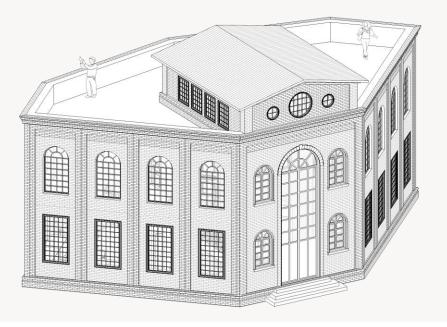
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## On the ground floor are the youth clubs, and above them are streetworker and artist apartments

The Repbulik Square (Platz der Republik) is a place where young people can find a very colourful range of activities: They can paint, carve, sculpt, dance, play in a band or cook together.

In each building there are areas where you can also simply "chill out". Outside there are also little walls, stairs or meadows where you can relax.

Any young person with a bridge card can come and join in
- if there are too many you will need to sign up for a schedule or you can sign up online for an activity.

The activities are organised and supervised by street workers and artists, who can move into affordable accommodations on the upper floors.

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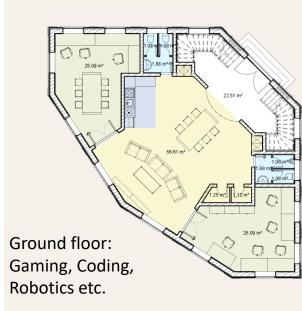
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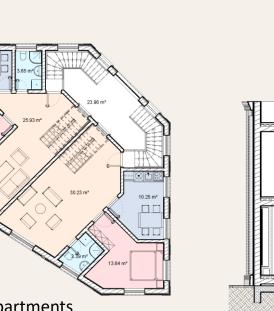
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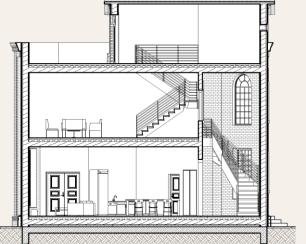
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Both apartments

roof terrace

have access to the

Affordable loft apartments for street workers and artists as an attractive aspect of the work in the youth quarter

1st floor: Two apartments with approx. 62sqm Wfl

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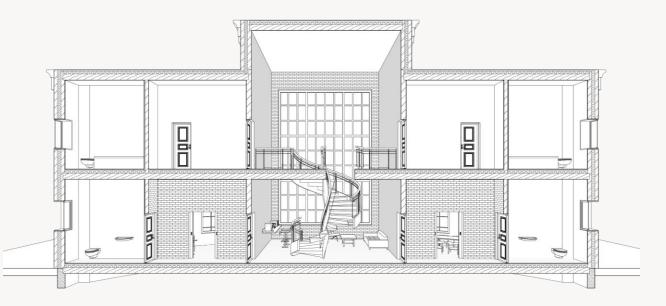
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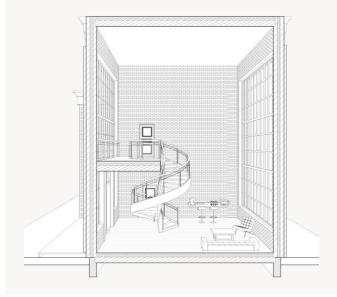
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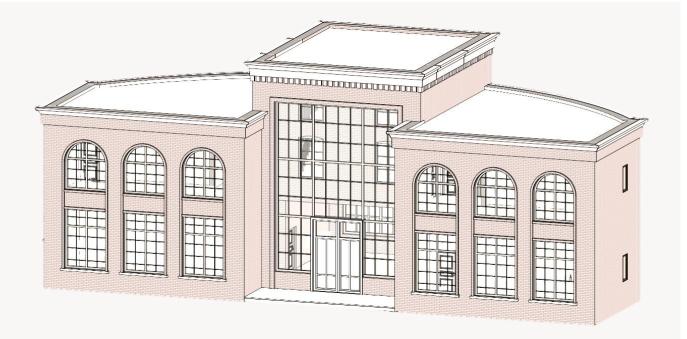
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The loft architecture offers space for various activities, many youthful participants and largescale art

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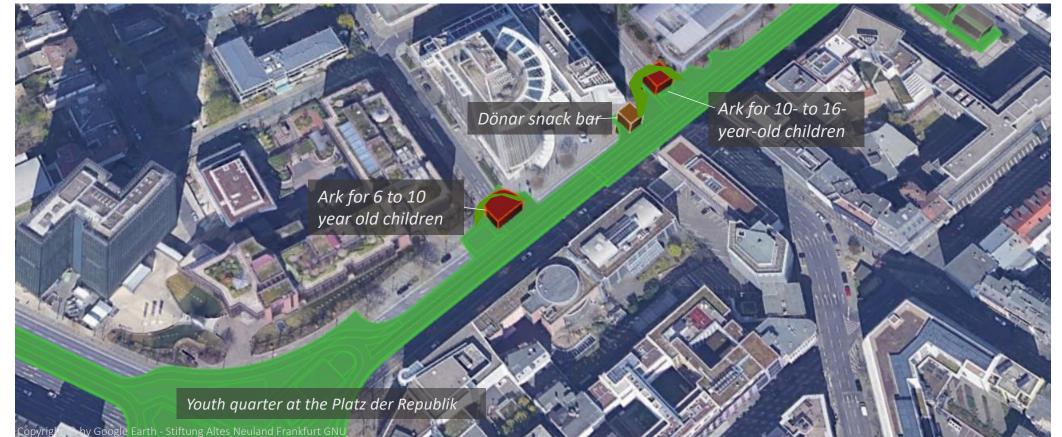
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#### The Youth Quarter at the Platz der Republik is complemented by two "Ark Houses"

The nearby Main Train Station Quarter is considered a socially critical neighborhood, and the Gallusviertel, located to the southwest of the Platz der Republik, is also considered a socially weaker neighborhood. The two "Ark Houses" in the immediate vicinity of the Youth Quarter are intended to enable children from these areas to have meals after school and a place to study and play. The Ark buildings are located on the Frankfurt Bridges above Mainzer Landstrasse, which continues from Platz der Republik to the Alte Oper. With their backsides, the buildings look out onto side streets leading into the Westend.



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## The Ark House for 6 to 12 year olds

The first Ark House is a generously proportioned building with two large window loggias on the ground floor, one of which is continued on the first floor. The window loggias are satinfinished up to parapet height, so that one cannot look in from the outside, but the children can observe what is happening outside.

### Space for about 20 children

On the ground floor there is a large semicircular room with a large table for eating together. Afterwards, the children can do homework, do handicrafts, paint or play in this room and also in an adjoining room. The large eat-in kitchen also serves as a staff lounge and less for cooking, as food is delivered.

Kitchen

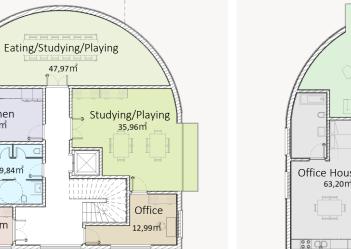
WCs 19.84m

Cloak Room

10,37m

## Designed with care

The Ark House is also barrier-free on the 1st floor. There is a nice big room for relaxing and playing. For children who sometimes do not feel well or simply need to catch up on sleep, there are two beds in a rest area. Next to it is an approx. 45sqm service apartment, so that the Ark House can be occupied or inhabited at night if necessary.





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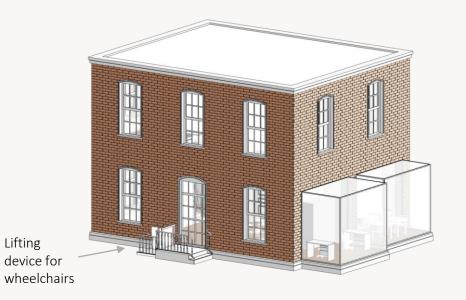


Lifting

#### Doner Kebab-Bistro



Ark House for older children



## Another Ark House for the 12 to 16 year olds

The second Ark House is for somewhat older children or adolescents, as the interests and thus also the room design change significantly from the age of 12 or 13.

This Ark House is accordingly smaller, but still designed for about 20 teenagers, because older children do not need so much space for their leisure activities.

Next to the Ark House for the older kids and teens is a kebab snack bar with an outdoor area that should also have appeal for the teens from the youth district - as a change from the neighborhood pizzeria and cafe.

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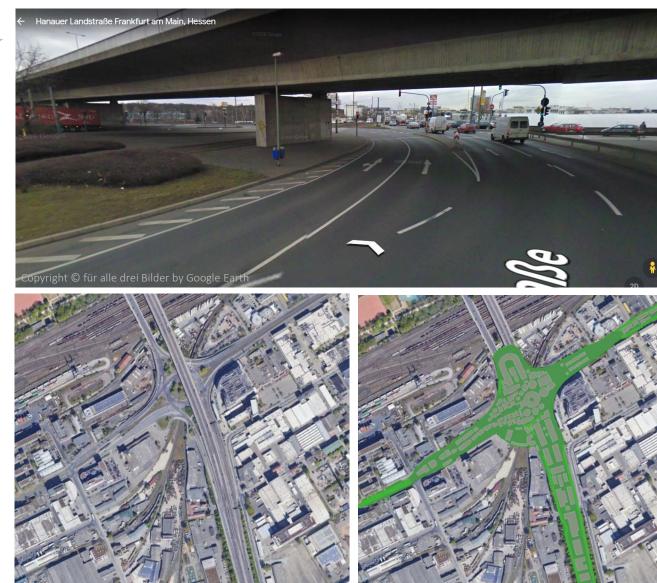
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Where Hanauer Landstrasse and A661 intersect, another cool quarter is being created: The floating IT college on the Frankfurt Bridges

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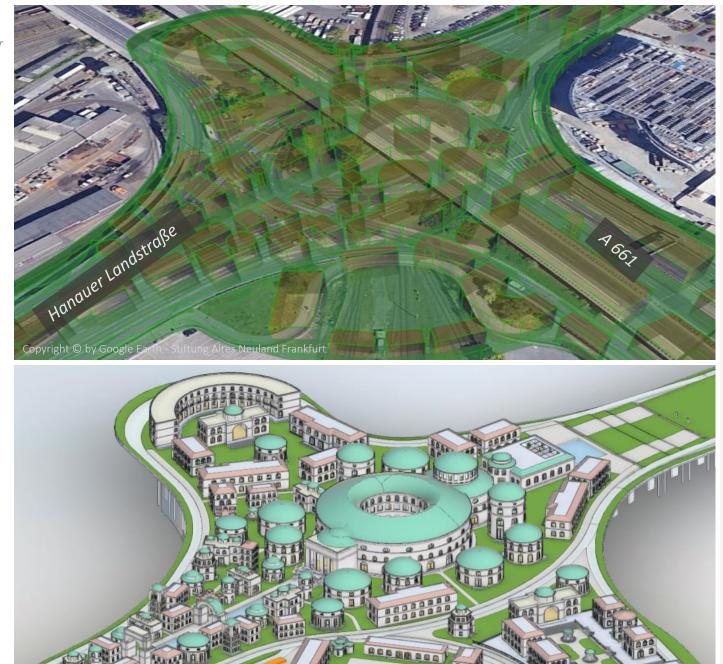
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The IT college has an area of over 30,000 square meters and is located in the immediate vicinity of the "Deutsche **Commercial Internet** Exchange": one of the largest Internet nodes in the world

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The sides of the Frankfurt Bridges on the IT college site are equipped with photovoltaic modules that reach down to the ground and generate electricity for the college like an energy centre



This generates a particularly large amount of electricity around the IT college, which can be used directly there for the computers, which have an extraordinarily high power requirement.

Below the IT college, the floor-to-ceiling side elements create a dark room in which only columns are illuminated and one can walk on illuminated gratings walkways hanging from the ceiling

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The walkways under the IT college are suitable for adventures - not only for children, but also for adults.



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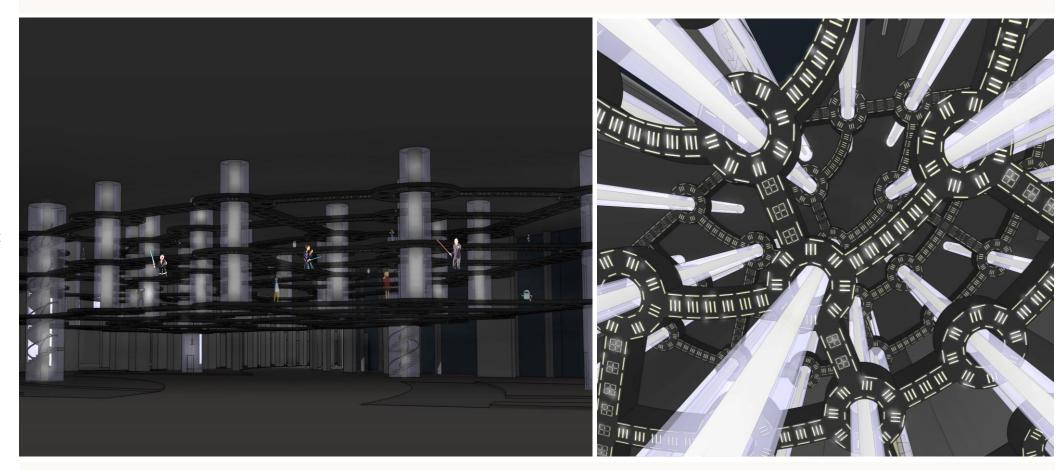
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The area under the bridge is deliberately darkened by photovoltaic modules on the sides reaching down to the ground – an area that is illuminated by luminous columns



Especially fights and chases with the laser sword can be fought out here very well

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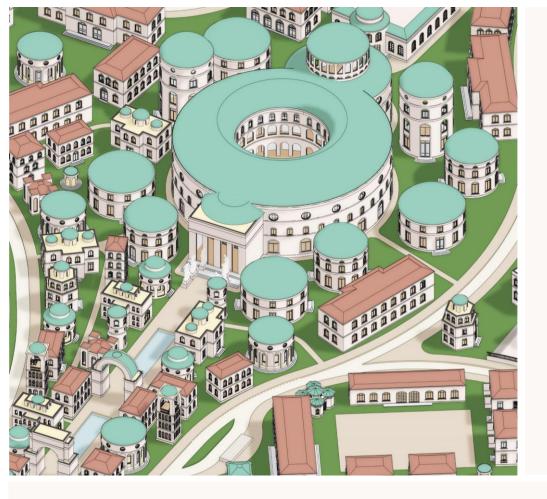
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## The IT college in Renaissance architecture: free for all people with a high talent for computer science

You can already study computer science at the Goethe University in Frankfurt and at the Frankfurt University of Applied Science.

However, the IT college on the Frankfurt Bridges covers a special segment: anyone can study IT there, no matter how old, no matter where the person comes from, and above all: even without any schoolleaving qualifications, as long as there is a high aptitude for computer science.

## A modern campus does not have to look like the Google campus

Quite the opposite: on the Frankfurt Bridges, a protected innovation space is being created for education on the second level of the city that functions differently from conventional structures. The IT College on the bridges harks back to the free spirit of the Renaissance and not to framework conditions defined by educational policy like other educational institutions in Germany, nor to an American campus world that wants to come across as clean and as thoroughly technologized as possible. The IT college on the Frankfurt Bridges is about the innovative creative spirit of Europe, the spirit of optimism of the Renaissance and the liberal thinking of the Enlightenment. This is the value foundation of the floating IT college on the Frankfurt Bridges.

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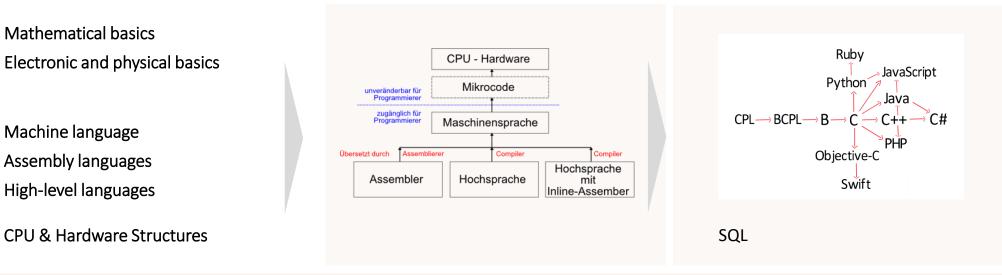
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## For over 2000 students, the IT college on the Frankfurt Bridges offers a wide range of content: Every student in the college is free to choose his or her subjects and majors

However, they must acquire a basic education in all fundamental areas, regardless of their focus. To this end, there are compulsory basic courses in all relevant aspects of computer science, followed by a wide range of optional specialisation courses.



These basics probably just need to be completed for all students, because since the (only!) admission requirement is proof of a high aptitude in some area of computer science, it is safe to assume that most students, even the very young, will enter with a prior knowledge of at least one of the areas.

After completing the basic training, a specialization can take place, both within the main subject areas of computer science and in connection with the application world: No matter whether these are in the area of databases, control, cyber security, etc etc - for the application world, guest lecturers from the application areas are always called in, whether from the manufacturing industry, the financial world, logistics, research or other areas.

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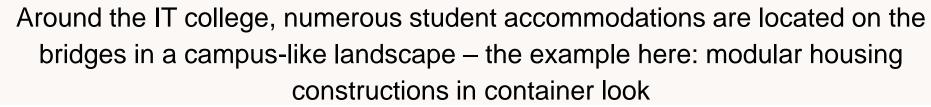
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Another quarter - without a main focus of use, but with a special type of construction: On the way to the bathing lake, above the Rosa-Luxemburg-Allee, the "Bathing-Lane" arises - long rows of colorful houses in North German style - as if you were on your way to the beach



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### The lobster houses on Helgoland are the main model for the design

The lobster houses are actually originally workshops of the fishermen of the North Sea island Helgoland. Nowadays you can find restaurants, small art or offices in them - but you can't buy them, they belong to the municipality.

On the Frankfurt Bridges, they are not reproduced one-to-one, but merely serve as an inspiration for the terraced houses that are located on the way to the bathing lake behind the gourmet row; for the strikingly beautiful thing about them is their colour scheme: This was created by Johannes Ufer, a German painter and sculptor of the so-called "lost generation" of artists (born 1912).

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Not only the colors serve as an inspiration, but also the building material: The lobster houses are traditionally made of wood. However, on the Frankfurt Bridges on the Bathing Lane, the houses are not only made from simple wood, but from particularly sustainable wood building materials: These can be wooden bricks made from damaged wood, or wood concrete made from old and leftover wood, or glue- and chemical-free solid wood construction, and many more. There is a growing and colourful landscape of sustainable timber building materials in Europe, and accordingly the most diverse innovative (or rediscovered) timber building materials are used on the Bathing Lane of the Frankfurt Bridges.

The colourful terraced houses between the Gourmet-Line and the Nidda are only two to three storeys high, while on the other side of the Nidda, larger four-storey wooden buildings are being built, inspired by Scandinavian modern architecture.



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## A little further on - on the other side of the Nidda - somewhat taller houses are being built: 79&Park in Sweden serves as the inspiration for them

The 79&Park site in Sweden has a reduced reinforced concrete core and is clad in cedar wood, which is extremely weather-resistant (it is also used in shipbuilding) and has its own wood preservative due to its essential oils.

Since genuine European cedars grow very slowly, however, sustainable forestry must serve as a supplier. Then the wood is also almost unbeatable for constructive parts of multi-storey buildings: Traditional Chinese multistorey buildings are made of cedar, and some of them are already over 1000 years old.

The houses at the bridge end market place of the Bathing Lane are only four floors high; building material and architectural impression of the Swedish model can find here therefore suitable application.

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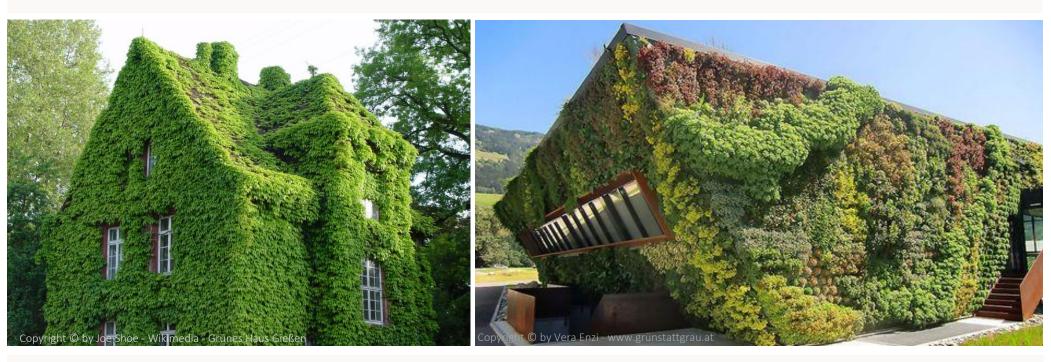
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Hobbit houses on the side of the Bathing Lane: Whether houses green themselves or are greened by humans, it's usually a pretty sight



However, complete greening that includes the roof and facade is not trivial: If you don't want to constantly water everything by hand, it has to be ground-rooted climbing plants that take care of themselves. Alternatively, there is facade greening, where the plants are hung in nets on the facade and the roof plants are planted on special water-storing substrate - with everything equipped with a fine control system for irrigation. The challenge here is to use as little plastic as possible for the façade system so that no microplastics are washed out.

Sloping roofs are another challenge: If the plants are not exactly firmly grown on an earth-like subsoil, as is the case with Icelandic sod houses, special fastening systems must prevent the plant layer from slipping off. Unfortunately, grass sod houses are ruled out for the Frankfurt Bridges due to the high maintenance requirements.

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# As cute as the sight of the ingrown sod houses in Iceland may be - the preservation of a house with an "earth roof" is unfortunately too costly for the hobbit houses on the bridges in Frankfurt

Almost all bridge houses will have a complete greening of the façade for at least one side with ground-rooted climbing plants. All flat roofs on the bridges are also greened, unless they are used for solar energy generation or function as roof terraces. However, no matter which greening technique is used: unfortunately, that of the grass sod houses from Island cannot be used on the Frankfurt Bridges, as the care and maintenance effort would be far too high.

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Hobbit houses on the Frankfurt Bridges are used for research into root-resistant roof sealing for green roofs



While greened flat roofs on the Frankfurt Bridges function according to the same principle of underfloor irrigation on carbon concrete columns as the greened Frankfurt Bridges themselves, the hobbit roofs with their curved shape pose a very special challenge, especially since they can also be two-storey: Their curved or rounded shapes can (as with all other curved roofs) only be sealed with root-resistant foil material.

However, even if this foil material is low in pollutants, it can become brittle over the years and release microplastics into the environment via rainwater. In view of the fact that more and more roofs - including curved and sloping ones - are to be greened worldwide, it is important to minimise potential wear problems with the sealing material as early as possible through innovation and research.

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### If it's northern Germany in the middle of Hesse, why not thatched roofs?

The construction materials on the bridges should be diverse in order to be able to explore as much as possible on the basis of this "innovation area", which the Frankfurt Bridges represent, and above all to be able to observe long-term effects of ecological construction methods.

However, only those materials are used that show research potential in some aspect, and this is currently not the case with thatched roofs. Moreover, there are no companies in Hesse that would be specialized in the (non-trivial) maintenance of such roofs. And without any research aspect, there is no reason to have craftsmen travel hundreds of kilometres to repair a roof.

In addition, there is the issue of fire risk: Wooden houses do not burn more frequently than houses made of other materials, and they will certainly remain standing for the legally prescribed 90 minutes in the event of a fire.

Moreover, wood can be flamed in a controlled manner so that it forms a fine charcoal crust before it is installed, and is very difficult to ignite afterwards. A thatched roof, on the other hand, is more flammable and burns down much faster. Conversely, the inestimably great advantage of thatched roofs does not come into play in Frankfurt: namely their comparatively high resistance to coastal storms of all kinds.

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Natural materials are tested on the bridges near the river: houses made of hemp bricks and straw bales

Two other building materials made from renewable raw materials may gain in importance in the future and are to be used in best-practice construction methods on the Frankfurt Bridges and observed as part of research and technical optimization: hemp and straw.

And since these renewable raw materials do indeed pose a slightly higher fire risk, they are located near the Nidda River.

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## Straw bale houses in Germany are usually erected in post construction with wooden uprights

The wooden stud frame forms the supporting structure, and the spaces in between are filled with pressed straw blocks. If the straw is properly pressed, it does not mold and provides excellent thermal insulation - ideal for the energy requirements in the construction of the future. As a rule, straw-bale houses are plastered with clay, so they achieve fire safety class 90.

And greening doesn't hurt these buildings either: the oldest known straw bale and wood frame structure, the Maison Feuillette, is a case in point: built in 1920, it is beautifully greened and still houses a training center.

There is also what is known as "load-bearing construction," in which the compressed straw bales are used like building blocks and act as a load-bearing structure even without a timber frame. However, this works primarily for smaller, single-story buildings and is not yet common in Germany. On the Frankfurt Bridges, however, this construction method could be considered for the large number of single-story student apartments, for example - instead of container construction methods.

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## Hemp houses made of hemp blocks achieve HTC-values of up to 0.18 with a wall thickness of 40cm: the climate house standard

Hemp bricks consist of hemp and natural lime, which are pressed into a brick using a cold-air process. This comparatively low-energy process and the fact that hemp grows 50 times faster than wood make it an ideal sustainable building material.

Moreover, hemp bricks can be used to build a house without additional insulation: If you make the walls 40cm thick, you get a climate house, if they are 45cm thick, the HTC-values even meet the passive house standard.

With normal slaked lime, it is also possible to produce hempcrete, which has the advantage that it can be formed on site, but has the disadvantage of significantly longer drying times.

On the Frankfurt Bridges, the possibilities for further optimization of hemp houses are being explored in various buildings along the Nidda.

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## What about the clay construction?

It is possible to build amazingly high with rammed earth, up to five stories are possible, as the Pise House in Weilburg from 1828 shows.

Rammed earth is an impressive and extremely sustainable building material because it is locally available. Building with clay is also low-energy: Clay bricks are not fired, nor is rammed earth.

And thick rammed earth walls inside the building can serve as heating or cooling walls and regulate humidity. Another plus is that pise walls can be made with excavated material from the site if brick chippings are mixed in.

All these advantages would speak in favor of a large number of earthen structures on the Frankfurt Bridges - if it weren't for one major disadvantage at play: clay bricks or rammed earth are almost as heavy as concrete and thus unfortunately not suitable for structures on the bridges.

Only lightweight clay blocks in wooden post-and-beam constructions can also be used on the bridges.

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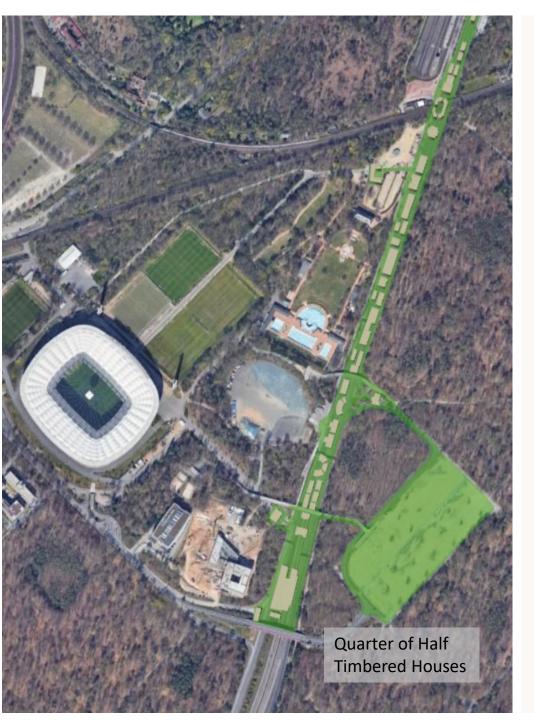
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## The quarter of the half-timbered houses in the forest

The historic old town of Frankfurt was one of the largest half-timbered towns in Germany. Its buildings were largely from the Middle Ages and were destroyed in the 1944 air raid on Frankfurt during the Second World War.

The people of Frankfurt have already expressed their longing for the destroyed old town twice: the first time in 1983, when the old half-timbered houses on the east row of the Römer were rebuilt; and the second time with the construction of the "New Old Town", which contains 15 half-timbered houses reconstructed true to the original.

Even if Frankfurt's old town remains lost in its entirety, individual iconic buildings of the time are to be reconstructed on the Frankfurt Bridges in the halftimbered quarter. This is also a nice task or challenge for the Master Academy for the preservation and innovation of European arts and crafts.

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# Half-timbering is not always visible - but regardless of whether it is visible or not: it is an extremely sustainable construction method that is to be taken up and further developed on the Frankfurt Bridges

The "Five Finger Place" was already particularly popular with tourists, painters and photographers in the 19th century: Pretty narrow alleys with buildings opened out there, the charm of which can still be seen in old photographs. Even though today's building regulations do not allow the alleys to be reconstructed in exactly the same way, because there is a minimum distance of 5 metres between houses, the basic structure can easily be recreated on the southern area of the Frankfurt Bridges.

Rapunzelgässchen

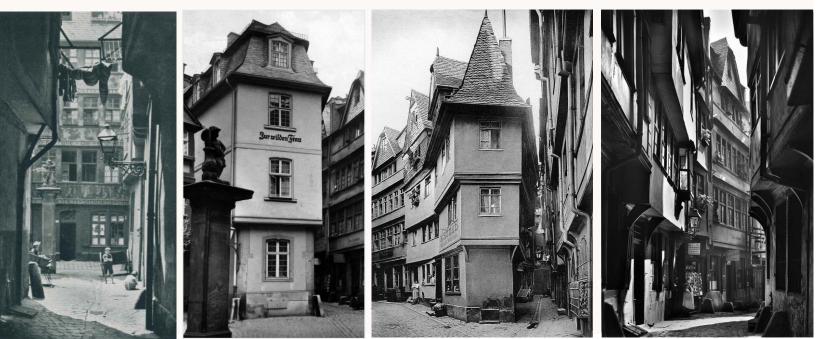
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#### Schwertfegergasse

House to the wild woman

House of Aries

Goldhutgasse



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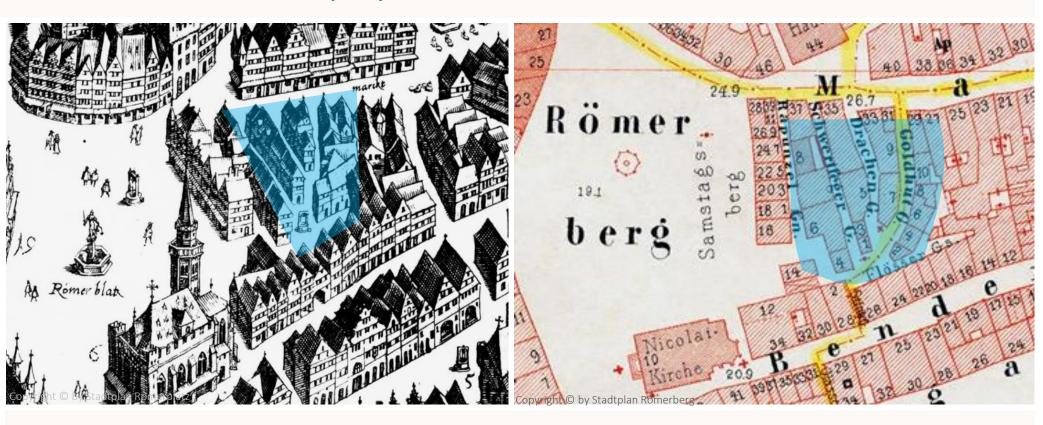
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It should be clarified with fire protection experts whether the 5-metre distance can be undercut with a special concept in order to retain the characteristics of the alleyways of the Old Frankfurt Quarter



Due to its unique high-rise canyons, Frankfurt has already had to overcome numerous fire protection challenges for half a century. In this respect, the local experts and authorities are used to dealing with even more tricky constellations than a few narrow alleys. Since not only the Quarter of the Half Timbered Houses, but also its subsoil and its entire infrastructure are being built from scratch, all modern or innovative fire protection measures can be applied here - which will in any case become an important field of research in Germany, not only in view of the spatial confinement, but also simply because of the increased use of sustainable, renewable raw materials such as wood, straw etc.

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## Why recreate historic half-timbered houses instead of creating modern half-timbered houses?

In terms of building physics, modern half-timbered houses usually function somewhat differently than traditional half-timbered houses, not least because they often insert glass in the "compartments" and conversely have fewer traditional windows. Large windows are nice, but in a more densely built-up quarters like the half-timbered house quarter of the Frankfurt Bridges, they also reveal passers-by and neighbours a great deal of privacy.

In addition, the aim of the Frankfurt Bridges is to preserve and promote arts and crafts and to combine them with innovative technology - and arts and crafts are only offered by the old half-timbered houses.



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How sustainable half-timbered houses are can be seen in Frankfurt in Old Sachsenhausen: Half-timbered houses from the 16th and 17th centuries still stand there today.

Properly built and covered with slates from the 1st floor, they are extremely durable.



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## And another quarter, completely modern: The quarter of flowing forms. It is being built above Hanauer Landstrasse - and also includes an infinity pool "for everyone"

Even if buildings á la Zaha Hadid were too large for the bridges, the flowing formal language of the late architect can still be cited on the Frankfurt Bridges, albeit with a focus on sustainability and humane accessibility and warmth - two aspects that were not always at the forefront of Zaha Hadid's architecture.



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## Flowing shapes with Rabbitz technique

If you want to build flowing or round walls not from concrete parts, but in a lightweight construction method that uses sustainable building materials, then the Rabbitz technique is a good choice: Here, the building form is double-walled, with a substructure of round iron (it could also be

normal steel beams in conventional construction forms). The construction is covered with a plaster base made of fine wire mesh and mineral plastered on the inside and outside. The cavity between the inner and outer walls can be filled with recycled insulating material, which should be shaped into small beads so that they

flow almost like water when filled, insulating even the smallest cracks in the double-skin construction. Insulated in this way, Rabbitz houses can achieve a primary energy requirement of less than 20 kWh/(m²/a).

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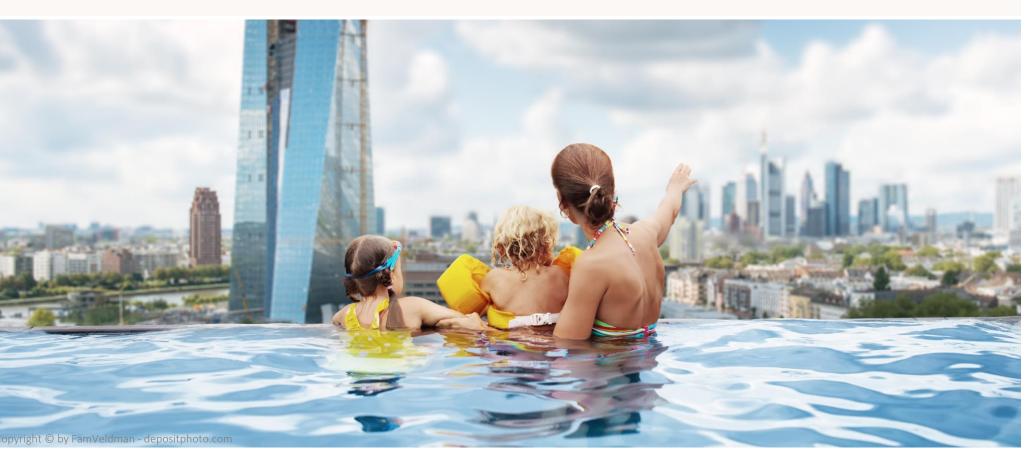
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## Where the Frankfurt Bridges on Hanauer Landstrasse cross the S-Bahn bridges at a height of 15 metres, there is also a luxury infity pool "for all"

Although not in Rabbitz design, the infinity pool is just as elegant as its direct modern bridge surroundings, with a view over the city from its outdoor pool. Inside, it is designed like a luxury hotel and is heated with solar thermal energy and the waste heat from the data centers on Hanauer Landstrasse. The most important feature of the pool is that it costs no more than the Rebstock swimming pool and is therefore equally affordable for all citizens. Open 20 hours a day, it is set to become Frankfurt's favorite wellness spot. However, you have to register in advance with your bridge card number to avoid overcrowding.



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## An important parameter in all neighborhood planning on the bridges: All buildings and their function or use are related to the neighborhood buildings around them or else to the buildings along their section of the bridge

In the bridges' building cadastre, housing is proposed to be allocated to persons entitled to affordable housing who work in professions where attendance is necessary and who work in the immediate vicinity of the bridges (many occupations are not home-office-capable), so that commuter traffic is massively reduced: At Otto-Hahnplatz, for example, lower-earning employees of the schools, kindergarten or Mainufer museums should be given housing; at Nibelungenallee, for example, employees of Bürgerhospital, especially those with night shifts, etc.

	Plan Nr – Bridge Post Code	Location	Name of the Bridge Quarter	Building No.	Living or Commerc ial	Usage	Opening hours	Description of the use and, if necessary, proposal in connection with the bridge environment.	No of Parties in the House	Inhabitants/ People [No]	Floors	Space [sqm]	Total Space [sqm]	Effective Area [sqm]
	1003	Otto-Hahn-Platz	Rosenplatz	1003001	w	WSo		2 Flats for special education teachers at Schiller- or Carl-Schurz-Gymnasium Highschool; 2 Flats for staff of the Protestant Kindergarten	4	12	3	183	549	467
	1003	Otto-Hahn-Platz	Rosenplatz	1003002	w	WSo		Flat for staff of the Protestant Kindergarten	1	2	1	72	72	61
	1003	Otto-Hahn-Platz	Rosenplatz	1003003	w	WSo		Flat for trainees teachers at Schiller oder Carls-Schurz-Highschool	2	5	2	121	243	206
	1003	Otto-Hahn-Platz	Rosenplatz	1003004	w	Wso		Flat for staff of the Städelmuseum	1	4	2	78	155	132
CLIMATE	1003	Otto-Hahn-Platz	Rosenplatz	1003005	G	ES	15	Bio-Supermarket			1	178	178	142
	1003	Otto-Hahn-Platz	Rosenplatz	1003005	G	GR	15	Bio Pizza-Pasta affordable + 40 sqm Music-Salon		30	1	178	178	142
	1003	Otto-Hahn-Platz	Rosenplatz	1003005	w	WSo		Flat for tainees	1	2	0,5	178	89	76
	1003	Otto-Hahn-Platz	Rosenplatz	1003006	w	WSo		Flat for apprentices/students	1	1	1	38	38	32
	1003	Otto-Hahn-Platz	Rosenplatz	1003007	G	GC	20	Operator Kiosk			1	30	30	24
	1003	Otto-Hahn-Platz	Rosenplatz	1003008	G	GC	10	Juice Bar			1	33	33	27
	1003	Otto-Hahn-Platz	Rosenplatz	1003009	w	WSo		Flat for apprentices/students	1	1	1	35	35	30
DWIDE		Nibelungenallee	Blumen-Allee	1020001	G	EG	9	Paper-shop & Copy-Shop			1,5	48	72	61
		Nibelungenallee	Blumen-Allee	1020002	w	WN		Flat	1	3	2,5	49	122	104
		Nibelungenallee	Blumen-Allee	1020003	w	WSo		Flat for staff of the National Library	2	4	2,5	57	143	121
		Nibelungenallee	Blumen-Allee	1020004	G	GC	20	Vienna Coffee House with small roastary		15	2,5	70	175	148
		Nibelungenallee	Blumen-Allee	1020005	w	WSo		Students' Flats	12	12	3	182	545	463
		Nibelungenallee	Blumen-Allee	1020006	G	GC	20	Groundfloor: Operator Kiosk with gluten-free organic bakery products		6	3	57	171	146
	1020	Nibelungenallee	Blumen-Allee	1020007	G	DW	12	Wellness- and beauty saloon		30	2,5	93	232	197
	1020	Nibelungenallee	Blumen-Allee	1020008	W	WSo		Flat for nursing staff of the Bürgerhospital	4	8	3	92	275	234
	1020	Nibelungenallee	Blumen-Allee	1020009	W	WN		Flat	2	4	2	68	136	115
	1020	Nibelungenallee	Blumen-Allee	1020010	W	WSo		Flat for nursing staff of the Bürgerhospital	4	9	2,5	140	351	298
	1020	Nibelungenallee	Blumen-Allee	1020011	w	WSo		Flat for staff of the Free Church Parish	2	4	2,5	59	147	125
	1020	Nibelungenallee	Blumen-Allee	1020012	G/W	GC	20	Groundfloor: Operator Kiosk with Ice-Creme, Crepes, Cake		8	1	66	66	56
	1020	Nibelungenallee	Blumen-Allee	1020012	G/W	WSo		Second Floor: Flat for staff of Operator Kiosk		3	1,5	66	99	84
	1021	Nibelungenplatz	Blumen-Platz	1021001	w	WSo		Flat for nursing staff of the Bürgerhospital	1	1	1	42	42	36
	1021	Nibelungenplatz	Blumen-Platz	1021002	w	WSo		Flat for staff of the Bürgerhospital	3	12	2	260	519	442
<b>`</b>	1021	Nibelungenplatz	Blumen-Platz	1021003	G	GB	15	Tappas-Bio-Bistro		20	1	76	76	65
/	1021	Nibelungenplatz	Blumen-Platz	1021004	w	WSo		Flat for staff of the Bürgerhospital	1	4	1	136	136	115
	1021	Nibelungenplatz	Blumen-Platz	1021005	w	WSo		Flat for nursing staff of the Bürgerhospital	1	4	1,5	90	135	115

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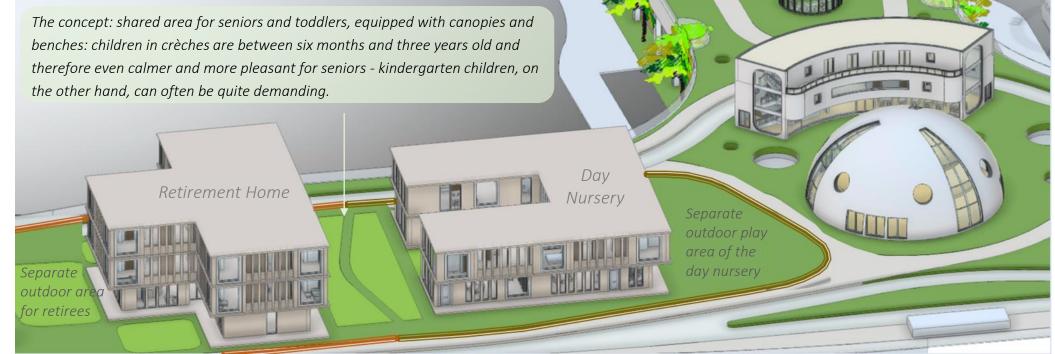
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# On the bridges, too, sensible combinations of buildings are provided for as a basic principle of planning: Functions are not considered in isolation, but planning is done along human relationships or needs

For example, daycare nursing centers and senior citizens' homes are built side by side: They have each their own large outdoor areas, but also a common outdoor area where seniors can sit and watch the little under-threes play in the sandbox or even entertain the very young ones in their strollers. The little ones in particular are happy for any loving attention, and seniors often love contact with young children in their otherwise elderly environment.



The concept of human connections of buildings can be realized not only on the bridges, but also in urban planning in the rest of the city

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Example station forecourts: When redesigning the area in front of Frankfurt's main train station, either a station forecourt can be created again - only a bit greener and more like new than before, or ...

In January 2009 for the award no first place was awarded. Only a second and third place won the competition.



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.... or you can make the square a living space that takes into account the needs of ALL the people who usually spend time in front of train stations: Tourists, commuters, residents but also homeless people and begging or drug addicted people

Waiting at train stations is usually unpleasant, is only accepted involuntarily and often also reduces the willingness to travel by train at all instead of by car. If the station is a beautifully designed living space with cool gastronomy and attractive stores, then spending time there becomes a positive experience. There must also be places to go for the poorest in society who spend time there: Drug help and charitable stations must be planned in with their own buildings.



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drug help/

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Instead of driving drug addicts or people without shelter away from station squares through "hostile engineering," open drop-in centers for them should be integrated into the colorful world of buildings there, especially in front of the stations

Especially older people, children, young people or even women are understandably often afraid to go to the station or arrive there by train, especially in the evening hours, because they find it difficult to assess homeless people and begging or drug addicts. Therefore, station squares should not only be framed with livable, cool and attractive gastronomy and stores, but buildings for people who acutely need help should also be incorporated.

At Frankfurt's main station, this could be the beautiful corner buildings: In the rooms there, drug addicts can get first aid if necessary, receive clean syringes, be directed to the nearest consumption rooms or also receive drug counseling.

Homeless people can also receive medical first aid in the second large corner building, and they are informed about where to find food outlets, opportunities for cleaning, or humane homeless shelters - for example, Little Soho right next to the train station.

In this way, these poorest of the poor in our society do not have to be evicted by the watch company, which is also given space in one of the buildings, but can be directed to these points of contact, from where they can be taken on to the appropriate aid stations.



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If one builds the buildings from lightweight bricks (because of the B-level below) with appropriate artisan design in the style of the main station, the beautiful drug and homeless houses on the edge will also find much more acceptance among the citizens.

Irrigation by rainwater from the station roof, following the example of the Frankfurt bridges, serves to unseal and green the entire area, including green roofs: a living world of experience is created!



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# The Frankfurt Bridges are a showcase of innovation: also in terms of the wide range of sustainable building materials used there

Examples of sustainable building materials on the Frankfurt Bridges:

- All types of concrete with various aggregates, binder substitutes, reinforcements or even "self-healing" with the help of bacteria.
- Wood with various sustainability aspects
- Renewable raw materials of all kinds
- Exotic (to date) in the construction business: intelligent steel, Rabbitz, translucent concrete, 3D textiles for building casings, mushroom as insulator, graphene flakes and much more.

In the quarters, the focus is always on building from or with a special building material, whereby if possible at least two different houses are created, which also have slightly different urban conditions - for example, one is in the blazing sun, while the other is shaded by other buildings (be it buildings on the bridge, or next to the bridge). Only if you have several test objects that are basically in the same neighbourhood (i.e. have comparable test conditions, but differ in a few parameters - e.g. shading, structural requirements, etc.), you can research the behaviour of these building materials and optimise their use in other construction projects over the years.

The Frankfurt Bridges are thus also a testing and research field.

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# The peculiarity of each neighborhood can be shaped by different factors

Special atmosphere is achieved by landscape architectural design and architectural styles

Above particularly bleak intersections, quarters with a particularly positive, warm atmosphere are in demand - not least for the sake of the residents who have had to live with the grey wasteland on their doorstep up to now. The special use can be in the fields of education, culture or even social affairs

In many cities, often there are neither resources nor premises for education and social services. On a newly created second level in the city, though, such offers can be placed exactly where they are needed.

# When using innovative building materials, the link to research is important

Depending on the respective bridge quarter, there is a different emphasis in the selection of building materials and construction techniques used. All building materials have only one thing in common: They must be directly or indirectly sustainable.

The construction method and logic of the quarters on the Frankfurt Bridges can also be applied in the areas along the bridges and the rest of the city

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# Conclusion: The neighborhoods on the Frankfurt Bridges are of colorful diversity

The Frankfurt Bridges are not uniformly designed from a single mold, but have a wide variety of quarters, all of which also have a very different appearance - just like in a grown city.

The diversity comes from several factors: be it a special atmosphere, a special use , the use of innovative building materials - or a combination of \_\_\_\_\_all three.

The quarters defined so far can be supplemented by further quarter ideas: With a bridge area of over 2 million square meters and a building area of 1.15 million square meters, the Frankfurt Bridges offer enough space to build quarters suitable for a wide variety of needs.

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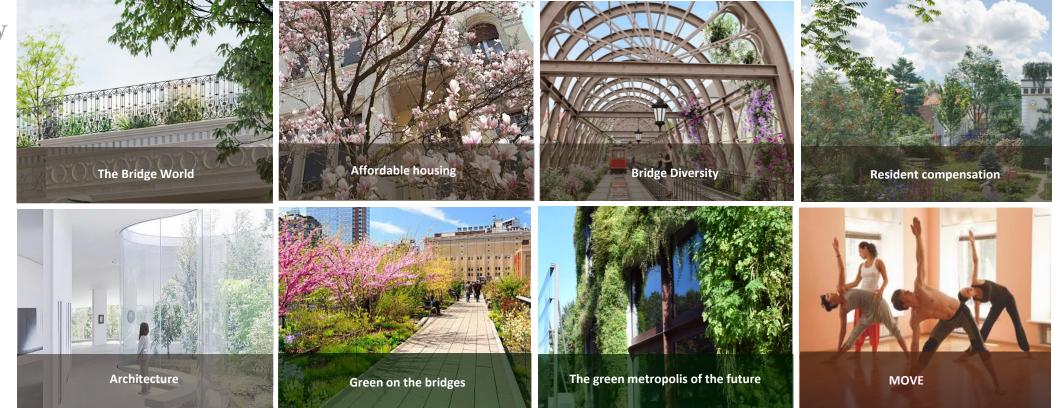
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#### CONTRIBUTING

Architecture	Geoinformation	Urban climate - global climate	Water	Law	Critical sparring partners:
Picture & Photo	Green & Nature	Statics	Packing	Finance	Professors
Bridges	Communication	Transport	Webpage & Design	Implementation	Professionals
Energy	Art & Culture	Technology & IT			Inspirers & Supporters

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### The Frankfurt Bridges are architecturally diverse in design and execution

The Frankfurt will be designed differently to match the streets they cross and according to the width of the road: ultra-modern or with traditional craftsmanship. Some sections are made of steel trusses, others of red Main River sandstone or even of light-colored exposed concrete combined with modern art - every conceivable variation is planned. Accordingly, the large Main river bridges on the route are also designed differently: Both Main bridges will be artisan-crafted and will cite old German or European bridge structures. The bridge that spans the tracks behind the main train station in Frankfurt, on the other hand, will be ultra-modern.

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# The Frankfurt Bridges are constructed differently depending on the local conditions

The route for the Frankfurt Bridges is very heterogeneous: In some places, the underlying roads are not quite so wide, so that the Frankfurt Bridges have to be kept relatively slim or - when running through residential areas - even glassy; in other places, however, the roads are comparatively wide but are already crossed by railroad bridges, so that the Frankfurt Bridges have to pass over these crossbridges at a greater height.

For each of these local conditions, a correspondingly suitable bridge design must be conceived: In narrow places, a glass or filigree bridge structure made of truss steel is chosen instead of a wide bridge corpus made of concrete; where the bridges have to go up high, a viaduct-like design - for example, made of natural stone masonry - makes the most sense ; or else they float as high as gondolas above old trees. A wide variety of shapes and materials are used.



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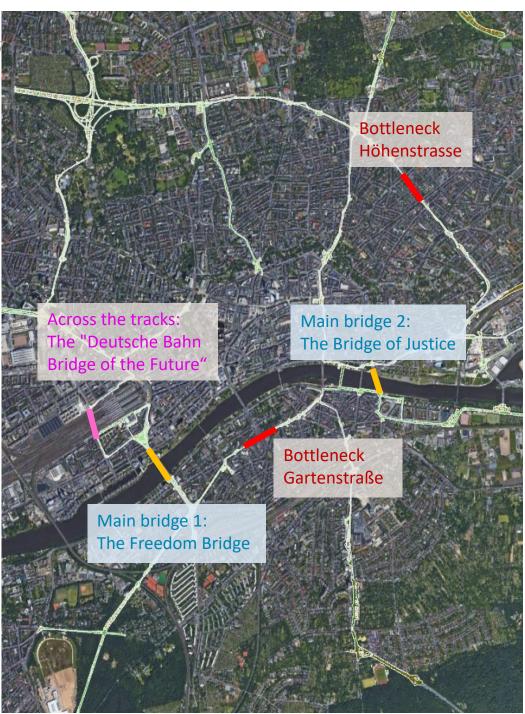
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Frankfurt's bridges run in a wide variety of environments: sometimes over the river, sometimes over tracks of the main railway station or suburban train bridges in the city; and in a few cases they also run through narrow streets.

Each of these challenges requires its own solution.

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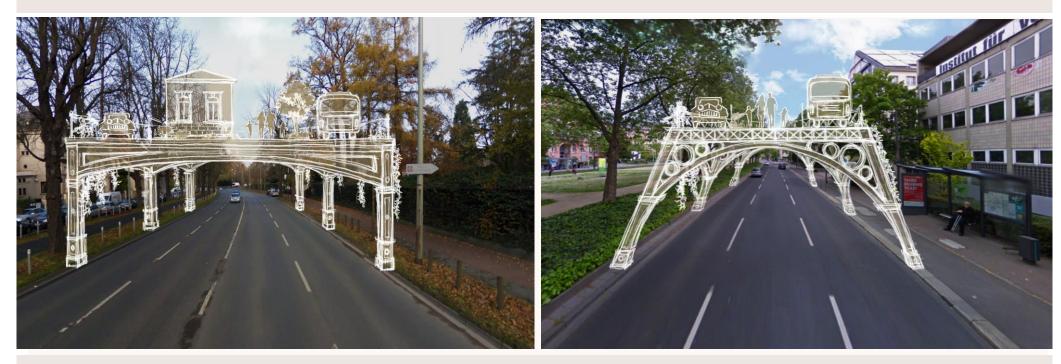
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# Not all bridges are the same: In the course of Frankfurt Bridges, a wide variety of constructions come into play - depending on the environment

Unlike river bridges, the Frankfurt Bridges do not have large spans, but must primarily bear the load of the quarters, plants and traffic routes. Accordingly, they are built of concrete with steel reinforcement for most of their course. If the streets are not four or six lanes wide, but narrower in some places, or if the bridge piers are on narrow sidewalks and thus quite close to the wall of houses, then Frankfurt Bridges are not built of concrete, but of steel with piers that face away from the walls of the houses.



These different construction methods for a second level in the city were already being considered in New York in 1870, when the city was looking for new transportation routes that could provide another level of traffic through the street canyons of Manhattan.

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# The Frankfurt Bridges over the Main River will be built with steel - and for bottleneck sections they will be also constructed with steel

Most bridges in Germany were built of concrete after the Second World War. Today, after only 50 or 60 years, more than half of them are in need of renovation, while steel bridges from the 19th century are still doing their job. These are also easier to repair because you can get right up to the structure, whereas with concrete bridges, where the steel reinforcement is hidden under the concrete, it is often not apparent how dilapidated the structure may already be.

The Frankfurt Bridges cross the Main twice. In both cases, construction in steel is planned.

Steel trussing is also ideal for the two narrow pass sections through which the Frankfurt Bridges run, because steel trussing is filigree, lets in a lot of light and - when artistically designed - is aesthetically very pleasing.

Steel has the advantage of allowing filigree structures and its durability (when properly processed and maintained) makes it suitable for a highly sustainable bridge construction system

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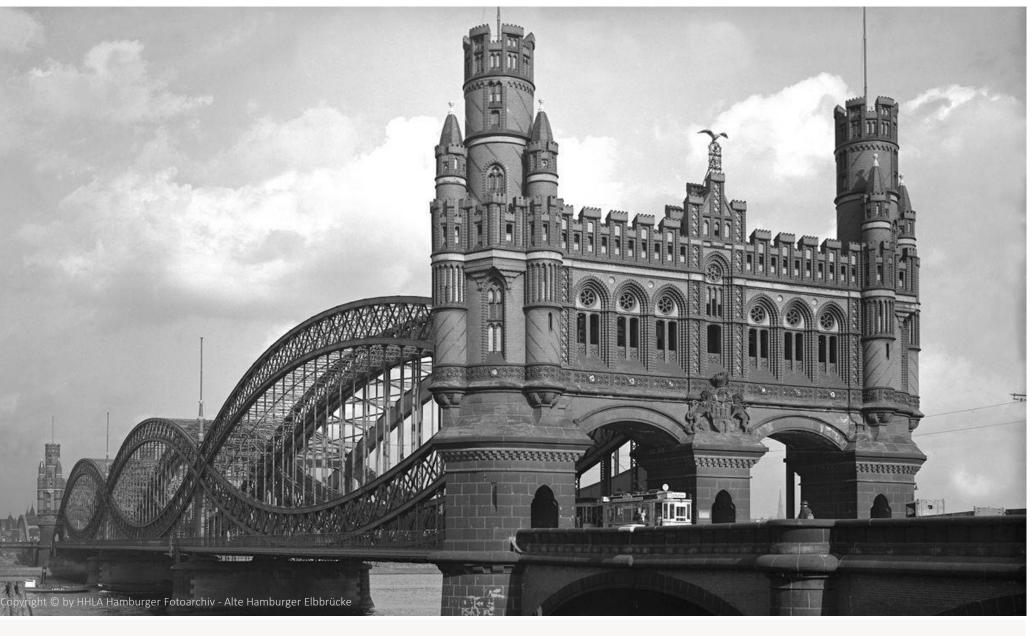
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A renaissance of the steel truss would be the most sustainable solution

- the only question is whether there are still companies existing today that can build it...

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# Steel trusses are the method of choice not only for bridge construction, but also for hall construction

Buildings that can last for centuries and are beautiful: the old market halls in Paris (Les Halles), the Pennsylvania Station in New York (unfortunately demolished in 1969) or even the Eiffel Tower - they are all examples of an engineering art that has almost been forgotten.



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Frankfurt has some beautiful steel truss constructions: the Honsellbrücke and the Eisernen Steg as well as the hall of Frankfurt's main train station

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# Arches and rosettes also have a function

One often finds strikingly beautiful worked arches or rosettes in steel trusses. Admittedly, these do not have a load-bearing function; but they are not simply for the sake of beauty either, but have a stiffening function: This not only makes the overall structure more stable, but also reduces the vibrations of the steel body due to an evenly distributed "extra" mass.

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Especially with regard to steel construction and steel trusses, which flourished during the period of industrialization, there are fortunately still numerous records and documentation of calculations that can be evaluated and processed in the Master Academy on the Offenbach bridges.

### An example: the Ardant steel truss

In 1839, engineer Camille Polonceau invented the structurally effective Polonceau truss. However, architects long refused to expose iron structures in public buildings for aesthetic reasons.

Nevertheless, engineers recognized the great structural possibilities of iron roofs, which led them to experiment with curved trusses to avoid the stick roof trusses reminiscent of industrial buildings.

Today, though, everyone knows the Polonceau truss, while its aesthetic counterpart, the Ardant truss, is known to few. This curved truss uses an inscribed arch tangential to the main rafters of a gable roof to increase the rigidity of the roof structure and avoid distracting tie straps.

In keeping with the spirit of the times, this solution, with its high decorative potential, seemed to offer a satisfactory answer to both the aesthetic and structural problems of iron roof trusses in public buildings.

As a result, it was widely used in swimming pools, stock exchange buildings, schools, platform roofing, palaces, shopping malls, etc. (https://onlinelibrary.wiley.com)

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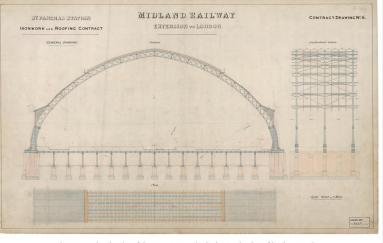
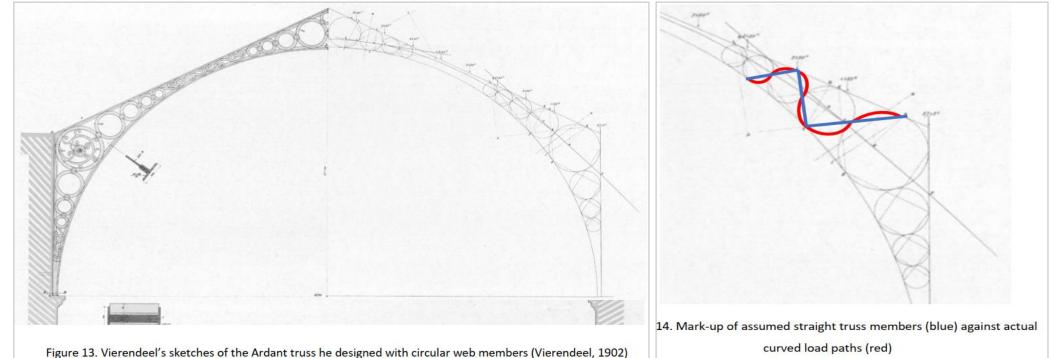


Figure 9. Section drawing of the St. Pancras Train Shed trussed arch roof (Barlow, 1868)

The Ardant truss is a roof truss structure consisting of a "spandrel arch" attached tangentially to the main rafters and gable frame.

The design was intended to be an aesthetically pleasing alternative to the poloceau truss, a conventional truss popular for its optimal truss use of elements and minimization of material. The poloceau truss relies on a horizontal tie rod spanning the roof to balance the horizontal thrust caused by the roof loads.

Figure 14 shows the principle used by Vierendeel (Belgian engineer 1852 to 1940): some pseudo-stretched truss joints (in blue) and the actual curved truss elements (in red).



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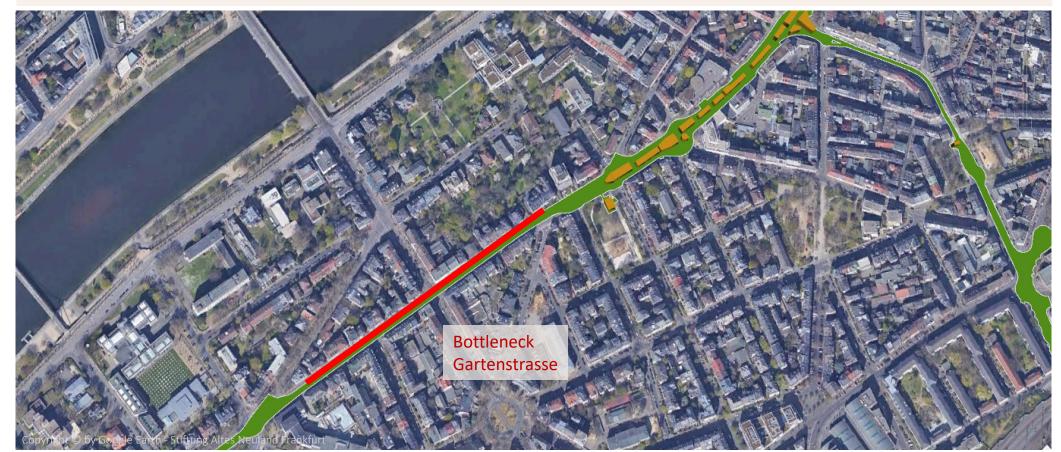
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SEARCH THE TEAM CONTACT & IMPRINT Steel trusses for bottlenecks: Most of the time, the Frankfurt Bridges run over very wide four- or six-lane roads - but there are also bottlenecks along the entire route

One of the two most critical bottlenecks is a section of Gartenstrasse: Although it, too, has four lanes, it has comparatively narrow sidewalks in some areas, which means that a particularly filigree structure has to be chosen for the Frankfurt Bridges. A glass structure is a possibility here, or steel trusses with a high quality craftsmanship finish.





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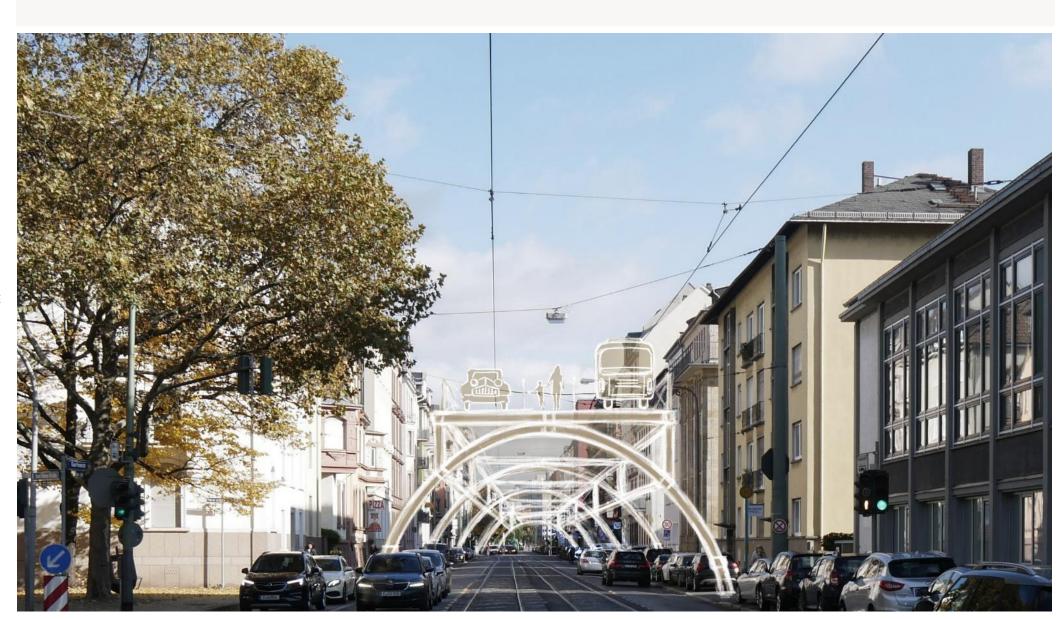
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SEARCH THE TEAM **CONTACT & IMPRINT** < © (in (f) ) (i) A glass structure in narrower sections of the street looks comparatively plain, but has the great advantage for residents of creating a minimum of shading



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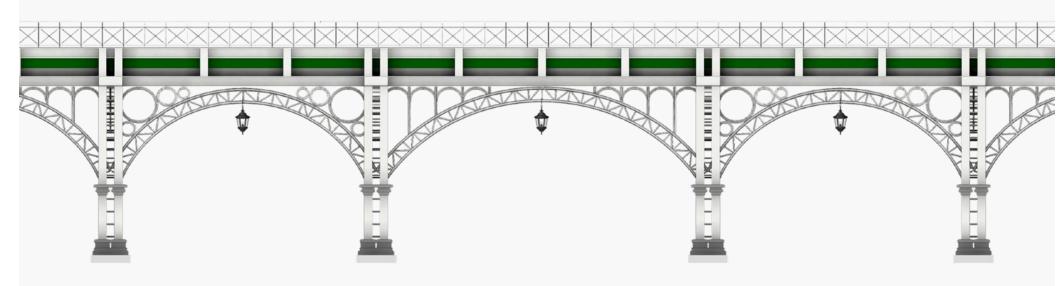
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### A comparatively filigree steel truss bridge leads through Gartenstraße



The design is structurally flexible: Different arch sizes ensure that driveways are left free and -where possibleparking spaces remain unaffected.

Arches can be steel-framed with bracing rings and arch elements. Wrought iron lanterns can enhance the bridge section in the evening with insect-friendly amber light.

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# This could also be equipped with a plantable arch - top view of a section through a steel truss bridge in Gartenstrasse

The section in Gartenstrasse is "Frankfurt Bridges light": There are no buildings or other structures on the bridge section, but it only serves autonomous traffic on the sides and strollers in the middle, with a total corpus width of only 9.5 meters. Overgrown with climbing plants, the bridge offers residents a green space in front of their windows.



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# Here is a variant without an arch: In bottlenecks, bridge elements such as the arch can also be omitted. In any case, it is important that as many light windows as possible are let into the bridge floor

The lighter and more filigree, the better. This also applies to the body of the bridge: Wherever possible, it is equipped with a walkable glass floor, which is either interspersed in the form of round light holes or - as in the Gartenstrasse example - extends as a strip under both the roadways and the walkways, allowing plenty of light under the bridge.



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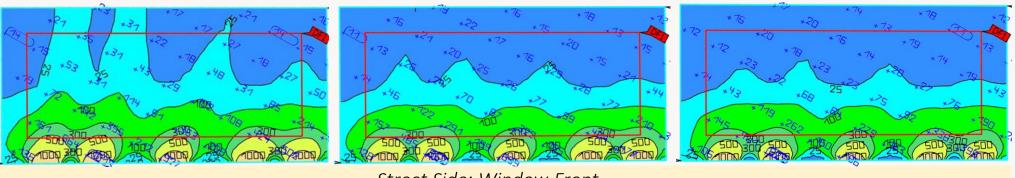
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With the help of a shadow analysis, it was possible to determine that the daylight quotient is reduced by 4% to 11% for a bridge without an arch, and by 18% to 20% for a bridge with an arch.



Street Side: Window Front

Ground floor daylight incidence: Gartenstraße: with bridge - without arch

Ground floor daylight incidence:

Gartenstraße: without bridge

D<sub>max</sub>

2.313%

D<sub>min</sub>

0.122%

D <sub>min</sub>	D <sub>max</sub>
0,109%	2,218%

Ground floor daylight incidence: Gartenstraße: with bridge - with arch

D <sub>min</sub>	D <sub>max</sub>
0,097%	1,889%

It can be seen from the figures that it is not so much the incidence of light at the front of the window that is affected, but rather the incidence of light into the depth of the room (turquoise areas). The values below (Dmin and Dmax) denote the "daylight quotient": The daylight quotient (D) describes the ratio of indoor illuminance (Ei) to outdoor illuminance (Ea) under overcast skies, and is a measure of the supply of natural light to a space. While at present daylight penetration in ground-floor apartments on Gartenstrasse reaches the back of the rooms in some places, this is reduced by 4 to 11 percent even in the case of a filigree bridge without an arch.

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In order to reduce the impact on the daylight quotient to a minimum, a "glass bridge structure" was designed (cross-section shown here)



However, the decision as to which form is chosen is to be left to the residents in all sections: whether a glass unadorned bridge or a filigree steel truss, whether with or without a plantable arch - all this can only be assessed by the residents once comprehensive shadow analyses are available for all variants. The only important thing for the bridge route is that even through the bottlenecks, the traffic route for the bridge transport system remains secure.

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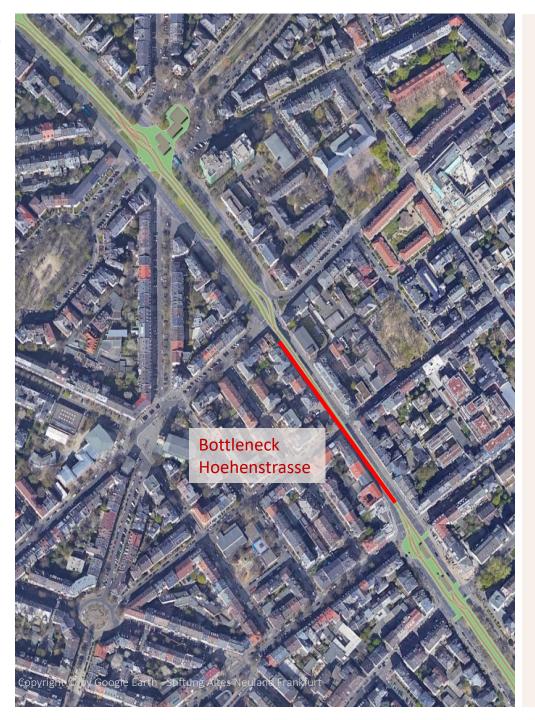
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# Another bottleneck on the entire route is located on the Höhenstraße

Similar to Gartenstraße, the distance between opposing houses is only 19 to 20 metres.

For Hoehenstrasse, therefore, an even slimmer construction is proposed than for Gartenstrasse: the lanes of the autonomous traffic run one above one another here, so that the lower bridge corpus is only 8 metres wide, and the upper bridge corpus is even only 5 metres wide.

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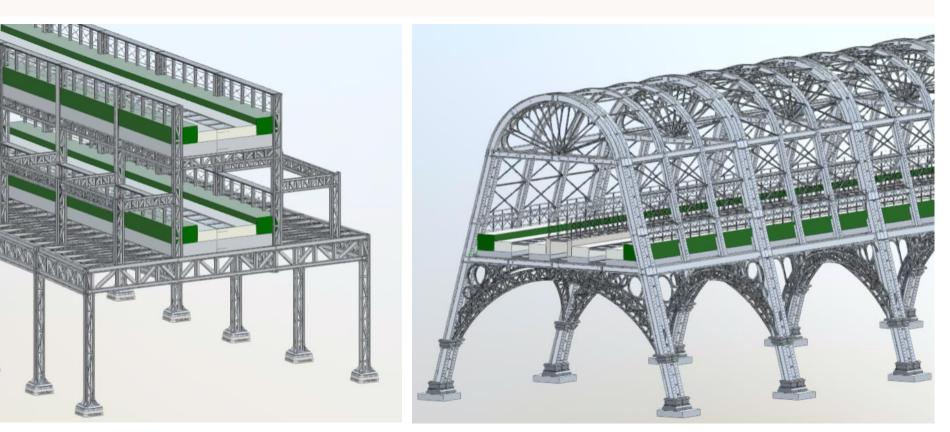
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# In Hoehenstraße the vehicle lanes are one above the other, whereas in Gartenstrasse they are side by side

If one wants to create a closed ring traffic around Frankfurt's city center, there is hardly any alternative to these two road sections. An interruption of the ring route connection would significantly impair the effectiveness of the autonomously driving traffic system or possibly even make it unattractive. The slim bridge variants are a possible solution here to make the bridges' travel and pedestrian paths continuous while sacrificing as little space and light as possible – and can be still replaced by glass bridges, if the filigrane construction turn out create too much shadow for the people living along the brigdes.



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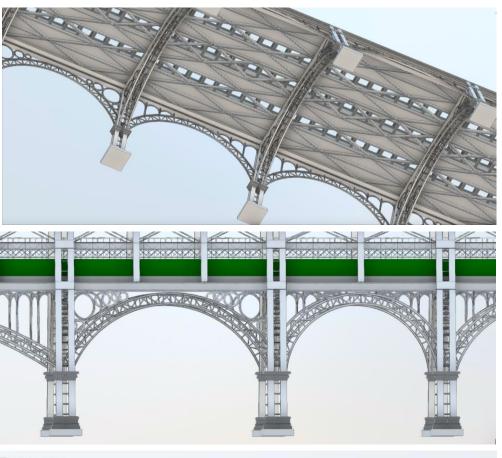
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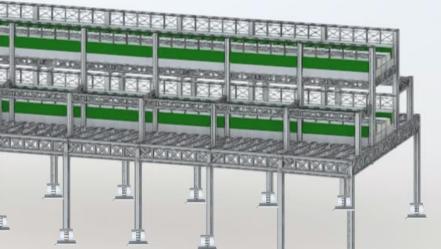
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Brightness under the bridges is maximized mainly by walk-on glass shelves in the bridge body

A wide variety of designs are possible for the bottlenecks

But no matter which truss construction you choose: It is important that it looks as filigree as possible

If the construction still casts too much shadow, a glass bridge body can be chosen instead.

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Figure 1 - Approach view from Waidmannstrasse or Paul-Ehrlich-Strasse into Kennedyalle

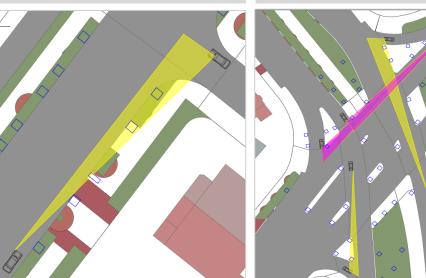
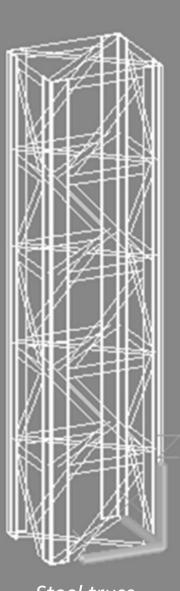


Figure 2 - Approach view from Eschenbachstrasse into Kennedyalle Figure 3 - Approach view from Straßheimstraße into Kennedyalle

Figure 4 - Approach view of Kennedyallee - Stresemannallee intersection



Steel truss pillar

# When positioning all bridge sections, a "field of vision"- check must be carried out in advance

The structural system of the bridge pillars is kept for all sections that were statically checked in the feasibility study in such a way, that the supporting pillars of the bridges can always be moved slightly variably up to one meter to the right or left.

If they are then still in the field of vision at intersections, then their design must be constucted in the form of steel trusses so that they are permeable to view.

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# Main bridge 1, the "Freiheitsbrücke" (Bridge of Freedom) will run with parallel course to the existing "Friedensbrücke, (Bridge of Peace)

The Frankfurt Bridges arrive at the Friedensbrücke with a clear height of 6.20m above street level on the banks of the Main River. In the further course, however, they do not pass over above the Friedensbrücke, but run as a second, newly built bridge alongside the Friedensbrücke. On the one hand, this simplifies construction, as no existing structure is affected: If the route were to be routed over the Friedensbrücke, the latter would have to statically support the new upper section, which it is not designed to do; moreover, the Frankfurt Bridges on the Main provides a visually beautiful backdrop behind the otherwise rather grey drab Friedensbrücke.

The traffic in Frankfurt is massively relieved by the approximately 40 million passenger trips that the autonomously driving system takes over on the Frankfurt Bridges - which affects the "Friedensbrücke" in particular. Anyone who has already been stuck in traffic jams there with nice regularity will appreciate the relief provided by a second bridge next to it.



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# The Freiheitsbrücke (Freedom Bridge) next to the Friedensbrücke (Peace Bridge) is made of steel trusses, based on the example of Frankfurt's Eisernen Steg (Iron Bridge)

Corresponding to the Peace Bridge, the higher bridge next to it bears the name "Freedom Bridge". Freedom as an important complement to peace is thus honoured: freedom of opinion or freedom of speech - a valuable basic element of our cultural area in Europe.

In terms of design and construction, the bridge is based on the most prominent bridge in Frankfurt: the Eiserner Steg (iron footbridge), built in 1868 and immortalized in one of his paintings by the famous expressionist painter Max Beckmann.



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# The Freedom Bridge is planned as a cantilever bridge made of steel trusses - just like the Eiserne Steg

Even though the Iron Bridge looks like a suspension bridge, since it was renovated and raised in 1912 it is no longer a suspension bridge but a so-called cantilever bridge.

The first cantilever bridge with articulated girders in the world already crossed the Main, some 150km from Frankfurt: Heinrich Gerber built the Hassfurth Main Bridge there in 1864, the design of which he patented in 1866.

Two other cantilever bridges were built in the late 19th century: the Quebeck Bridge and The Fourth Bridge in Scotland. Both bridges are still standing today.

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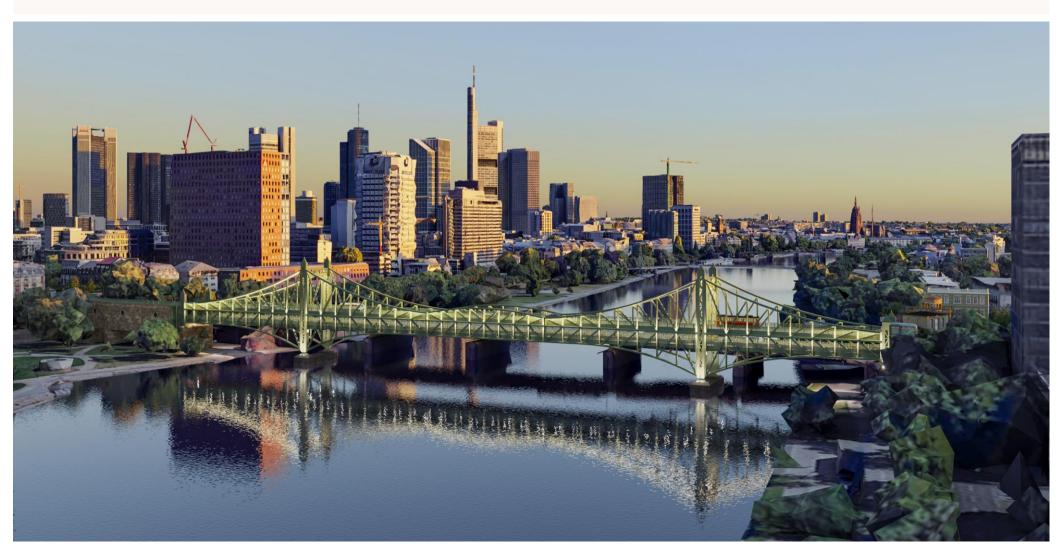
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The Freiheitsbrücke (Freedom Bridge) over the Main has two levels: The vehicles of the autonomous bridge traffic drive on the upper level, the lower level is reserved exclusively for cyclists and walkers.



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# Two "relatives" of the Frankfurt's planned Freedom Bridge: in New York and Budapest

The steel framework of the Freedom Bridge on the Main is shown off to its best advantage at night thanks to discreet lighting.
- similar to its namesake, the Freedom Bridge in Budapest, or to the Queensboro Bridge in New York, which also has two traffic levels on top of each other.





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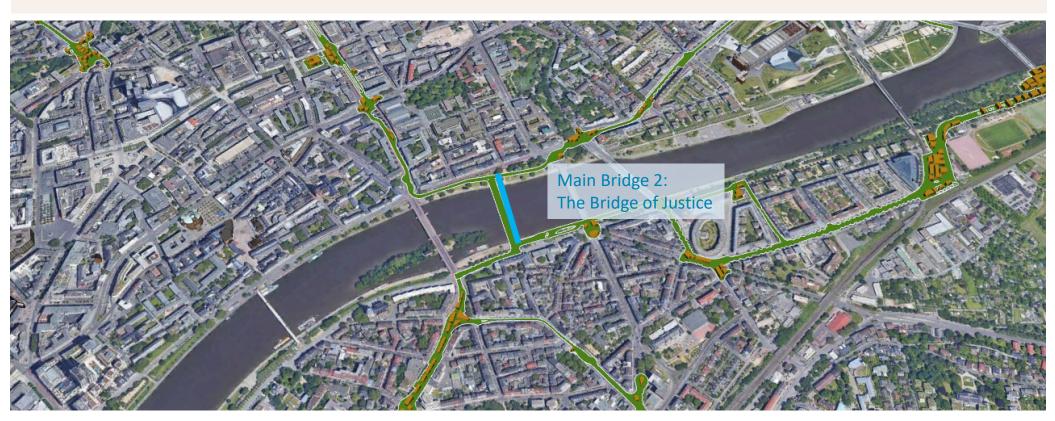
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# Main bridge 2 - the "Gerechtigkeitsbrücke," (Bridge of Justice): It leads the Frankfurt Bridges from the Deutschherren-Ufer over to the Schoene Aussicht

The Frankfurt Bridges cross the Main a second time to close the ring: from Walter-Kolb-Straße / Deutsch-Herren-Ufer on one side to the Schoene Aussicht on the other bank.

The name of this second Main bridge is "Gerechtigkeitsbrücke" (Justice Bridge or Bridge of Justice) - as a supplement to the first Main bridge, the "Freiheitsbrücke" (Freedom Bridge): Alongside Liberté, Fraternité and Egalité were central values in the French Revolution for Europe's departure towards democracy. The concept of justice is a reminder of these fundamental values: Striving for social justice in all dimensions of our society will be one of the great challenges of the future, alongside the aspects of freedom.



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In the spirit of fraternité and egalité, the Frankfurt Justice Bridge for Social Justice is modeled on the Pont- de Bir Hakeim in Paris



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The main similarity between Pont de Bir Hakeim and the Justice Bridge: Both have transport routes on two levels below is pedestrian traffic and above is light rail traffic

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Traffic on two levels across the Main is thus provided by both bridges: the Freiheitsbrücke (Freedom Bridge) next to the Friedensbrücke (Peace Bridge) and the Gerechtigkeitsbrücke (Justice Bridge) between the Alte Brücke (Old Bridge) and the Ignatz-Bubis-Brücke (Ignatz Bubis Bridge).

The Justice Bridge also provides protective canopies for pedestrians and cyclists on the lower level, while autonomous traffic travels on the upper level.



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### The Bridge Triad: Freedom Bridge, Peace Bridge, Justice Bridge

Frankfurt has always been a free trading city and has always been distinctly international. As a major transport hub and financial centre in Europe, it performs important functions. The anchoring of the fundamental values of "freedom, peace and justice" in its bridges fits both the tradition and the future of the city.



In terms of design, the Justice Bridge takes up the arches of its two neighbouring bridges: the Old Bridge on one side and the Ignatz Bubis Bridge on the other

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## The third major bridge crosses the tracks of Frankfurt Central Train Station: the "Deutsche Bahn Bridge of the Future"

In order to close the ring for the traffic circle route on the Frankfurt Bridges, they also have to cross over the tracks behind the main train station. This span of over 230 meters is spanned by a bridge that uses the most modern design of bridge construction to turn towards the city of the future, in which the space above the major traffic routes is used for living on a second level in the city.



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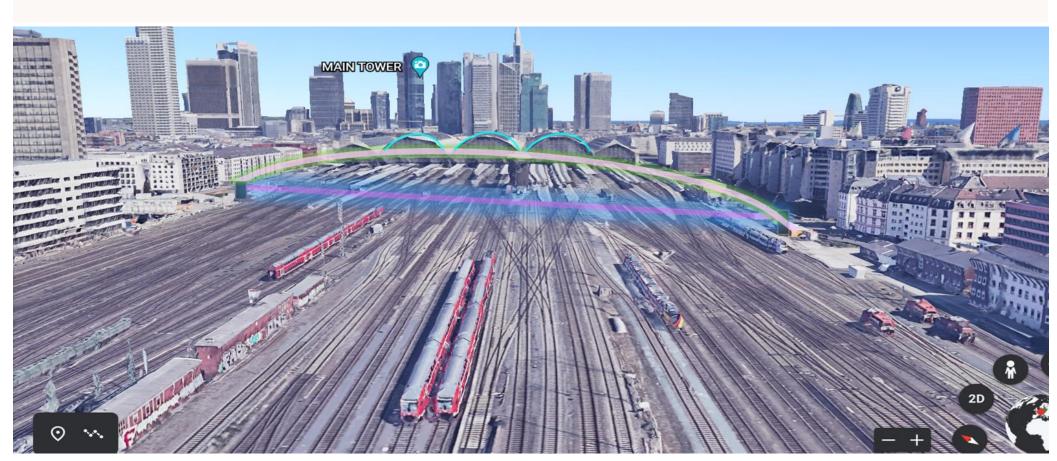
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# Design objective for the bridge over the tracks: The arch shape of the main station barrel roofs is to be taken up

The beautiful arch shape of the main station roofs provides the natural reference point for an equally arch-shaped bridge over the tracks. The one span of 230 meters can be represented with an arched bridge. However, the possible locations for piers of the bridge are diagonally offset from each other, which should be compensated by the bridge design.



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## Accordingly, the JK Bridge in Brasilia was the model for the Deutsche Bahn Bridge of the Future

The first of the three arches alone spans a distance of more than 230 meters - the Deutsche Bahn Bridge of the Ruture, on the other hand, spans just a total of only 234 meters.



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Unlike its model in Brasilia, Deutsche Bahn's Bridge of the Future does not have a surface of exposed concrete, but a shiny metallic one - corresponding with the rails beneath it and providing a perfect backdrop for its illumination



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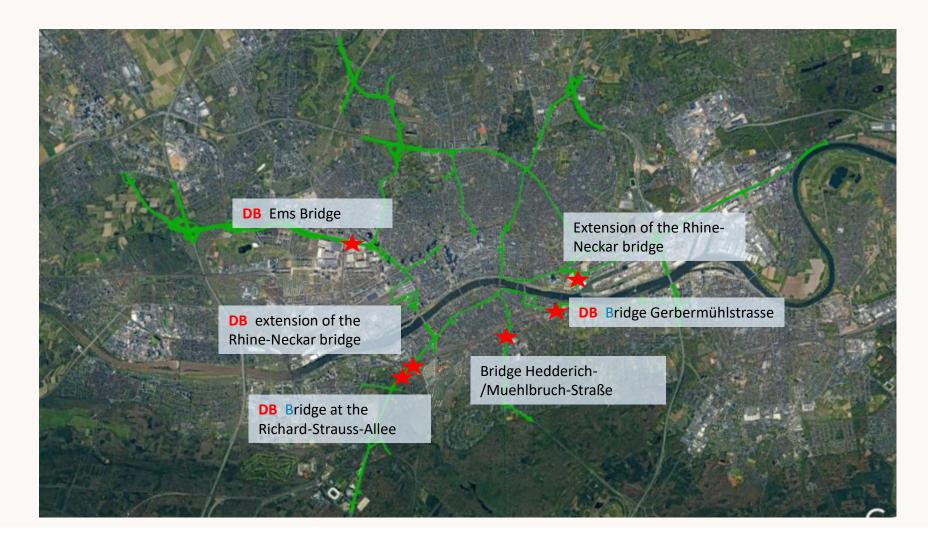
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### Without the cooperation of Deutsche Bahn, the Frankfurt Bridges could not be built

The Frankfurt Bridges not only have to cross the tracks of Frankfurt's main train station, but also cross smaller Deutsche Bahn railway bridges at six points along their route - on a third level, so to speak, above the second level "railway bridge". This can only be done in cooperation with Deutsche Bahn and not simply over them, in the truest sense of the word.



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## In the case of particularly high sections that run over DB railway bridges, viaduct architecture is used

In Frankfurt there are numerous railway bridges in the urban area, which - similar to motorway bridges - cross wide roads. The Frankfurt Bridges must still pass over these railway bridges at an appropriate distance, as they are not allowed to cross them wiht an intersection. If the Frankfurt Bridges usually run at a clear height of 5.2 metres, here they must run up to a clear height of at least 11.2 metres.

In the case of such bridge sections, which run particularly high, the construction method of conventional viaducts, which were traditionally also often built of natural stone, is more suitable.

Accordingly, it should be examined whether the concrete structures can be supplemented or partially replaced by natural stone at these points.

Slim valley bridge constructions are also suitable for spanning high treetops.

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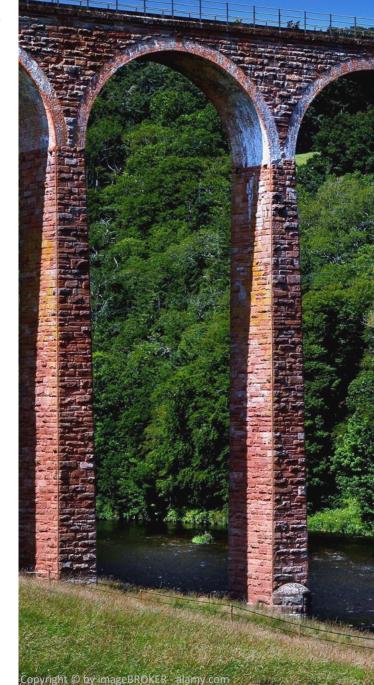
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Viable and aesthetically pleasing solutions can be found for all the challenges of the route

The Frankfurt Bridges do not use a uniform construction method, but a wide variety - adapted to the respective challenges of the route.

This allows bridge sections to be perfectly integrated into their surroundings.

For the bridges that cross the Main, bridge forms were specifically chosen that are aesthetically pleasing with two traffic levels: a lower one at street level and an upper one at the level of the Frankfurt Bridges.

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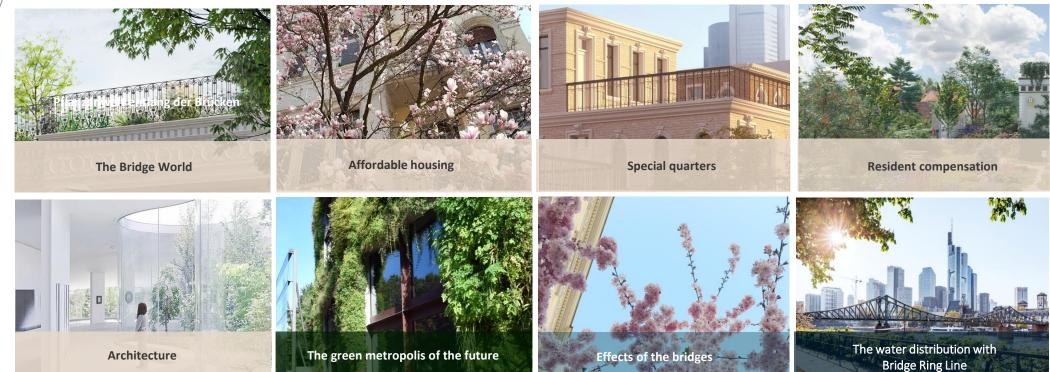
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URBAN GREEN & NATURE WATER

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ART & CULTURE PACKAGING - INNOVATIVE OLD NEW TERRITORY WORLDWIDE

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## Residents gain more quality of life and receive attractive compensation offers

Most residents on the bridges gain in quality of life, as they suddenly have a green and a bit of tranquil inner city walking world on their doorstep - with cafes, playgrounds or shops where there was nothing but grey streets before. And they suddenly have transport connections on the bridges that takes them to many parts of the city without changing trains, whereas before they lived more remotely. But there are also residents who are shaded by the Frankfurt Bridges and for whom a sophisticated compensation plan has to be worked out: If they are severely shaded, they receive better alternative living space on the bridges; if they don't want to move, they get their rent including ancillary costs reimbursed by the bridge company for up to five years, depending on the degree of shading. Others can get free lifetime allotments with small garden sheds on the bridges. Alternatively, there are monetary benefits for years via the bridge card, depending on the degree of shading, up to a value of 100,000 euros per person. The compensation program must be so good that residents living directly next to the Frankfurt Bridges also support the construction project.

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## There are many advantages for the residents in the buildings along the bridges

Before analysing the disadvantages of shading, here are the advantages at first - they are obvious: if you previously had a fourlane or six-lane motorway outside your window, the bridges on your doorstep suddenly create a whole new living environment.

#### Inner city feeling without inner city stress

Whereas before there was no colourful life in the immediate vicinity with special grocery stores, service providers, afternoon activities for children or shops for everyday errands, etc., the Frankfurt Bridges bring a bit of life to the front door.

#### Accessibility or networking with the rest of the city

Many things that were previously only inconveniently far away or could only be reached by car in a reasonable amount of time - such as special doctors, swimming pools, dance salons, therapists, special shops, etc. etc. - can now be reached easily and without changing trains: One gets into a bridge vehicle a few meters away from the house and is brought to one's destination in the shortest possible time - be it a destination on the bridges or next to the bridges.

#### Walking in green safe environment

Four- or six-lane highways are not only downright uncomfortable for jogging or walking, but it is also often dangerous to walk along them at dusk or after dark, especially for women, the elderly, and children. On the Frankfurt Bridges, however, there are well-lit wide walkways, vehicles still drive along to the right and left long after midnight, and about every 800 meters you will find one of the operator kiosks, all of which are open 24/7. Also for dog owners and their four-legged darlings, the -even in the twilight still safe- green environment directly in front of the front door is a pleasant enrichment.

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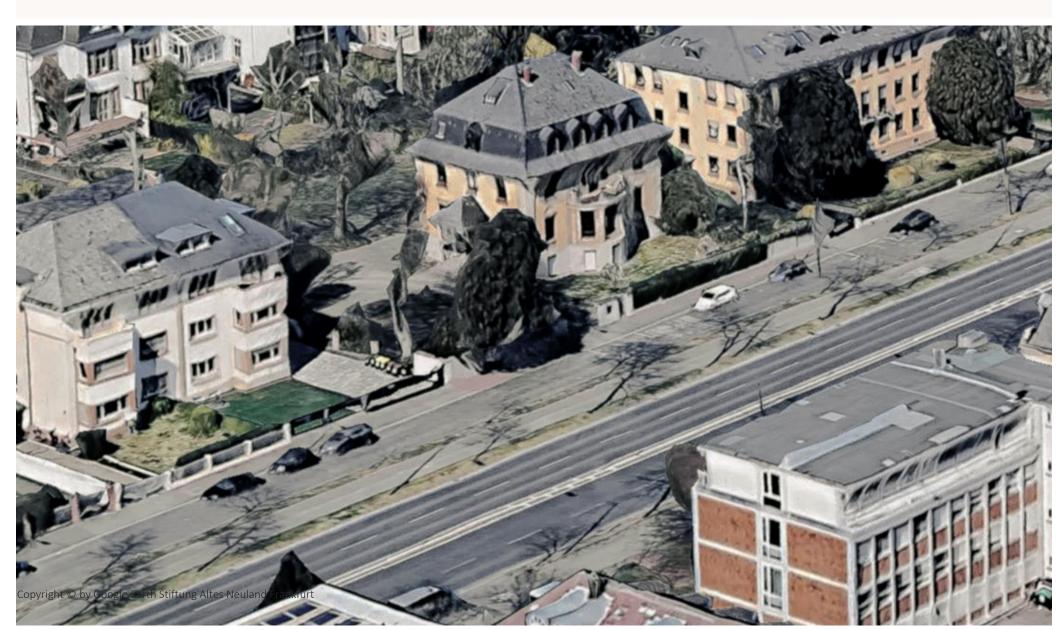
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If you were a resident who previously lived on a gray four- or six-lane road ....



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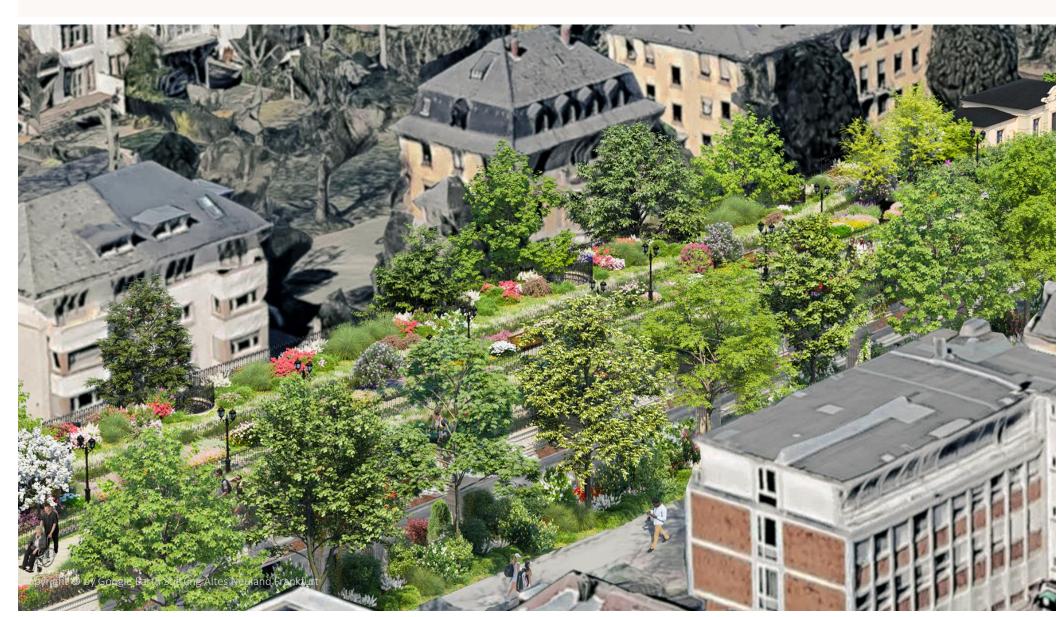
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.... so one has after the construction of the Frankfurt Bridges a park walkway in front of the door



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Has been a residential area hitherto secluded and comparatively deserted

. . . .



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# .... so after the construction of the bridges, residents suddenly have cafes, playgrounds, shops and much more on their doorstep - a little piece of tranquil city centre

And above all, the autonomous transport system provides an optimal connection to the city centre and many other parts of the city, which previously could only be reached by changing trains several times or by car.



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## Advantage for gastronomy along the bridges

Cafés and restaurants in particular benefit when the bridges suddenly pass in front of their doors: Not only does this mean that many Frankfurt residents can reach them within minutes thanks to the autonomous bridge traffic. Rather, the bridges also represent an attraction point and magnet per se, for Frankfurt residents as well as tourists, which significantly increases the number of people visiting their restaurant or café.

And even for restaurants, whose outdoor areas are temporarily shaded by the bridges, the bridges are an asset, as guests can now sit and eat protected from the noise and sight of the four- or six-lane road by the bridge's (potentially greened) arcades - and there is no competition for parasols when the sun is shining. Already today, restaurateurs try to achieve this effect more or less successfully with flower tubs.

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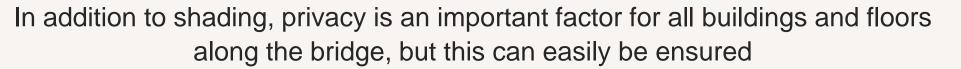
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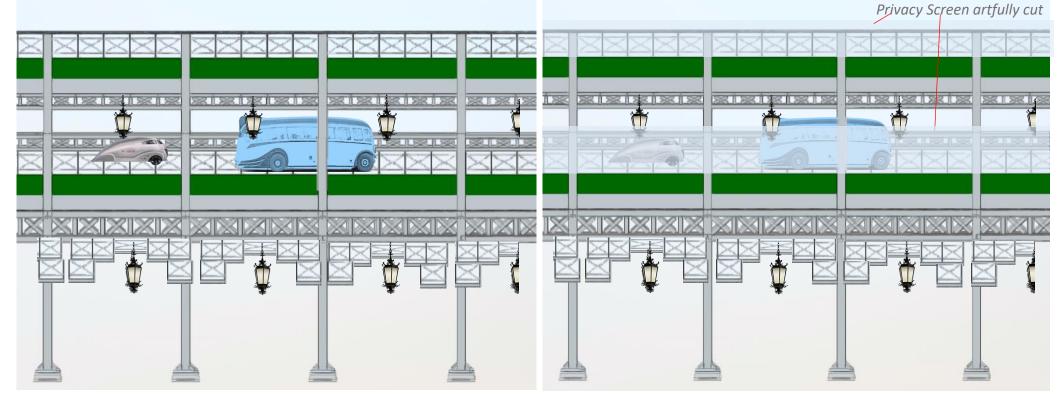
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Glass elements designed to be opaque but translucent are consistently installed wherever the bridges pass windows, whether residential or commercial.

It is ensured for every metre of the bridges that no one can see from the bridge into adjacent windows. In many cases, privacy is even better protected than before the bridges were built, because often - even on multi-lane roads - the neighbour on the opposite side at the same height can see what is happening within the four walls on the other side of the road if you forget to close the curtain. With the Frankfurt Bridges, on the other hand, a visual screen is provided through which no one from the opposite house can see anything.



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## Cut glass is better than satin glass as a privacy screen

Satinized panes can easily appear monotonous, especially over hundreds of meters. Cut glass, on the other hand, can be varied in design, suits modern bridge sections as well as steel framework or Wilhelminian stonemasonry, and is above all (beautifully sparkling) very translucent. In the past, interior doors were often fitted with faceted glass to be opaque, and in England this can still be found on old inns.

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No matter what kind of glass privacy screen the residents look at: It has to be beautiful!

In any case, the view of the privacy screen must be an "upgrade" to the view of the big wide car road before.

It doesn't matter whether the glass is inlaid, cut, faceted or painted - the only important thing is that it is artistically designed to a very high standard.

In the modern sections of the bridge, subtle faceted glass can be used to match the modern or minimalist design environment.

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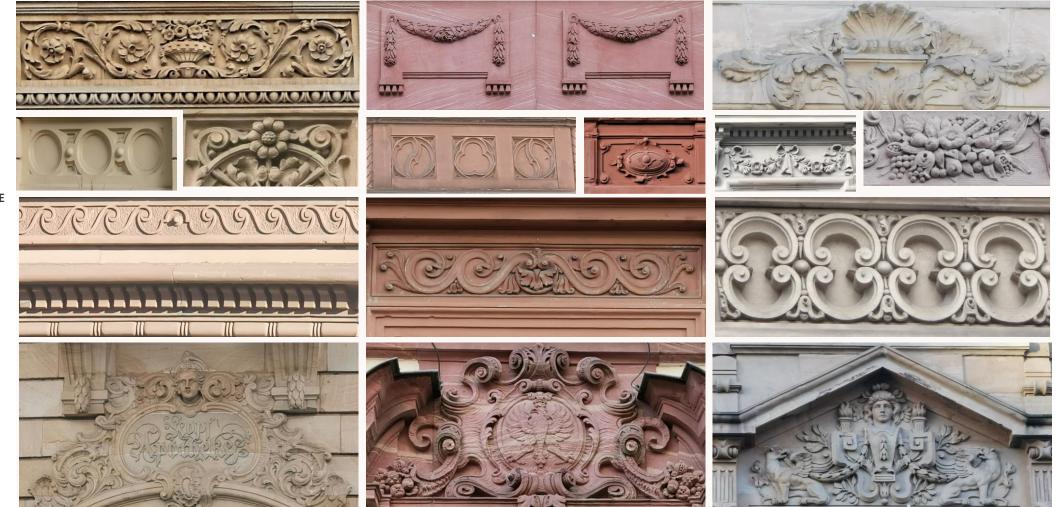
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Regardless of potential shading, people generally don't like to have anything placed in front of their windows: Therefore, the bridge must be of such high quality craftsmanship from the side that it has a museum-like character

if before you were looking at a car street, now when you look out of the window you see a palette of the most beautiful arts and crafts that Frankfurt has to offer.



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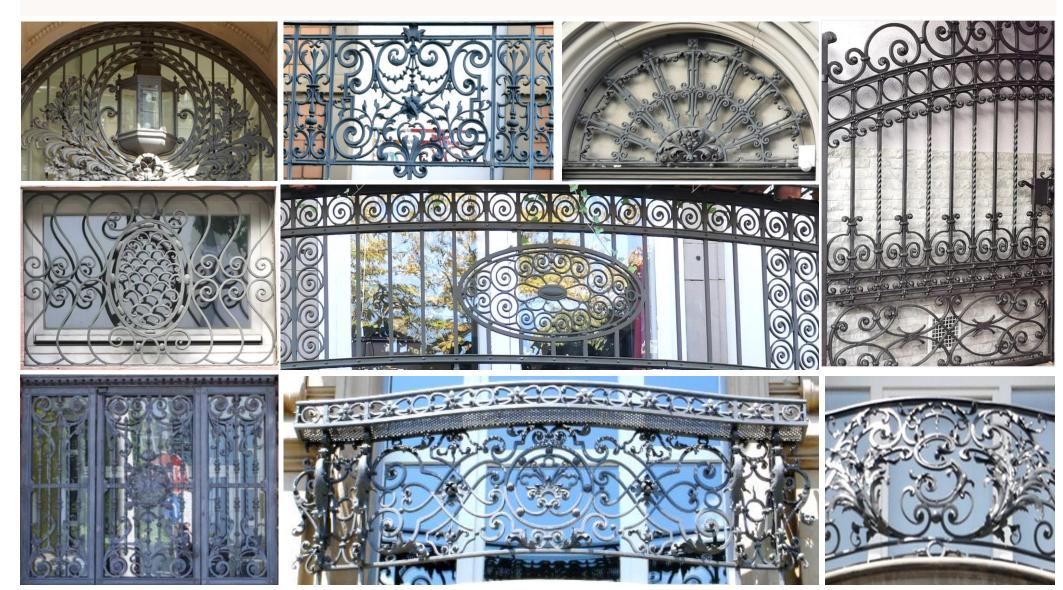
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The guard railing along the bridges' sides also offer a glimpse of Frankfurt's blacksmithing skills



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For the modern part of the bridge, more discreet high-quality surfaces on the sides of the bridge are suitable: for example, natural stone with a spectacular structure



Natural stone protects the concrete bridge body, is versatile and discreet and has an infinitely rich play of colours. Here, too, the following applies: The residents should not have just any structure placed in front of them, but with the construction of the bridges, not only should their surroundings improve, but also their view from their windows.

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And many of the natural stones on the sides of Frankfurt Bridges only reveal their full beauty to local residents when they are very slightly backlit at dusk or at night.

The geological background to the natural stones is explained in layman's terms on panels at the bottom of the columns over which they stretch like a ribbon.

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# Whether the bridge sections are modern or traditional craftsmanship: Everything under the bridges must be particularly bright and with aesthetically pleasing design

The aesthetically pleasing and bright design of the areas under and next to the bridges enjoys the highest priority: All surfaces of the bridge body on which there are no buildings are to be provided with light holes so that it is as bright as possible under the bridges.

The undersides of the bridges are to be kept in light colors and can also be artistically decorated. And on selected sections of the route, the Frankfurt Bridges can be vitrified on the sides of the bridges to protect residents from noise and fine dust from the road.



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## The massive upgrading of the location along the bridges also brings in most cases a significant increase in value for the owners of the buildings

If you own a building along the bridges, you can rejoice: The bridges are green, bright, artistically designed to a high standard and create a transport link that suddenly places any previously remote property location at the heart of the city's action - without having to move the building. It resembles a residential location overlooking a heritage site - which always results in priceless property value.

For the owners of entire buildings, it is also irrelevant whether or not some windows on the ground floor or lower floors are shaded, as long as they do not occupy these floors themselves. Because the property as a whole experiences a significant increase in value - by the way, usually also on the lower floors: For one thing, in most cases the shading is not complete, but only stronger at certain times of the day during certain phases of the year.

However, even though the owners of buildings along the bridges are in most cases the clear winners in terms of increased value, all buildings along the Frankfurt Bridges must still be examined as part of the resident analyses to determine whether and in what amount compensation payments for building owners will be necessary as a result of bridge construction.

The situation is different for the owners of condominiums along the bridges than it is for the owners of entire buildings – in particular if they occupy them themselves: If they are lucky, their condominium is located so high up that for them only the gain in the surrounding and quality of life comes into play and their residential property increases significantly in value with the construction of the Frankfurt Bridges. If they are unlucky, however, their condominiums will be located on the ground floor in those areas, where the Frankfurt Bridges will cause increased shading. A particularly attractive compensation program must be developed for this as well.

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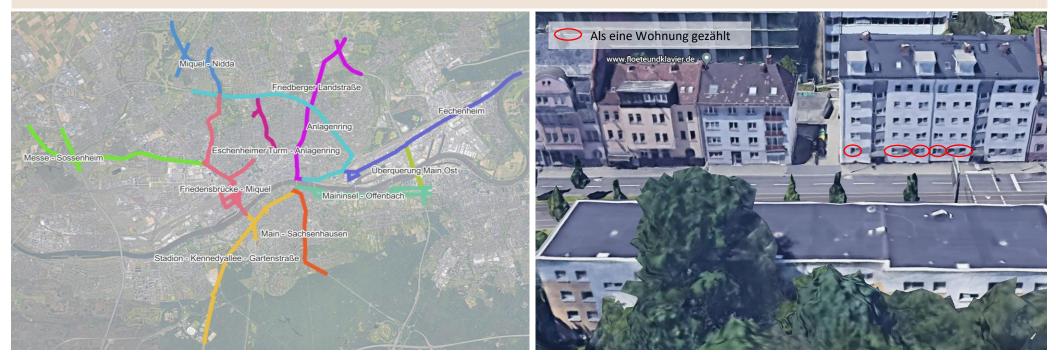
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# Even if the bridges are built as translucent and filigree as possible, especially at bottlenecks - parties that are shaded still exist again and again to the right and left of the bridges

As part of the present feasibility analysis, it was first estimated along the route how many dwellings could be affected by shading from the bridges. The entire bridge route was divided into sections, and the windows of the houses on the ground floor and first floor were counted for each section, which suggest residential use.

It was roughly estimated that, on average, two windows always represent a dwelling behind them. The windows on the ground floor and first floor that clearly do not belong to apartments but to businesses were subtracted because it was assumed that for offices of all kinds and the majority of restaurants and hotels, the advantages of the bridges in front of the door (especially connectivity and the upgrading from a C-location to an A-location) outweigh the potential disadvantages due to shading and therefore no separate shadow analysis or corresponding compensation program needs to be carried out for them.



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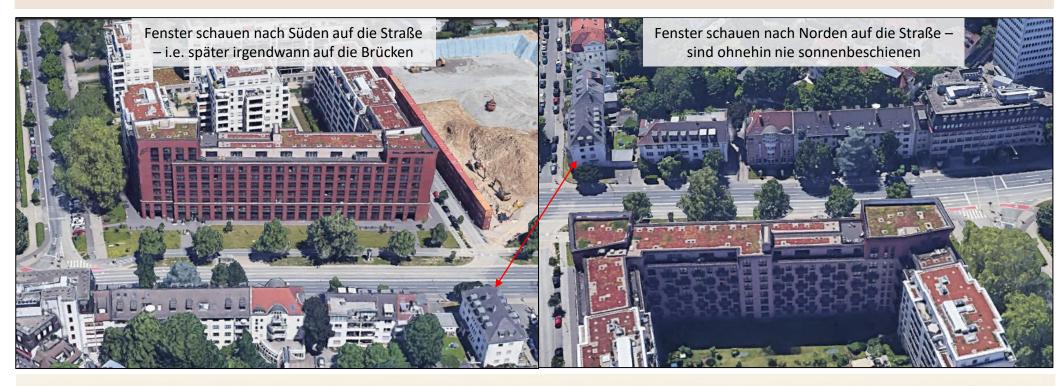
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# The degree to which a dwelling is shaded by the bridges depends primarily on whether it is located north, south, or east-west of the bridges

If the bridges run south of a building, they cast a shadow on the windows on the ground floor and the first floor when the sun is shining (due to their distance of several meters, only the lower two floors are usually affected). If, on the other hand, the bridges run north of a building, the windows facing them - i.e. windows facing north - do not receive any sunlight in sunshine anyway, but are always in the shade, regardless of whether there is a bridge in front of them or not.



For buildings facing east-west toward the street or later toward the bridges, shading from the bridges varies greatly depending on the time of day, the season, and also the distance from the bridges. Accordingly, each section along the Frankfurt bridges must be subjected to a shadow analysis in advance in order to precisely determine the degree of shading.

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## How many apartments will be shaded and to what extent must be analyzed in detail in the run-up to the construction of the Frankfurt Bridges

Modern scanning techniques have led to the fact that cities have the outlines of the houses in the urban area as 3D models, the so-called LOD1 or LOD2 representations (LOD = Level of Detail). Many architecture programs offer the function to cast the shadow of new buildings on the 3D buildings of a georeferenced area (= an area localized exactly by degrees). Thus, it can be determined relatively precisely which area of a window or balcony is shaded at which time of day or season.

These analyses must be performed for all sections of the bridges where residential buildings are located to the right and left. With the help of the shadow analysis, a "shading factor" is developed for each building, similar to a score: this shading factor is primarily composed of shaded sub-area sizes over time.

This means that it is analyzed exactly how many square meters of window or balcony area are shaded from which time to which time -to the minute- on which days. This is very time-consuming, but unavoidably necessary in order to be able to determine exactly which apartments are affected and to what extent, so that an attractive compensation package can then be developed for each affected apartment or, if necessary, the bridge structure can be modified so that it is largely made of glass - which can also be extremely expensive, but must always be considered when it is a question of also making the bridge residents winners in the bridge construction.

Because the motto of the Frankfurt Bridges is: Everyone should win! And the direct residents are the most important target group.

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# Explanation of the procedure of a shadow analysis using the example of the Gartenstraße bottleneck

First, it is noted how much shadow already falls on a house facade without an additional structure. In the case of the narrowest section of the Frankfurt bridges, Gartenstraße, a shadow analysis on December 22 (the day with the least light in the year) shows that the houses on the left are already shaded by the buildings opposite from sunrise to 1:20 p.m. at this time, even without the Frankfurt Bridge passing by. Then, for all days of the year and every hour, it can be simulated which windows are shaded by the bridge corpus and for how long.



For the bottlenecks along the course of the bridge, the shadow analysis is to be made for all 365 days in the year or for the entire course of the day. However, at about 80% of the bridge course there are hardly any or no buildings along the bridge, or they are commercial buildings such as DIY stores, car dealerships, exhibition halls, etc., or the buildings are very far away from the bridge. No shadow analyses need to be performed on these sections. For all residential buildings near the bridges, on the other hand, the shadow analysis per window must be carried out as a detailed light analysis.

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With the filigree, slimmest bridge variant, the ground floor windows along the bridge are only shaded by 11% to 16% more on critical dark days, even in narrow street sections

S	Floors on 31 March	band	ndard dwidths ermany	Current bandwidth in Gartenstraße				Bandwidth in Gartenstraße with reduced filigree bridge				Bandwidth in Gartenstraße with arched filigree bridge			
		DIN 5034-1:2021-08		Without bridge			With bridge but without arch				With bridge with arch				
		D <sub>m</sub>	D <sub>min</sub>	E <sub>senkrecht</sub>	D <sub>m</sub>	D <sub>min</sub>	D <sub>max</sub>	Esenkrecht	D <sub>m</sub>	D <sub>min</sub>	D <sub>max</sub>	E <sub>senkrecht</sub>	D <sub>m</sub>	D <sub>min</sub>	D <sub>max</sub>
ion	Ground Floor	0,900%	0,750%	159 lx	0,648%	0,122%	2,313%	143 lx	0,541%	0,109%	2,218%	125 lx	0,495%	0,097%	1,889%
	1. Floor	0,900%	0,750%	195 lx	0,909%	0,154%	3,097%	194 lx	0,904%	0,154%	3,095%	171 lx	0,747%	0,137%	2,538%
TURE	2. Floor	0,900%	0,750%	234 lx	1,230%	0,299%	3,657%	234 lx	1,230%	0,298%	3,657%	222 lx	1,133%	0,251%	3,536%
	3. Floor	0,900%	0,750%	266 lx	1,469%	0,463%	4,078%	264 lx	1,469%	0,463%	4,078%	264 l x	1,467%	0,463%	4,077%
OBAL CLIMATE ATIVE WORLDWIDE	Garden str 1. Floor 2. Floor 3. Floor With bridge 1. Floor 2. Floor 3. Floor 3. Floor 4. Floor 4. Floor 5. Floor 4. Floor 5. Floor 5	0,909% 1,230% 1,469% e - withou 0,904% 1,230% 1,469%	0,154% 0,299% 0,463% t arch 0,154% 0,298% 0,463%	Daylighting in Gartenstraße is already 28% at max. and 83% at min. below DIN value 0,648% 0,122% Floors in Gartenstraße are currently below the German standard illuminance bandwidths for daylight - especially on the ground floor - even without a bridge.			0.648 is only reduced by <b>16%</b> to 0.541, The 0.122 is reduced by approx. <b>11% to</b> 0.109. <b>0,541% 0,109%</b> With the bridge, the value on the ground floor is reduced by approx. 16% as far as the maximum average illumination by daylight is concerned; for the minimum average illumination, the reduction on the ground floor			0.648 would be reduced here by 23% to 0.495, The 0.122 would be reduced by about 25% to 0.109. 0,495% 0,097% If the filigree but arched bridge variant were built on Gartenstrasse, the maximum average illumination would be reduced by 23% and the minimum by as much as 25%.					
	2. Floor 3. Floor	1,133% 1,467%	0,251% 0,463%						ction on s even on	0					

On the floors above the first floor, filigree bridge strutures without arches make hardly perceptible, or in some cases no difference at all, in daylight or average illumination.

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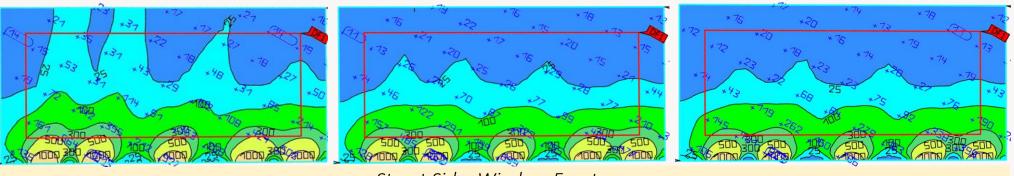
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With the help of a shadow analysis, it was possible to determine that the daylight quotient is reduced by 4% to 11% for a bridge without an arch, and by 18% to 20% for a bridge with an arch.



Street Side: Window Front

Ground floor daylight incidence: Gartenstraße: without bridge



Ground floor daylight incidence: Gartenstraße: with bridge - without arch

D <sub>min</sub>	D <sub>max</sub>
0,109%	2,218%

Ground floor daylight incidence: Gartenstraße: with bridge - with arch

D <sub>min</sub>	D <sub>max</sub>
0,097%	1,889%

It can be seen from the figures that it is not so much the incidence of light at the front of the window that is affected, but rather the incidence of light into the depth of the room (turquoise areas). The values below (Dmin and Dmax) denote the "daylight quotient": The daylight quotient (D) describes the ratio of indoor illuminance (Ei) to outdoor illuminance (Ea) under overcast skies, and is a measure of the supply of natural light to a space. While at present daylight penetration in ground-floor apartments on Gartenstrasse reaches the back of the rooms in some places, this is reduced by 4 to 11 percent even in the case of a filigree bridge without an arch.

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**Resident Compensation** 

Architectural Variety

#### **URBAN GREEN & NATURE** WATER

ENERGY TRANSPORT **URBAN CLIMATE - GLOBAL CLIMATE** 

**ART & CULTURE PACKAGING - INNOVATIVE OLD NEW TERRITORY WORLDWIDE** 

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**1st Floor** 

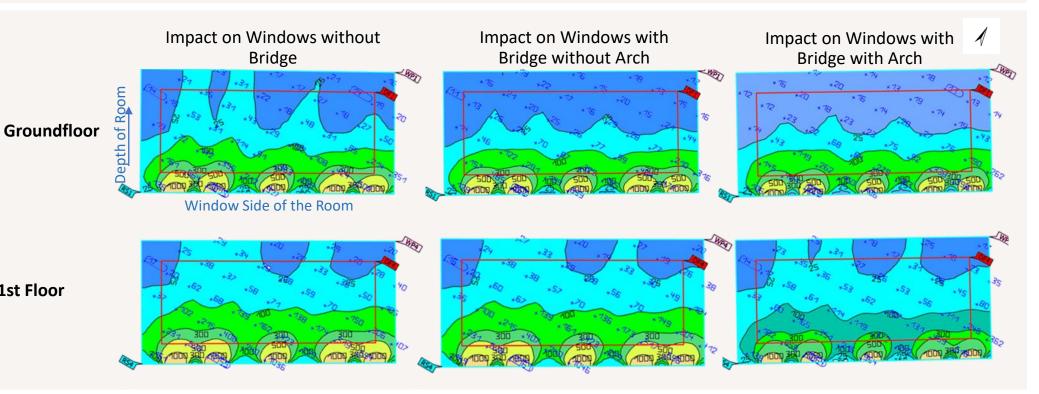
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## A loss of light occurs mainly in the rear part of the ground floor rooms - and there also only at certain times of the day and year

If we compare the light penetration of the windows analyzed here as examples in a section of Gartenstrasse, we see that on the ground floor, especially further back in the rooms, less light arrives at certain times. The window sides, on the other hand, are less affected - even if the bridge has arches.

The prerequisite for this, however, is that the bridges are built as filigree as possible at critical points, that the privacy walls on the sides are made of glass, and that the floors are also lined with walkable and drivable glass as much as possible, both for the driveways and for the walkers. Alternatively, the body of the bridge could be made entirely of high-strength glass with very plain arch supports. This should further reduce shading significantly.



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1st floor

ground floor

δ

R

2nd floor

3rd floor

An impairment of the daylight supply occurs -depending on the bridge type- mainly

on the ground floor and slightly on the 1st floor

From the 2nd floor onwards, only the bridge variant with an arch affects the supply of daylight to a minor extent. A loss of light occurs

mainly in the rear part of the ground floor rooms - and there only at certain times of the day and year.

1000 300 200

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1000 380 1000

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The analysis across all floors shows that, depending on the bridge type, daylighting is only impaired on the ground floor and possibly on the first floor. From the 2nd floor onwards, only the bridge variant with a high arch impairs the supply of daylight – and even then only to a minor extent

	DIN 5034	1:2021-08		Witho	out Bridge	2		Bridge without Arch Bridge with Arch			ith Arch				
	D <sub>m</sub>	D <sub>min</sub>	E <sub>senkrecht</sub>	D <sub>m</sub>	D <sub>min</sub>	D <sub>max</sub>	E <sub>senkrecht</sub>	D <sub>m</sub>	D <sub>min</sub>	D <sub>max</sub>	E <sub>senkrecht</sub>	D <sub>m</sub>	D <sub>min</sub>	D <sub>max</sub>	
Groundfloor	0,900%	0,750%	159 lx	0,648%	0,122%	2,313%	143 lx	0,541%	0,109%	2,218%	125 lx	0,495%	0,097%	1,889%	$D = \frac{E_{\rm p}}{100} \cdot 100 \%$
1st Floor	0,900%	0,750%	195 lx	0,909%	0,154%	3,097%	194 lx	0,904%	0,154%	3,095%	171 lx	0,747%	0,137%	2,538%	$D = \frac{-p}{E_a} \cdot 100 \%$
2nd Floor	0,900%	0,750%	234 lx	1,230%	0,299%	3,657%	234 lx	1,230%	0,298%	3,657%	222 lx	1,133%	0,251%	3,536%	
3nd Floor ;	0,900%	0,750%	266 lx	1,469%	0,463%	4,078%	264 lx	1,469%	0,463%	4,078%	264 lx	1,467%	0,463%	4,077%	

Since the upper floors are not affected by the bridge, but enjoy all the advantages of the bridge connection and, above all, when looking out of the window no longer look at four-lane or multi-lane roads, the bridges in front of the window mean an upgrade for a building as a whole if it had more than four full floors.

In addition, the bridges automatically provide some protection from the street noise below for the upper floors - for the lower floors this can be achieved by glazing between the columns as well: If the street noise was previously heard loudly, it can now be viewed undisturbed through a pane of glass when looking out of the window. Accordingly, even if the ground floor is impaired by the bridge body and the 1st floor is slightly affected, the buildings along the course of the Frankfurt Bridges are worth more after the construction of the bridges than before due to the upgrading of their floors on the 2nd, 3rd, 4th and in many cases also 5th and 6th floors.

The owners of entire buildings along the course of the bridge are the winners: with comparatively slight impairment of the lower two floors, all floors from the 2nd floor upwards experience an upgrade

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### Explanation of the daylight quotient used in shadow analysis

The daylight quotient (D) describes the ratio of the illuminance Ep in a point of a given plane, which is produced by direct and/or indirect sky light with assumed or known luminance distribution of the sky, to the simultaneously existing horizontal illuminance Ea outdoors with unobstructed sky hemisphere, whereby the portions of both illuminances caused by direct sunlight are not taken into account.

The impression of brightness in living rooms created by the daylight entering through the windows is sufficient within the limits of its psychological significance if the daylight factor on a horizontal reference plane, measured at a height of 0.85m above the floor at half the depth of the room and at a distance of 1m from the two side walls, is at least 0.9% on average and at least 0.75% at the least favorable of these points.

In living rooms with windows in two adjacent walls, the daylight factor must be at least 1% at the most unfavorable reference point. Since the room layout behind the windows of the houses was not known, a room depth of six meters was assumed for the calculation in DIALux evo (version 5.10.1.58862). With a smaller room depth, the impairment due to the bridge is less. Due to the lack of division into individual rooms, the result may be slightly different for the respective individual rooms.

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The values from the shadow analysis are entered into a special building register. All residential buildings along the bridges must be recorded in this - for businesses along the bridges, shading is not decisive, but other potential impairments may have to be recorded for them

In analyzing the buildings along the bridges, a distinction is made as to whether it is an apartment that is shaded or an office or commercial space. For commercial floors or offices there is no shading compensation, since it can be assumed that any form of business or office benefits massively when the Frankfurt Bridges pass by, since these make an A-location out of a previous B- or C-location through new connections, but also through their spectacular beauty and uniqueness.

With the Frankfurt Bridges on the doorstep, every business suddenly finds itself in a location that is equivalent to a high-quality city center location. It doesn't matter if it's patients for a doctor's office, customers for a specialty store or employees of an office: Each commercial unit will be much more accessible thanks to the bridges - for patients, clients, customers or even staff.

However, apart from shading caused by the Frankfurt Bridges, there could theoretically be other disadvantages for certain commercial units, for example, if outdoor seating space is reduced by a stairway of the bridges or the like. In this case, compensatory measures must also be developed for commercial units or the landlords who rent them out.

Building	Street	No.	Floor	Usage	Usage in Detail	 Balkony	Window towards the Street	Building Shape	Type of Building	Owner - inhabited
TEEEE	Höhenstr	30	1					Kompakt	Old Building Plain	n.a.
	Höhenstr	30	) EG	Retail	Shop for Cltohes	0	2	Kompakt	Old Building Plain	n.a.
DAL	Höhenstr	30	1.0G	Living		1	4	Kompakt	Old Building Plain	n.a.
	Höhenstr	30	2.OG	Living		1	4	Kompakt	Old Building Plain	n.a.
	Höhenstr	30	) 3.OG	Living		0	4	Kompakt	<b>Old Building Plain</b>	n.a.
	Höhenstr	30	) DG	Living		0	4	Kompakt	Old Building Plain	n.a.

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### In addition to shading, there is also the encroachment simply by having a bridge corpus built in the street in front of a building in the first place: Mesh architecture could also be used to better assess impacts from this

In mesh architecture, the contour of a building (or parts of a building) is reproduced from fine wire. If light rails are installed above them, these filigree constructions can also be illuminated at night. With their help, one gets a spatial idea of how a building actually stands out in its surroundings and how one would perceive it.



Mesh architecture art installations could be created for bridge sections in narrower street sections

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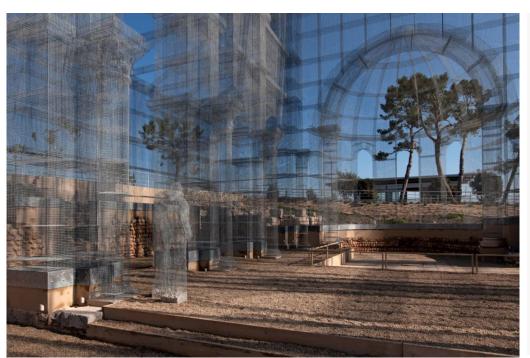
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Mesh architecture is particularly impressive when illuminated at night - but it also conveys a good sense of space for potential buildings during the day





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Alternatively, the sense of space for a structure like the Frankfurt Bridges could be created with 3D holograms



No matter whether the Frankfurt Bridges are staged using mesh architecture or 3D holograms: In any case, all options should be explored to give residents a sense of the impact on their street when a bridge section runs through it

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# Once the resident situation of each section along the bridge has been analyzed, the collected parameters need to be evaluated in conjunction with the shading factor to provide a basis for compensation calculations

In addition to the distinction of who is shaded (residents or businesses), other factors are included in the evaluation of the shading situation and the compensation claims, for example, whether the shaded areas are residential windows, stairwell windows or balcony areas - a different evaluation is made for each category.

The grading of the "compensation modules" is derived from the evaluation. People who will be impaired by the bridges in front of their windows towards the street should be offered the following – according to the intensity of encroachment:

Module 1. Substitute apartments on the Frankfurt Bridges of the same size but with balcony or garden space Module 2. Allotment gardens with their own garden sheds on the Frankfurt Bridges Module 3. Warm rent refund Module 4. The bridge card

The compensation packages mentioned here are all designed for residents along the bridge - renting as well as owning residents: i.e., those who would actually be impacted in their daily lives.

If there are building owners whose houses are devalued by shading of the ground floor and first floor more than they are upgraded by the upper floors, separate compensation programs are to be developed for these individual cases

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#### The compensation model comprises several stages

#### Module 1: Substitutional housing on the Frankfurt Bridges

At the highest shading level, tenants will receive a comparable apartment of their choice from the closest (presumably hotly contested) apartments on the Frankfurt Bridges. "Comparable" means: the same square footage at the same rental price. However, since many apartments on the bridges have balconies, terraces, gardens or roof terraces, the apartments there are not actually "comparable" but tend to be better than the original apartment. There are an above-average number of detached one and two-family houses on the bridges, very close to the city centre, which is also more attractive to many people than apartments on lower floors on a large wide road with traffic along the bridge routes.

In addition, the apartments on the bridges are all newly built, with shutters, additional underfloor heating and (in the attics) air conditioning for hot summer days. The ancillary costs are significantly lower than in conventional apartments due to the modern technology. And the costs of moving in and a new fitted kitchen are included in the compensation package.

A special situation arises for owners of condominiums along the bridges that are shaded. They too can move into rental housing of exactly the same size on the Frankfurt Bridges and keep and rent out their condominium. Since rents on the bridges are extremely cheap, this is an attractive alternative in purely monetary terms, since even their original apartments that they are vacating are likely to rent out very well based on the attractive bridge in front of them (despite the shading). On top, they will receive monetary compensation just like tenants along the bridges, according to the level of shading impacting their condomiums (see below).

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As more detached and semi-detached houses are built on the bridges, and residents entitled to alternative housing have first right of refusal, anyone who wants can get a flat with a balcony, roof terrace or small garden



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### Garden substitute are offered to those who do not want to move to a nicer, newer apartment on the Frankfurt Bridges, but prefer to stay in their now somewhat more shaded apartment

#### Module 2: Allotment garden with garden sheds on the bridges

Those who are somewhat less shaded than those affected in stage 1 have the option of choosing the nearest allotment garden on the Frankfurt Bridges and leasing it for life for a symbolic lease price. The care of the garden can be taken over by oneself, but can also be taken care of by the gardening crews of the bridge society.

In each allotment garden there is a small garden house, because the allotment gardens are located on the outer arms of the Frankfurt Bridges: They are optimally accessible for the residents 24/7 due to the bridge traffic, and since it could also rain from time to time and at times, one cannot drive back home for every meal etc., the garden house is equipped with the most necessary things, roughly like a Tiny-House. This also gives the whole thing a certain holiday home character.

On top, they will receive monetary compensation, according to the level of shading impacting their flat (see below).

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## The allotment gardens on the Frankfurt Bridges can be used for pure relaxation or for urban gardening.

Since the gardens are connected to the irrigation system of the Frankfurt Bridges and are also looked after by the gardening crews, all the gardens are always well maintained: It is possible to go away for weeks or months without the garden going to waste, and heavy physical work does not have to be done by the allotment garden tenants themselves, who can concentrate on the nice part of gardening or simply use the garden for barbecuing and relaxing.



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## Depending on the degree of shading, you get paid monthly your warm rent as compensation for up to five years

#### Module 3: Reimbursement of warm rent

There are people who neither want to move - no matter how much nicer or better located the new apartment is - nor do they want a garden. These residents can receive their monthly rent payments from the bridge company for up to five years as compensation for the shadows cast by the bridge in front of their windows.

This does not change the situation after the five years have passed, but one then has time to get used to the condition benevolently. No matter how many years rent-free one "qualifies" for by the calculated shading after completion of the bridges - the first year should then be paid out when the development plan for one's own section is passed through the magistrate's office and the planning of the Frankfurt Bridges begins.

The consequence of this is that many residents will have their warm rent paid by the bridge company as compensation for one year, even if they no longer live in the apartment 15 years later, when the bridge actually passes in front of their window; but this is still a valuable investment for the bridge company, because the residents then do not feel disadvantaged at the critical time of the decision - namely when the development plans are passed - but actually have a direct benefit from supporting the construction project.

Residents who own a condominium along the bridges can receive up to five years of installment payments from the bridge company, as well, provided they are still paying off the apartment, plus house payments; alternatively, they receive the warm rent they would receive if they were renting. In this way, the bridge company contributes to the accumulation of wealth as compensation for the potential decrease in value that would result from shading. Alternative housing or allotments may nevertheless be additionally chosen on the Frankfurt Bridges if condominium owner wish - they are the most privileged group among the residents along the Frankfurt Bridges' routes.

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### How much does resident compensation cost the bridge company?

The bridges aim is to make a positive difference for everyone:

- They make a contribution to the energy turnaround
- they offer solutions for a green water-sensitive city
- they promote art and culture to an unseen extent
- they provide people with humane living environments with affordable housing
- they help Europe to a renaissance as a location for innovation

In short, they are a benefit to society as a whole. But they must not be built at the expense of a few, namely the residents along the bridges' routes, simply over their heads. Instead, it must cost something to make those residents the winners of the Frankfurt Bridges.

In a first rough estimate, it was determined that approximately 285 million euros for compensation services would have to be provided by the bridge company in order to cover all claims for all residents as well as potentially disadvantaged building owners, especially in the case that all residents choose monetary compensation instead of alternative housing or allotments on the bridges.

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**Ground Floors Living North** 

**1st Floors Floors Living South** 

Ground Floors Living South

**1st Floors Living South** 

346

495

## There are estimated to be about 2,800 homes along the bridges and about 1,800 commercial units - though not all are affected equally

For all sections of the Frankfurt Bridges, the buildings to the right and left of their course were analyzed, with commercial units on the ground floor mostly detectable on Google Earth and identified by address search for the units on the 1st floor. For the residential units, it was assumed that one to two residential windows each correspond to an apartment behind them.

			Stadion – Kennedyallee					
			- Gartenstraße	Ground I II. commercial	1st Fl. Commercia	0	1. Fl. Living	
				# of Units	# of Units	# of Flats	# of Flats	
			North	34	6	33	59	
Miquel - N	loda	and the set	South	34	17	19	19	
	Friedberger Landstraße	2	West	39	27	64	62	
	rifedberger Landstraise	Street Lake	East	32	26	28	34	
	A DE LA D	Fechenheim	Main - Sachsenhausen	Ground Fl. Commercial	1st Fl. Commercia	Ground Fl. Living	1st Fl. Living	
	Anlagenring	Ko Sta	North	10	4	2	3	
A contract of the second se	Anagoning	A State A	_ South	16	5		28	
TT T	schenheimer Turm - Anlagenring		West	40	8	16	31	
Messe - Sossenheim			East	60	9	10	49	
	Überquerung N	Main Ost	Maininsel - Offenbach	Ground Fl. Commercial	1st Fl. Commercia		1st. Fl. Living	
Friedensb	rücke - Miquel	Libert Stranger	North	19	18	45	48	
	Maininsel - Offenbach		South	29	16	23	38	
	1 State of the state of the state		West	15	6	16	28	
			East					
	Main - Sachsenhausen	L. E Potence	Anlagenring	Ground fl. Commercial	1st Fl. Commercia	Ground Fl. Living	1st. Fl. Living	
Challen Manad	Ivallee - Gartenstraße	1 Same	North	85	24	138	235	
Stadion - Kenned	Ivanee - Gartenstraise	A State A	South	62	30	119	159	
		Contraction of the	West	10	7	51	52	
		The real	East	4	2	21	24	
		S						
			•	•	•	•	•	
	A CONTRACTOR	1 1	•	•	•	•	•	
Luce F. F. F.		the second second	•	•	•	•	•	
Crowned Floore Commercial North	Crowned Fleere Commercial Courts	Cround Floors C		Creved Fleere Comm	avaial Fast	Ground Floors Co	mm arcial tatal	
Ground Floors Commercial North	Ground Floors Commercial South		ommercial west	Ground Floors Comm		Bround Floors Co		
256	312		316		291		1.175	
1st Floors Commercial North	1st Fl. Commercial South.	1st Floors Comm	nercial West	<b>1st Floors Commercia</b>	al Earst 1	1st Floors Commercial total		
140	157	_	174		140	611		

Ground Floors Living West

**1st Floors Living West** 

205

349

**Ground Floors Living East** 

**1st Floors Living East** 

203

387

342

534

Ground Floors Living total

First Floors Living total

1.096

1.765

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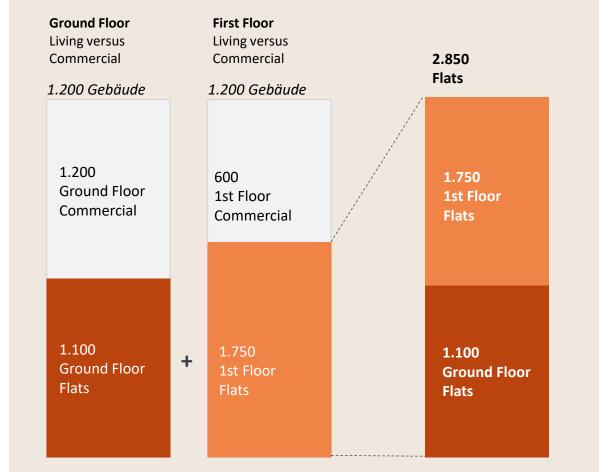
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In about **1,200 buildings** along the Frankfurt Bridges, there are an estimated **2,850 apartments** and **1,800 commercial and office units** on the ground floor and first floor - with the majority in the commercial sector resulting from the length of the outer arms.



The difference of about 50 units less on the ground floor is due to the fact that on the ground floor there are front doors, gateways, etc., while above on the 1st floor there is building usable space for residential or commercial purposes.

## Apartments should be the focus of the resident analysis

Commercial units and offices usually have a lease commitment of 10 to a maximum of 20 years, so hardly any business located at the time of building permit for the bridges will still have a current lease once the bridges actually come up in front of the respective building 15 years or more after building permit.

In addition, shading situations are less relevant or not relevant at all for many trades. For businesses where shading could be relevant, such as restaurants, compensation is paid to the building owner, not the business owner, because the owner may have to deal with a problematic re-lease situation, whereas the tenant will be long gone by then.

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About 900 apartments with unfavorable solar orientation to the bridges

About 900 ground floor apartments could be significantly affected by shading from the bridges due to their orientation towards the sun, provided they are close enough to the body of the bridge - 1st floor apartments are less shaded, but often lose their view of the street as a "view into the distance"

According to current estimates, at least 300 of these apartments are likely to be located so far away from the bridges that they are unlikely to be affected by shading, despite their ground floor situation and location north of the bridges. Even today, many of them are already impaired when looking out of the window by the sight of multi-lane motorways, motorway bridges and the like.



The 1,750 apartments on the 1st floor are shaded much less than the ground floor apartments, but in many cases they lose the long view or vista: in some cases only to less aesthetic buildings or car lanes, but in some cases also to pretty buildings or trees on the opposite side of the street beyond the four car lanes.

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Also counted were all ground floor apartments, in locations along avenues or country roads, which are often located further away from the traffic due to the urban structure of these wide access roads - accordingly, presumably not all 1,100 ground floor apartments are equally affected, because for some there is a much smaller impairment or even only an enhancement due to the remoteness



THE PLAN

#### **BUILDINGS & BRIDGES**

- The Bridge World
- Affordable Housing
- Special Quarters
- Bridge Diversity

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### Although the 1,750 apartments on the 1st floor are significantly less shaded than the ground floor apartments, in many cases they lose the long view or vista

In some cases, however, only to less aesthetic buildings or roads, in some cases also to pretty buildings or trees on the opposite side of the street beyond the four lanes. It is estimated that for half of these apartments, the view of the artistically designed or landscaped bridge corpus or its privacy screen should mean an upgrading of the view and not a devaluation.

2.850 Wohnungen (100%)			
	345 South of Bridges	Potentially	
1.750	530 West of Briges	impaired view on the 1st floor	
1st Floor Flats	385 East of Bridges	Already problematic	A PART
	<b>490</b> East of Bridges	outlook, therefore with bridges improvement	
1.100 Ground Floor Flats		Estimate:For about ha the residents on the 1 floor, the view of the greened and artistical decorated bridge side means an upgrade	st ly



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Estimate: For about half of the residents on the 1st floor, the view from the window is improved by the bridges

> Potential improvement in the view from the 1st floor

Already problematic outlook, therefore with bridges

improvement

1.100 EG Wohnungen

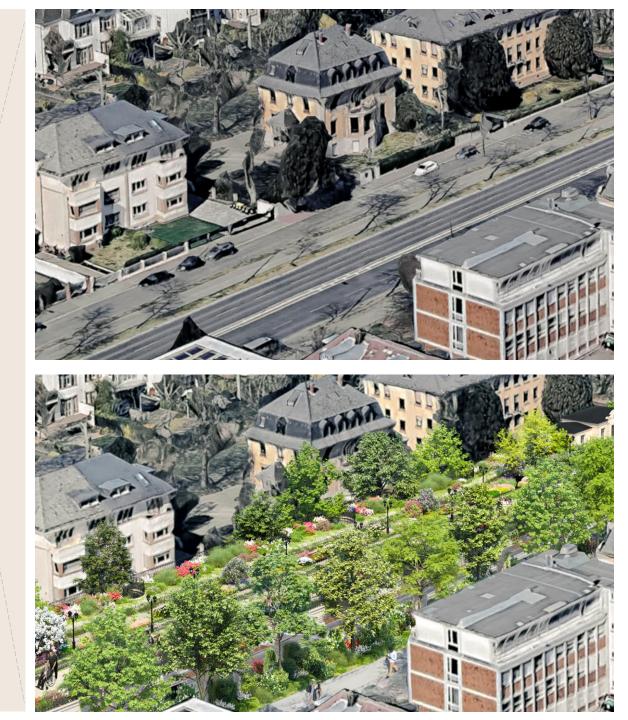
Wohnungen

2.850 Wohnungen

(100%)

1.750

1. OG



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Initial estimates: If one assumes that 90% of all residents along the bridges will be so shaded or have their views impaired that they will receive compensation payments, and all of them actually choose the "payment" module instead of alternative housing or allotment gardens on the bridges, then the bridge company will have to budget a total of around 225 million euros for this

	apartments behind them) facing the bridge	of apartments along the	Total # of flats along the bridges minus not affected flats		condominiu	•	average total rent per month	Assumed loan installment plus house payments plus heating and acillary costs (Euro)	rental apartment	r compensation per	Total payment by the bridge company to tenants	Total payment of the bridge company to apartment owners
RE	Ground floor living north of bridges	346	311	280	31	5,0	1.700	2.000	102.000	120.000	28.586.520	3.736.800
	Ground floor living west&east of bridges	545	491	441	49	4,0	1.700	2.000	81.600	96.000	36.022.320	4.708.800
	Ground floor living south of bridges	205	185	166	18	3,5	1.700	2.000	71.400	84.000	11.855.970	1.549.800
AL CLIMATE	SUM			888	99						76.464.810	9.995.400
VE ORLDWIDE	Position of the windows (i.e. the apartments behind them) facing the bridge		Total # of flats along the bridges minus not affected flats	Number of <sup>5</sup> rental apartments	condominiu	Assumed years of compensation according to the degree of shading	average total rent per montl	Assumed loan installment plus hous h payments plus heatin and acillary costs (Eur	g rental apartmer		n the bridge company to	Total payment of the bridge company to apartment owners
	1st floor living north of bridges	495	446	401	45	5,0	1.700	2.000	102.000	120.000	40.896.900	5.346.000
	1st floor living west&east of bridges	921	829	746	83	4,0	1.700	2.000	81.600	96.000	60.874.416	7.957.440
DN	1st floor living south of bridges	349	314	283	31	3,5	1.700	2.000	71.400	84.000	20.184.066	2.638.440
	SUM	1.765		1.430	159						121.955.382	15.941.880

Mixed forms of compensation are also conceivable: For example, if a rental unit is entitled to five years of warm rent reimbursement because of relatively heavy shading, then it could also choose, for example, two years of warm rent reimbursement plus the right to a lifetime allotment garden with a garden shed on the bridges instead.

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For potentially impacted leasing building owners along the bridges, the bridge company must budget an additional 60 million euros as a potential compensation payment

Among building owners, the percentage of those who experience more disadvantages than advantages from the bridges is estimated to be less than 5%. There are approximately 1,200 buildings along the Frankfurt Bridges: If a right to compensation payment due to shading of the lower two floors is assumed for approx. 60 buildings (without a great view from the upper floors or without building bridges and the new "prime location" at the bridges massively upgrading the building in return) then the bridge company with another 60 million budget can offer each affected homeowner an average of 1 million euros as compensation.

Commercial tenants, on the other hand, are likely to benefit primarily from the bridges moreover, their leases are likely to expire by the time the bridge is built, so they are free to move elsewhere if they find the disadvantages severe

The impact on commercial tenants is estimated to be low, especially since these tenants have sufficient time until the construction of the bridges -about 15 years after the adoption of the development plan- to rent premises elsewhere after their expiring lease, if they really estimate the disadvantages to be so serious and see too few advantages for their business through the bridges in front of the door.

In most cases, due to the beauty of the bridges, tough, their green and artistic design, and especially the excellent connection to the rest of the city through the bridge traffic, almost every business -including restaurants- should see the bridges in front of them as an asset. And in individual cases, you could also be offered to rent space on the bridges if the land use plan provides for comparable commerce on the site on the Frankfurt Bridges.

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And for all residents along the bridge - whether shaded or not - there is the "bridge card": Each member of the household receives a bridge card for 10 years with an equivalent value of up to 10,000 euros per person during that time

#### Module 4: the bridge card

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Numerous offers can be used on the Frankfurt Bridges, which are usually paid for with the bridge card:

- To use the bridge traffic service, you pay 20 euros per month, or 240 euros per year.
- The rotating deposit credit that one needs for the reusable packaging amounts to a starting credit of around 100 euros which one always has free every year when packaging is lost.
- The infinity pool and the inclusivity pool cost 5 euros to enter, which adds up to 120 euros a year if both are used monthly.
- The hobby pop-ups take expense contributions of 5 euros for courses and events, as do the music pavilions. If one visits both monthly, this also results in 120 euros per year. Other admissions to concerts, cinema, operas, events amount to another 100 euros per year.

A person with bridge card "for free" saves over 550 euros per year (or more with more intensive use of the offers, whereby there is a limit per person, so that e.g. not all hobby pop-ups are permanently booked out by bridge residents). Over 10 years, the compensation bridge card saves at least 5,000 euros per year, and up to 10,000 euros p.a. if the offers are used more intensively.

Since the free bridge card is valid for all household members who are registered in a dwelling along the bridge at the time construction begins, a family of four can save up to 40,000 euros in 10 years if the bridge offers are fully utilized. By issuing the bridge card to all residents along the bridges, the bridge company will lose about 100 million euros in revenue over 10 years, or 10 million euros in revenue per year. However, this is in line with the basic idea of the Frankfurt Bridges, namely that the bridges should be perceived as an extraordinary enrichment for all their residents in particular and not as a nuisance.

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## The goal of the compensation program: The residents along the bridges should become the biggest fans of the Frankfurt Bridges!

The bridge company is the operating company for the bridges - for 85 years, from completion of the bridges to handover to the owners, 100 years after the official start of planning.

Within the framework of this bridge company, many things have to be organized and controlled: There are control centers for autonomous driving, but also maintenance stations at the parking loops for the vehicles; there are professional gardening teams that maintain the bridge, as well as research stations that monitor and evaluate the development of flora and fauna on and next to the bridges together with universities; furthermore, there are operator kiosks, many of which are open 24/7 so that citizens and tourists can always find contact persons even at night and during off-peak hours; and of course there is arts and crafts maintenance as well as artistic further development and further design of the bridges - an incredibly colorful variety of activities.

If several applicants with the same qualifications apply for these jobs, those who are direct bridge residents should be given preference, as this is a win-win situation for both sides: The bridge company gets employees who have not only a professional but also a personal interest in seeing excellent performance in the operation of the bridges on their doorstep; and the employees can identify all the better with the bridges and regard them even more than before as part of their living environment and home. Also for apprenticeships and traineeships up to student internships, especially the bridge residents should always get optimal opportunities on the bridges for themselves or their children.

Thus, residents should identify positively with the bridge on their doorstep, among other things by the bridge company giving them preference for jobs and apprenticeships on the bridges

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## An attractive compensation for commercial properties along the bridges: In some cases, these can also be connected to the Frankfurt Bridges by building bridges

Larger hotels, commercial buildings or even, for example, buildings of the Frankfurt Trade Fair, which the Frankfurt Bridges pass by, can be massively upgraded by connecting them to the Frankfurt Bridges so that people can walk directly into them on dry feet. If they were not easily accessible for pedestrians before, such as the Maritim Hotel or the trade fair buildings on Theodero-Heuss-Allee, people can then stroll there via the bridges.



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#### The residents' compensation model is also an innovative role model

For many problems and challenges on the way to the city of the future, the creation of a second level is a promising approach to solving them, be it by creating "bypass structures" with which autonomous traffic, data, energy, rainwater or even hydrogen can be distributed into urban areas to which no infrastructure leads so far and to which no pipeline routes can be laid in the existing structure; or be it by creating a second level for the purpose of densification.

Whatever the reason, the Frankfurt Bridges will crisscross cities or evolved structures, they will in any case represent a shading factor for residents that is not necessarily welcomed in Central and Northern Europe. The analysis tools, calculation and evaluation systems, and innovative technical solutions to the light problem created in the context of bridge planning can serve as a model for conflict-free densification and interpenetration of Europe's cities with structures that would otherwise be rejected by existing residents.

The compensation models being developed in the context of the Frankfurt Bridges are intended to serve as a model for other infrastructure projects in Germany, Europe and also the USA. The aim is to resolve the fundamental conflict of interests that often arises between infrastructure developers on the one hand and the affected population on the other by asking and answering the question from the outset of the project as to how those affected can be made the biggest winners from the new infrastructure. This is not just about compensation payments, but also about creative compensation and offer packages, such as those presented here.

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The model of the Frankfurt Bridges is a concept for humane innovative urban densification, which does not take place at the expense of green spaces - and can even show solutions for the problem of temporary and partial shading



The Frankfurt Bridges represent a form of redensification in the city, although not as extreme as anticipated by Harvey Willey Corbett in his City of the Future, 1913.

The great advantage of redensification through the Frankfurt Bridges is that neither allotment gardens nor parts of parks fall victim to it, as had already been considered in Frankfurt due to the housing shortage.

Instead, the city uses the space above the wide entrance roads, where the walking value and often also the residential value is comparatively limited anyway by multi-lane car traffic, lack of life and absence of shops for daily needs.

But as delicate, green and artistic as the bridges may be, hovering above the large, wide grey streets, there are always apartments along their course that are shaded. For them, the system of shading analyses is being

expanded as part of the bridge construction, compensation models are being further developed, and research is being conducted into technologies for optimal compensation with "sun on demand".

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### Conclusion: The bridges are a benefit for residents - and potential disadvantages are outweighed by attratkive compensation

With the Frankfurt Bridges on the doorstep, residents, offices, stores and restaurants suddenly have excellent access to many parts of the city that were previously difficult to reach: The bridges pass several hospitals, secondary schools, kindergartens and daycare centers, museums and cultural attractions etc.

If before you had a multi-lane road in front of your door, with the bridges you have paradisiacal walking paths, cafes, restaurants, hobby pop-ups, music pavilions, dog runs and much more within easy reach.

In addition, the bridges create a connection to hubs such as the main train station, Westbahnhof, Ostbahnhof or Konstabler Wache and the Eschersheimer Turm, which is especially important for residents on the outer arms.

And those who are shaded will have their warm rent reimbursed for up to 5 years as compensation: Residents should be the biggest winners in the construction of the bridges. The bridge company should budget around 285 million euros for compensation payments - less than 1 percent of the construction sum.

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#### CONTRIBUTING

Architktur	
Bild & Foto	
Brücken	
Energie	

Geoinformation Grün & Natur Kommunikation Kunst & Kultur Stadtklima - Weltklima Wasser

Statik

Transport

Technik & IT

Verpackung

Webpage & Design

Recht Finanzen

Umsetzung

Professoren

Fachleute

Inspiratoren & Unterstützer

Kritische Sparringspartner:

## Architectural Variety

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### Architecture

In terms of design, the architecture of the Frankfurt Bridges and of the buildings on them is guided by only one important criterion: Do people want to live, work and spend their leisure time there? Is it designed in such a way that the majority of people say: "I absolutely want to go there - that's where I want to be"?

Good architecture is defined by whether (1) people find a building beautiful and (2) whether it is pleasant for them to use it. Since there are all kinds of different perceptions of beauty or aesthetics, the Frankfurt Bridges also take into account all styles that have ever existed in Frankfurt; and whether a building is pleasant to use is seen in how desirable it is in the residential or commercial rental market. In other words, only architecture that has stood the test of time is received, from all eras, whether "modern" or from earlier times. Technically, however, and in terms of sustainability, all the buildings on the Frankfurt Bridges are ultra-modern.

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The Frankfurt Bridges should be exemplary for the city of the future- and this should be designed humanely for the well-being of people and not according to abstract principles

When societies work toward a better future, they have a positive goal in mind. The architecture on the Frankfurt Bridges is correspondingly positive and full of humanity. It is not the result of a forecast that mercilessly perpetuates everything modern, as is often outlined when it comes to the vision of a city in the future.

Urban planning should always start with what many people demonstrably find pleasant, beautiful and worth living in. The best and least distorted indicator of this is rental and purchase prices, making sure to compare areas that are equivalent in terms of location and differ only in terms of urban planning layout.

Another good indicator is what kind of buildings or neighborhoods people from all over the world come to admire as tourists. One should also always learn from this before planning new areas.

Urban planning should therefore always look for models of success and learn from what is already there, what has been tried and tested, instead of trying to realize abstract "ideas" that look attractive on visualizations but are planned past the people. If one orients oneself on what has proven itself and is in demand, then this is to be valued as a valuable urban planning architectural approach and has nothing to do with "unimaginative imitation".

Urban planning and architecture is not about the urban planners and architects, it is exclusively, without exception, only about the people who have to use or inhabit the planned and constructed buildings - no other factor counts, no matter if it is modern or traditional architecture

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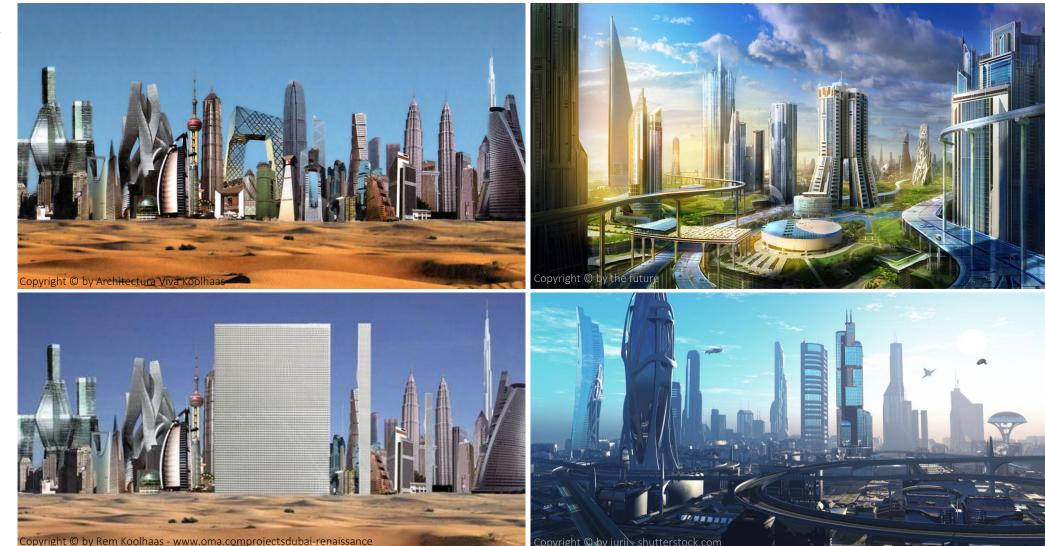
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Many visions of the "city of the future" are a continuation of today's conurbation architecture and appear more threatening than "progressive". - and above all rarely humane



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Even the positive aspect of a green building is counteracted if it becomes merely a postulate or a continuation of urban agglomeration aesthetics -only in green

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## The philosophy of architecture worldwide over centuries: Always take the best and develop it further!

While architects today often see themselves as creative designers of new things, their predecessors in ancient times were primarily master builders who endeavoured to build the best and most beautiful things that (already) existed for people - their "clients". One oriented oneself permanently to the buildings of the ancients and predecessors and took over "the best" of it - that is to say, all that which one still found to be good. The only things that were changed were those that resulted from the new needs of society or from new technical possibilities.

To this day, good architects do not see themselves as self-referential or self-actualizing designers of new things, but rather as service-providing master builders, for whom the only thing that counts is whether people love to live and work in their buildings - or not. For the shape of the living space in which people spend 100% of their time (at least in cities) is a fundamental component of life that must be served in a correspondingly more "customer-oriented" way than other product or service needs. The often limiting dictate of building owners to build cost-effectively should not counteract this orientation towards humane architecture (i.e. architecture loved by people), but rather inspire them to nevertheless build beautifully and livably - a challenge that must be mastered not only in architecture, but also in all other industries.



## Receiving building designs- no matter where

For example, the sketchbook of the architect Ernst Rambaum, who even maintained his professional routine during the First World War and sketched the buildings he passed and brought them home with him: "3 years in the East, advance, stage and front", ink, pencil and coloured pencil drawings in a bound, stapled folder.

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If one always takes the results of centuries of "team groundwork" so to say by earlier architects and further optimizes it, then the kind of architecture that makes us travel halfway around the world as tourists automatically emerges: Because no matter where we travel, it is always the old buildings and old city centres that we find beautiful and that - when renovated - are also the most sought-after by the local population for living - whether in Morocco, China, Turkey, Persia or anywhere else in the world.



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Frankfurt was destroyed to more than 70% in the war, but nevertheless many beautiful old buildings are preserved and testify to the former splendour and the gifted artisans of the city.

Even today, an unbelievable variety of architectural styles is represented, from halftimbering to neobaroque, Wilhelminian style and Art Deco to Art Nouveau.

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NAME AND ADDRESS

Wide, large buildings in the city centre with facades of light-coloured sandstone - which was more expensive than the red Main sandstone bear witness to the wealth of the commercial and financial metropolis that Frankfurt had already been for centuries. The economic boom following the victory in the Franco-Prussian War in 1871 and the founding of the German Empire led to a building boom of gigantic proportions



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SEARCH THE TEAM CONTACT & IMPRINT If you look at the year of construction of the old buildings in Frankfurt, you will see that entire streets were built in just a few years: Within 30 years, all the beautiful town houses were built in which apartments are still very much in demand today. The unbelievable variety of the facades is fascinating - even though the same elements were always used: symmetrically arranged windows, balconies, dormers and facade-protecting cornerstones, cornices, roofing, etc.



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In those days, just as today, there were certainly "mass-produced" houses, which were often comparatively plain and poor in ornamentation - but which are nevertheless still extremely popular today and exhibit a very special beauty through their proportions alone





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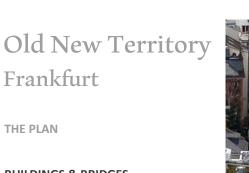
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Modern architecture in Frankfurt is also comparatively diverse and unique, such as "die Welle" or it captivates with its simple, bright elegance with arcades in the extension, such as the UBS Tower.

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# But it is not only skyscrapers and office buildings that offer fascinating modern architecture in Frankfurt

Single-family and multi-family houses also come in a wide variety of architectural directions with buildings that invite you to live in them. They also fulfil another important criterion of good architecture: you are pleased at the sight of them when you walk past them and would also be pleased if you pulled up the blinds in the morning and you had these buildings in front of your eyes when looking out of the window.

If these conditions are fulfilled, it is a matter of humane architecture - that is, architecture created for people and their desires and needs.



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Much of Frankfurt's diverse architecture was destroyed during the Second World War



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But cultural assets were not only destroyed during the war: In the decades that followed, old buildings of high artistic value were also demolished in order to be replaced by new, more profitable buildings.



# For this reason, 60% of the buildings on the Frankfurt Bridges reflect architectural styles from the period before the Second World War

Forty percent of the buildings on the bridges, however, are inspired by modern architecture. Both in the reception of modern architecture and in that of old buildings, the selection of models is not limited to buildings in Frankfurt, but takes "the best" of successful architecture from all over Europe.

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People love bridges with buildings on the right and left, like the Pulteney Bridge in Bath, the Krämerbrücke in Erfurt, the Ponte Veccio Bridge in Florence or the Rialto Bridge in Venice show

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# Another topic that characterizes the Frankfurt Bridge landscape: the statics of the bridges, which must be designed in such a way that buildings can be erected on them

In terms of construction statics, the Frankfurt Bridges are a hybrid between "bridge construction" and "structural engineering". Unlike normal bridges, they do not have to withstand exorbitant spans, which is a relief in terms of statics. However, the Frankfurt Bridges have to carry a not inconsiderable amount of load: the buildings, the vehicles, and the plants along with the substrate soil in which they grow. In some places, this is a greater load than what river and motorway bridges have to bear. With the means and methods of modern statics, however, the Frankfurt Bridges as a whole are a challenge that can be mastered - from a structural point of view, there are far more astonishing structures that have already been mastered.



The challenge with the statics of the Frankfurt Bridges is rather the permanent change of the column distances and column arrangements, which change permanently with the course of the bridges, in order not to impair driveways, sight lines or even trees on the ground.

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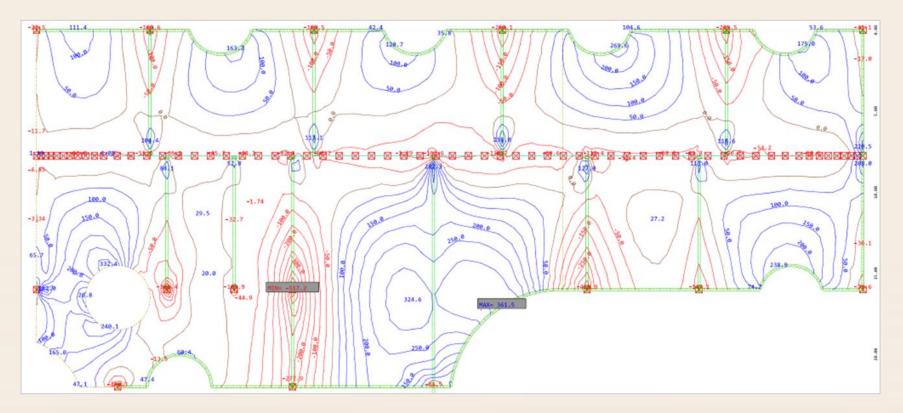
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# Each section of the Frankfurt Bridges has different bending moments due to the permanently changing number and arrangement of columns

Besides the width of the road to be bridged, the construction statics is the limiting factor for the number and size of buildings that can be built on a bridge section: If more columns can be placed and, if necessary, the median strip of the roadway can also be used for columns, more or larger buildings can be placed, i.e. a greater weight can be placed on the bridge section. If only a few columns can be placed, because otherwise driveways on the ground would be blocked, bicycle lanes narrowed, sight lines for motorists impaired or trees damaged, then sometimes only a few or no buildings can be built on the respective sections despite the considerable width of the road, and the only permitted loads are the vehicles, pedestrians and, for example, a dog run.



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# The width of the road also determines how many buildings can be placed on a bridge section and in which arrangement

Bridges offer only a limited amount of building space, in contrast to building areas in the city's environs. If you want to have transport routes along the bridge surface in addition to the buildings and a pedestrian path between them, the buildings automatically become very narrow or do not have much depth.

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Well planned, however, even narrow floor plans with little depth still offer a pleasant living feeling













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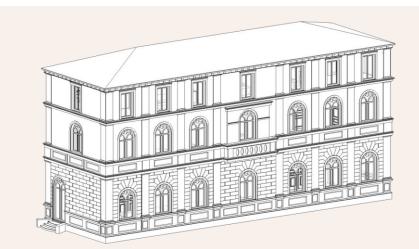
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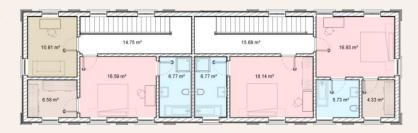
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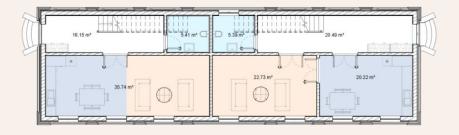
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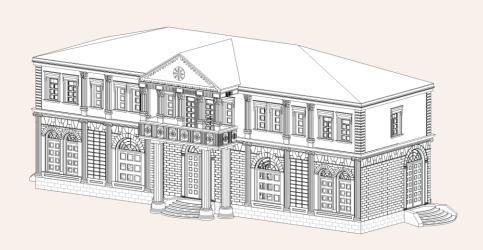
















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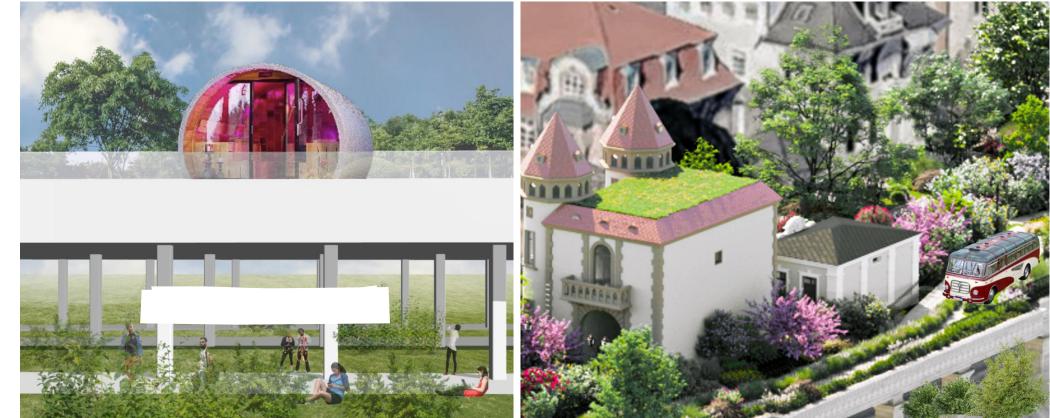
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In some places on the Frankfurt Bridges, houses have to be not only narrow, but small overall to fit on a buildable area: These mini-houses are mostly operator kiosks or so-called "tiny houses"



The architecture on the bridges is subject to the restrictions of statics and bridge width - but can otherwise be designed in a varied manner

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Modern terraced house architecture is often monotonous - the houses in Amsterdam Borneo Sporenburg, on the other hand, look beautiful through a variety of form, material and colour design and therefore served as inspiration for terraced houses on the bridges

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Accordingly, in the section of bridges on Hanauer Landstrasse, terraced houses will also be designed in a colourful and varied way, following the architecture in Amsterdam. Since large windows on the ground floor offer too little privacy despite the water basin, work areas for home offices can be planned there.

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Alternatively, some "privacy screens" for large window areas on ground floor levels can be created by appropriate planting

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Not only colourful rows of houses from Amsterdam, but also colourful houses from Frankfurt serve as inspiration and model





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The terraced bridge-houses in the style of old buildings on Baseler Platz are reminiscent of noble quarters in London



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In Frankfurt there are some very nice old factory buildings, which serve as a model for the Platz der Republik as well as for the architecture on the Meisterbrücke in Offenach



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# Do you know the land where the lemons bloom?

Goethe already wrote about Italy- and in Frankfurt's architecture, too, a longing for Mediterranean aesthetics was expressed in some buildings, so that even today there are houses that could stand in Italy in exactly the same way and not - as in these examples - in Frankfurt's inner city or in the Westend.



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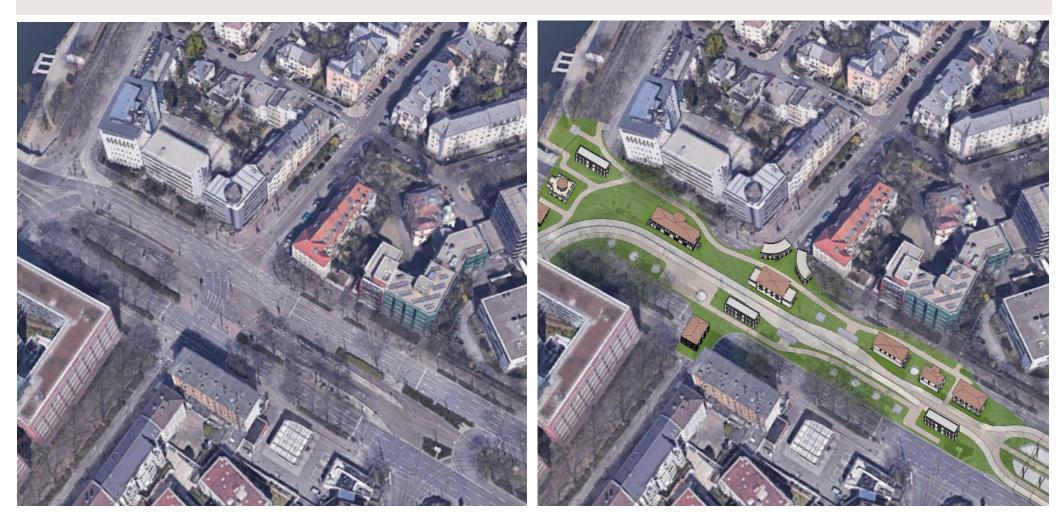
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SEARCH THE TEAM CONTACT & IMPRINT The longing for the colourful elegance of Italy has been the inspiration for Little Italy on the Frankfurt Bridges: Just above the grey wide section of Stresemann-Allee towards the Friedensbrücke, buildings in the Italian Renaissance style are being built



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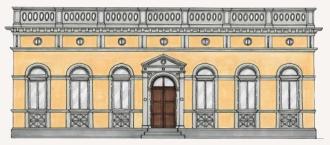
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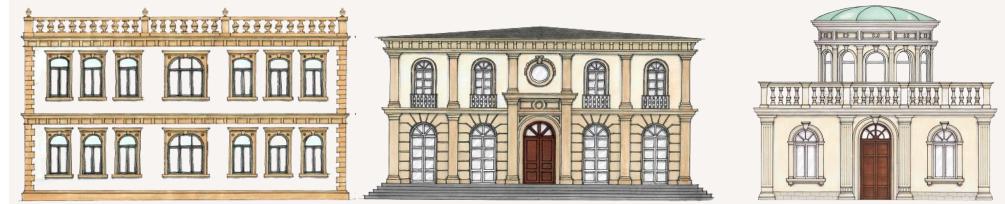


This longing for colourful, Mediterranean-style houses is also reflected in the building design of Little Italy











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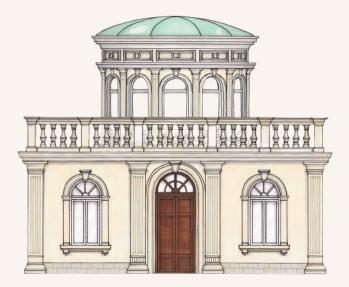
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Not all buildings from Italy existed exactly as they were planned in Little Italy. Rather, various elements of the Italian Renaissance and Neo-Baroque were taken up on the basis of different photographic templates, so that completely new buildings could also be designed in a similar way.

The "Palladio", for example, is found once in a somewhat smaller version as a living space on Türmchenplatz, and once somewhat larger as an Italian organic restaurant in Little-Italy, with a terrace view of the Main.



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Little Italy is also a nice place for evening walks

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Above the Baseler Platz there are solitary buildings on the Frankfurt Bridges with a different building tradition from Southern Europe: coloured tile houses between light discreet buildings



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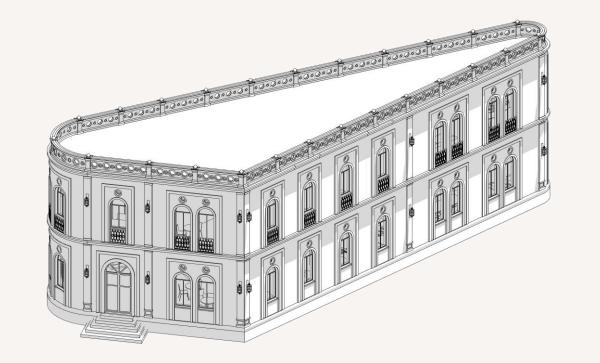
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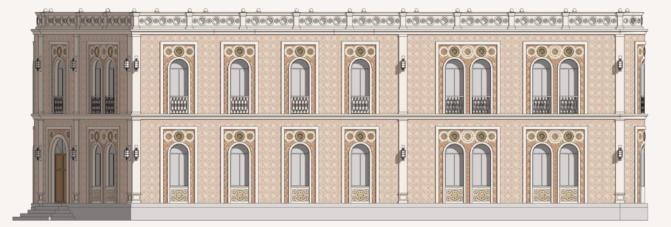
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The tile houses have a wide variety of inspirational models, including the Cosmati floors from Italy



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Frankfurt was not a center of Art Nouveau, but it had some impressive Art Nouveau buildings

Art Nouveau in Frankfurt is mostly found in large commercial buildings in the city centre and in large public buildings such as the Südbahnhof or Schumann-Theater. Smaller villas or singlefamily homes were much rarer than in Darmstadt, for example or Wiesbaden, the strongholds of Art Nouveau near Frankfurt.

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# The Schumann-Theater and the Ostbahnhof were both destroyed in the second world war

Only the Südbahnhof has been preserved as a testimony to the architectural style of many European railway stations from the Art Nouveau era.





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# On a small scale there were also some Art Nouveau pavilions, two of which have been preserved in Frankfurt and Höchst respectively

The small Art Nouveau pavilion at the Hauptwache was a waiting shelter for the horse-drawn tram from 1895. It was dismantled when the tram lines were extended before the Second World War and rebuilt at the Triftstraße stop in Niederrad. The citizens of Frankfurt expressed their love for the small beautiful Pavillon. However, it can no longer be seen there in photographs of the stop after the Second World War.





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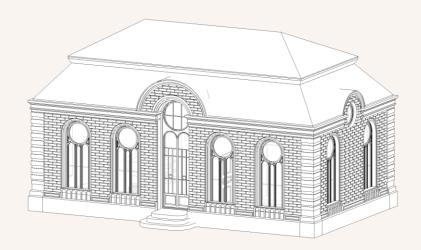
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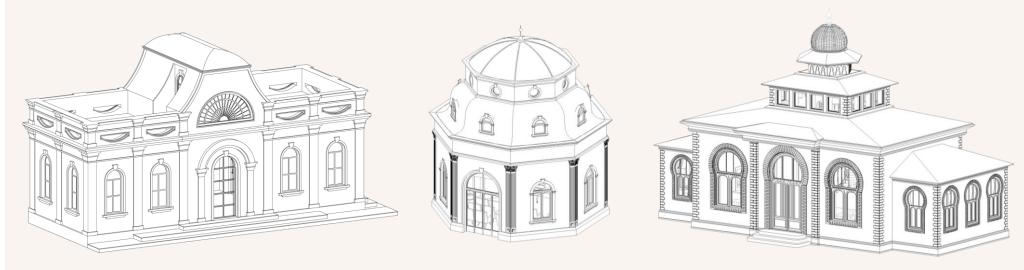
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SEARCH THE TEAM CONTACT & IMPRINT An art nouveau square with numerous smaller art nouveau houses is being built on the Frankfurt Bridges above Wendelsplatz in the direction of Darmstädter Landstraße - a homage to the Art Nouveau in Darmstadt







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# For all style elements in the planning of the old buildings on the Frankfurt Bridges, photographs from the picture archive of the Stiftung Altes Neuland Frankfurt were taken as a model

The picture archive contains for the most part photographs of Frankfurt's old building architecture, but also in part photographs from those of other German or European cities. As an example, here is an excerpt from the picture archive section "balustrades".



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# Window walls and walls without windows

In large public buildings, it was common practice during the reconstruction of the 1950s to house the stairwell in a round glass section of the building. Two buildings in Frankfurt's city centre can still be admired today with these unusual stairwells.

The principle can already be found in Bauhaus architecture in the 1930s - not only in commercial buildings, but also in private villas. Today, only the best rooms of the building would be placed in such sections.

Whether round or square - since the Bauhaus Era, windows have been used much more than before to structure and design a building in its sections. Windows took up entire walls, while there were also completely windowless components directly next to them.

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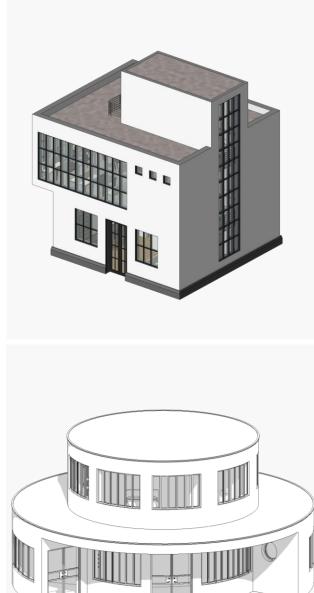
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Occasionally, this principle is also applied to the architectural style of the Frankfurt Bridges - but with considerably more "window-wall" than windowless walls.

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### There are many styles represented in the modern houses on the Frankfurt Bridges - always adopting the best of the period.

Modern architecture also already has its own tradition, which is taken up on the bridges. The bridge section over Miquellallee, for example, also pays homage to the architecture of the 1950s: an entire neighborhood with buildings in the architectural style of that time.



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An example: Above the living room with floor-to-ceiling windows facing the garden is the bedroom, in front of which is a large covered balcony. On the other side of the house, which opens onto the street, there is an office and study across three floors. The perfect layout for the self-employed who also receive clients in the home office.



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The atmosphere of a Frankfurt area can also serve as an inspiration for the reception of a building style, such as here the container romanticism at Frankfurt's Osthafen: The IT college for 2000 students is being built there, for whom one-room apartments in container architecture are nicer than large student dormitories.





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Affordable one- and two-room apartments for trainees and students

As a trainee or apprentice you start in many industries with net salaries of only 600 euros per month, students often have either no income at all, because they can not qualify for federal education assistance (but the parents can not support them either), or they receive federal education assistance of less than 1000 euros per month. Cheap housing is therefore urgently needed and can be created on the Frankfurt Bridges in a style that suits the Osthafen.

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On the Frankfurt Bridges you will also find classic modern buildings like this multi-generation house





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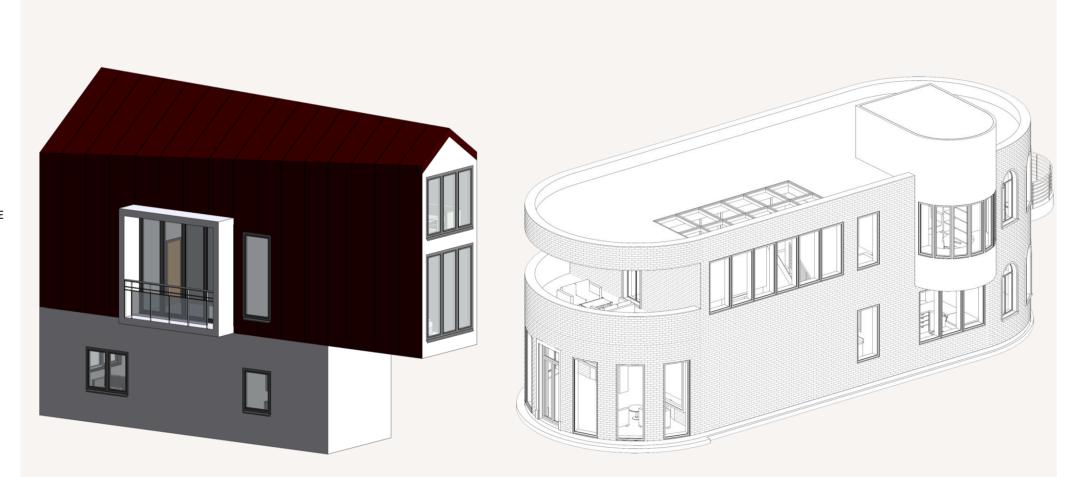
Old New Territory Frankfurt

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# Extravagant modern buildings can also be found on the eastern arm of the bridges



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## Thematic focuses of the individual bridge quarters are also expressed in the architecture

Within the quarters, however, the architecture is mainly from one era or style, otherwise the bridge landscape in the quarters would become too restless.

#### Rosa Luxemburg to Niddapark/Bathing Lake

Bright colorful row houses facing the "beach": boardwalk style

- Scandinavian
- Mediterranean

#### Theodor-Heuss-Allee to Rebstock

Integration: swimming pool on bridges with ground foundation, designed for people with walking disabilities; water slides for children with disabilities, etc. Integration: senior citizens' home distributed over small terraced houses no "bunker-style" but Frankfurt Wilhelminian style

#### Baseler Platz

Designed as **a lantern square**: Frankfurt lanterns for the purpose of good lighting because of the proximity of the station. **Waterfalls** at the edges of the garden bridge around the square with **fountain** in the center

### Miquelallee

**Integrative** nursery, kindergarten, elementary school, child psychologists etc. with connection to Goethe University Architecture: **Bauhaus 2.0** 

#### Hanauer Landstraße B8 - Kreuz-Autobahn 661

**Computer science college** for "students" without university entrance - from 14 years onwards. Teaching staff: programmers/hackers etc. Campus style: **Renaissance 2.0** 

Beginning of Stresemannallee

Mediterranean cultural world: Italian gastronomy and landscape or planting. Italian Renaissance: Italian architecture with special lighting concept

Darmstädter Landstraße from Walter-Kolb-Street bis Babenhäuser Landstrasse

Up to Wendelsplatz: German Art Nouveau area (especially Darmstadt Art Nouveau). Behind Wendelsplatz to Babenhäuser Landstraße: European Art Nouveau style Hanauer Landstraße to Fechenheim

Ultra modern: Graphic and design route Minimalist architecture incl: modern green concepts with algae glass walls, etc. Futuristic: use of innovative materials for architecture and vehicle track

Master Academy - Area above Kaiserlei

Craftsman School wiht 23 Master trades: stonemason, plasterer, sculptor, art blacksmith, glazier, roofers, tinsmiths etc. Brick factory loft style

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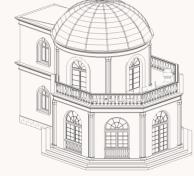
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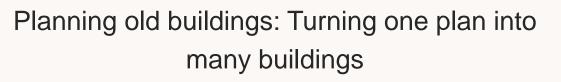
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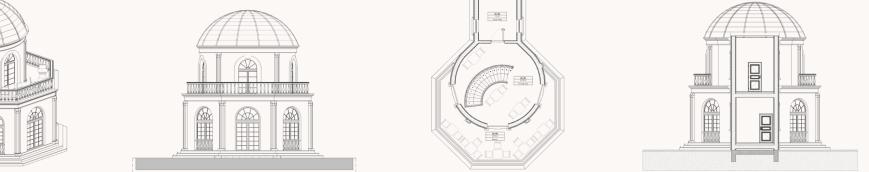
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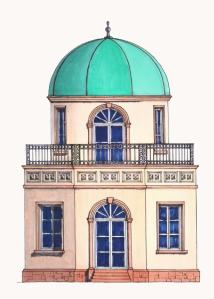






For some quarters of the Frankfurt Bridges, hand drawings served as a visual template for the building design









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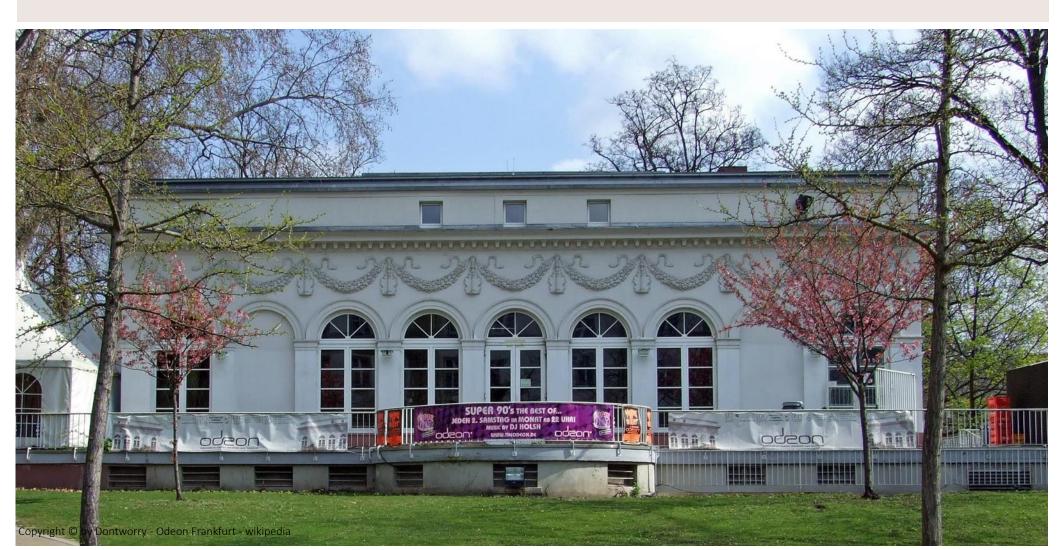
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## In the planning of quarters on the Frankfurt Bridges, work was done with the variation of individual building concepts

Starting from a building as inspiration -such as the Odeon pavilion- a building model was developed: a narrow pavilion with a roof terrace. The design was implemented in many ways.



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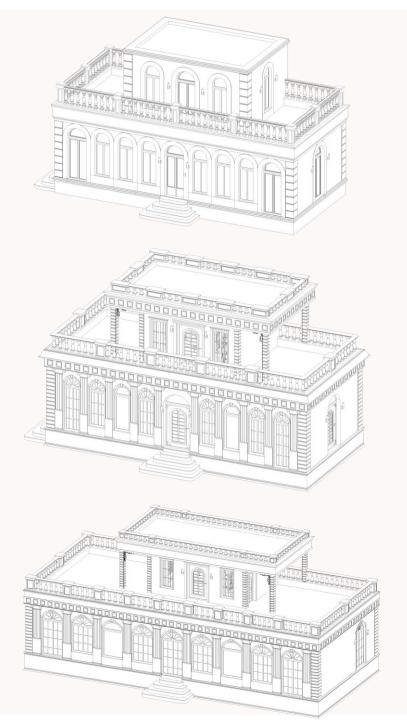
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For example, the facade design was varied in drawings







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Afterwards, 3D views of the drawings were created to illustrate the planning

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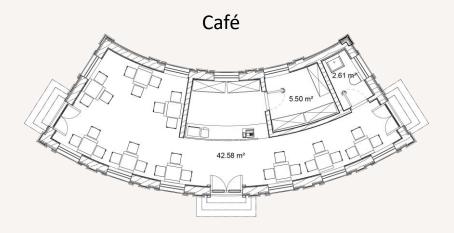
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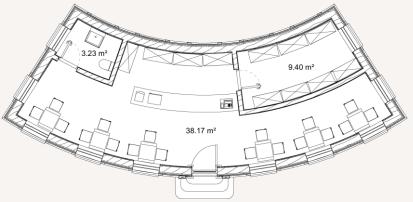
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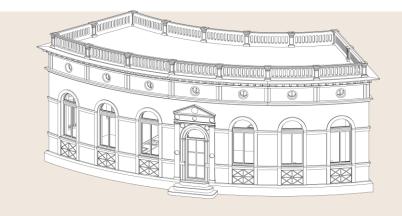


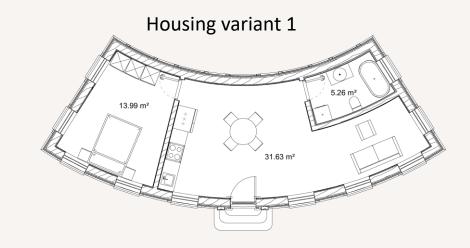
Another possible variation is the use: In many buildings, commercial use can be designed just as sensibly as residential use. Accordingly, a building plan then has different floor plans.

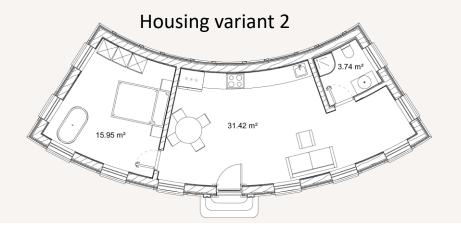


Bakery/butchery









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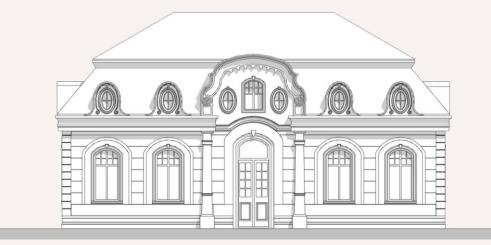
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Depending on the roof structure, one and the same building model can be designed as a single-storey or two-storey building

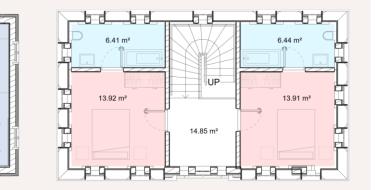


17.40 m²

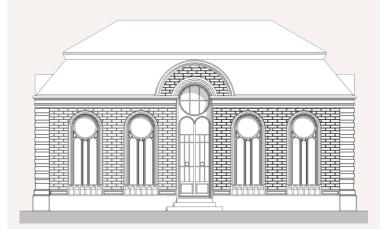
2.88 m

14.85 m²

21.06 m<sup>2</sup>



## One-storey variant of the Art Nouveau building model





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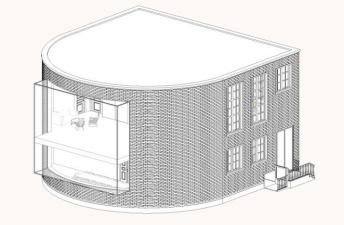
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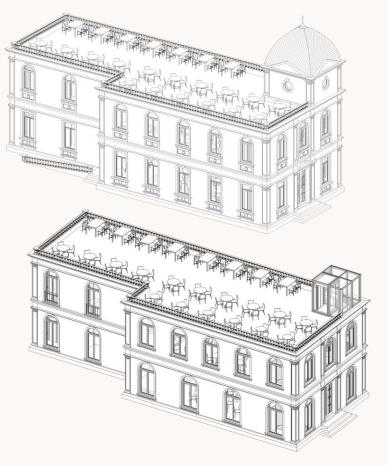
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### Variations of accessibility

1.68 percent of the population in Germany is dependent on a wheelchair. More than half of the severely disabled are over the age of 65, and around a quarter of them are likely to be housed in appropriate institutions rather than in rented apartments.

That still leaves over 1.4 percent of the population who participate in the active life of society and live in rental housing. In addition, there are people who are also dependent on accessibility due to walking disabilities. Due to the aging population, their number will continue to increase in the coming years.

Therefore, 50% of all apartments on the bridges are planned to be barrier-free. The reason, why it is not feasible to plan 100% of the apartements barriere-free is the fact, that too many houses on the bridges have to be narrow or tiny to fit into certain sections.

All public facilities on the bridges (youth centers, hobby popups, schools, daycare centers, concert halls, etc.) and 100% of all stores and service providers are all to be made barrier-free as well: with the help of ramps, if necessary at separate entrances, elevators or platform lifts.

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### Why are not all buildings planned to be completely barrier-free?

Completely barrier-free design for a building means not only that the entrance situation must be wheelchair accessible, but also that there must be an interior lift if the corresponding apartment or business or restaurant extends over several floors. Furthermore, complete accessibility is only given if there is also access to all guest toilets and terraces for people in wheelchairs.

The building landscape on the Frankfurt Bridges is characterized by two features: Due to the narrow building areas per house, many buildings are very narrow with an interior depth of only 4 or 5 meters, so that an interior elevator would take up a relatively large amount of space or would be in the way of necessary walkways and escape routes. Bathrooms and toilets especially guest toilets - are located under the stairs due to the frequently used "Tiny House building layout" and are already quite narrow even without a wheelchair. Furthermore, the narrow building area width does not always allow the addition of a wheelchair ramp or mini-elevator to the ground floor mezzanine. However, the design of the mezzanine is also necessary due to the lack of space in many building areas on the brigdes, as the house utility technology is installed under the bridgeshouses, because it often has no space in the house.

It would not be possible to erect barrier-free buildings on many construction areas on the bridges, and the only alternative would then be to leave all these construction areas empty simply because they cannot be built barrier-free - which would be a senseless waste of potentially erectable affordable living space at the expense of those who are not in wheelchairs but urgently need an apartment. The same applies to about 20 percent of the shops, restaurants or service providers, where, however, the ground floor access is barrier-free in any case, only the barrier-free toilet, terrace and indoor wheelchair situation would not be feasible. However, since more than half of all particularly narrowly planned buildings are single-storey, people in wheelchairs have as unrestricted access to almost all buildings in the Frankfurt Bridges as everyone else - a model for the building landscape of the future.

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# The solution through external lifts - a necessity also for buildings in the non-bridge stock

On the Frankfurt Bridges, all non-residential buildings that have special functions on upper floors but no space for indoor elevators will make full use of the option of outdoor elevators: These can be discreetly glass, satin-finished or, as true masterpieces of craftsmanship, modeled on old elevators.

For our building landscape in German cities, a similar penetration rate of exterior elevators that match the buildings would be desirable. Currently, this is still prevented by minimum distance regulations to neighboring properties: Anyone who wants to attach an outdoor elevator to their apartment building usually needs permission from neighboring property owners to do so, which is often not granted.

A reform of the building regulations would be appropriate here, especially against the background of an increasingly ageing population, which is likely to increase the number of people in the future who will need a wheelchair or at least a lift in later phases of their lives in order to still be able to reach their apartment on an upper floor. Old New Territory The ice cream café in Little Italy is can also be palnned as a residential building -Frankfurt however, due to the interior depth of only 4 meters, it cannot be designed barrier-free

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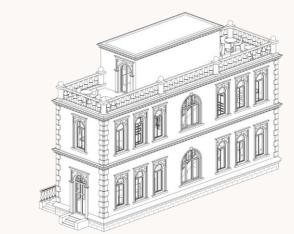
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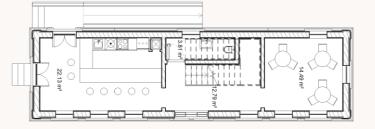
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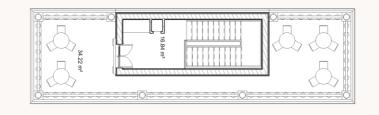
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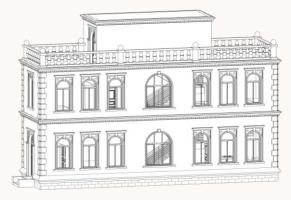


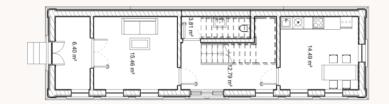


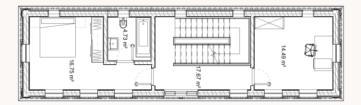


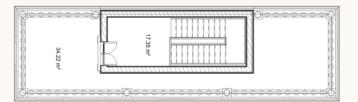












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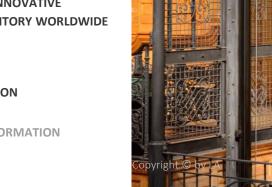
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In the case of old buildings, both elegant modern lifts as well as historically appropriate examples can be used, which are made by craftsmen and still meet modern Technical Supervisory Association requirements.

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## Conclusion: The design on the bridges is not of one piece, but thrives on different neighborhood architecture

Architecturally, the entire potential on the Frankfurt Bridges should be exploited, that construction section sizes and statics allow: This means that there should be suitable architecture for ALL population groups - for every taste and every need.

Accordingly, architectural styles from all epochs will be taken up, both from Frankfurt's architectural history and from many regions of Europe.

The focus is exclusively on the fact that people love the buildings and would like to spend their lifetime there - in this respect, there are no limitations imposed by ready-made design concepts. Rather, it is the diversity that counts and also has the space to unfold on 2 million square meters of bridge area.

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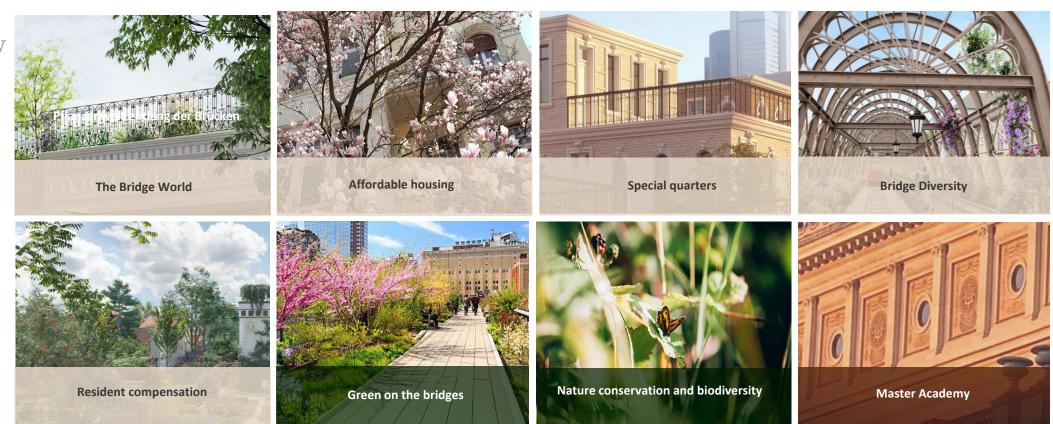
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