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CONNECTIONS AND BARRIERS:

Merging Nuremberg and Fürth

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ABSTRACT

Since the start of industrialization the region joining Nuremberg and Fürth has been the site of drastic urban transformation. Germany's first railroad was built there in 1835. During the post-1945 era, firms such as AEG and Quelle built large plants in the area. Yet by the beginning of the twenty-first century, the region's industrial chapter had come to a close. Today, in the place where AEG and Quelle once stood are vast tracts populated by massive vacant buildings, some designated historic landmarks. For years now, officials have been in search of a feasible urban renewal plan for these abandoned industrial areas. One scenario under consideration is the erection of a regional university and research center on the former AEG factory grounds.

This paper investigates the opportunities and risks of urban development in the region against the backdrop of its postindustrial change. It examines the historical developments since industrialization by creating axial maps for different periods. This analysis shows that three cordons leave a powerful mark on the region, raising questions about how to traverse and link the districts they separate. The main connecting axis between Nuremberg and Fürth, Fürther Straße, has global importance in the regional network but is not locally significant. And without links to the surrounding areas, the street cannot urbanize neighboring districts. Further isolating the neighboring districts are stretches of large-scale building and development. Given these structural realities, the planned university center stands to become a space without urbanity, unable to advance the development of neighboring districts.

This case makes clear that the midpoint of direct connection linking the two urban centers cannot itself become a new urban center without enormous effort. The permanence and scale of the peripheral structures located there represent long-term obstacles to the formation of a new local center.

KEYWORDS

Space syntax, Urbanization, City Centres, Nuremberg, Fürth, Angular Segment Analysis

1. MOTIVATION

Post-industrial structural change in region joining Nuremberg and Fürth has raised an urban development scenario that has been considered again and again: the merging of both towns along the axis linking them. Though this endeavor has failed many times in the past and is currently no longer being seriously discussed by policymakers plans have been introduced to establish a new regional university and research campus in the area. These plans contain a vision already described in 1922: the creation of a new center, midway between the towns (figure 1). But the creation of a new regional university and the merging of the cities face structural obstacles to a new urban center between Nuremberg and Fürth. The main road connecting the cities – the former Nuremberg-Fürther Chaussee, which today is known as Fürther Straße in Nuremberg and Nürnberger Straße in Fürth – is an about six-kilometer straight line. The area in between seems better suited for driving by than for the construction of a new center.

This article examines and tries to understand the historical development of this connecting axis. It uses a space syntax approach to analyze the local and global importance of the area between Nuremberg and Fürth in historic and present state. On the basis of its findings, it then sheds light on the obstacles and oppositions that can arise the attempting to merge urban centers.



Figure 1 - Poster (1922) for referendum that envisions a combined municipality in which Fürth is no mere suburb but an equal partner linked to a new commercial center and traffic hub between the two towns.

2. METHODS

Axial line maps of the Nuremberg and Fürth region were prepared using information from three different years and sources: the Bavarian Lang Registry from 1850; a 1929 map from the Bavarian Topographical Office of 1929; and the 2015/16 issue of the Land Survey Register of the Bavaria Atlas (figure 1, top). For each map, the longest lines of sight among pedestrian-accessible streets were drawn by hand as vector graphics. Expressways and streets closed to pedestrians were not recorded.

The historical maps were chosen based on their ability to give insight into city growth during industrialization. Maps of Nuremberg and Fürth were also selected for their uniformity: a decision was made not to merge individual regional maps from different years. Unfortunately, for the period prior to 1800, no sufficiently detailed maps are available that show the road network before the construction of the Nuremberg-Fürth Chaussee (1801–1806). In an attempt to recreate this network, we used the land register of 1850 and removed all streets that could be plausibly assumed not to exist before the construction of the Nuremberg-Fürth Chaussee. The map dated 1800 is thus a reconstruction to gauge the changes that the Nuremberg-Fürth Chaussee effected on the road network.

The resulting four maps were analyzed using Depthmap X. Choice as a measure of 'betweenness centrality' and Integration values as a measure of 'closeness centrality' were calculated for various radii using angular segment analysis. These topo-geometric syntactic analyses of the street network are accompanied by a historical examination of the region's urban morphology and use structure.



Figure 2 - Top: Bavarian Land Register, 1850. Middle: Map of the Bavarian Topographical Office, 1929. Bottom: Aerial photograph, Bavaria Atlas, 2017.

3. HISTORY

The first written mentions of Nuremberg and Fürth came soon after the start of the second millennium. During the Middle Ages, Nuremberg first rose to prominence as a free imperial city of the Holy Roman Empire. Its importance overshadowed that of Fürth, which was subject to changing rule – first under the Principality of Ansbach and later under the provost of Bamberg and the Imperial City of Nuremberg. Fürth did not receive a town charter until 1806, when Emperor Francis II dissolved the Holy Roman Empire of the German Nation and the Kingdom of Bavaria annexed Nuremberg with the support of the French army. Today, Nuremberg and Fürth have around 500,000 and 200,000 inhabitants, respectively. In the German classification system, this makes them Großstädte, towns whose population exceed 100,000.

Construction on the first modern, direct route between Nuremberg and Fürth south of the Pegnitz River began in 1801 at the behest of Karl August von Hardenberg, a Prussian state official who administered the Ansbach-Bayreuth region for the Prussian crown, and was completed in 1805¹. Before that, travelers had to use a country lane that meandered on the north side of the Pegnitz River through Nuremberg's New Gate, St. Johannis, and Schniegling (figure 3). At Doos, a bridge over the Pegnitz finally brought them to a series of winding paths leading to Fürth². The significantly faster new road, known as the Nuremberg-Fürth Chaussee, followed a straight line that cut through unpopulated parcels of land south of the river – obviating the need for river crossings – and curved slightly before reaching Fürth. Unlike the previous route, which extended radially from the New Gate, the chaussee was tangent to the city's ring-like wall beginning at Plärrer, a square located just outside Ludwig's Gate where medieval farmers and merchants freely plied their wares. Though the chaussee reduced travel time between Fürth and Nuremberg, it did not extend into either of the town's medieval centers.

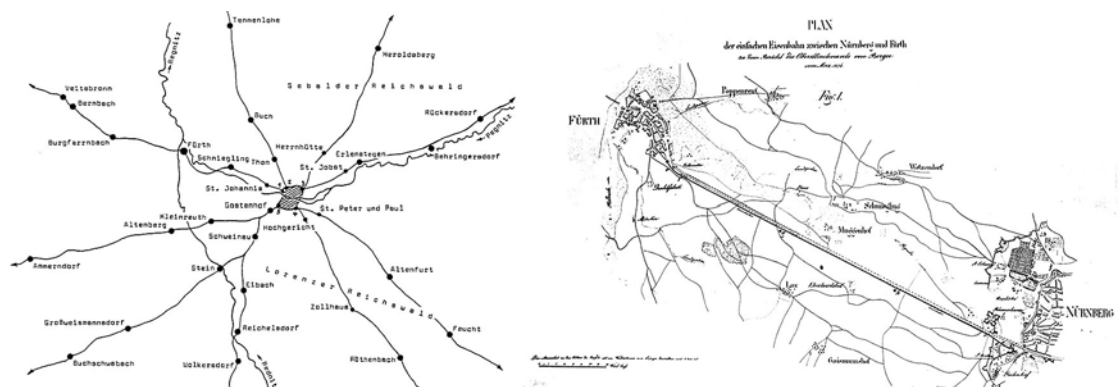


Figure 3 - Left: Roads leading from Nuremberg before the construction of the Nuremberg-Fürth Chaussee (Höhn, p. 47). Right: map of the railway along the Nuremberg-Fürth Chaussee, 1836 (Deutsche Bahn Museum, Nuremberg).

The Nuremberg-Fürth Chaussee was the longest transport axis in the region. Choice analysis indicates that the new road considerably weakened the significance of the old route as a connection (figure 7; log choice radius n). In 1800, Plärrer Market was the most globally integrated place in Nuremberg and the surrounding area; the globally preferred paths were the routes around the ring wall. The new chaussee shifts importance to the southern paths around Nuremberg's ring wall and weakens the north-western routes around the ring wall. In Fürth it emphasizes the eastern part of town and weakens the significance of the bridge across Pegnitz in the north east (figures 3,7,8)³.

- 1 In building the road, the Prussian administration sought to circumvent the tolls levied by Nuremberg on existing routes. See Centrum (1985), p. 8
- 2 In all likelihood, a rural route leading to Fürth through Muggenhof existed south of the Pegnitz, but its exact path remains unknown. See Centrum 1986, p. 8 ff.
- 3 Today Pegnitz is called Ludwigsbrücke.

At the same time, the area between Fürth and Nuremberg south of river Pegnitz remained unimportant: locally, at a radius of 800 meters, no new subcenters along the new road are detectable. Highlighted areas of small 'urban seeds' at a radius of 800 meters (see Hillier, 2009) continue to occur north of the Pegnitz, in Schniegling and Wetzendorf in 1850 (log choice, integration; figures 7,8).

4. TRANSPORT ROUTES AND INFRASTRUCTURE CORRIDORS

In 1835, construction began on Germany's first railroad, the Bavarian Ludwig Railway. The line ran alongside the wide corridor of the Nuremberg-Fürther Chaussee and terminated in Fürth. In 1844, the Ludwig Railway received its first connection station. Located between Doos and Muggenhof, the Fürth Junction intersected with the northern stretch of what would soon become the Ludwig South-North Railway running from Lindau to Hof. The Ludwig South-North Railway sparked the construction of a central station in Nuremberg (1847) and in Fürth (1865). Running along the southern side the new chaussee, the corridor for intercity train traffic interrupted the only major lateral connection south of Fürth between Doos and Dambach. Another development at this time was the construction of the Ludwig Canal. Dedicated in 1846, it was designed to transport goods from the Main River in Bamberg with the Donau River in Kehlheim. The canal ran south of the Ludwig South-North Railway and at Doos crossed the Nuremberg-Fürther Chaussee and the Pegnitz. Economically, the canal was unable to compete with the rapid expansion of the region's railway lines and flopped. Starting in 1881, the traffic and transportation network in Nuremberg and Fürth underwent further expansion. A private horse tramway was built between Plärrer square and the more centrally located Fürth fruit market, parallel to the Ludwig Railway. The tramway was electrified and placed under municipal authority at the turn of the century. No match for the direct competition, the Ludwig Railway discontinued service in 1922. Germany's first railway was replaced not by a modern long-distance train but by a tram⁴.

The region joining Nuremberg and Fürth soon saw more drastic changes to its infrastructure. Shipping on the Ludwig Canal ceased after Hermann Jansen introduced his master plan for the region (1921–1932), which foresaw the construction of an expressway alongside the railway to replace the canal – an idea later endorsed by the National Socialists. But a road was not built on the canal corridor until the 1960s. The Frankenschnellweg ("Franconia expressway") began as a thoroughfare and later became a controlled-access highway. Then, in 1972, the electric tram line was replaced by the U1 subway. This subway line, following the old chaussee, eventually had five stops between Nuremberg and Fürth, and was elevated starting at Eberhardshof. The construction of the subway altered the appearance of Fürther Straße, changing its width and course multiple times. In some sections, the road runs north of the subway line; in other cases, south. Now the road sometimes has four lanes with a median and sometimes two lanes with wide sidewalks. Thanks to the subway and the Frankenschnellweg, travel between the towns became faster. But the corridor also created a significant barrier between the neighboring quarters along the north-south axis.

4 See Centrum 1987, pp. 10–14.

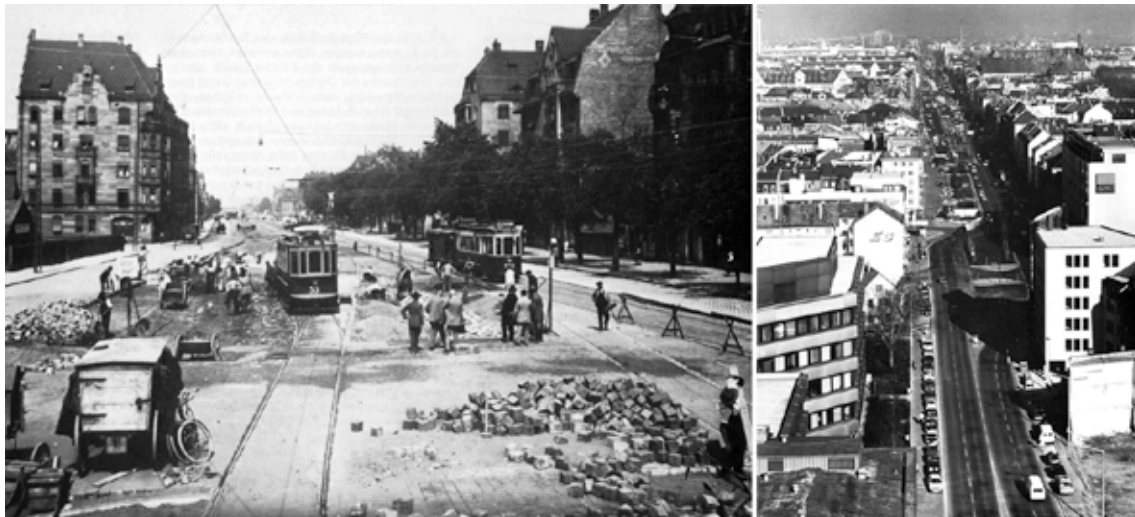


Figure 4 - Fürther Straße before and after construction of the subway (left: Bildarchiv Centrum Industriekultur, right: VAG-Archiv Nürnberg).

5. MERGING NUREMBERG AND FÜRTH

The construction of the Bavarian Ludwig Railway introduced the idea of merging Nuremberg and Fürth into a single municipality. After several failed political initiatives in the nineteenth century, a referendum was held in 1922. It failed with a vote of 64.8% against. Later efforts by Nuremberg's National Socialist mayor Willy Liebel to push through a merger without a vote did not succeed. After the war, several new attempts were initiated but failed as well, mostly on account of the strong reservations each town held about its neighbor. On October 3, 1990, the Green Party organized an ironic event at the boundary of Nuremberg and Fürth. Under the banner of "Now what has always been side by side will grow together" the party celebrated the towns' "unification," renaming Nuremberg as "East Fürth."⁵



Figure 5 - Left: Postcard about the Fürth-Nürnberg merger, 1922 (Archiv Kamran Salimi). Bottom: "Reunification demo by the Green Party, 1990 (Archiv Kamran Salimi).

⁵ October 3, 1990 was also the day of German reunification. The slogan played on Willy Brandt's much-cited 1989 quote in response to the fall of the Berlin Wall: "Now what belongs together will grow together."

To date, Nuremberg and Fürth have been unable to form a shared urban identity; on the contrary. The residents are deeply attached to their respective historic center and define themselves in contradistinction to their neighbors. Neither side is committed to forging a shared center and a common identity.

6. LOT SCALE AND LAND USE

In 1850, the area between Nuremberg and Fürth was for the most part undeveloped. In later years, it grew into one of the most the region's most important industrial zones, with companies such as Siemens-Schuckert, Hercules, Triumph, and Mars setting up headquarters there. Industry continued to bloom until the 1970s, when gradual postindustrial change began, bringing fundamental transformation to the region. A prime example is the former AEG industrial grounds. Starting in 1914, it was the site of the Bing Works, a manufacturer of tin toys and domestic goods. In 1921, Bing merged with AEG, a Berlin firm founded by Emil Rathenau. AEG began producing ovens and heating units at its Nuremberg plant in the 1930s; during the war, it manufactured arms with the help of forced labor. In the post-war era, AEG reemerged on the wave of the German economic miracle, and the Nuremberg plant was retrofitted for washing machine production. In the 1980s, the domestic manufacture of appliances was hit by a crisis and AEG, after filing for bankruptcy, was acquired by Daimler Benz. In 1994, the domestic appliances division was absorbed by Elektrolux. The last Elektrolux washing machine rolled off the lines in 2007, when domestic production was relocated to Poland. A project developer subsequently bought the former AEG factory grounds as rental space. Today, large parts are still vacant, though the Elektrolux administration remains headquartered there and around 6,000 square meters are currently occupied by Energy Campus, a research association of regional universities and research institutes founded in 2011. The Energy Campus is currently being considered as the starting point for further university expansion at the site.

Starting in 1955, the mail order company Quelle, founded in 1927 by Gustav Schickedanz in Fürth, erected a modern multi-floor industrial building with a clinker façade and ribbon windows on Fürther Straße. Despite the company's success in the post-war era, it declined amid emerging online commerce and in 2009 filed for bankruptcy. The former Quelle building, designed by the German architect Ernst Neufert, comprises 250,000 square meters spread out over just under seven hectares, and is currently the largest vacant building in Germany after the Tempelhof Airport in Berlin. In 2015, the Quelle building was sold in a forced auction to a Portuguese investor for a mere 16.8 million euros. Though the development plan is still uncertain, the structure will likely be preserved given its status as a historic landmark. That being said, it nevertheless interrupts the development zone between Fürther Straße and the Frankenschnellweg, creating a permanent obstacle to stronger links between the neighboring areas to the east and west. Both the AEG and Quelle areas have proven difficult to redevelop due to the size of the buildings (some designated landmarks) and the industrial scale of the lots.

Two other structures between Nuremberg and Fürth bear mentioning. The first is a fenced correctional facility, built in 1865, located on an eight-hectare site north of Fürther Straße. Right next door is the Palace of Justice, a large urban structure on Fürther Straße completed in 1916 (and the site of the Nuremberg trials). Like Quelle and AEG, the expansive complex of buildings that make up the prison and the courthouse form a barrier to urban development. In particular, they further corset Nuremberg's Bärenschanze district between Fürther Straße and the river, isolating it from surrounding neighborhoods. The industrial development along Fürther Straße and its peripheries that started 150 years ago still today blocks small-scale urban and residential development in the area.

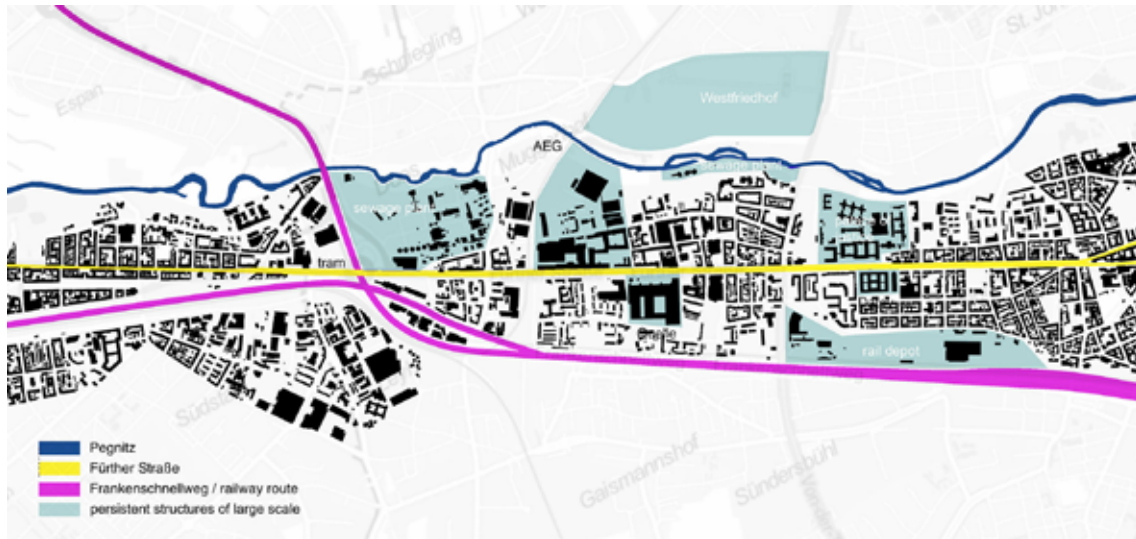


Figure 6 - A map showing the region's triple cordon and large-scale industrial development.

7. A TRIPLE CORDON AND A SHARED BOUNDARY

Three structural cordons bound the area between Nuremberg and Fürth: the Pegnitz River to the north, Fürther Straße in the middle, and the Frankenschnellweg to the south (figure 7). Each cordon creates linkages along the northwest-southeast axis but creates barriers along the transverse axis. The Frankenschnellweg, together with the train tracks alongside it, can be crossed only four times in Nuremberg before the city limits at Muggenhof. And one of the crossings, the Leibsteg, consists of a small pedestrian path that runs along a community garden. Fürther Straße is no better. Forty meters wide, four lanes across at times, divided by a median in parts, and with a kilometer-long impassable stretch of aboveground subway line, long sections of the street lack crossing points connecting its opposite sides. Though some streets enter on one side, they frequently do not continue to the other. This is especially pronounced over the 2.5-kilometer-long section between Schumannstraße in Nuremberg and Finkenstraße in Fürth. What is more, the Pegnitz and its adjoining meadows close off large swaths of territory to the north. Here, too, there's a dearth of routes linking districts on either side of the river. And at the edge of the river's meadows are large structures that form an enduring barrier to neighboring districts: the Westfriedhof (West Cemetery), the correctional facility mentioned above, two wastewater treatment plants in Muggenhof (one built in 1913, the other in 1929), a community gardens, and several large commercial buildings. These structures prevent an urban network from forming between the northern and southern sections of the Pegnitz meadows.

Together, these structural cordons shape development at the border shared by the two towns. Peripheral and marginal structures dominate without a hint of shared urban development. There are (on the Nuremberg side) large commercial buildings, the aforementioned AEG complex, a water treatment plant, the partly abandoned tramcar depot in Muggenhof (now an historical landmark), and (on the Fürth side) a public utility company, today *infra fürth gmbh*. Until fairly recently, large-scale commercial development took place at the city limits, including the construction of furniture warehouses and car dealerships. And current zoning plans provide for continued commercial development around the former AEG factory grounds and between Frankenschnellweg and Kurgartenstraße. These conditions would even seem to be anchored in collective consciousness: the first subway station on the Fürth side bears the appropriate name 'Stadtgrenze' ('city limits').

Another key feature of the border area between the towns is the number of thoroughfares. The Frankenschnellweg crosses Fürther Straße with a wide expressway exit at the cross section. Furthermore, the Frankenschnellweg, together with the historical railway to the west and the Pegnitz River, cuts off Muggenhof from most of the surrounding area, rendering it an urban island. The only north-south connection, Adolf-Braun-Straße, links Muggenhof to the northern

part of Schniegling, but beyond the Frankenschnellweg it leads (as Sigismundstraße) to a large commercial area. The street, in other words, connects one commercial zone with another instead of linking mixed-use residential areas. Absent from the boundary of Nuremberg and Fürth are any early signs of a shared urban center.

8. THE GLOBAL AND LOCAL IMPORTANCE OF FÜRTH STRASSE

Today, Fürth Straße is the most important global connection with the highest Choice values for radius n (Choice) in the area under investigation. Locally, it is unimportant as a connecting axis up to a radius of 5,000 meters. It is a preferred path connection only starting at a catchment radius of 8,000 meters (figure 9, choice radius 500- n). Integration values also increase beyond a radius of 5,000 meters. The elevated values for Integration and Choice are located at the intersection of Fürth Straße with the four-lane ring road Maximiliansstraße. This is a major intersection in the foreground road network and is especially important for vehicle traffic.

The area surrounding Fürth Straße within the three cordons mentioned above shows no additional local path connections up to a radius of 5,000 meters. Only outside this sphere does another street – the Adam-Klein-Straße, which ends at the former Quelle building – gain importance. Moreover, at a radius of 5,000 meters, side streets leading to subway station at Fürth Straße over large intervals seem to be the preferred routes. Only the Eberhardsstraße station lacks such an important side connection. Both choice and integration values support the hypothesis that the region joining Nuremberg and Fürth is globally important, though it lacks a strong local center.

The comparison of catchment radii (figures 9, 10) shows that, as Nuremberg's medieval center loses importance and the radius increases, Fürth Straße becomes more important. Today the center is still the most central part of the region in terms of closeness and betweenness-centrality up to a radius of 2000 m (figures 9, 10). But it quickly loses importance at larger radii. It becomes important again exactly opposite to Fürth Straße at a catchment radius of 2000 m. This shows that Fürth Straße and its surrounding areas are creating local, urban centrality for pedestrians and a global centrality for motorized traffic. The centrality of Fürth Straße and the city center are not alike but they are complementary (figures 9, 10). If the foreground network of preferred routes (figure 9; choice at higher radii) is seen as a "deformed wheel" (Hillier 1996), today's Fürth Straße is the straightest and longest spoke in the system. It resembles a spoke tangentially attached to a hub, the latter of which is represented by Nuremberg's walled medieval core.

Also of note are the changes that took place between 1929 and 2016. Over eighty odd years the street network has become significantly denser outside the historic centers, but a similar density cannot be found along Fürth Straße. Here, especially in Muggenhof, around the former AEG and Quelle factories, and at the Palace of Justice, the urban grid continues to be large-meshed and gap-ridden. Corridors, buildings, and land zoning have prevented the grid from becoming denser. Paradoxically, the future-looking planning measures of the past predestined the area for a low density of street networks punctuated by peripheral structures. The rail, canal, and highways, the wastewater treatment plants, the factories, and the Palace of Justice complex stand in the way of "grid intensification" (Hillier 1999).

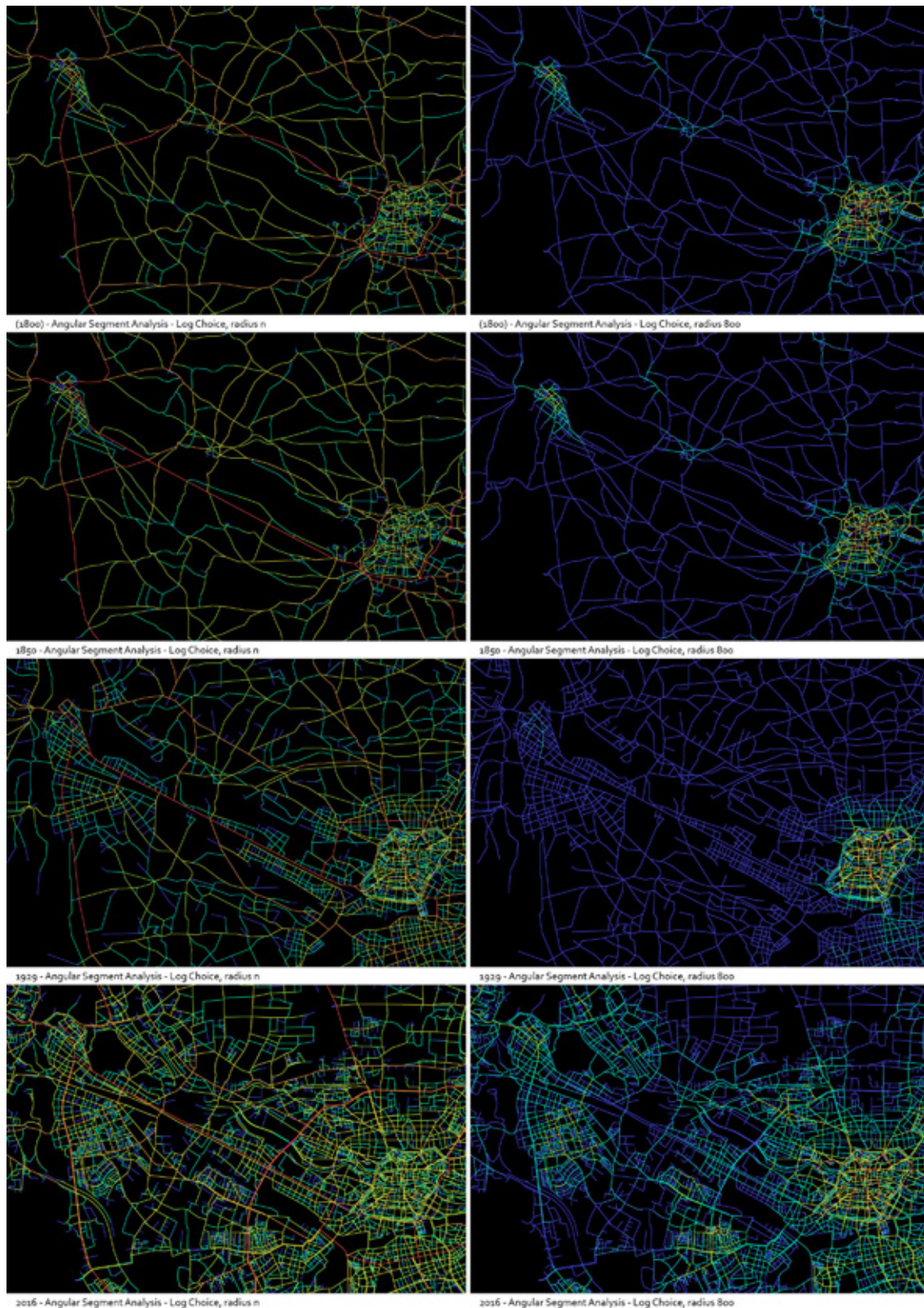


Figure 7 - Angular Segment Analysis Log Choice 1800, 1850, 1929, 2016, radii n and 800.

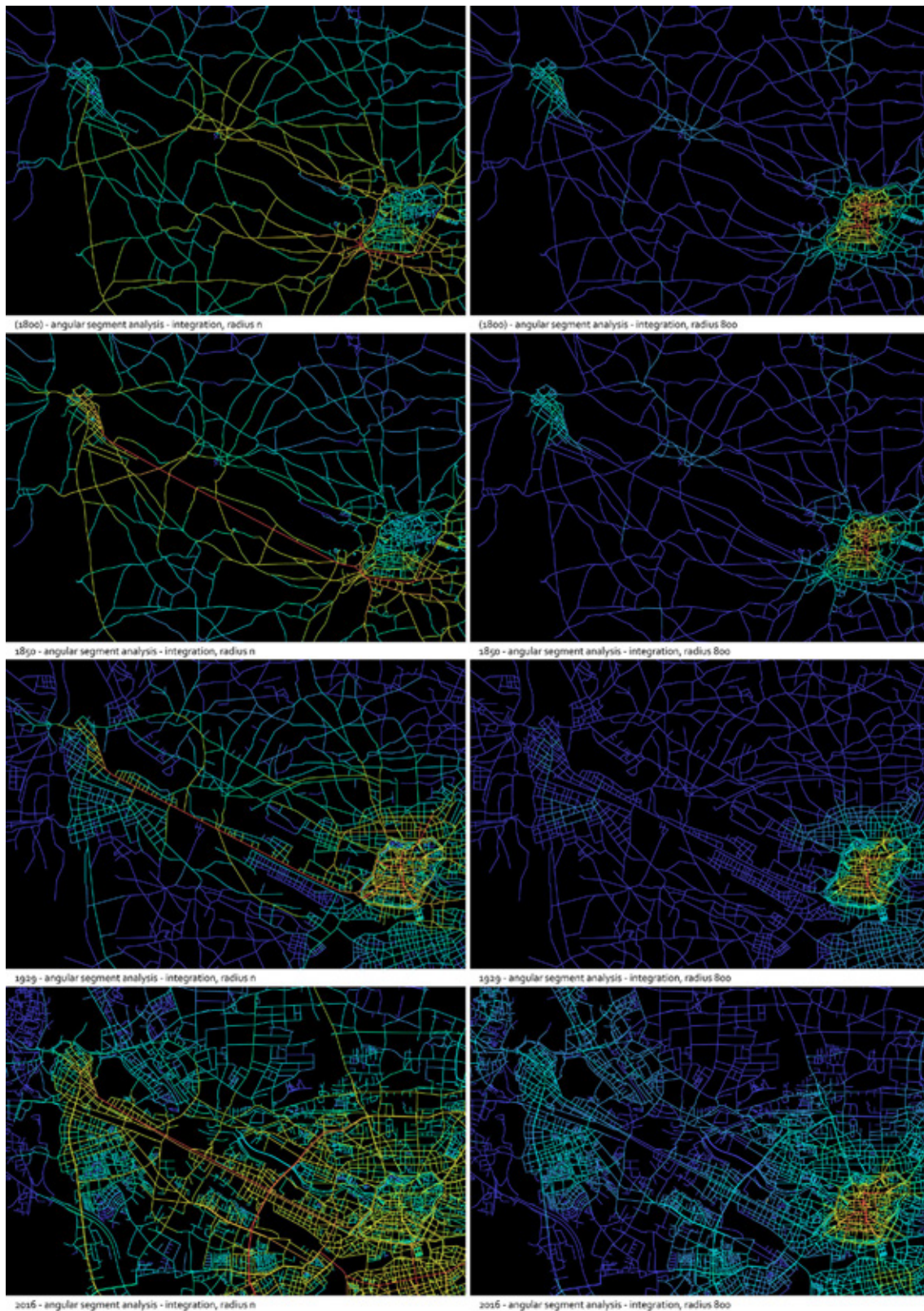


Figure 8 - Angular Segment Analysis Log Choice 1800, 1850, 1929, 2016, radii n and 800.

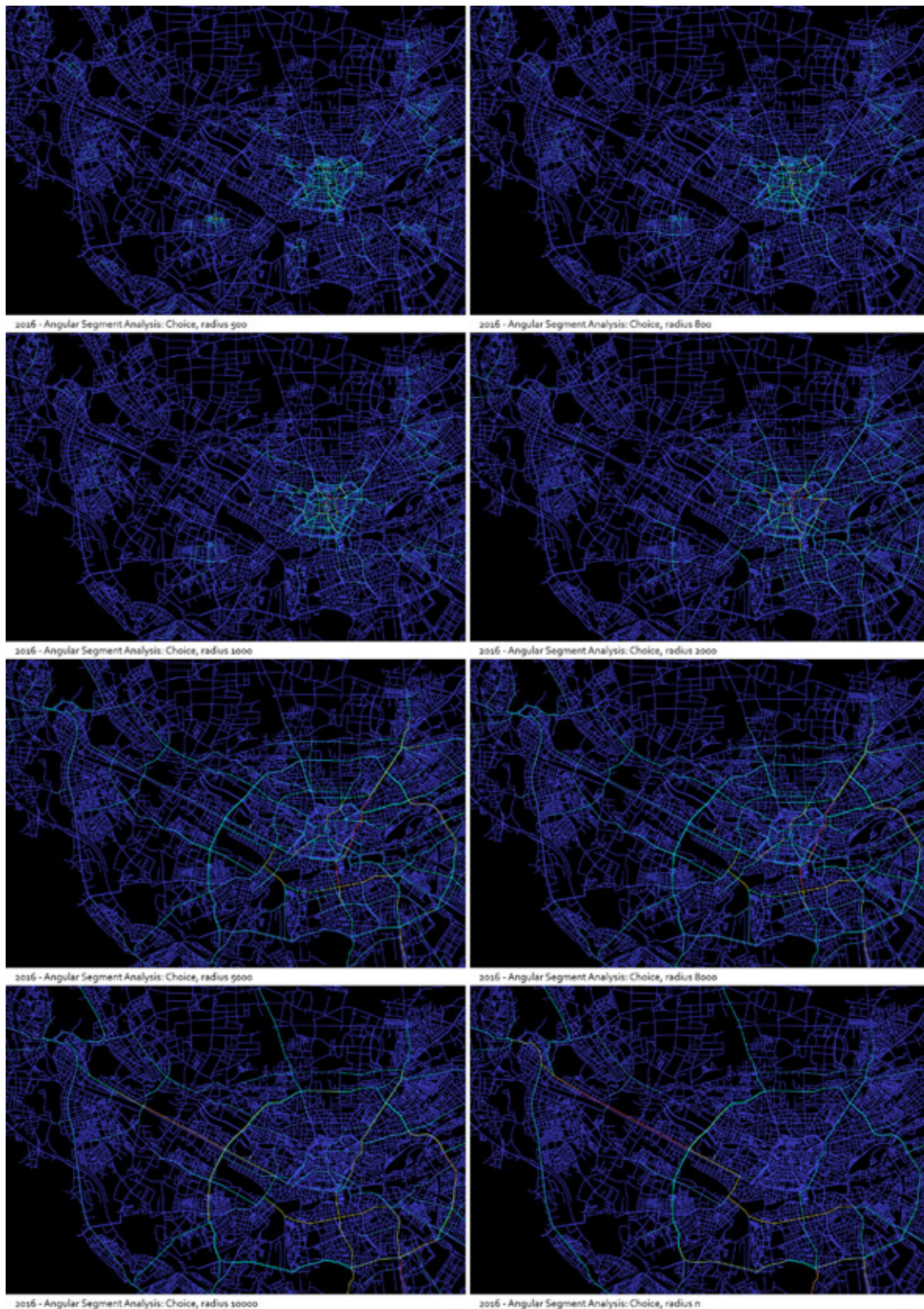


Figure 9 - Angular Segment Analysis Choice 2016, radii [m] , 500, 800, 1.000, 2.000, 5.000, 8.000, 10.000, n

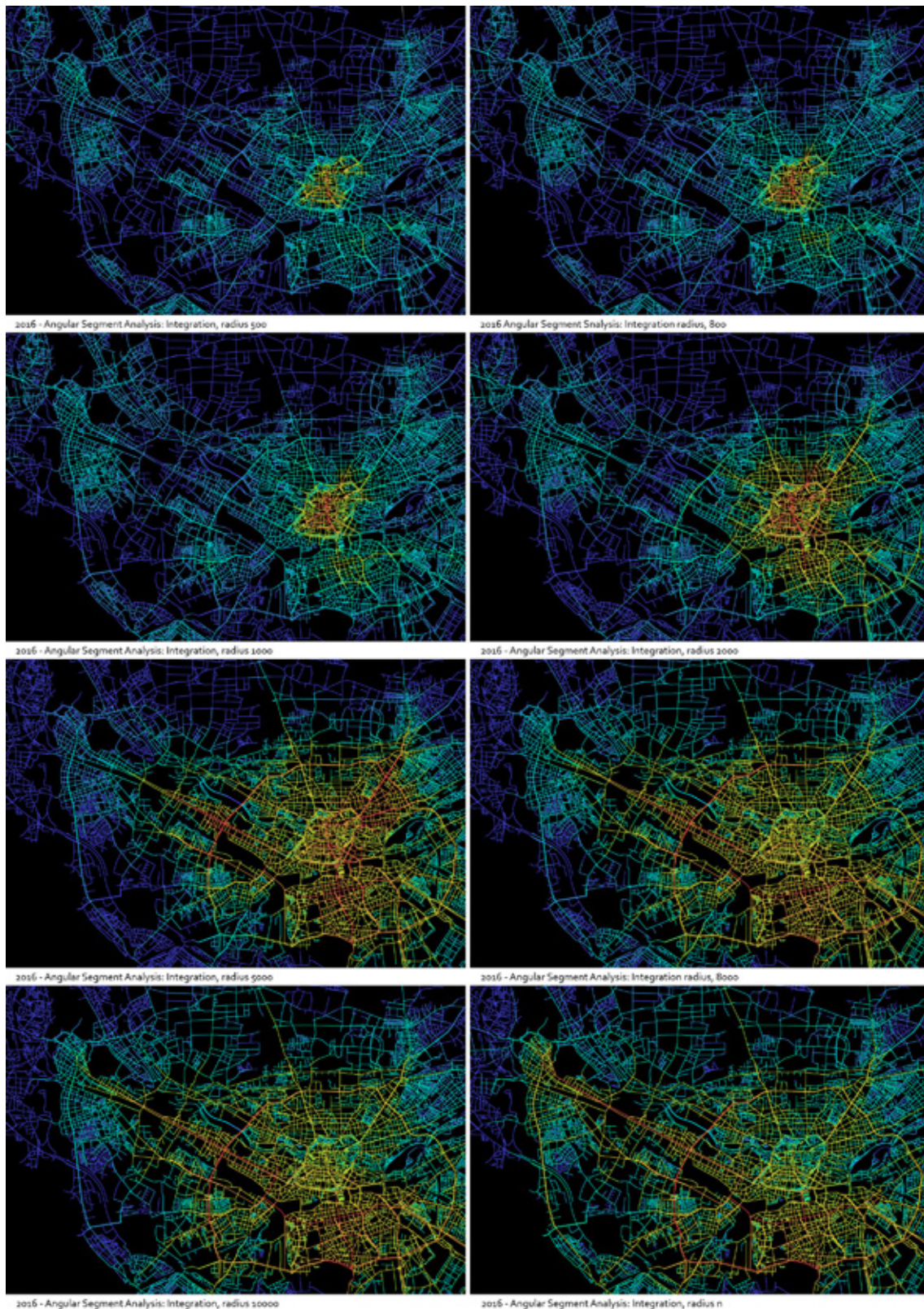


Figure 10 - Angular Segment Analysis Integration 2016, radii [m] , 500, 800, 1.000, 2.000, 5.000, 8.000, 10.000, n

9. CONCLUSION

Neither in the medium nor in the long term is it likely that Nuremberg and Fürth will grow into a common mixed-use urban area, even if the mental and administrative hurdles are overcome. It is therefore likely that a new university campus on the former AEG factory grounds will assume a peripheral character. The urban barriers created by the wastewater treatment plants, the Pegnitz River, and an aboveground subway along Fürther Straße will prevent new university buildings from reviving neighboring districts. The campus project is mostly likely to have positive effects on Eberhardshof, a district lying to the west. But the Palace of Justice complex will impede the integration of the campus with the center of Nuremberg via Himpfelshof. And a southern connection will still have to be created via Fürther Straße's aboveground subway.

What is more realistic than a new urban university campus and merger of the towns around a new midway point is to accept that a new center cannot be built on Fürther Straße. The experience of the past hundred years shows that the peripheral quality at the border between the two towns will remain even if urban development along Fürther Straße continues.

It is wrong to think that midpoint of the main connection axis between the centers of Nuremberg and Fürth can emerge as new center. The development that has occurred along Fürther Straße stands in the way of a close-meshed network and promotes the kind of large-scale structures that block passage to other districts. This case shows that city centers do not merge like water drops when they come too close; they grow by sprouting links between unconnected areas. But links created for speed and immediacy can have long-lasting effects, retaining their transitory and peripheral character far into the future. The development of Fürther Straße also shows that grid intensification cannot unfold concentrically because the areas around main access routes preserve their peripheral character even after strong urban growth. As the grid intensifies in other areas, the conservation of large-scale structures contributes to the fractal structure often observed in cities (Batty 1994). Fürther Straße cannot easily be fashioned into a Haussmann-like boulevard because the urban tissue around it has grown into a kind of peripheral organ for the city.

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