**Sample Report**

# Neufreimann Neighbourhood Development (Former Bayernkaserne)

*Image: moka-studio*


**Author:**

Plan4Better GmbH
Am Kartoffelgarten 14
81671 Munich
Germany


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# Content

## Context

Neufreimann, formerly known as Bayernkaserne, stands as one of Munich's most significant urban development projects, alongside Freiham (City of Munich 2021b). Spanning an expansive 58-hectare area, the project entails the construction of 5,000 apartments capable of accommodating 15,000 inhabitants. The objective of this report is to assess the accessibility of public transportation and educational institutions for the new residents while identifying any potential weaknesses. The study draws upon Bebauungsplan no. 1989 (English: *Urban Development Plan*) as its foundation. Using the planning software GOAT, the report employs both current conditions and future scenarios for analysis. GOAT allows for modelling and evaluation of a new neighbourhood across various target parameters.

### The area today

Neufreimann is located in the north of Munich and was previously military property (see Figure 1).

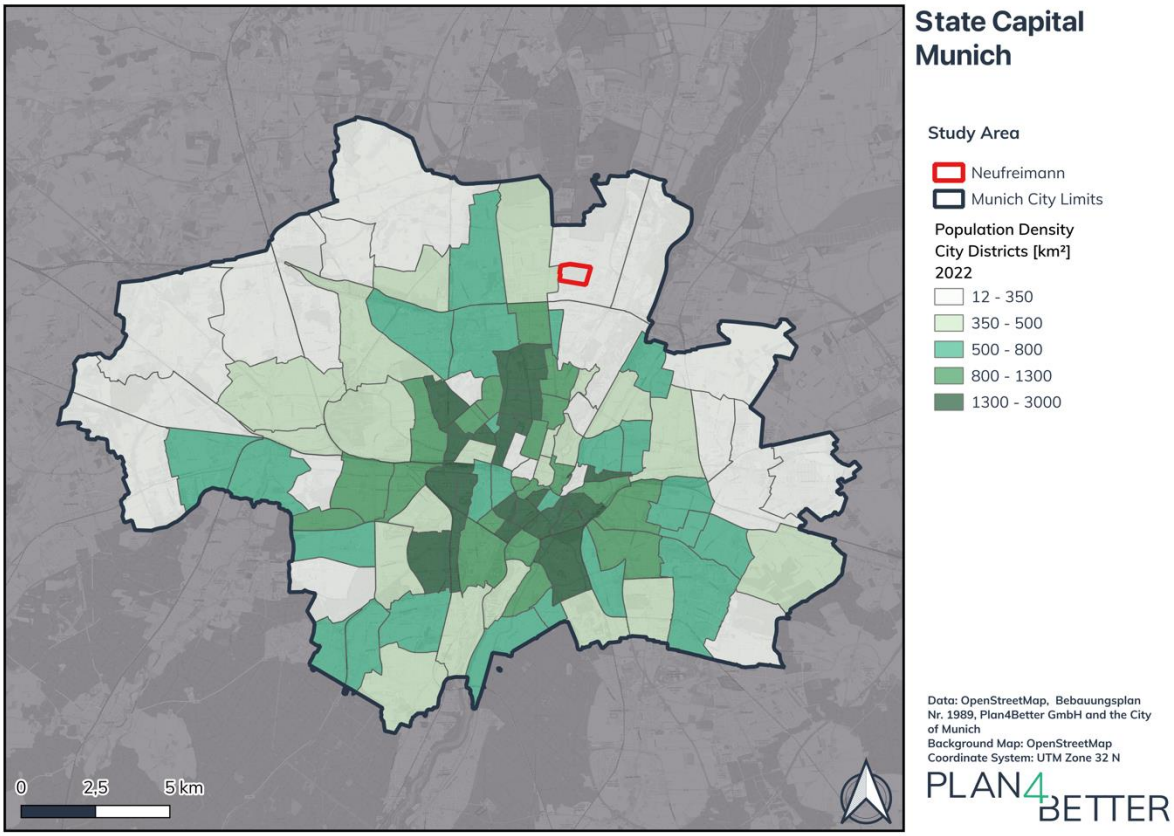


*Figure 1. Orientation map – Location of the Neufreimann study area in Munich*

More precisely, Neufreimann is located in district 12 Schwabing-Freimann, south of Heidemannstraße and north of the industrial-commercial area Euro-Industriepark, which is also to be redeveloped in the foreseeable future. Euro-Industriepark is to become an urban quarter with a high proportion of housing and green or sports areas (Krass 2022a).

The new quarter is situated approximately 7 km away from the city centre, with the majority of the land being owned by the City of Munich. Certain portions of the apartments are intended to be made available for rent following the Munich model (Krass 2022b).

## Neufreimann 2030

The Urban Development Plan no. 1989 (see Figure 2) for Neufreimann became legally binding in April 2019, and the ground-breaking took place shortly afterwards (City of Munich 2021b).


*Figure 2. Urban Development Plan no. 1989 for Neufreimann, former Bayernkaserne (City of Munich 2019)*

By 2030, the vibrant district of Neufreimann is to be fully developed, featuring two large school campuses, 14 day-care centres, a multitude of shops, cafes, restaurants, a library, a centre for the seniors, and various other amenities. Neufreimann places high value on its proximity to urban conveniences, aligning with Munich's vision of becoming a "city of short distances". Consequently, ensuring accessibility is of paramount importance. To accommodate the anticipated surge in demand, a new tram line, Tram 24, will be introduced, and the existing Tram 23 will undergo extension.

The neighbourhood will be developed in several stages and is, as aforementioned, expected to be completed in 2030 (City of Munich 2021b). Figure 3 shows a rough schedule of some of the development steps.


*Figure 3. Timeline of development steps in Neufreimann*

In this report, the future planned new development area (year 2030) is modelled in GOAT and examined by means of various accessibility analyses. Various accessibility analyses are conducted, with a specific focus on pedestrian and bicycle accessibility to key points of interest, as well as accessibility to public transportation stations. The report aims to address and visualize two key questions using maps:

1. How does the new tramline impact the public transportation offer in the area?
2. How accessible are educational institutions (childcare, elementary school, middle school, realschule, gymnasium and university) on foot or by bicycle?

# Analyses

## 1. New tram line

The introduction of the new tram line in Neufreimann aims to enhance public transportation accessibility throughout the entire area. The "Tram Munich North" project involves extending Tram 23 and constructing the new Tram 24, which will traverse the districts of Schwabing-Freimann and Milbertshofen Am Hart. Spanning approximately 5.7 km in length, the planned "Tram Münchner Norden" will feature 12 new stops, with sections passing through and alongside the Neufreimann region (Münchener Verkehrsgesellschaft 2021).

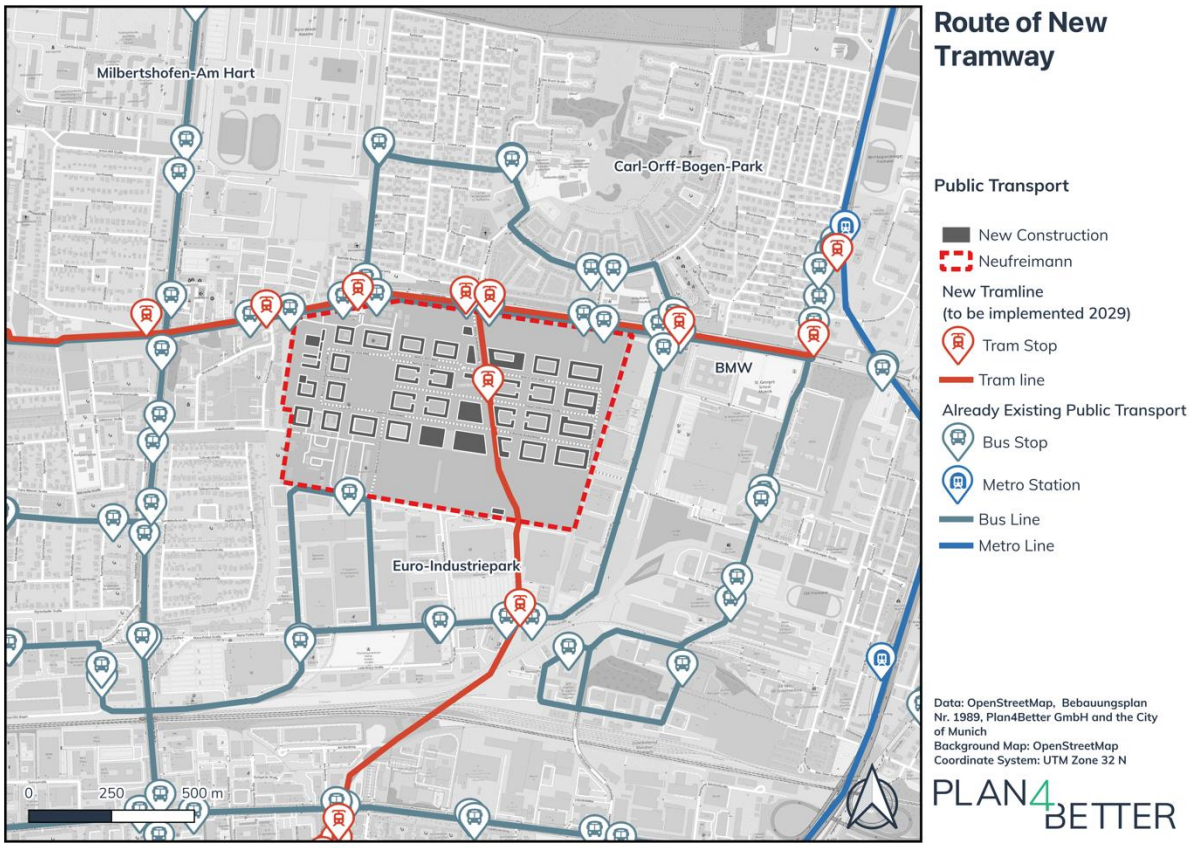


*Figure 4. Route of new tramway (Münchener Verkehrsgesellschaft 2021)*

To the east of the area, the U-Bahn line U6 runs with stops at Freimann and Kieferngarten. These stops are accessible on foot from the centre of Neufreimann in approximately 20 minutes. Additionally, several bus lines, including 140, 150, and 180, currently provide service in the vicinity of the area.

### Public Transport Quality Classes

To analyse the public transportation offer, the first step involves referring to Public Transport Quality Classes. These classes encompass an evaluation of both development and service quality. Catchment areas are calculated based on the service quality, considering factors such as frequency and type of public transport. The analysis utilizes current GTFS data as the foundation for calculations, while making assumptions for the new tram lines. The assessment of Public Transport Quality Classes in Neufreimann 2030 focuses on working days during rush

hour, with a 10-minute interval for the new and extended tram lines. As the bus lines planned for 2030 are not yet operational, the analysis is based on the existing bus network's current state. Similar to the tram lines, the bus frequency corresponds to the weekday rush hour. Each stop is initially categorized based on stop type and service frequency, as outlined in Table 1.

*Table 1. Public Transport Quality Classes - Determination of stop category*

| Determination station category | | | |
|---|---|---|---|
| Frequency | Metro station<br>Suburban rail station<br>Rail station | Tram station | Bus station |
| < 5 minutes | I | I | II |
| 5 ≤ x < 10 minutes | I | II | III |
| 10 ≤ x < 20 minutes | II | III | IV |
| 20 ≤ x < 40 minutes | III | IV | V |
| 40 ≤ x < 60 minutes | IV | V | VI |
| 60 ≤ x < 120 minutes | V | VI | VII |

The following calculation determines radii for the respective stop categories with the size and quality represented in Table 2.

*Table 2. Public Transport Quality Classes according to stop category and catchment radius*

| Category | < 300m | 300-500m | 501-750m | 751-1000m |
|---|---|---|---|---|
| I | A | A | B | C |
| II | A | B | C | D |
| III | B | C | D | E |
| IV | C | D | E | F |
| V | D | E | F | - |
| VI | E | F | - | - |
| VII | F | - | - | - |

Further information on the calculation basis of the Public Transport Quality Classes can be found here.

In Figure 5, the calculated Public Transport Quality Classes are initially shown in the current state.

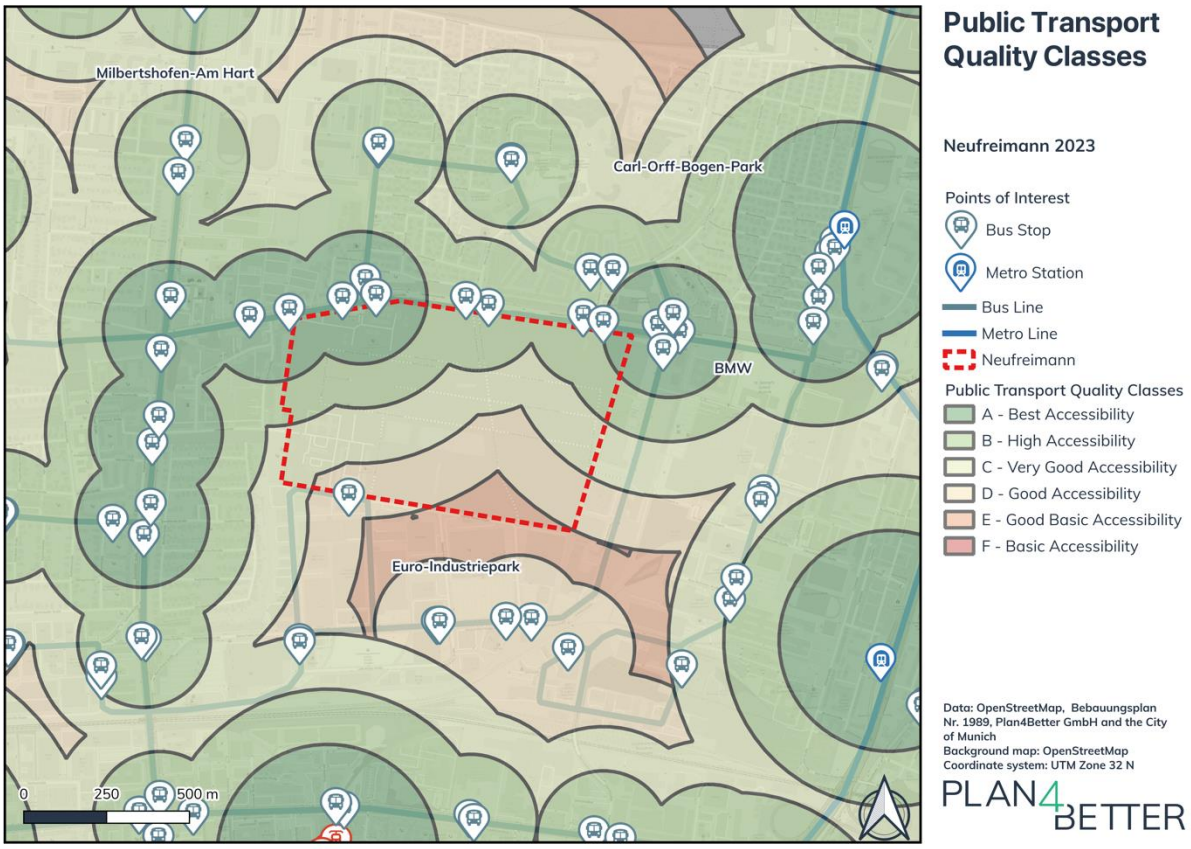


*Figure 5. Public Transport Quality Classes in Neufreimann 2023 (weekdays, rush hour)*

In Neufreimann 2023, Public Transport Quality Classes A, B, C, D, and E are present within the area. The northern section, specifically along Heidemannstraße, currently enjoys the highest quality of public transport. Conversely, the southern part experiences the weakest public transport connections.

Figure 6 illustrates the anticipated improvement in Public Transport Quality Classes by the year 2030 due to the expansion of the tram network.

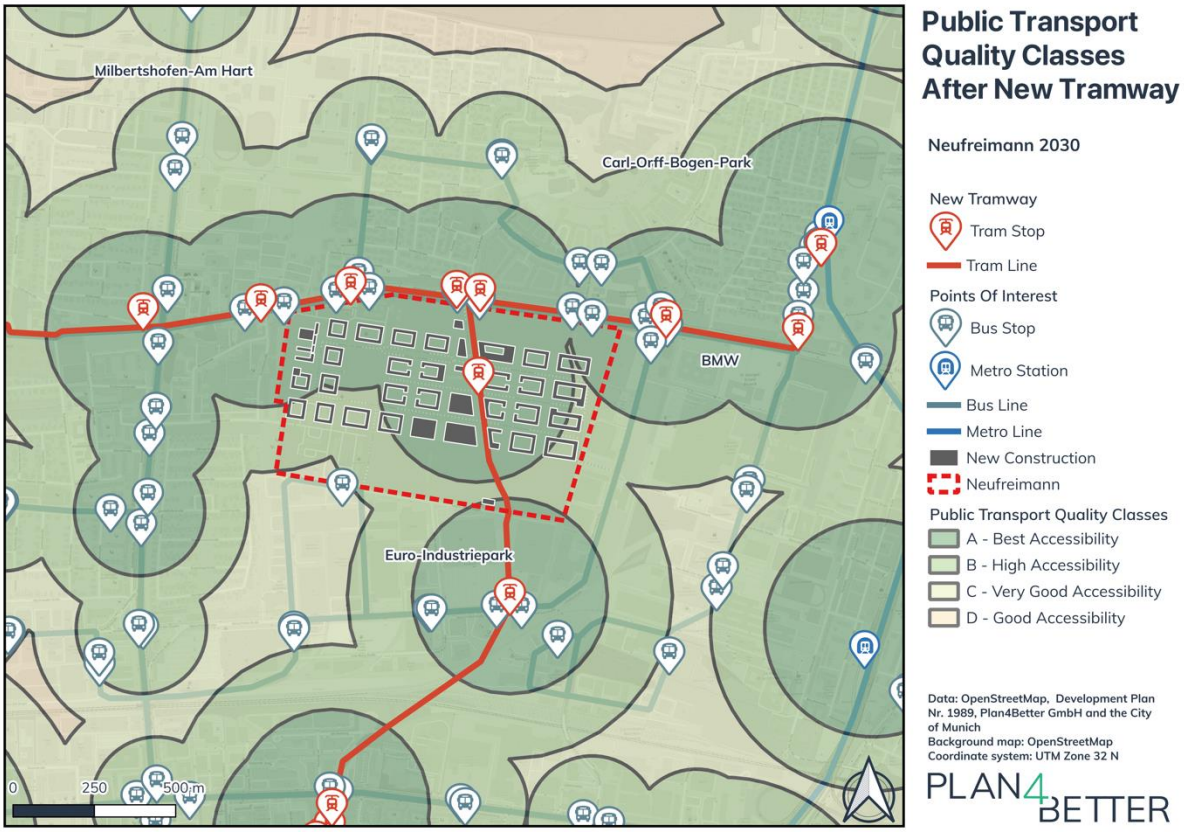


*Figure 6. Public Transport Quality Classes in Neufreimann 2030 (weekdays, rush hour)*

The majority of Neufreimann 2030 is assigned to public transport quality class A, a smaller part to public transport quality class B and an even smaller part to public transport quality class C.

Ensuring access to a well-developed public transport network is a crucial aspect of promoting sustainable mobility. The introduction of the new tram line significantly enhances the current public transport offering (as of 2023) and, as a result, ensures excellent accessibility within the district.

### Multi-isochrones

To provide a more comprehensive analysis of tram accessibility, multi-isochrone calculations were conducted alongside the Public Transport Quality Classes. Unlike the linear buffers used in the quality classes, multi-isochrones take into account the actual road network, enabling a more detailed assessment of catchment areas for points of interest, including public transport stops. Additional information on the calculation of multi-isochrones can be found here.

For this analysis, multi-isochrones were calculated to determine the 5- and 10-minute catchment areas on foot around the various tram stops. The walking speed used for the calculations was 5 km/h. Figure 7 depicts the calculated catchment areas of the tram stops.

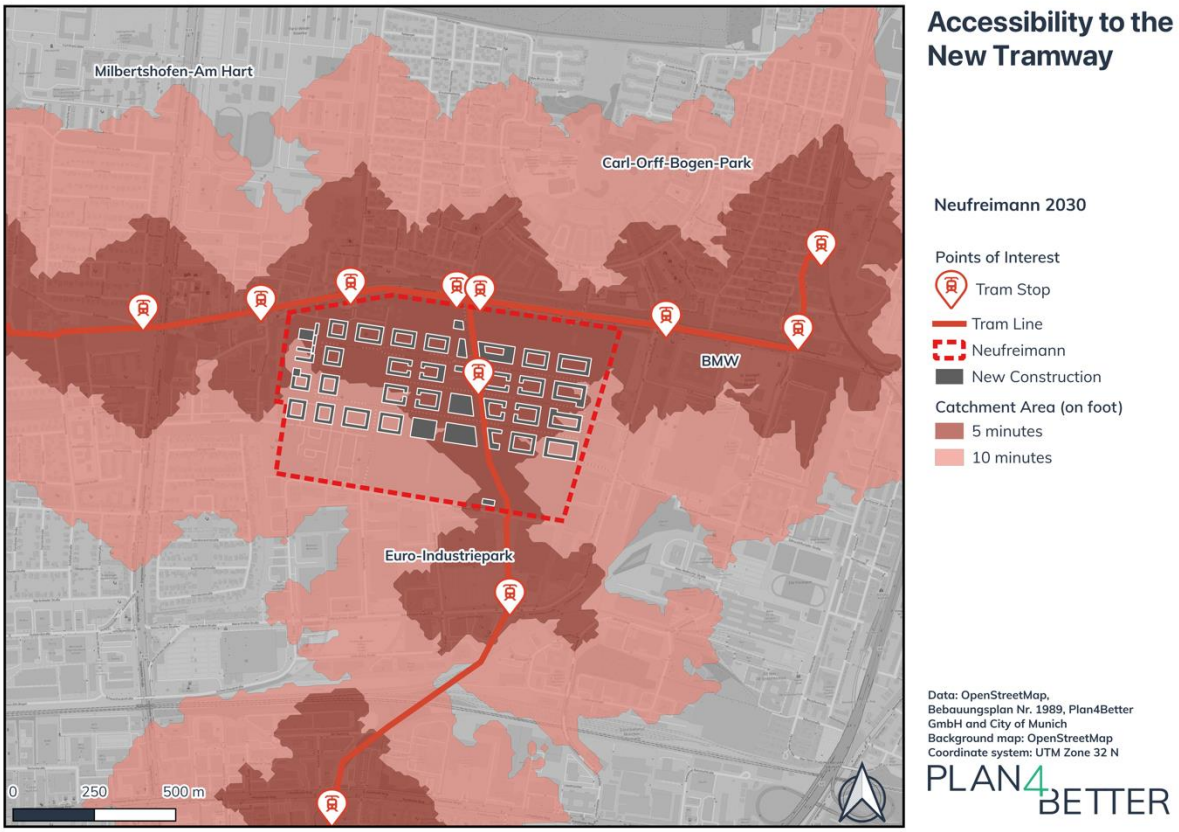


*Figure 7. Accessibility of the new tram line in Neufreimann*

Figure 8 provides a detailed breakdown, illustrating the percentage of the population that can reach a stop within a specific walking time.

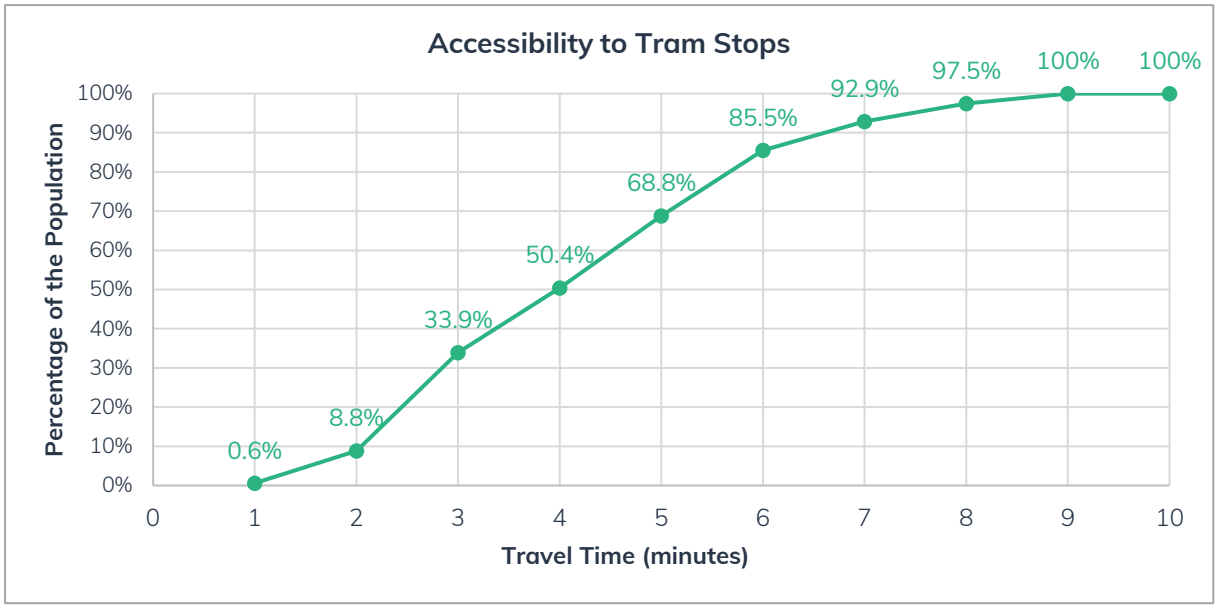


*Figure 8. Accessibility to tram stops (on foot)*

10,345 residents in Neufreimann, accounting for 68.8% of the population, can access a tram stop on the new tram line within a 5-minute walking distance. However, residents residing in the south-western and south-eastern parts of the area face longer travel times, with distances of up to 9 minutes required to reach a tram stop.

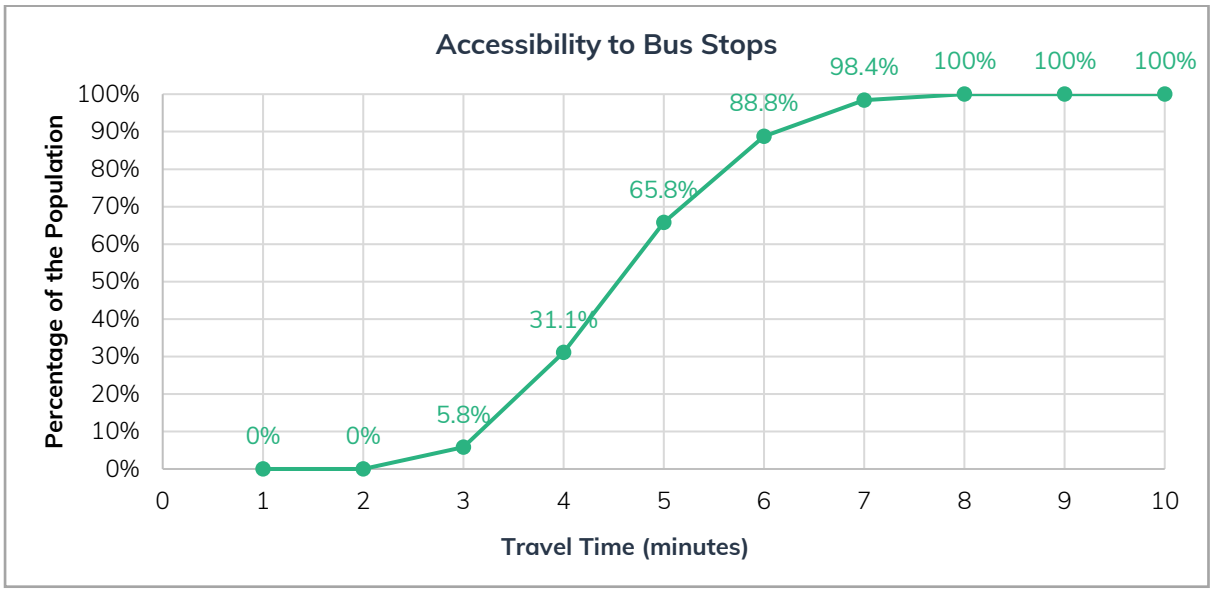


*Figure 9. Accessibility to bus stops (on foot)*

The analysis of the existing bus lines (see Figure 9) reveals that 65.8% of Neufreimann's population can reach a bus stop within a maximum of 5 minutes on foot, and the entire population can reach a stop within a maximum of 8 minutes on foot. A well-developed public transport system, complemented by an attractive network of footpaths and cycle paths, can incentivize residents to opt for sustainable mobility options over private vehicles.

While the future mobility offerings for Neufreimann have not been fully planned, the analysis indicates good public transport connections during weekdays and rush hours in Neufreimann 2030, providing a foundation for promoting sustainability objectives. However, the study also highlights that in certain cases, it may take up to 9 minutes to walk from the southern parts of the area to the nearest tram stop. This suggests that mobility stations with micro mobility options such as bike sharing and e-scooters could serve as valuable supplements, particularly in the southwest and southeast regions, to cover the last mile of travel.

The combination of the new tram line and the existing bus network presents Neufreimann with robust public transport infrastructure. Nevertheless, it is advisable to conduct further analysis to determine precise accessibility for different times of the day when determining the public transport offerings. Additionally, developing a local mobility concept that includes planning for car-sharing locations, in coordination with the timetables of the new public transport lines, can ensure reliable accessibility throughout the week and day.

## 2. Educational institutions

In the ground floor zones of the future residential buildings in Neufreimann, there are plans to create a diverse range of uses. By 2030, the district will feature various childcare facilities, which will be situated on the ground and first floors of the buildings. Additionally, a gymnasium and two primary schools are planned within the area.

The purpose of this analysis is to determine the time it takes for different proportions of the population to walk or cycle to reach specific educational institutions, such as nurseries, kindergartens, primary schools, middle schools, realschules, gymnasiums and universities. The objective is to identify any existing deficits and pinpoint potential areas for improvement. Multi-isochrones are utilized as a tool for conducting this analysis.

### Nurseries

In Figure 10, the catchment areas of the nurseries are shown for 3-, 5- and 7-minutes walking time.

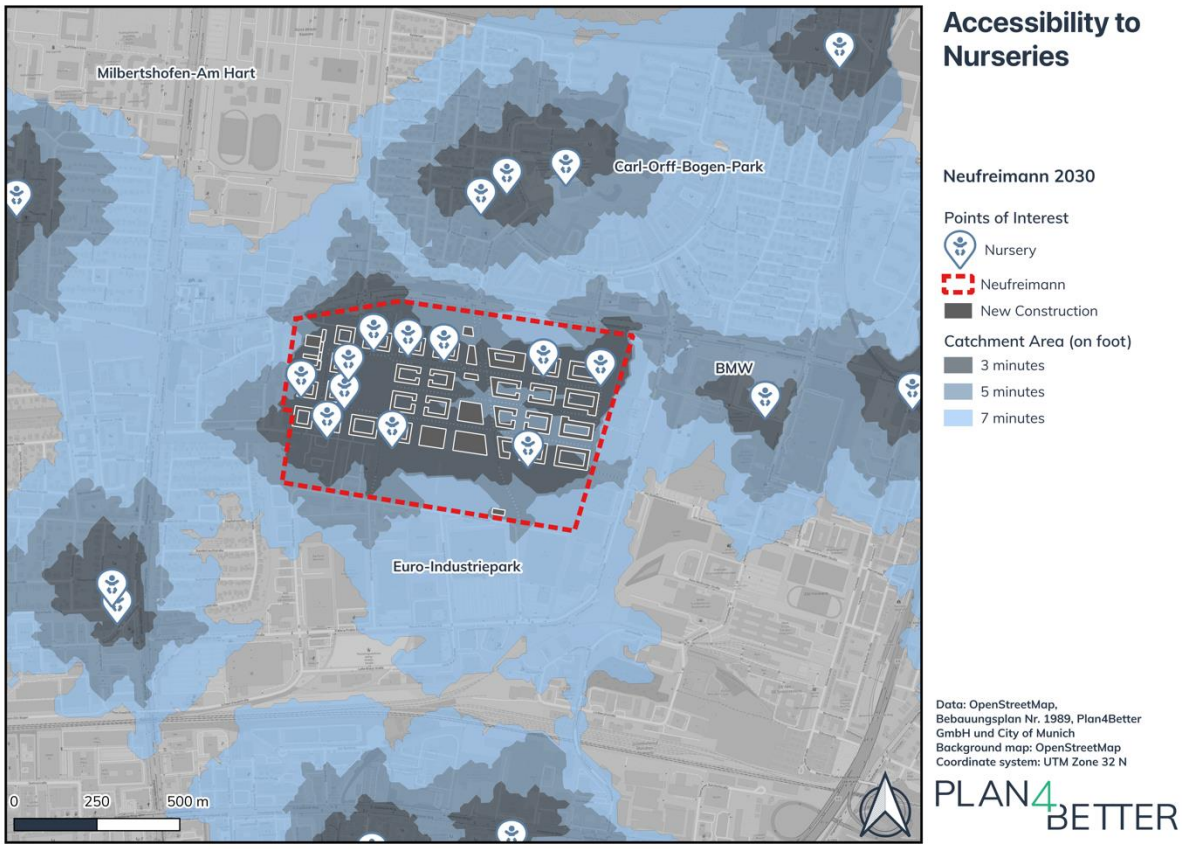


*Figure 10. Accessibility to nurseries (on foot)*

According to the data presented in Table 3, 80% of the residents in Neufreimann can reach a nursery within a 3-minute walk. Furthermore, all residents have access to nurseries within a maximum of 5 minutes' walk. It is worth noting that there is a considerable shortage of day-care places in Germany, with approximately 384,000 places lacking nationwide and around 62,000 places in Bavaria, as highlighted in a Bertelsmann study (Focus Online 2022). However,

Neufreimann stands out as a district that is well-supplied with childcare facilities, addressing a significant urban development concern in Bavaria.

*Table 3. Accessibility to nurseries per travel time and proportion of the population (on foot)*

| Minutes (on foot) | Reachable population | |
|---|---|---|
| | percental | absolute |
| 3 | 80% | 12,095 |
| 5 | 100% | 15,040 |
| 7 | 100% | 15,040 |
| 10 | 100% | 15,040 |

## Kindergartens

In Figure 11, the catchment areas of the kindergartens are shown for 3-, 5- and 7-minutes walking time.

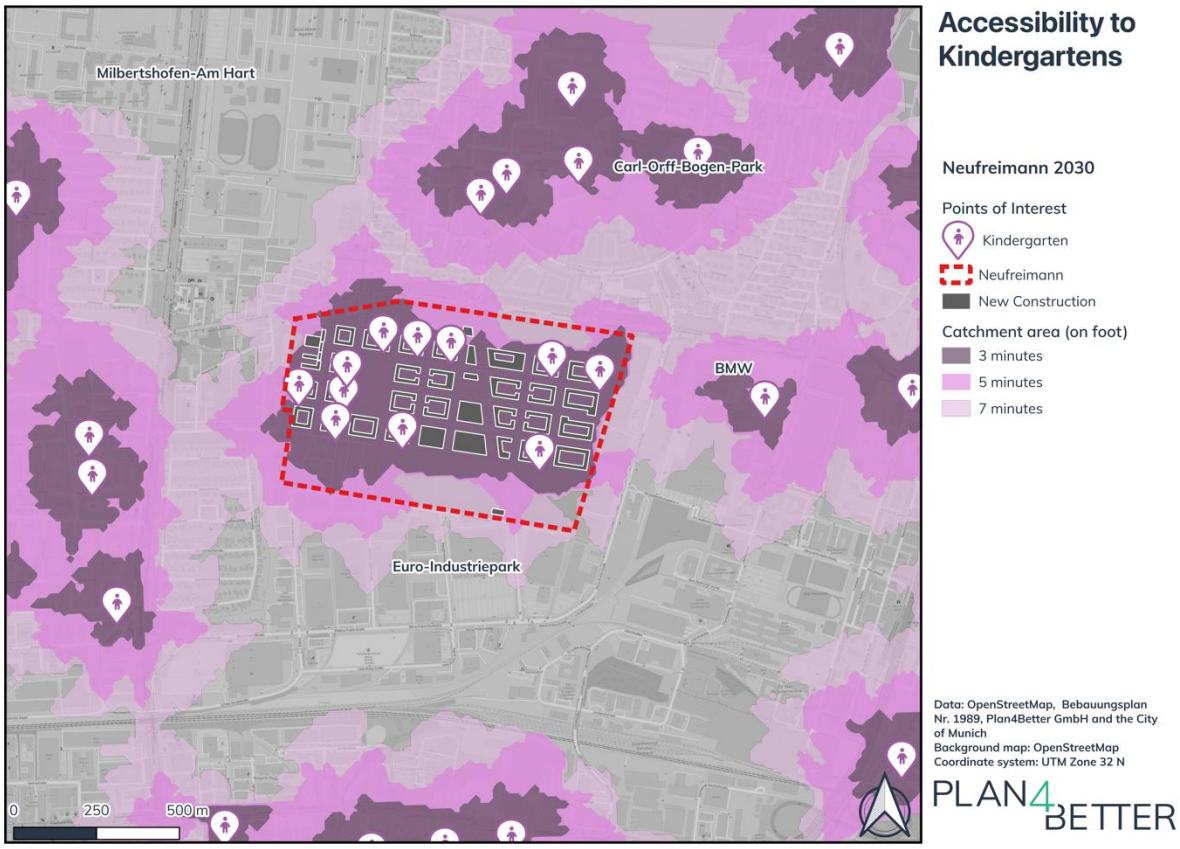


*Figure 11. Accessibility to kindergartens (on foot)*

As Table 4 displays, 90% of the residents can reach a kindergarten within a 3-minute walk. Within a maximum of 5 minutes, each resident has access to a kindergarten.

*Table 4. Accessibility to kindergartens per travel time and proportion of the population (on foot)*

| Minutes (on foot) | Reachable population | |
|---|---|---|
| | percental | absolute |
| 3 | 91% | 13,710 |
| 5 | 100% | 15,040 |
| 7 | 100% | 15,040 |
| 10 | 100% | 15,040 |

## Primary schools

In Figure 12, the catchment areas of the primary schools are shown for 3-, 5-, 7- and 10-minutes walking time.

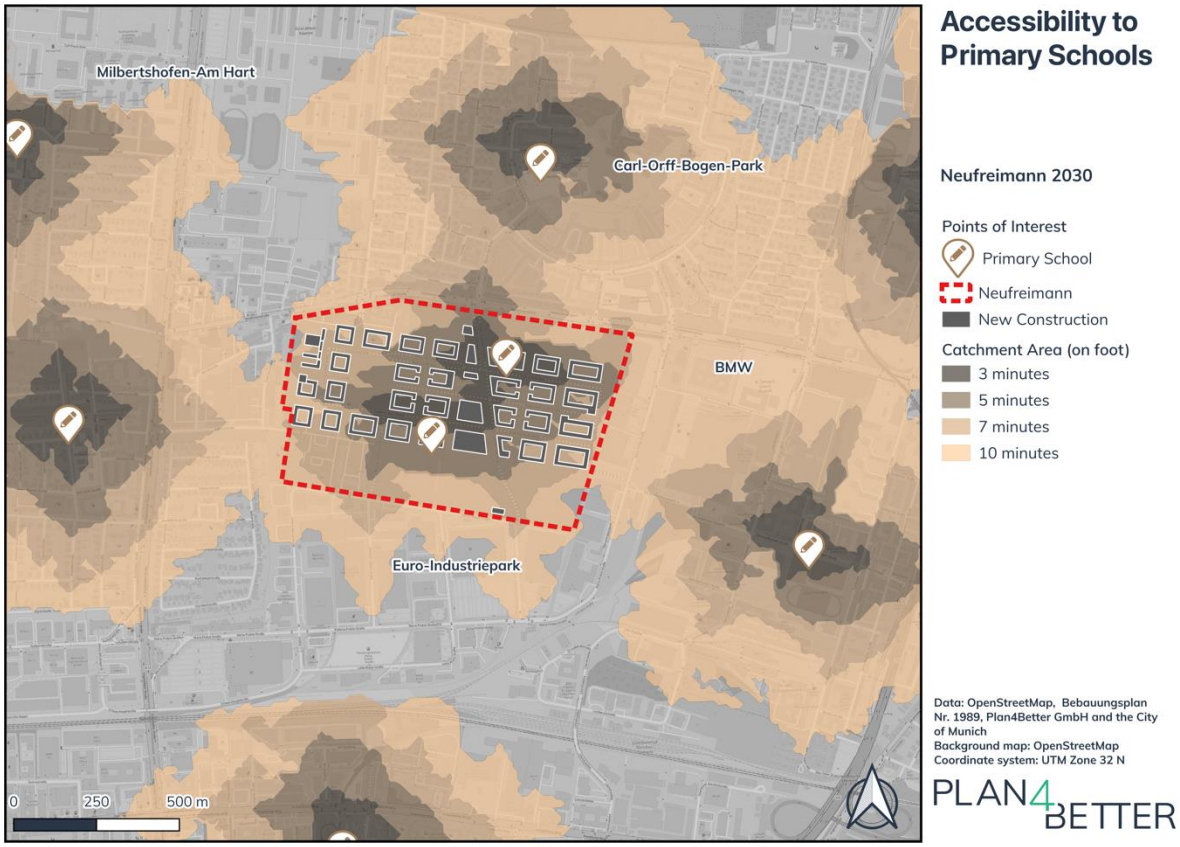


*Figure 12. Accessibility to primary schools (on foot)*

In Neufreimann 2030, every resident will be able to reach a primary school within a 10-minute walk. Furthermore, more than half of the residents will only require a short 5-minute walk to reach the nearest primary school, as highlighted in Table 5.

*Table 5. Accessibility to primary schools per travel time and proportion of the population (on foot)*

| Minutes (on foot) | Reachable population | |
|---|---|---|
| | percental | absolute |
| 3 | 20% | 3,022 |
| 5 | 63.5% | 9,552 |
| 7 | 91% | 13,718 |
| 10 | 100% | 15,043 |

## Middle Schools

In Figure 13, the catchment areas of the middle schools are shown for a 10-, 15- and 20-minute walk.

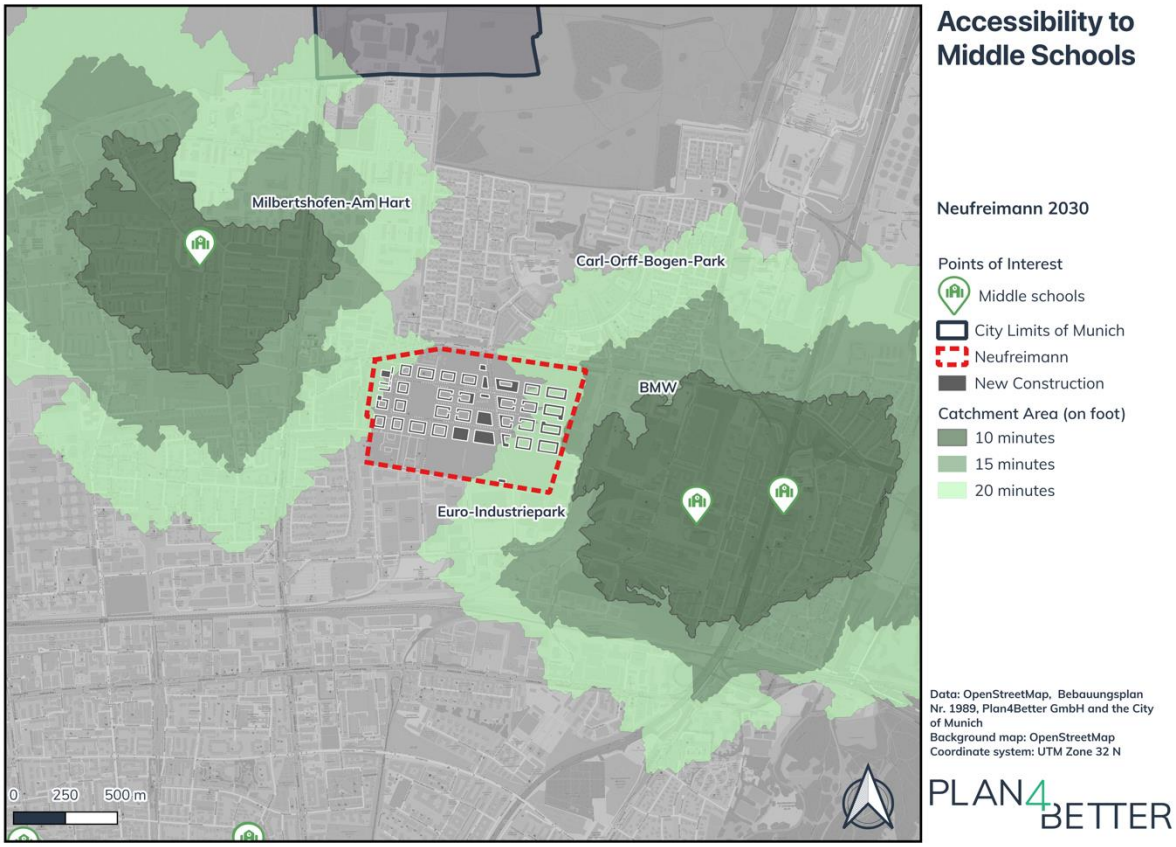


*Figure 13. Accessibility to middle schools (on foot)*

As shown in Table 6, only 34% of the residents in Neufreimann can reach a middle school within a 20-minute walk.

*Table 6. Accessibility to middle schools per travel time and proportion of the population (on foot)*

| Minutes (on foot) | Reachable population | |
|---|---|---|
| | percental | absolute |
| 5 | 0% | 0 |
| 7 | 0% | 0 |
| 10 | 0% | 0 |
| 20 | 34% | 5,070 |

Since the accessibility on foot is quite low, the accessibility by bicycle (average speed of 15km/h) was also calculated. The results are available in Figure 14 depicted.

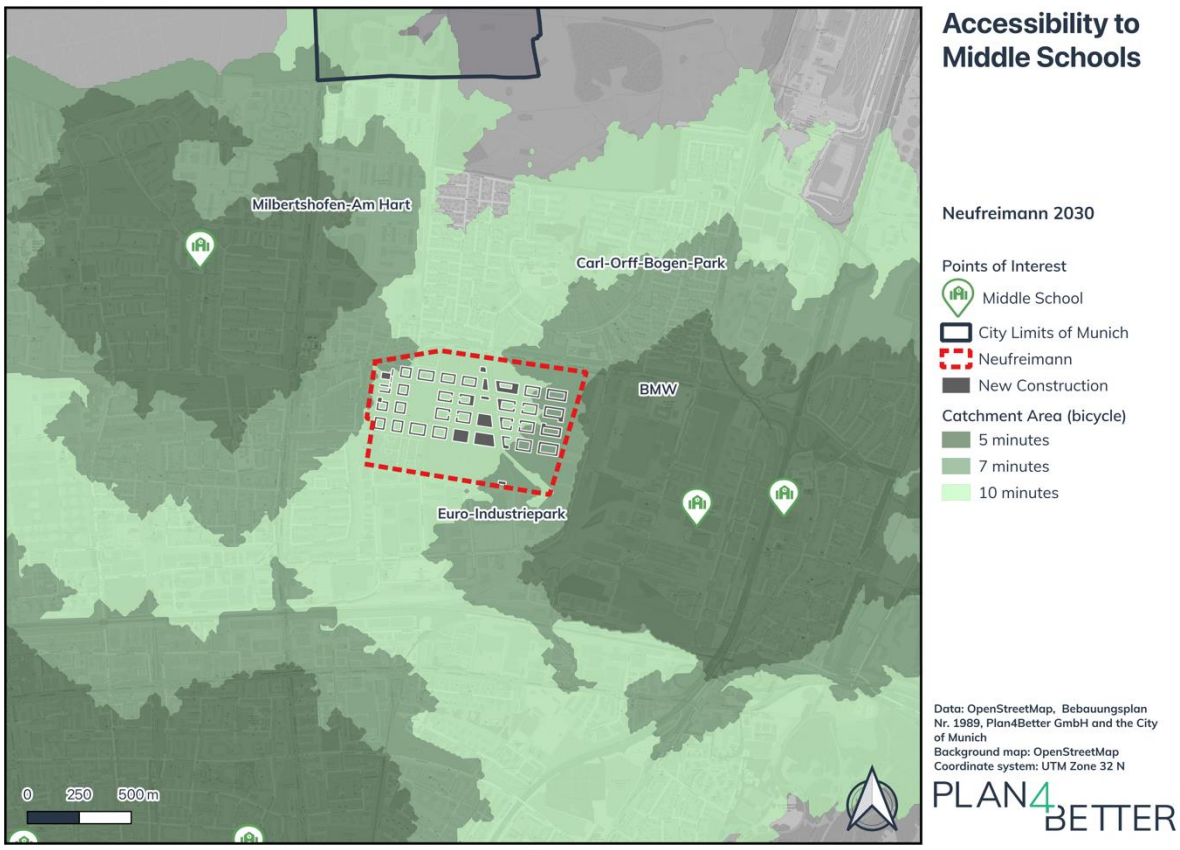


*Figure 14. Accessibility to middle schools (bicycle)*

A minimum of 28% of Neufreimann's residents can reach a middle school within a 7-minute bicycle ride. However, residents located in the central part of the area face longer travel times, with up to 10 minutes required to reach a middle school (see Table 7).

*Table 7. Accessibility to middle schools per travel time and proportion of the population (bicycle)*

| Minutes (Bicycle) | Reachable population | |
|---|---|---|
| | percental | absolute |
| 5 | 0% | 0 |
| 7 | 28% | 4,150 |
| 10 | 100% | 15,040 |

## Gymnasiums

In the German education system, the term "Gymnasium" refers to another type of secondary school, which exists next to middle schools. The Gymnasium is designed to provide an academic education and prepare students for higher education, such as attending university. Since there are no direct term in English, this type of school is in this report simply named “gymnasiums”.

In Figure 15, the catchment areas of the gymnasiums are shown for 3-, 5-, 7- and 10-minutes walking time.

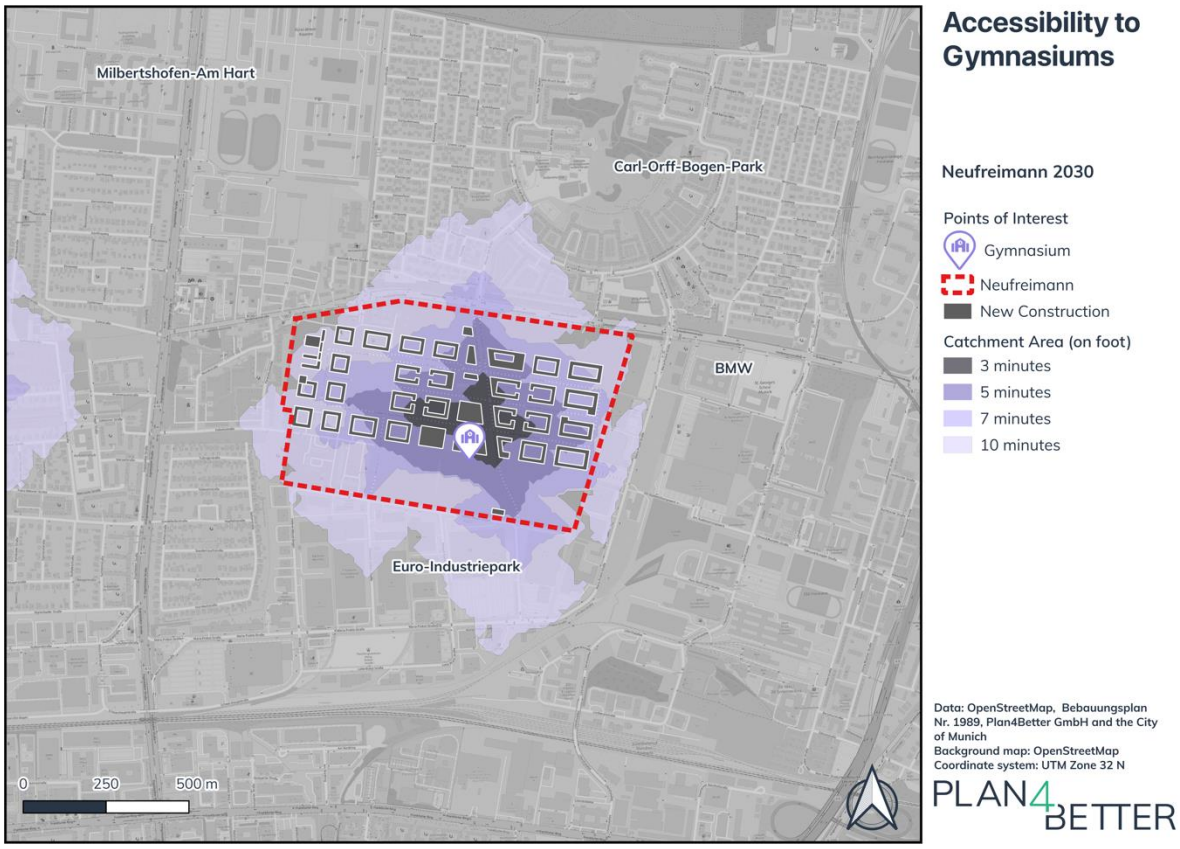


*Figure 15. Accessibility to gymnasiums (on foot)*

The gymnasium in the south of Neufreimann, which is to be completed in 2030, can be reached by 98% of the population within a 10-minute walk.

*Table 8. Accessibility to grammar schools per travel time and proportion of the population (on foot)*

| Minutes (on foot) | Reachable population | |
|---|---|---|
| | percental | absolute |
| 3 | 8.5% | 1,270 |
| 5 | 43% | 6,420 |
| 7 | 79% | 11,820 |
| 10 | 98% | 14,770 |

In order to promote sustainable mobility, it is essential to have urban amenities conveniently located in the immediate vicinity. Neufreimann is reasonably well-equipped with educational institutions, particularly in terms of childcare facilities, which are being developed effectively within the district. Schools can also be reached within a 10-minute walk or bike ride, although a separate analysis should determine if the capacity of these facilities is sufficient.

However, residents of Neufreimann 2030 will lack accessibility to universities and realschules within a pedestrian- and bicycle-friendly distance. The "Realschule" is another type of secondary school in Germany, which complements middle schools and gymnasiums, and it can be roughly translated to "secondary school of general education" or "secondary technical school." The realschule offers education to students aged around 10 to 16 (grades 5 to 10) after

they complete primary school (Grundschule). Residents will need to cycle or use public transport for more than 20 minutes to reach a university or a realschule. The introduction of the new tram connection will be a crucial component in addressing this gap.

The results of these accessibility analyses demonstrate the potential of local mobility and public transport in facilitating sustainable transportation choices. To encourage sustainable mobility, it is vital to create attractive footpaths and cycle paths while supplementing the service offerings with innovative sharing services. This presents an enticing opportunity for residents to rely less on their own vehicles and meet their daily needs within their own neighbourhood.

## About Plan4Better

Plan4Better GmbH was founded in 2021 as a spin-off at the Technical University of Munich (TUM). The diverse team of environmental engineers, traffic planners and GIS developers offers digital planning tools, in particular the interactive accessibility tool GOAT as a software-as-a-service solution for municipalities, counties, regions and planning offices worldwide. The instrument is based on versatile accessibility indicators and was created as part of a doctorate by one of the founders. The tool has already been awarded the Munich Innovation Prize, the Bitkom Award Smart City and the BMWi Start-up Prize. GOAT is also in practical use in cities such as Freiburg, Amsterdam and London.

In addition, Plan4Better offers versatile data-driven consulting in the field of urban and transport planning. The consulting services revolve around integrated urban and transport planning, active mobility planning, and local transport planning. A central element of the consulting service is the accessibility tool GOAT, which is used in conjunction with conventional GIS software. The team bundles in-depth expertise in geoinformatics, the analysis of spatial and mobility data, as well as data visualization. In addition, the team combines competencies in the participation of stakeholders and the population. In its day-to-day work, the team pursues a scientific yet practice-oriented approach that translates the latest findings into practice.

### Reports

In our reports we use GOAT to answer specific planning questions for our customers. The results are presented in the form of a short report with maps, tables, diagrams and accompanying texts. Common planning questions we answer in a report include:

- What effects does a new cycle bridge have on accessibility?
- How well are the residents of a new residential neighbourhood served with daily needs?
- What effects does a new public transport connection have?
- Which location has the greatest potential for the placement of a new facility?

If you are interested in a report, please send us a message with a description of the planning question to be answered. We will then contact you as soon as possible to discuss the next steps.

Website: https://plan4better.de/en/

Contact: https://plan4better.de/en/contact/

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