NIGHT TRAIN HUB BERLIN

Figure 1: Berlin as night train hub in Europe

INDEX

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BODIES BUILDINGS BERLIN
GROUP 5 - ECONOMY
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INTRODUCTION

Thesis Topic

Night trains go back to the 19th century. Once it was possible to take a night train from Paris to Istanbul, this was the orient express which started in 1883. One of the most comfortable and luxurious ways of traveling in Europe, it was discontinued in 1977 due to declining ridership (Britannica, 1998). This was also a trend for other night trains, with Deutsche Bahn ending its last night trains in 2016 (Steer & KCW, 2021). Caused by the competition of budget airlines (Ramboll, 2022). The end of the night train in Europe seemed likely a few years back with flying being extremely cheap (Airportwatch, 2018).

However, things are changing. 2021 was named the European year of the rail by the European Union, because of the sustainability goals of the EU Green Deal (Keim, 2021). As well as the reinstating of the night train done by ÖBB the Austrian railway company. ÖBB reinstated over twenty-five night train routes in 2022 and is carrying over 1,5 million passengers per year (Bauer, 2022). The night train of ÖBB is shown in figure 2. The night train is making a comeback. Now the European Union is also starting a pilot all over Europe with new night train routes (Directorate-General for Mobility and Transport, 2023).

The reason for this change is sustainability since traveling by train is seven to eleven times more sustainable than traveling by plane (Milieu Centraal, n.d.). On top of this, it is a comfortable alternative to flying, according to research (Ramboll, 2022).

Night train travel is a way of traveling long distances by train while sleeping (ÖBB, n.d.). Night train travelers get in at the city center in the evening, sit back, relax, and sleep. The next morning, they wake up at their destination in another city center (ÖBB, n.d). This gives night train traveling a particular time-specificity; travelers always depart in the evening and arrive in the morning.

Berlin is proposed as a city to put a night train hub, because of its central location in Europe (Ramboll, 2022). Moreover, the increase in night train travel results in a demand for a station that has the facilities for night train travel (Ramboll, 2022). Therefore the design of the graduation project will be that of a night train hub in Berlin.

Figure 2: The new Nightjet train of Austrian railway company ÖBB at Vienna HBF

01

Problem Statement

With Berlin being proposed as a destination for night train travel, a problem of design requirements arises. Existing stations are not designed for large amounts of night trains and night train travelers (Ramboll, 2022). There are several arguments for why a specific night train hub is needed. The first reason is capacity. Night trains have the same rush hours as normal trains, this being in the morning and the evening (Ramboll, 2022). Existing German train stations have been dealing with capacity problems since the price reductions of public transport (Buckley, 2022). The addition of night train travel would mean even more travelers at existing stations. Secondly, current train stations lack comfort, especially during the night (Buuren, 2022). Thirdly existing stations lack the facilities for night train travel (Ramboll, 2022). These include specific facilities for night train travelers and personnel (Ramboll, 2022) Another specific facility needed for night train travel are long platforms, since night trains are longer compared to regular trains (Ramboll, 2022).

Research Question

Night train travel is on a comeback in Europe and existing train stations are not designed for this comeback. This results in the research question: **Does contemporary Europe need night train hubs?** The goal of the research question is to try to answer how the typology of a night train hub functions and how it differs from existing train stations. By designing a night train hub in Berlin this question will be researched. Firstly, this research investigates the functionalities of a possible night train hub as well as defining important themes. By looking at the program, client, and site the design requirements of a night train hub will be defined. Later, this will translate into an architectural design of the night train hub. By finalizing this design, the question will be answered if the night train hub should be a typology on its own or if it could be included in a normal train station. In the next paragraph, the theoretical framework will be specified based on the topics of comfort, time-specificity, and sustainability.

RESEARCH FRAMEWORK

Theoretical Framework

The theoretical framework will define the themes of comfort, time specificity, and sustainability. By doing this the relevancy of the themes to night train travel and the night train hub is explained. This framework will also help to make decisions during the research and the design of the night train hub.
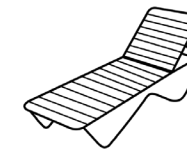
Sustainability

As seen in the introduction of this research plan traveling by night train is a sustainable way of long-distance traveling. Traveling must become more sustainable, because of climate change (Milieu Centraal, n.d.). The goal of night train travel is sustainability. It should thus be considered when designing the night train hub. Moreover, with sustainability being the goal, as many travelers as possible must be convinced to travel by night train instead of taking flights within Europe.

Comfort

In this context, comfort is a relevant concept because it is the main determinant for people choosing the night train (Kantelaar et al., 2022). Next to that Comfort is one of the three factors when deciding on a mode of long-distance travel, shown in figure 3 (Witlox et al., 2022). The first one is travel time, which is the most important factor. The second factor is the level of comfort and the last one is travel costs (Witlox et al., 2022). Travel costs of night train travel could be lower in the future in comparison to flying with potential future flight taxes (NOS, 2023). It is important to mainly focus on the first two: travel time and level of comfort. The travel time of the night train is longer than the flying time (Kantelaar et al., 2022). However, travel time becomes of less importance when there is a higher level of comfort (Witlox et al., 2022). Next to that, the level of comfort not only has to do with the journey itself, but it also applies to everything before and after the journey (Witlox et al., 2022). This includes the train station, making the level of comfort important for the design of a night train hub. This will give night train travel the ability to compete with flying, which will support the goal of sustainability. This is shown in figure 4.
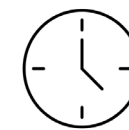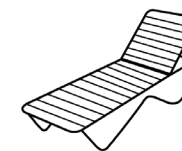
1. Travel Time   2. Comfort Level   3. Travel Cost

Figure 3: Factors of long distance travel

Comfort   Sustainable Travel

Figure 4: Comfort supports the end goal of sustainability

02

The level of comfort depends on the user. What is comfortable for one can be uncomfortable for someone else (Shariff, 2023). This will have to be considered when analyzing users and designing the night train hub. Next to that, there is the physical comfort of a building, this includes acoustics, heating, and daylight but also for example visual comfort (Shariff, 2023). With night train travel Witlox et al. (2022) states three factors of comfort: safety, convenience, and luxury (Witlox et al., 2022). In figure 5 the division of comfort is shown for the design of the night train hub. The three main factors are physical comfort, convenience, and luxury. Moreover, several elements are shown which could potentially influence these factors. These are on a building scale, which makes them relevant for architectural research and design. These elements include wayfinding, simplicity, additional facilities, 24/7 functionality and more. Which elements are important for the comfort of the station will be further researched.
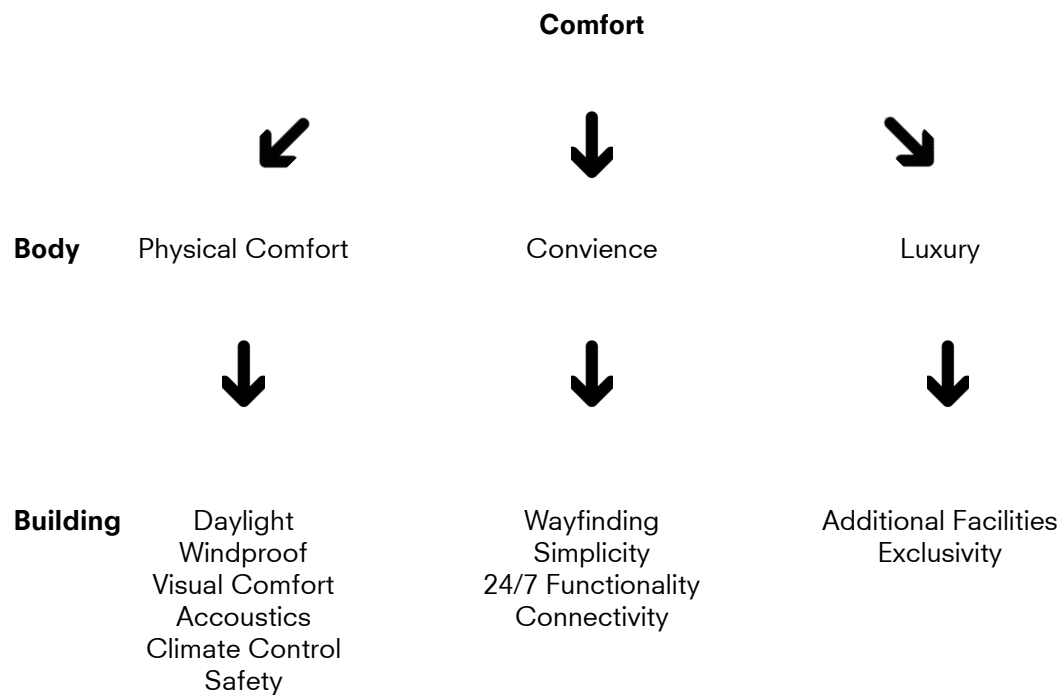
Time Specificity

Time specificity is unlike comfort and sustainability not a goal of the design but a characteristic of night train travel itself. However, it will influence the design of the night train hub. The reason that night train travel is time specific is that night trains always depart in the evening and arrive in the morning (Witlox et al., 2022). This means that in the morning only arriving travelers will be at the station and in the evening only departing travelers. This is shown in figure 6. This will have an impact on the functionality and thus design of the night train hub. Next to that, there is the time between the arrivals and departures. This is during midday and night. What happens at the station at those times will have to be looked into. Important to note is that if for example a night train is canceled people will need a comfortable space to stay during the night (Buuren, 2022). Therefore, parts of the station must be functional 24/7. 24/7 functionality could also enhance safety around the station (Tan & Klaasen, 2007). Thus, increasing the comfort of the night train hub overall.

The theme of time specificity also relates to the theme of flows used in the studio. Because the night train hub has different flows of people during day and night. And the night train hub must function well both during rush hour and during calm nights. An overview of the theoretical framework will be discussed in the next chapter relevance.

Relevance

This will be a brief overview of the project, showing its relevance. Night train travel is relevant because of its sustainability. The trend of night train travel results in demand for specific night train hubs, because of problems with capacity, lack of comfort, and lack of facilities at normal stations. Berlin as a night train hub has also been a subject of research last year (Ramboll, 2022).

This specific night train hub must deal with sustainability, but more importantly, it must deal with comfort. Since if people experience night train travel in total, including the station, as more comfortable. More people will travel sustainably. Comfort can be achieved with concepts such as physical comfort, convenience, luxury, and 24/7 functionality. Time specificity is important for the night train hub since it is an important characteristic of night train travel itself. And influences the functionality, thus influencing the design of the night train hub. This theme of time specificity also relates to the 24/7 functionality of the night train hub but also to the studio theme flows.

Next to that, the research through design of the night train hub is relevant, because train stations specifically for night trains have not been designed yet. There is currently only a list of facilities that should be included in a station for night trains (Ramboll, 2022). This makes the design of the night train hub and the research question relevant for this graduation studio.
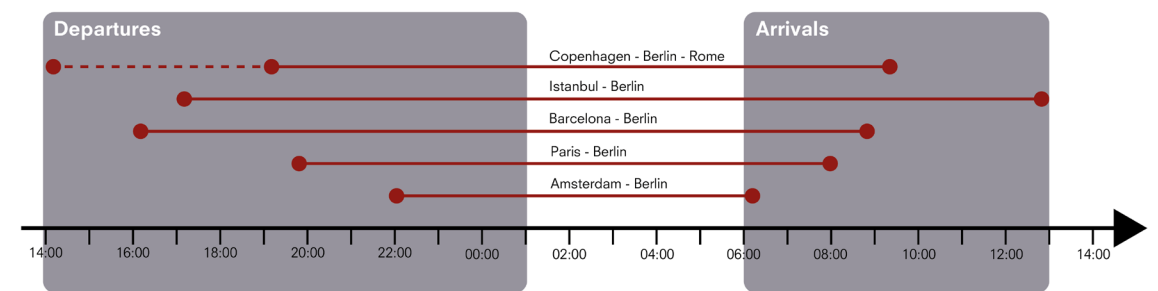

Comfort

Body	Physical Comfort	Convience	Luxury

| **Building** | Daylight
Windproof
Visual Comfort
Accoustics
Climate Control
Safety | Wayfinding
Simplicity
24/7 Functionality
Connectivity | Additional Facilities
Exclusivity |

Figure 5: Overview of the theme comfort and how it can be possibly integrated in the design

Figure 6: Night trains always depart in the evening and arrive in the morning

RESEARCH METHODS

Program

The analysis of the program is divided into three categories: research on the numbers of travelers, train station research, and research on additional facilities. The number of travelers is needed to determine the size of the building. For the second category train stations are researched because this typology is the basis of a night train hub. Lastly, research on additional facilities is done to see what facilities need to be included in a night train hub in Berlin.

Different methods are used to analyze the program. First data concerning the number of travelers will be researched. This is data such as the current numbers of night train travelers, the number of passengers at Berlin Brandenburg Airport, and tourism numbers of Berlin. Resulting in an estimation of the number of travelers for the night train hub.

Secondly, several train stations will be analyzed as case studies, this will be done through literature research, benchmarking, and visiting train stations during different times of day. This research will determine programmatic demands for the train station part of the night train hub.

Rotterdam Centraal and Vienna HBF will be analyzed more precisely. Rotterdam Centraal will be analyzed since train travelers are positive about the design and functionality of the station (NOS, 2022). Vienna HBF will be analyzed because it partly functions as a night train hub since it is the headquarter of the previously mentioned Austrian railway company ÖBB (Rojas, 2022). A drawing of the benchmark of Rotterdam Centraal is shown as an example in figure 7.

Thirdly literature research about night train travel and Berlin will be done, to determine which additional facilities will be needed for a night train hub in Berlin. In addition, specific functions such as lounges, hotels, restaurants, and personnel facilities will be benchmarked.

Lastly, an interview with a night train expert will possibly be arranged. It would be relevant to get an expert opinion about the functionality and facilities of a night train hub. The combination of this research will make up the program of the night train hub.
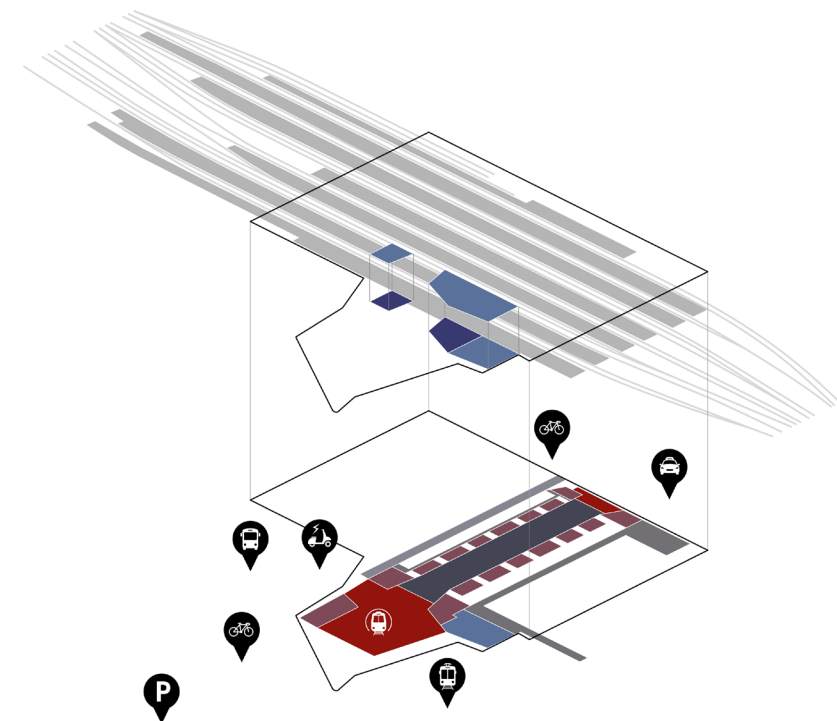

Figure 7: Analysis of Rotterdam Centraal Showing the functionality of the station

03

Client

The analysis of client is divided into three categories. These categories are users, initiators, and partners. Users are people who will use the building when it is finished. Initiators are parties or people who will initiate the project, thus shaping the design. Partners are important institutions or people who are involved in the project because of their expertise or other reasons.

Different methods are used to analyze client. Firstly, the different users and their demands will be researched, this will be done by literature research. Secondly, possible initiators and partners will be analyzed by looking at documents from Berlin, the German government, the German rail network, and the European Union. These documents will make it possible to come up with a scenario for which party will initiate the build of a night train hub in Berlin. It will also be used to determine which institutions or persons are partners in the project. This research will make up the client of the night train hub in Berlin.

Site

The site of the project must be determined. This has to fit the functionality of the night train hub. At the same time, the night train hub has an impact on its direct surrounding and Berlin as a whole. The research of the site is divided into three parts. The first partof the research is abut Berlin, since this is the city where the night train hub will be located. Secondly, there are demands of the night train hub which influence the choice of the site. Lastly, there is the group project which will also influence the site location. This group project is about the economy of Berlin.

Different methods are used to analyze the site. First Berlin will be analyzed as a case study for the night train hub. This analysis consists of studying, documents, maps, and data of Berlin. In addition, a site visit to Berlin will be done, to visit potential sites. Secondly demands of the night train hub for the site will be formulated, this will be done by doing literature studies about night train travel and the research of train stations. The research on train stations for the program earlier in this research plan can also be used to formulate site demands. Lastly, group research on the economy of Berlin will be done to determine requirements for sites in Berlin. The combination of this research will make it possible to determine a site for the night train hub in Berlin.

DESIGN BRIEF

Program

For P1 the program is based on the previously mentioned research, including literature research and benchmarking. This resulted in the following program, shown as a program bar in figure 8 and as a relation scheme in figure 9.

The program is devided into three parts, as shown in figure 8. The program bar and the relation scheme of the building can change in the future based on further research.
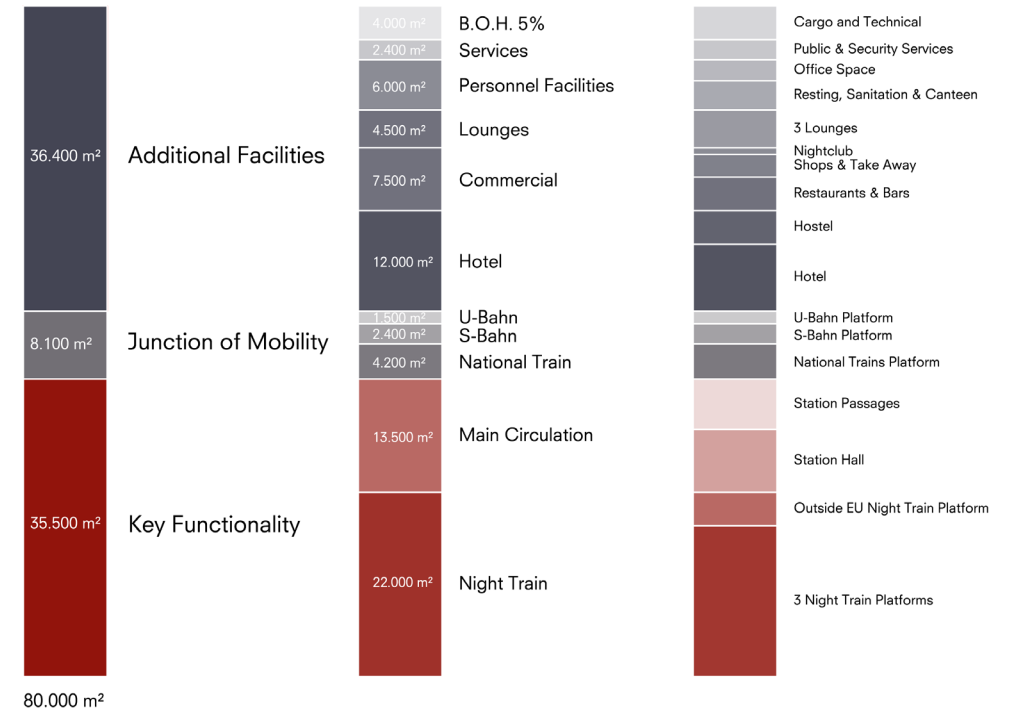

Figure 8: Preliminary program bar of the night train hub in Berlin
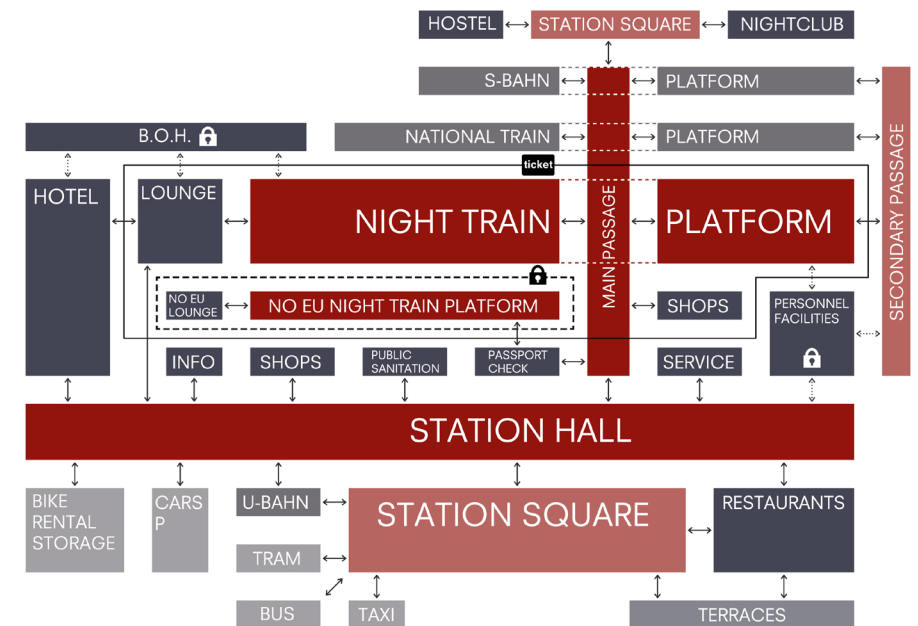

Figure 9: Preliminary relation scheme of the night train hub in Berlin

It is important to note that the emphasis is specifically on the program needed for night train travel. This includes 500m platforms. Next to that restaurants, personnel facilities and lounges are important facilities to support the needs of night train travelers and personnel. They could also enhance comfort for travelers and personnel of the night train hub. Lounges are specifically important since these also relate to the theme of comfort. A programmatic diagram of the lounge is shown in figure 10 and as a interior collage in figure 11. In addition, nightclubs, bars, and hotels are added to the program. This additional program is also shown in the exterior collage in figure 12.These enhance the 24/7 functionality of the station thus increasing comfort of the night train hub. Lastly, the size of the night train hub is 80.000 m². The estimation of night train travelers is 15.000.000 per year.
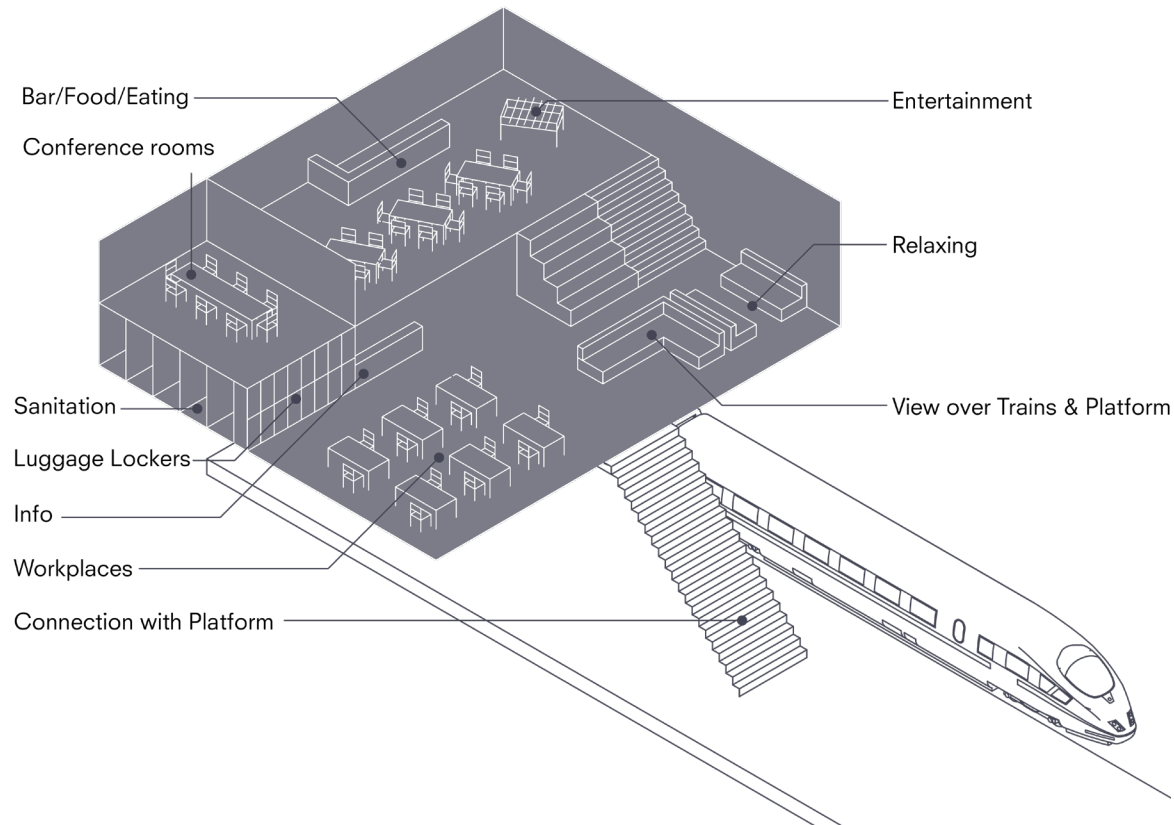

Figure 11: Interior collage of lounge in the night train hub

Bar/Food/Eating

Conference rooms

Entertainment

Relaxing

Sanitation

Luggage Lockers

Info

Workplaces

View over Trains & Platform

Connection with Platform

Figure 10: Programmatic diagram of the lounge in the night train hub

Figure 12: Exterior collage of the night train hub showing additional facilities

Client

The preliminary users, initiators, and clients have been determined based on the research of these three. The users are shown in figure 13. These include tourists, business travelers, personnel, and Berliners. These users are of importance since they also influence the program of the building. The initiators and the scenario of the night train hub are shown in figure 14. In the scenario the European Union starts The EU Nightjet which will include night train hubs in Europe, inlcuding one in Berlin.

A second initiator is the Berlin municipality. Because they also took the initiative to research the possibilities of Berlin being a night train hub in Europe (Ramboll, 2022). Together these two initiators will start the process of the design of the night train hub in Berlin. Lastly, the two partners that were identified for now are the Deutsche Bahn, since they also manage the Rail network in Germany. And the German government since it is a big infrastructure project. The clients could change in the future based on further research.
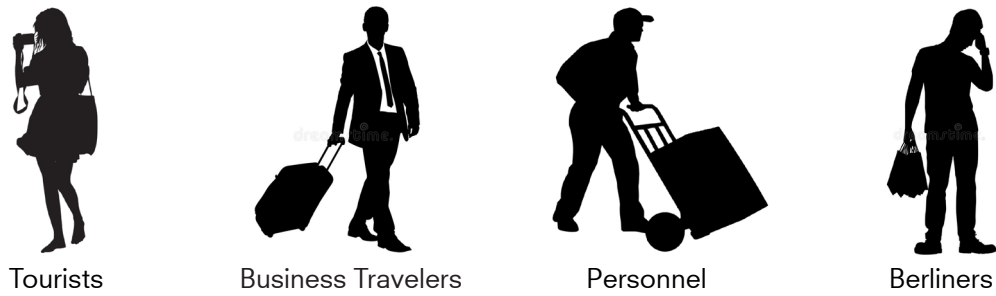

| Tourists | Business Travelers | Personnel | Berliners |

Figure 13: The different users of the night train hub

European Union → EU Nightjet

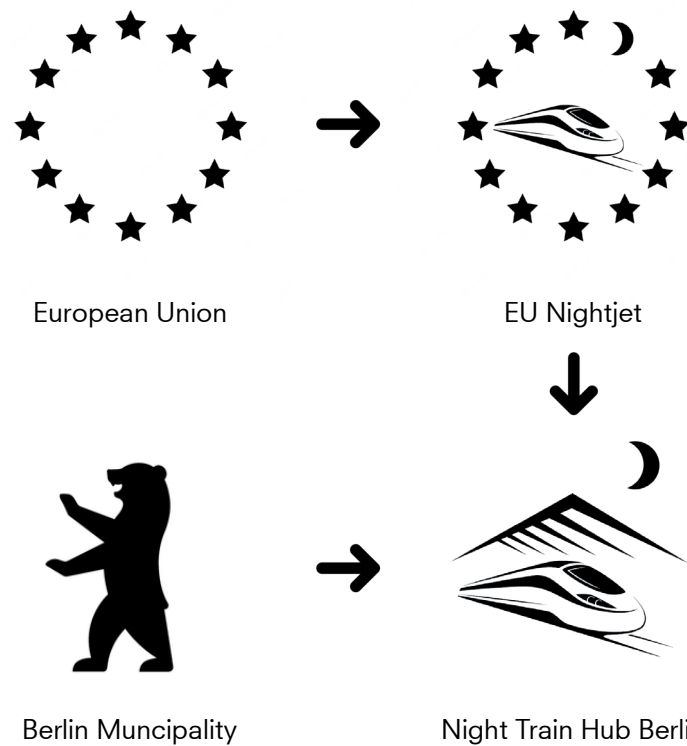Berlin Muncipality → Night Train Hub Berlin

Figure 14: The scenario for which parties will initiate the design of a night train hub in Berlin

Site

For P1 the site is based on the requirements of the night train hub, the requirements of the group work, and the study of Berlin. A site visit has not been conducted yet. This will be done in a later stage of the research. Therefore the selected site is a preliminary one. The preliminary site, for now, is Bahnhof Lichtenberg in East Berlin. The location is shown on the Berlin map in figure 15 and a close-up of the site in figure 16.

This site has been chosen since it has a good connection with the city center. The site has enough space for 500 m platforms. It is also next to a railway yard where night trains can be stored during the day. Based on further research of the site and program the site of the night train hub can still change.

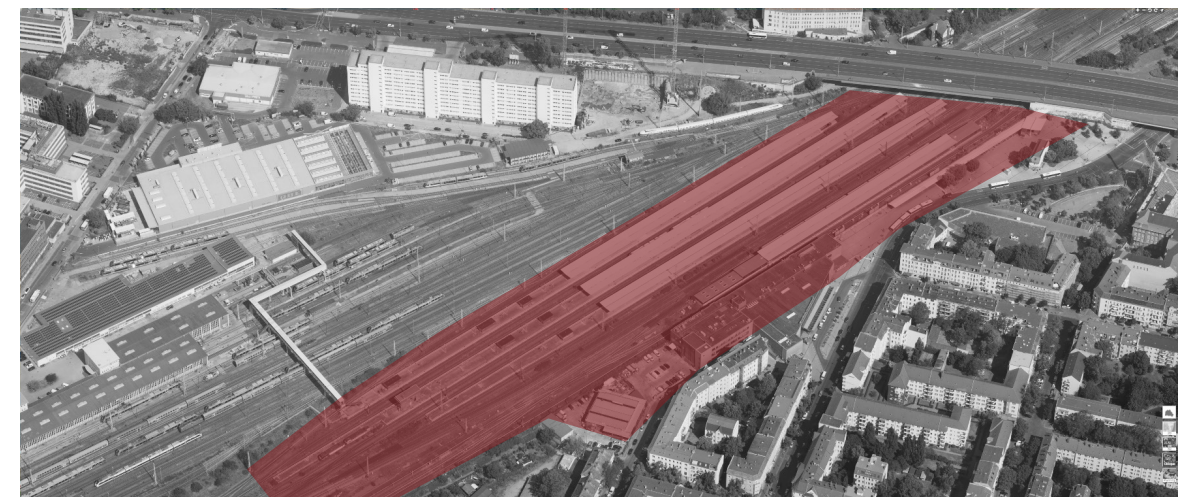**Figure 15:** The preliminary site Bahnhof Lichtenberg in Berlin

Figure 16: A close-up of the preliminary site Bahnhof Lichtenberg

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05

Figures

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        Nightjet. https://www.nightjet.
        com/en/buchung/buchungsablauf
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