LUND UNIVERSITY

RECLAIMING BROWNFIELDS:

LIVING IN PROXIMITY TO RAILWAYS

THESIS PROJECT BY INTA VASKA
SUSTAINABLE URBAN DESIGN PROGRAMME
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RECLAIMING BROWNFIELDS:
LIVING IN PROXIMITY TO RAILWAYS

Master Thesis Report
Sustainable Urban Design Programme
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INTRODUCTION

Latvia is a country in the Baltic region in North-East Europe (Image 1). Riga is the capital of Latvia and the largest city of the Baltic States with 696 593 inhabitants in 2015 (***Riga in Figures.., 2016***). Both historically and nowadays, the city has been an important infrastructural hub between Eastern and Western Europe.

Riga has an international airport, a passenger port and one of the biggest export ports in the Baltic States which serves cargo transfers. Most of the transit goes through the city centre by using the railway system with a 1520 mm railway track gauge. For the upcoming 10 years, there are plans for a new high speed railway line via city centre of Riga and the airport connecting Tallinn to Warsaw (and Berlin) using the standard 1435 mm gauge (Images 2-3, p. 8). All of these connections will meet at the city centre of Riga.

At the same time, the city itself is not that well connected. The main problem is that the city centre, which was built prior to the industrialisation up to the end 19th century, is currently separated from the new city built in the 20th-21st century. This separation is outlined by the railway line surrounded by wastelands and brownfields (Images 4-5, p. 9).

Historically, before the industrialization Riga was within the size of the inner part of the railway loop. The first railway in Riga was built in 1861 (Altbergs, Augustāne, Pētersone, 2009, p. 27). The railway loop around the city centre was finished on 1872 (Altbergs, Augustāne, Pētersone, 2009, p. 54) and factories were placed along it followed by working-class residential areas. Nowadays most of the factories are gone from the area around the

Image 1

Facts about Rail Baltica

Goal- to integrate the Baltic States in the European rail network and to connect Poland, Lithuania, Latvia, Estonia (and indirectly also Finland) with European standard railway line.

Baltic Route - Tallinn – Riga – Kaunas.

Full Route- Tallinn – Riga – Kaunas – Warsaw – Berlin and later also Venice.

Rails - European standard railway line with 1435 mm width.

Length- 728 km (235 km in Latvia, 229 km in Estonia and 264 km in Lithuania).

Average speed- for passenger trains 170 km/h, for cargo trains 68 km/h.

Year 2020 - Start of the building process.
Year 2024 - Finish of the Rail Baltica in the territory of the Baltic States.
Year 2025 - expected openning of the connection Tallinn – Riga – Kaunas.
Year 2030 – expected openning of the connection to Warsaw.

Ref.: Facts about Rail Baltica (2014)

The route of the Rail Baltica in the Baltic States

Image 2

The route of the Rail Baltica in Riga

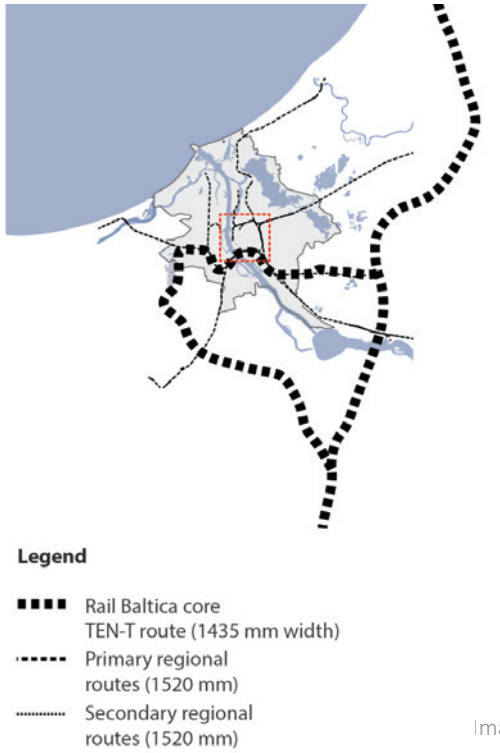

Image 3

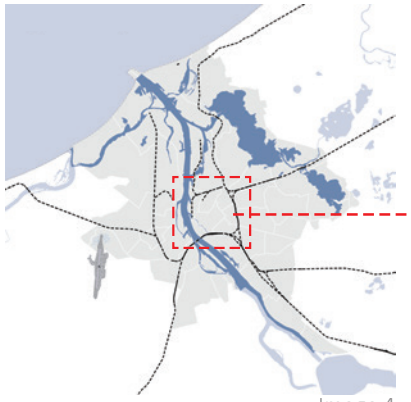

Image 4

"The main problem is that

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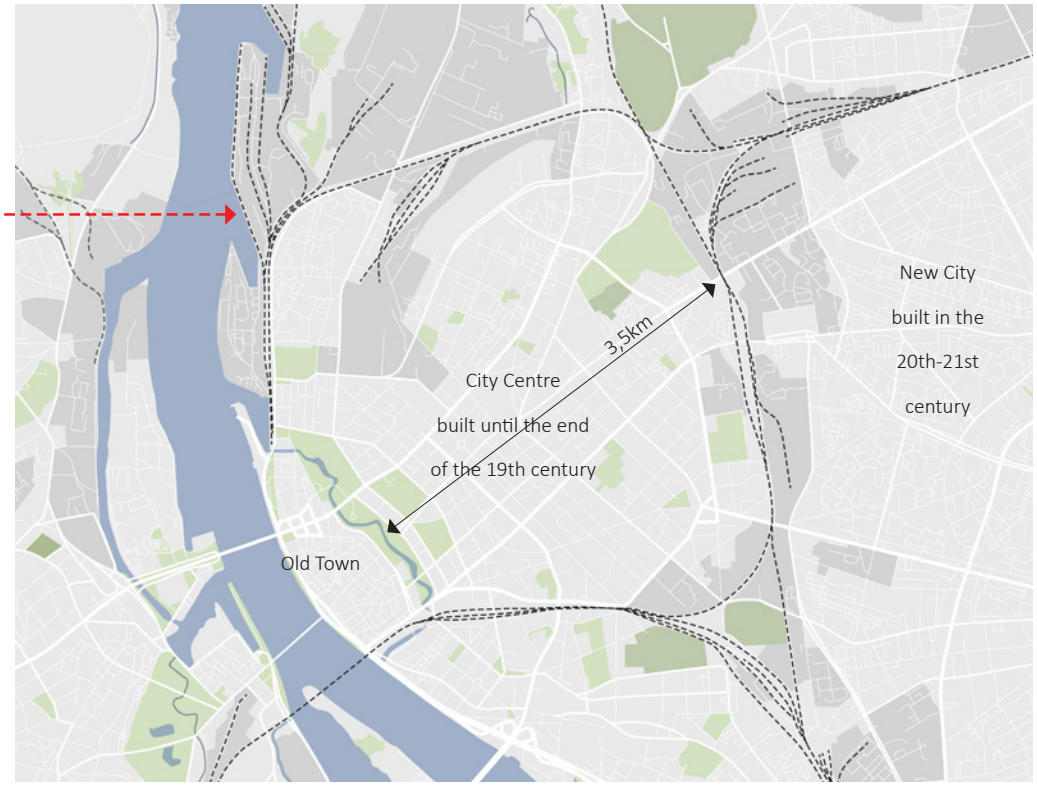

Image 5

Facts about Latvia

Capital - Riga
Geographical size- 64 589 km2
Population- 2 151 366 (2015)
Land borders- Estonia, Lithuania, Russia and Belarus

Coastline of the Baltic Sea - approx. 500 km long lined by pine forests, dunes, and continuous white sand beaches.

Land cover - 50 % woodlands, 30% farmlands, 20% other

Terrain- low plain
most of the territory is less than 100 m above sea level,
and most of it is composed of fertile low- lying plains with some hills in the East.

Inland waters - more than 3 000 lakes, 12 000 rivers and
10% of territory are mires.

Nationally protected areas - approx. 20% of Latvia's total land area.

Climate - humid continental

Vegetation- boreal forests

Ref.: Riga in Figures (2016)

railway line. Old industrial warehouses are destroyed, unused or used as storages. Currently, most of these areas in proximity to the railway are lacking clear functions, moreover, they are unsafe places in dark hours and they are disturbed by noise and vibrations from the railway. All of these factors has created a belt of wastelands around the city centre and separates the centre from other parts of the Riga.

My interest in this topic is based on one question: why are these lands so undervalued? Clearly one of the reasons is that they are affected by noise and vibrations which lead to the question: how that can be changed by shaping the landscape and choosing the right building forms? Another issue is that the railway together with the brownfields creates segregation between the city centre and the suburbs. That brings up the next question: how could re-development of these lands help to provide a better connectivity between the neighbourhoods on both sides and how could these brownfields and wastelands be integrated back into the city fabric.

All of these questions lead to the essential discussion about liveability in proximity to the rail operations.

AIM AND METHOD

The aim of the project is to rethink what urban infrastructure and neighbouring lands might be in future in order to make areas in proximity to railway operations liveable, well connected and integrated into the existing city fabric.

The project research questions are:

1. How to revitalize brownfields and wastelands in proximity to the railway operations?
2. How to integrate these areas back into the city and its neighbourhoods?
3. How to connect both sides of the railway to lessen the barrier effect?
4. How to avoid noise and vibrations from railways?
5. What can the city gain from redeveloping brownfields and wastelands in proximity to the railway operations?

The study consists of the four main parts: first three are background and analysis, and fourth - a design proposal. Each of the first three parts is concluded with my proposed strategic development steps. The fourth – proposal gives a visual insight of the possible design solutions.

THE AIM OF THE PROJECT IS
TO RETHINK WHAT URBAN INFRASTRUCTURE
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LIVEABLE,
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CASE STUDIES

Since the industrial revolution most of the European cities has experienced significant growth of population and urban expansion. Development of technologies and manufacturing during the 19th century has changed the way the cities are organized, and transport infrastructure has become one of the key elements of urban development.

Very often, transport infrastructure, especially railways, has shaped cities by creating permanent spatial divisions. Large infrastructure projects that historically brought rapid development for many suburban and periphery areas are now one of the main challenges to make these areas in proximity to transport infrastructure accessible and connected, not only by motorized transport but also for pedestrians and bicyclists.

In the following sections of this part of my thesis I will provide two examples from the Netherlands where transport infrastructure has created a gap between the neighbourhoods and one example of transit oriented urban development from Copenhagen.

The first case study represents the Ringroad around Antwerp. The bypass was built in middle of the last century at the place of former fortifications which divides the inner city from the newer outer city. The municipal authorities have been trying to find solutions on how to connect both parts of the city, but still without considerable success. However through many competitions, several engrossing ideas has been developed.

The second case study represents the project called Sijtwende in Hague Region, Netherlands. This example shows how two completely unconnected neighbourhoods can grow into one

by putting the road, which worked as a barrier, in a tunnel and building on top of it. Besides that, this project represents a successful public-private partnership financial model, a long-term funding model between a private party and a government entity, which could be considered as solution in the case of Riga.

Lastly, the third case study addresses the American concept of Transit Oriented Developments (TOD). The concept involves the idea of living close to a railway station (metro or tram station) in a vibrant mixed-use area where everything is reachable within walking distance. Although the term is rarely used in Europe, the concept of living close to public transport in a compact city is a conventional model for sustainable development worldwide. For the case study, I have chosen the Finger Plan of Copenhagen, Denmark. It is not the most typical example of TOD, especially if compared with Asian and American cases, but it has some values that can be applied in Riga's case.

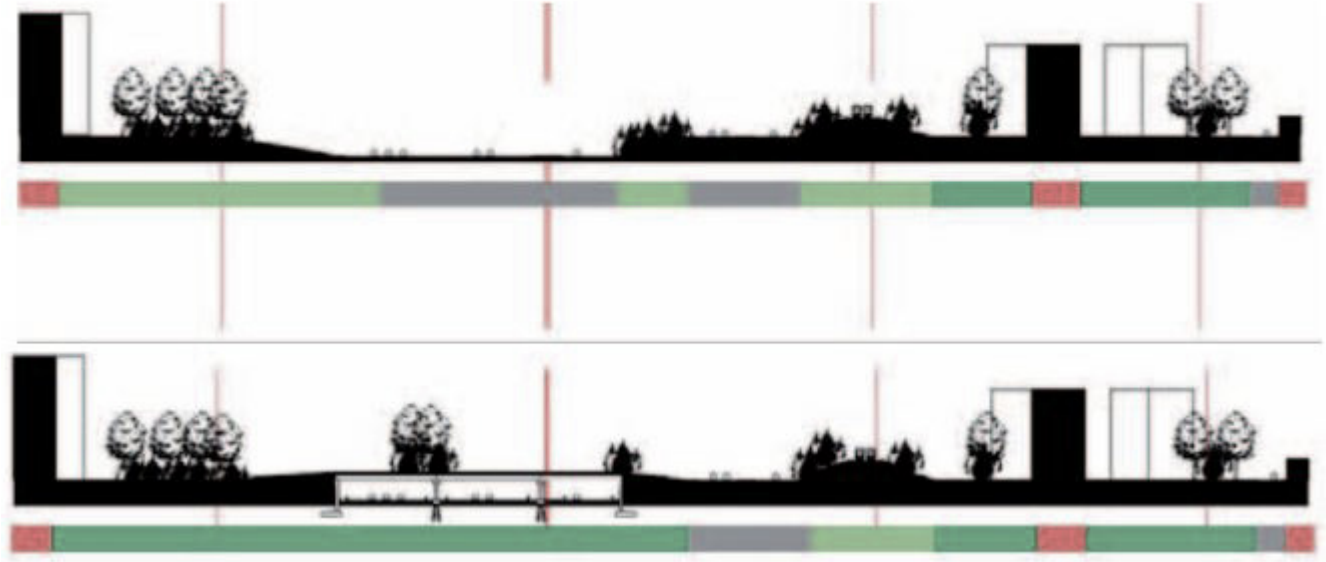


Image 6
Ref. (Overkappingsonderzoek Antwerpse Ring (2000), p. 49)

Image 7
Ref. (Overkappingsonderzoek Antwerpse Ring (2000), p. 49)

CASE STUDY 1
THE RINGSCAPE, ANTWERP, BELGIUM

The Ringscape of Antwerp is a multiple ring road infrastructure built at the area of former fortifications with intention to connect the city and its port with international road network. The issue with the Ringscape is that its multiple ring roads separate the historical city from the new city.

The first design competition for the area was lunched right after the demolition of the fortifications in 1906 (Infrastructural Urbanism, 2011, p. 35), but none of the designs became a reality and the area was left for recreational purposes until 1960's when the ring road was built (Urban development.., 2012, p. 53).

After that a lot of research, analysis and design competitions have followed to find a strategy on how to develop the ringscape and many different visions have been offered during the last century starting from boulevards and parks connecting neighbourhoods to wide bridges and underground tunnels. Several masterplans has been developed and rejected. In 1989 O.M.A developed a masterplan which consisted of a landscape of gardens and bridges in dialogue with the motorway intersection on the left bank, however the dissolution of the competition meant that the plans lost their relevance (Infrastructural Urbanism, 2011, p. 41).

Currently the ringscape consists of a six lane motorway bypass that encircles the historical city and 13 km long green belt with large vast parks called The Green Singel along it.

Due to the regular traffic jams on the ring road, an option of widening the ringroad to a 14 line motorway was discussed, but the idea was rejected. Now there are discussions about putting parts of the ring road in tunnels (Image 6) (Overkappingsonderzoek Antwerpse Ring, 2000).

Image 8

Ref. (Durven dromen van een Groene Rivier (2009), p. 5)

The strategic Spatial Structure Plan for Antwerp 2006 envisages revitalizing the Green Singel through the landscape, infrastructure and building concepts to transform it into an accessible space that connects existing parks and inner and outer city of the Antwerp (Urban development.., 2012, p. 54).

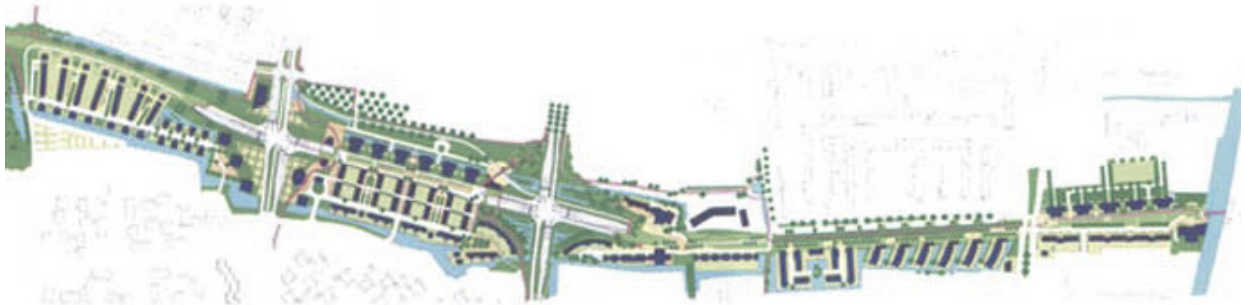


Image 9, Ref. (Voorburg Leischendam..)

Image 10, Ref. (Voorburg Leischendam..)

Image 11, Ref. (Voorburg Leischendam..)

Image 12, Ref. Google Maps

Image 13, Ref. Google Maps

CASE STUDY 2
SIJTWENDE, HAGUE REGION, NETHERLANDS

The project Sijtwende is made by a Dutch landscape architecture company Eurolandscape and it was opened in 2013. The project site is approx. 2.5km long and it is located on the border of former municipalities Voorburg and Leidschendam. It includes 3 tunnels that are part of the Northern Ring Road of the Hague Region (NORAH), 900m of light railway, an underground station and 700 houses along the route. (Companies profile.., p. 82)

From the project description: “The implementation was conducted by means of a road in a hollow dike / a tunnel. Ground level intersections facilitate local connections. The hollow dike principle (urban plan KuiperCompagnons) significantly reduces the traffic noise, which created a possibility for housing development. At the moment, 700 houses have been developed. Due to the tunnel the landscape was lifted up to six meters above ground level. ” (Voorburg Leischendam..)

The project is result of ‘Public - Private Partnership’ between the government and the private initiative. It was financed partly by the government and partly through revenues from the sales of the houses and land. (Companies profile.., p. 1136)

As result of this project, in 2002 municipalities Voorburg and Leidschendam united and formed a new municipality of Leidschendam-Voorburg.

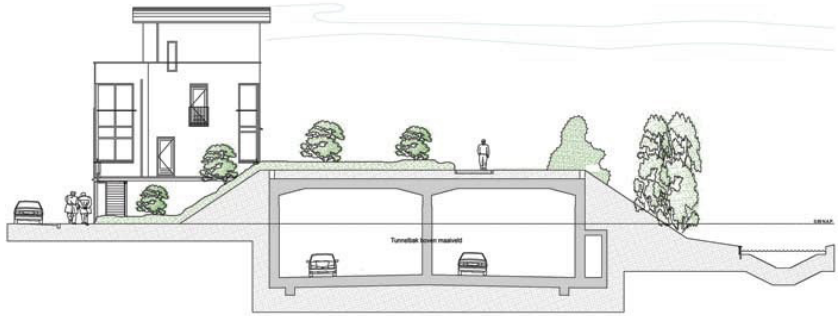


Image 14, Ref. Ref. (Voorburg Leischendam..)

Image 15, Ref. (Sketch of The Finger Plan..)

CASE STUDY 3
FINGER PLAN, COPENHAGEN, DENMARK

The Finger Plan was created in 1947, and was the first strategic plan for Greater Copenhagen. The idea of the Finger Plan is to have a dense centre of the city – the 'palm' and new developments along the existing railway infrastructure – the 'fingers'. Areas between the fingers are left for recreational and agriculture uses. Since 2007 The Finger Plan has a legal status and it is incorporated into Denmark's Planning Act.

One of the reasons why this plan can be considered as a TOD model is that even back in 1958 an important part of this plan was to create new secondary centres of the city, because the city has grown too big to have only one main centre (The Finger Plan, 2015, p. 4).

During the 1960's the new TDO hubs were competing with the main city centre for growth, but the current strategic development plan determines to develop business oriented hubs next to the railway stations at the core of the city (at the 'palm of the hand') mixed with dense residential developments, whereas the suburban and periphery centres should provide shopping facilities mixed with the residential developments (The Finger Plan, 2015, p. 11).

According to The Finger Plan document by Nature Agency (2015), surveys shows that placing business districts next to the station areas significantly increases the use of public transport for daily travels to work and home. This effect can be reached if the work place is in 500-600m walking distance from the railway station (The Finger Plan, 2015, page 14).

Therefore, the implementation of the Finger Plan has not only prevented uncontrolled urban sprawl, but also decreased traffic problems and congestions.

In the beginning of 1990's a new TOD project was introduced- an extension to the existing Finger Plan. The project area is called Ørestad, and it is a new urban development- a sixth 'finger' for the city with a metro line as a central spine and new mixed-use developments along it. The area was owned by the municipality and government, and the costs of the metro line was planned to be covered by selling the plots of the area.

In 1995 the first master plan was designed and the area was divided in four districts. Despite the fact that the area has a metro line and convenient connections with the centre of Copenhagen, the Copenhagen's airport and even Malmo, moreover, several important public objects were built at the area, still the project had a lot of financial struggles and difficulties to attract investments. Due to this, it may be questionable of the projects can be considered as a successful example of TOD contrary to The Finger Plan in general.

Image 16
The finger city structure:
green wedges
Ref. (The Finger Plan, 2015, p. 19)

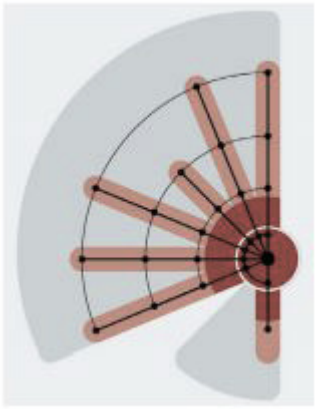


Image 17
The finger city structure:
transport infrastructure
Ref. (The Finger Plan, 2015, p. 19)

Image 18

1. THE CITY OF RIGA

Riga is the capital of Latvia and has developed at the crossroads of trade. It was officially found in 1201 by a German bishop Albert.

The city is located on the Gulf of Riga, the Baltic Sea and it is bisected by the river Daugava. In 2015 the population of Riga totalled 696 593 inhabitants which is approx. one third of the country's population in total. Riga's territory covers 304 km2 with population density 2291 people per km2 (Riga in Figures.., 2016).

The old medieval town of the city sits on the East side of the river. The old town together with ring of 19th century architecture forms the historical centre of Riga. It is a UNESCO World Heritage Site noted for its Art Nouveau/Jugendstil architecture and 19th century wooden architecture. It covers 438 ha (Historic Centre..).

19th and early 20th century architecture makes up the central part of the city up to the railway loop. It is followed by a mix of low-rise private house districts and Soviet time 5-18 floor apartment micro-districts.

The city aims to be compact, but it is slowly merging with the towns and villages in its agglomeration area.

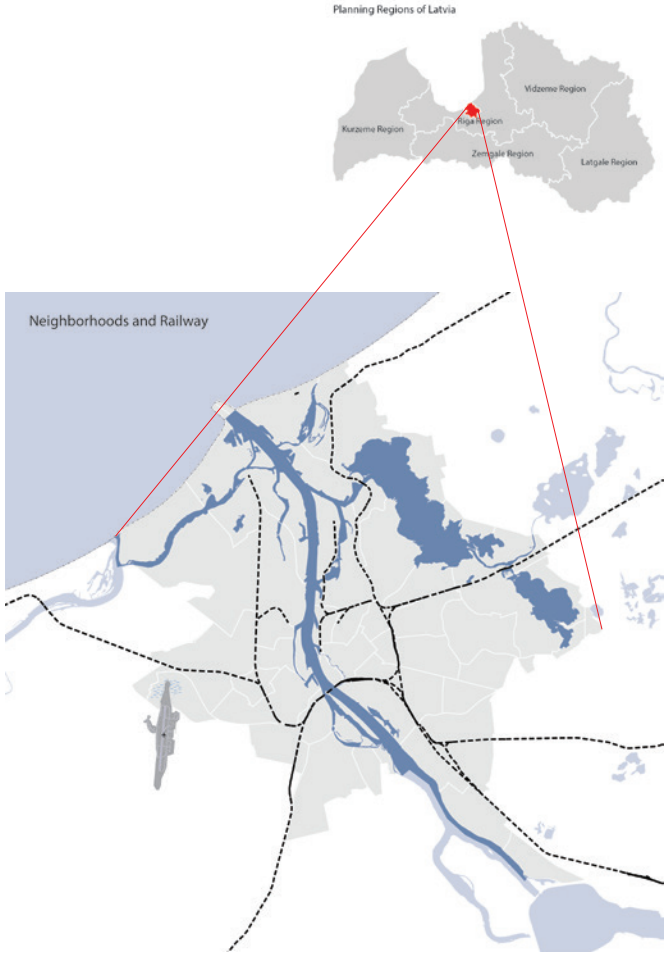


Image 19

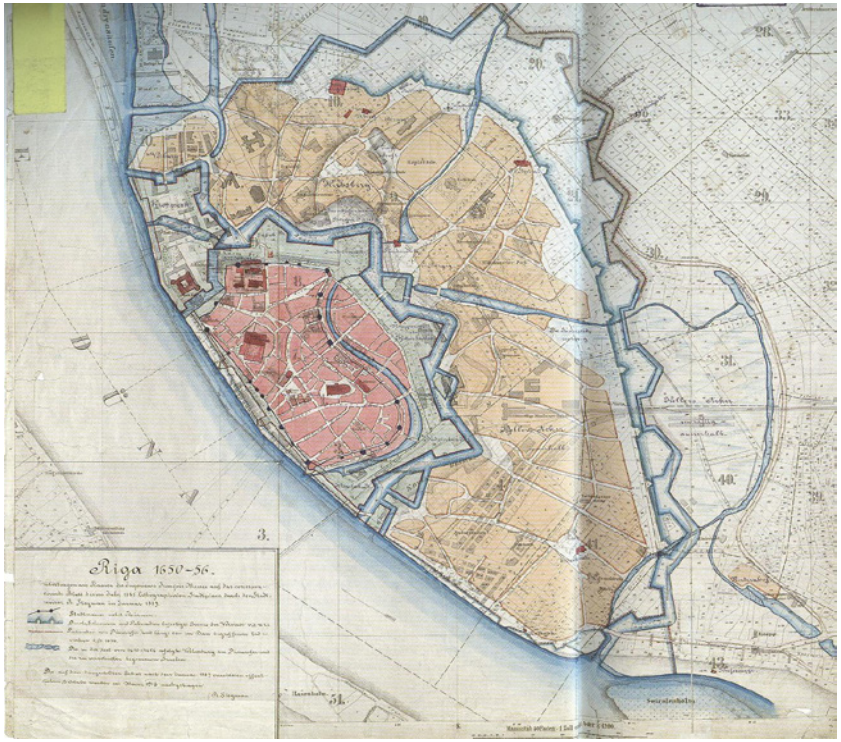


Image 20
Comparative plan of Riga: the situation in 1650-1656 overlaid on a late 19th century. Richard Julius Stegman.
Ref. (Bākule, Siksna, 2009, p.14-15)

1.1. HISTORY

Historically, the city has gone through a lot of changes but from the origin of the first settlement it was a place of trade.

The city of Riga begins as a settlement on right side of Daugava River at a natural harbour. Officially, the city was funded in 1201 by Germans, and it is one of the very few European cities that were built according to several successive comprehensive plans (Bākule, Siksna, 2009). Most of them were related to military needs.

The construction work of the first fortifications started in 1207, and in 1282, Riga became a member of the Hanseatic League. With new military achievements, the first fortifications lost their value and new ones were built in 1554 (Rīga, 1988).

In 1621 Riga came under the rule of Sweden. In 17th century fortifications were renewed by Swedish authorities. The first plan for Riga's suburbs was designed by 1652 by Johann Rodenburg. It was similar to fortifications of Amsterdam and Gothenburg (Bākule, Siksna, 2009).

In 1710 Riga was occupied by the Russian Empire, and fortifications were renewed again, and was followed by several new suburban redevelopment plans.

Because of the progress of military possibilities, fortifications gradually lost their importance and they were demolished in 1856. The City Architect of Riga Johann Daniel Felsko prepared redevelopment proposal for the area of the fortifications, but the Russian government

considered it too expensive. After being revised by architect Julius August von Hagen, the project was approved by the Russian Tsar. The area of fortifications was redeveloped in a park with canal and new boulevards were built on both sides of the park followed by masonry buildings (Bākule, Siksna, 2009).

In 1861, the first railway was built in Riga, and the city continued to expand strongly while regulated by several sequent comprehensive plans. The city council also developed strong regulations of building typologies. The city was formed by masonry buildings in the Classical style, Art Nouveau, National Romantic and Rationalist style, many wooden buildings were replaced. The only wooden buildings of the second half of the 19th century were mostly apartment houses for factory workers (Bākule, Siksna, 2009).

Image 21
Plan of Riga indicating new, wide defensive line to encompass the suburbs. 1862.
Franz Eduard Todleben. Ref. (Bākule, Siksna, 2009, p.14-15)

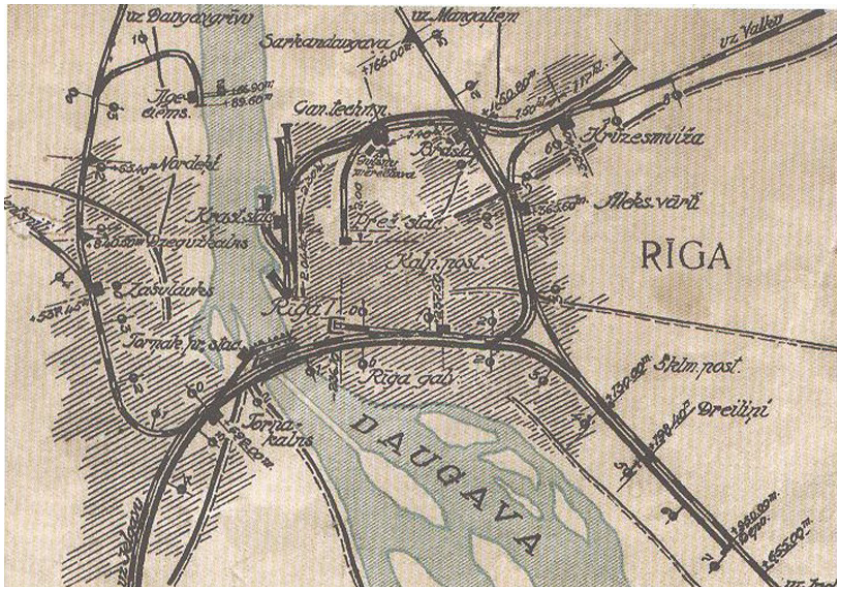


Image 22
Ref. (Altbergs, Augustāne, Pētersone, 2009, p. 76)

The period of industrial revolution in Latvia started in 1830's, and it determined the construction of the city's railway lines. In 1872 a new railway line was built to the port in city's north northern area and it marked the border of the 19th century's city.

Factories were placed mainly behind the railway line, as well as houses for factory workers. The city's structure on the other side of railway formed chaotically.

After word war I, Latvia gained its independence, and the city was renewed. The City Council introduced new large development plans, but they were not economically possible. After World War II, Latvia was occupied by the Soviet Union which led to new poor quality micro- district developments in the suburbs.

The railway border of the 19th century's Riga has become a barrier in the city. This included the inner city - Riga's historical centre is a UNESCO World Heritage Site, noted for its Art Nouveau/Jugendstil architecture and 19th century wooden architecture (Historic Centre..).

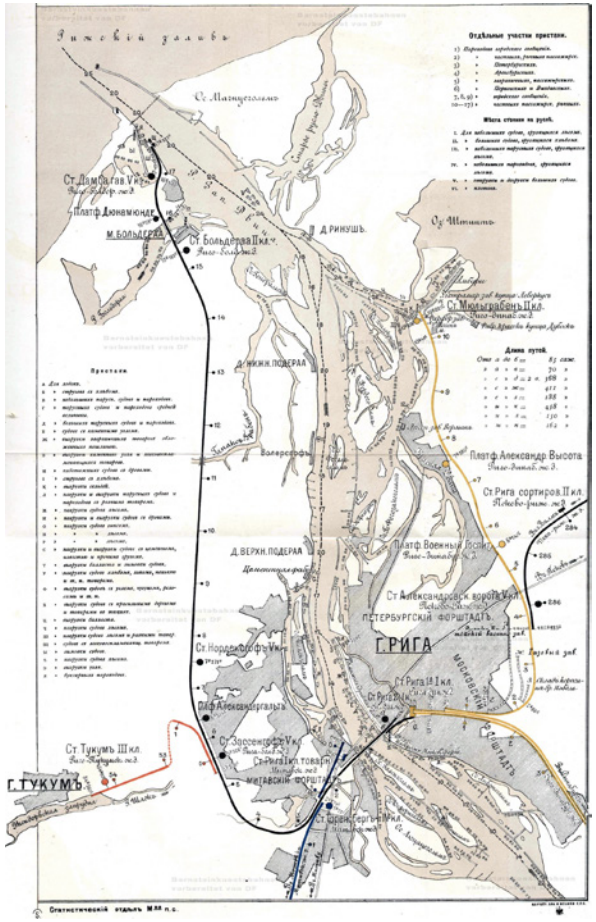


Image 23
Ref. (Baltic Railways , 2008)

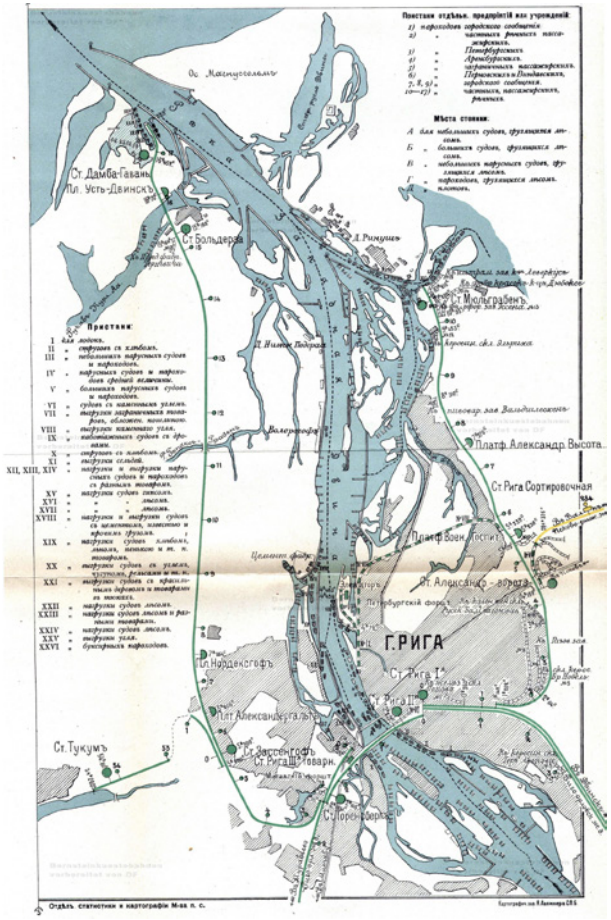


Image 24
Ref. (Baltic Railways , 2008)

Image 25
Ref. (Baltic Railways , 2008)

1.2. RIGA AS AN IMPORTANT INFRASTRUCTURAL HUB OF LATVIA

Riga International Airport
direct flights from 83 cities in the world

Railway connections
with Russia, Belarus and Estonia

Ferry - line
to Germany and Sweden

Buses
to more than 100 european cities

Facts about Riga

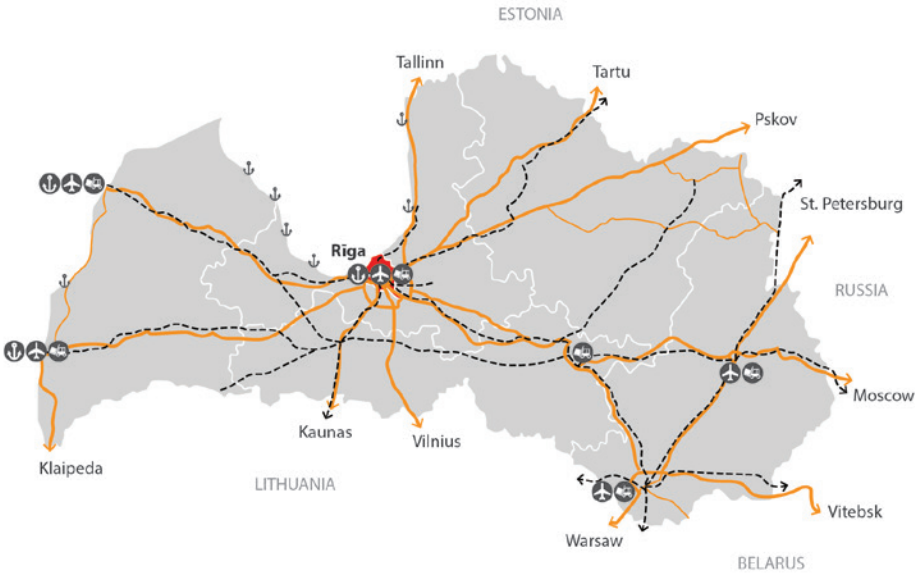
City Area - 304 km² (117 sq mi)
Metro Area - 10,133 km² (3,912 sq mi)
Population of the city (2015)- 696,593
Population of the metro (2015)- 1,018,295
Density of the city- 2,300/km² (5,900/sq mi)
Density of the city- 101.4/km² (263/sq mi)

Ethnicity (2015) - 45.9 % Latvians, 38.1 % Russians, 16 % others

Time zone - EET (UTC+2), summer EEST (UTC+3)

Historical affiliations:
1201–1561 Terra Mariana
(condominium of Archbishops of Riga and Livonian Order)
1561–1582 Imperial Free City
1582–1629 Polish–Lithuanian Commonwealth
1629–1721 Kingdom of Sweden
1721–1917 Russian Empire
1917–1918 German Empire
1918–1940 Latvia Republic of Latvia
1940–1941 Soviet Union
1941–1944 Nazi Germany
1944–1990 Soviet Union
1990–present Latvia Republic of Latvia

Ref.: Riga in Figures (2016)



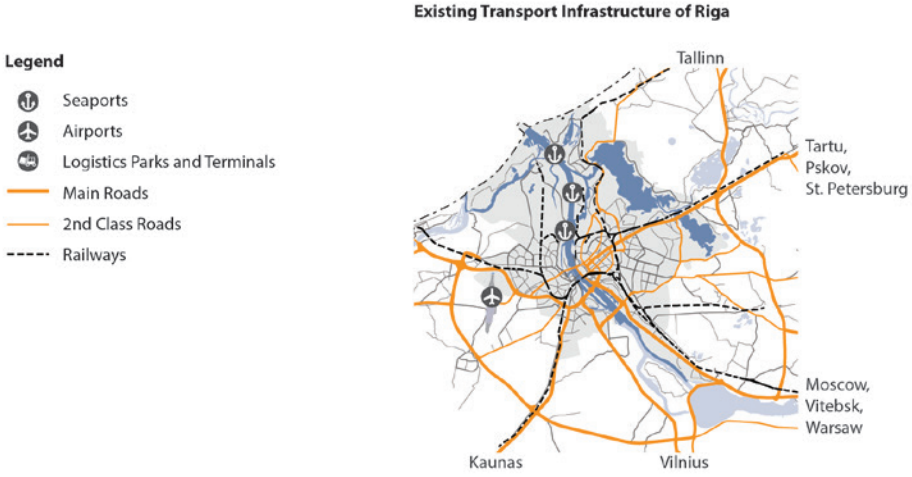


Image 26

1.3. SCALE COMPARISON

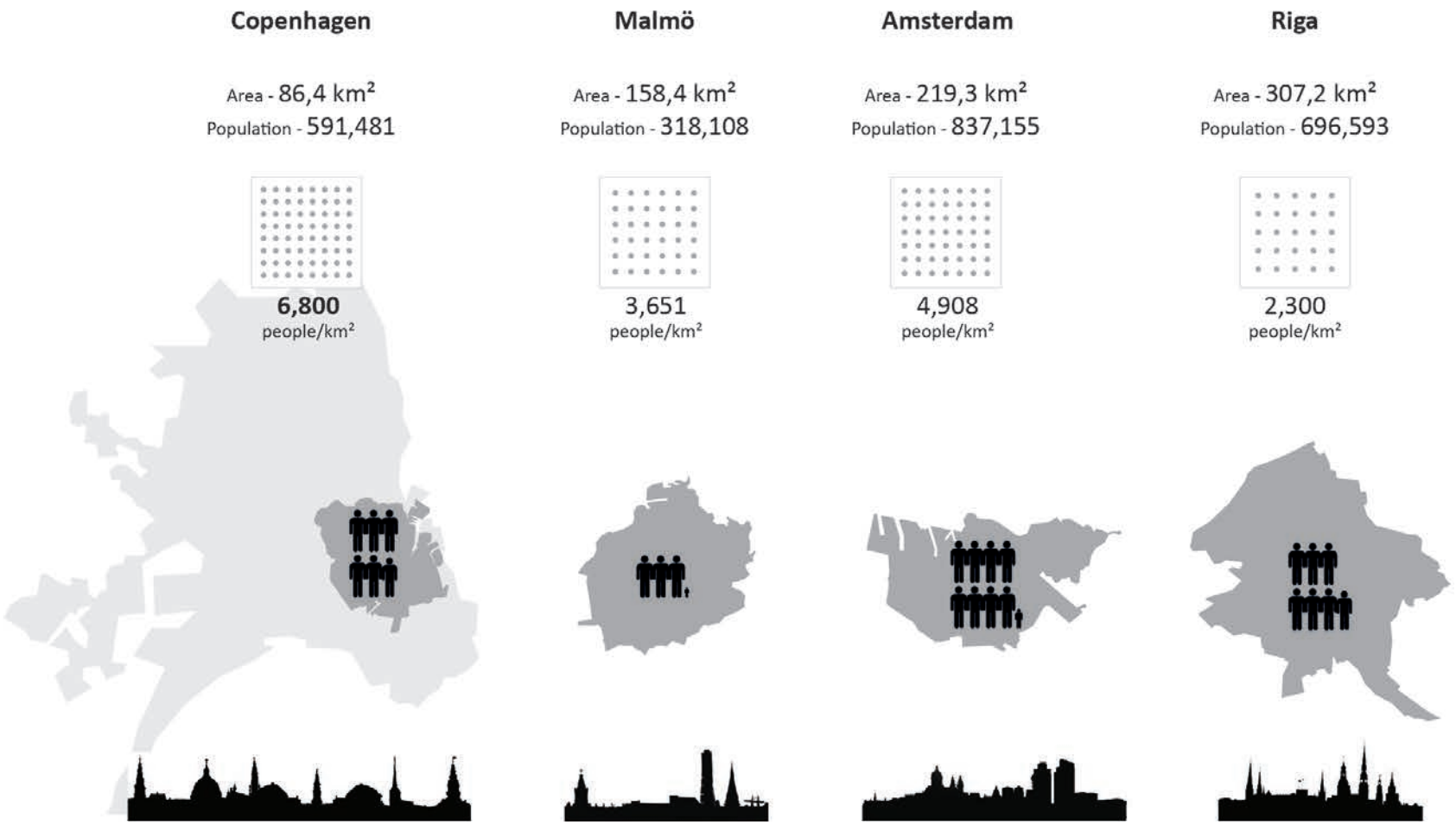


Image 27

1.4. CLIMATE

Image 28

Image 29

The climate of Riga is humid continental (Köppen Dfb) and has four pronounced seasons.

The winter usually lasts from December till March. The coldest months are January and February with an average temperature of −5 °C (23 °F), but almost every winter there is a couple of weeks with temperatures being as low as −20 to −25 °C (−4 to −13 °F). Light snow generally falls every winter, but in January and February snow storms occurs and almost every year there are some periods with a lot of snow.

The spring usually begins in March or April and lasts till June. The average air temperature in spring is 0 to +15 °C (32 to 59 °F), and amount of sunny days gradually increases while the snow disappears.

The summer starts in June and continues until September. The average air temperature in the summer is +18 °C (64 °F), while on some days it may rise to +30 °C (86 °F). The precipitation increases in the summer months, especially in August.

The autumn lasts from September to December with the average temperature from +10 °C (50 °F) in September to 0 °C (32 °F) in November. The proximity of the sea causes frequent autumn rains and fogs. The strongest storms occur in periods between October and January.

Prevailing winds in cold months (Oct-Mar) comes from the South, in January and February from the South-East, but in warm months (May-Aug) wind comes from the South-West, West, North-West and even North erly directions.

Average Minimum and Maximum Temperature Over the Year and Average Monthly Precipitation Over the Year (Rainfall, Snow)

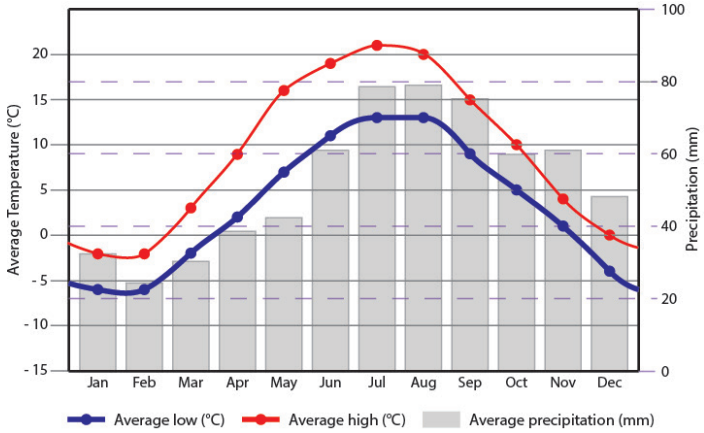


Image 30

Average Monthly Hours of Sunshine Over the Year and Average Snow Depth (cm)

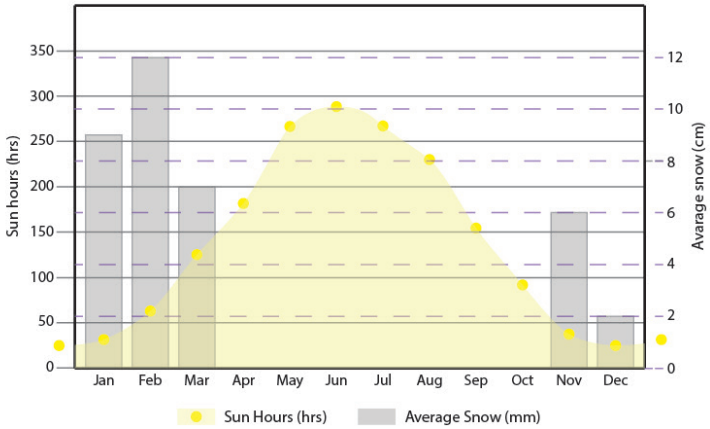


Image 31

Wind direction distribution in (%)

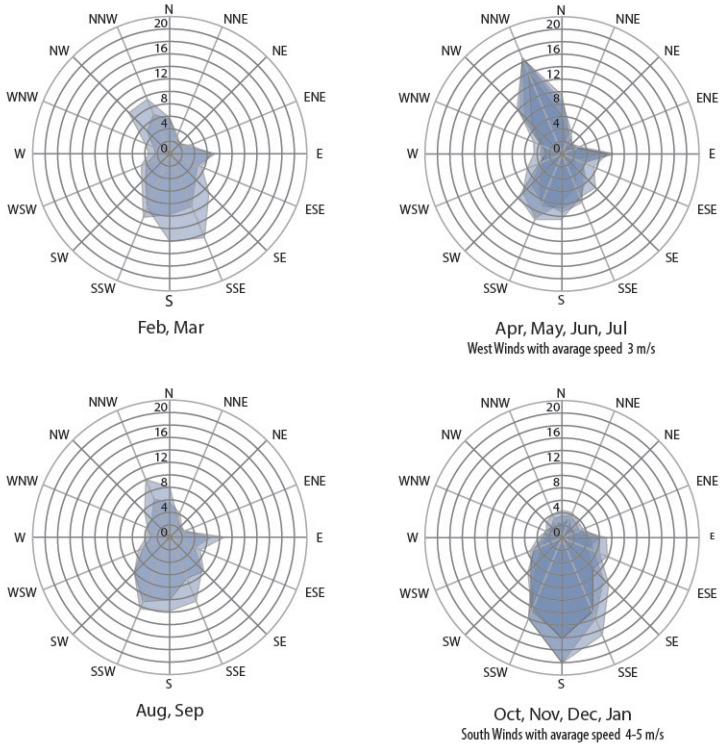


Image 32

In summers the warmest wind comes from the South-East, the slowest wind comes from the North-East direction, but the strongest wind all year around comes from the North-West direction (Climate information..).

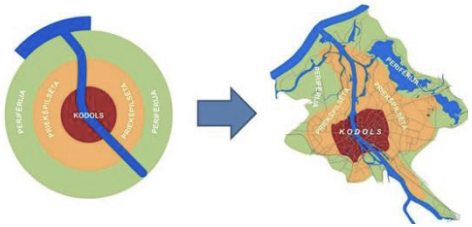


Image 33,, Structure of the sity
Ref. (Riga 2030..)

1.5. CITY STRUCTURE

The city of Riga is the regional centre, and most of the agglomeration population commutes to the metropolis daily. The metropolitan area of Riga consists of three parts:

1. the city core with the historical centre along with,
2. suburbs along with microdistricts and mixed-use neighbourhoods,
3. green periphery with low-rise buildings such as private villas and cottages (Image 33).

The city is divided in the West and East side by the river Daugava (Image 34).

The city is distinctly mono-centric and most of the activities are placed at the city centre. Most of the valuable built structure is placed in the city core surrounded by railway. Historical industrial areas separates the city core from periphery with large-scale housing areas.

44.8% of the city isconsists of vast natural and green areas and waters (Image 35) (Comprehensive Plan .., p. 20). There are several large forest parks in the metropolitan area of Riga. At the same time, the historical centre is not as green as it could be. There are several parks, but most of the streets don't have any vegetation which leads to poor air quality.

Overall, city structure is diverse and offers places for all kinds of needs, but most of the areas are mono-functional and poorly connected, except the city centre which is the main destination for citizens' daily needs. The city lacks mixed-use centres in suburbs and in periphery.

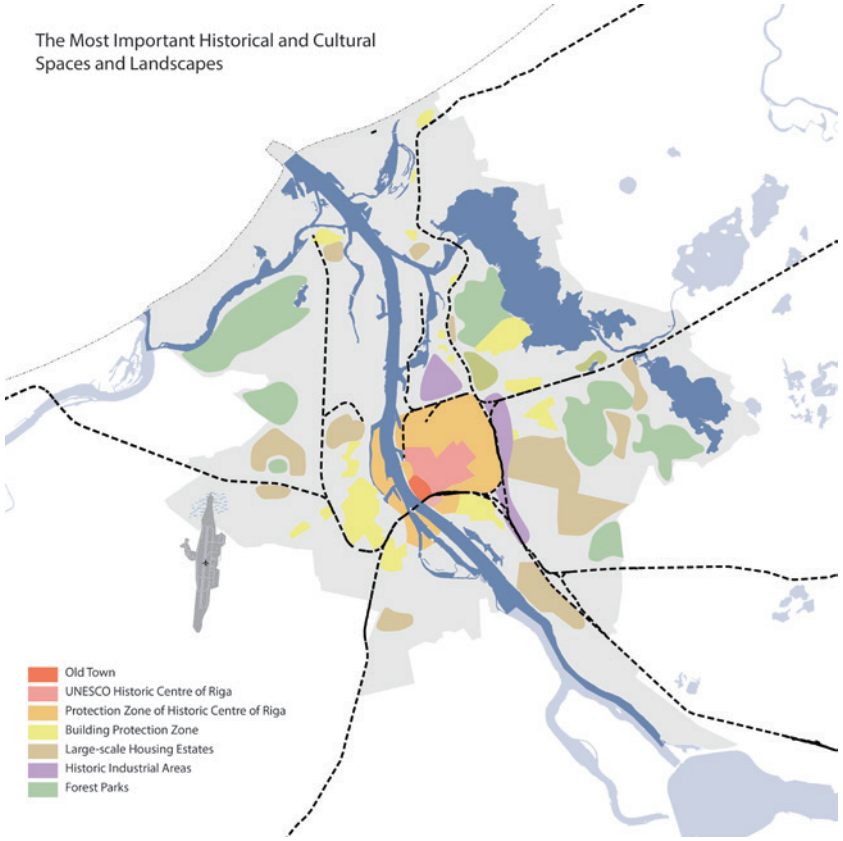


Image 34

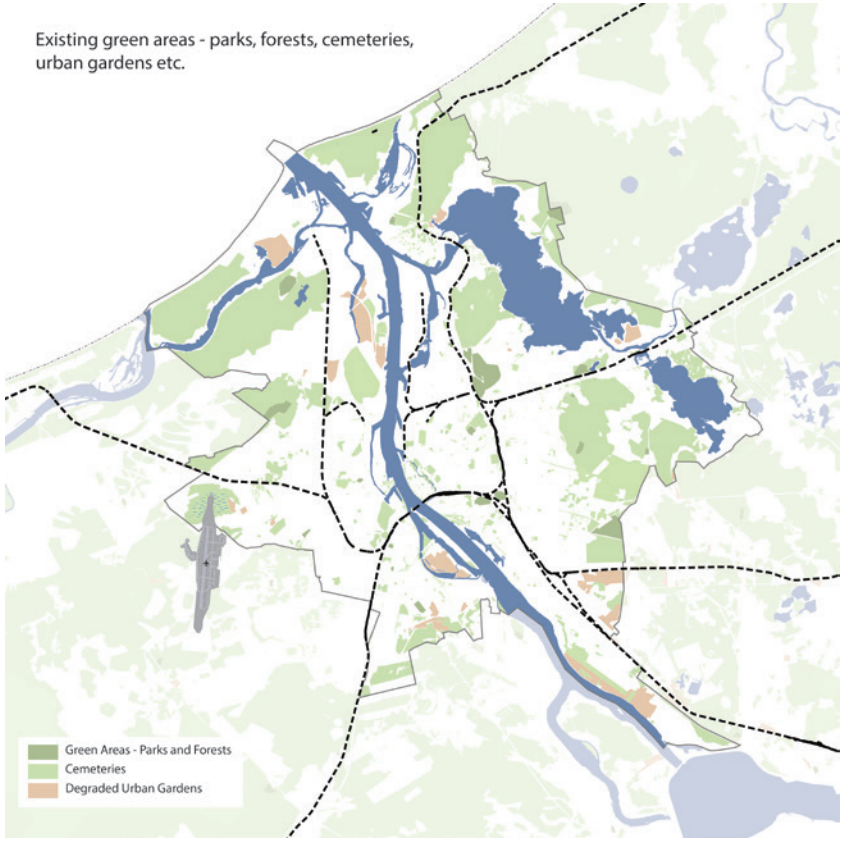


Image 35

Image 36,
Riga street network conception
Structural scheme
Ref. (Northern Corridor..)

1.6. TRANSPORT INFRASTRUCTURE

Transport is one of the most important elements of the city's infrastructure, it provides liveability in the city. Like in many other cities in the world, in last 10 years the use of cars has also increased in Riga, and it continues to do so. Cars are one of the main polluters in the city. Until now, most of the traffic has gone through the city centre (Image 37) creating traffic-jams in city centre as well as in suburbs, especially on bridges that crosses the railway.

To improve the air quality in the city centre, several big scale infrastructure projects is introduced by the municipality of Riga. One of them is a new bridge over the river in the south of the city, which has been completed in 2008. The bridge is a part of the bigger infrastructure project. It is planned to make a double-loop bypass around the city centre (Image 36 and 38) to divert car traffic from the city centre.

While car traffic is considered as a problem by the municipality, public transport is not taken into consideration. There are planned new high-speed train line which will connect Riga and its airport to Tallinn and Berlin, but the local train system is old and need to be rethought and reconstructed. Furthermore, the train system is not connected with the public transport system of the city.

The transport infrastructure of Riga has a lot of potential to provide connectivity of the different parts of the city, but it has not been developed yet.

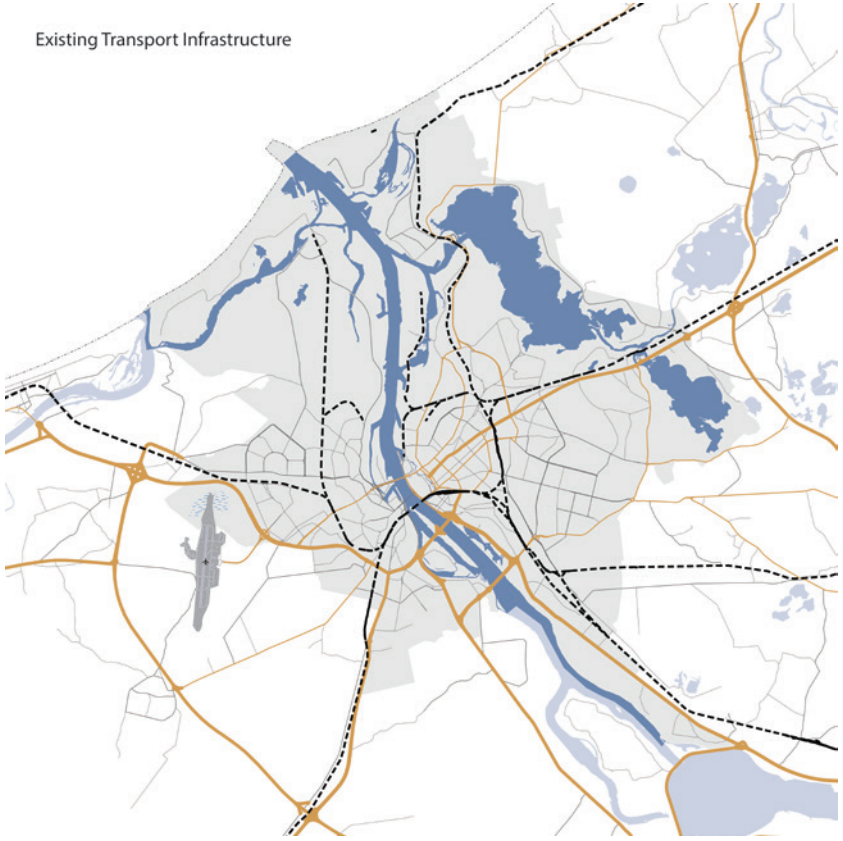


Image 37

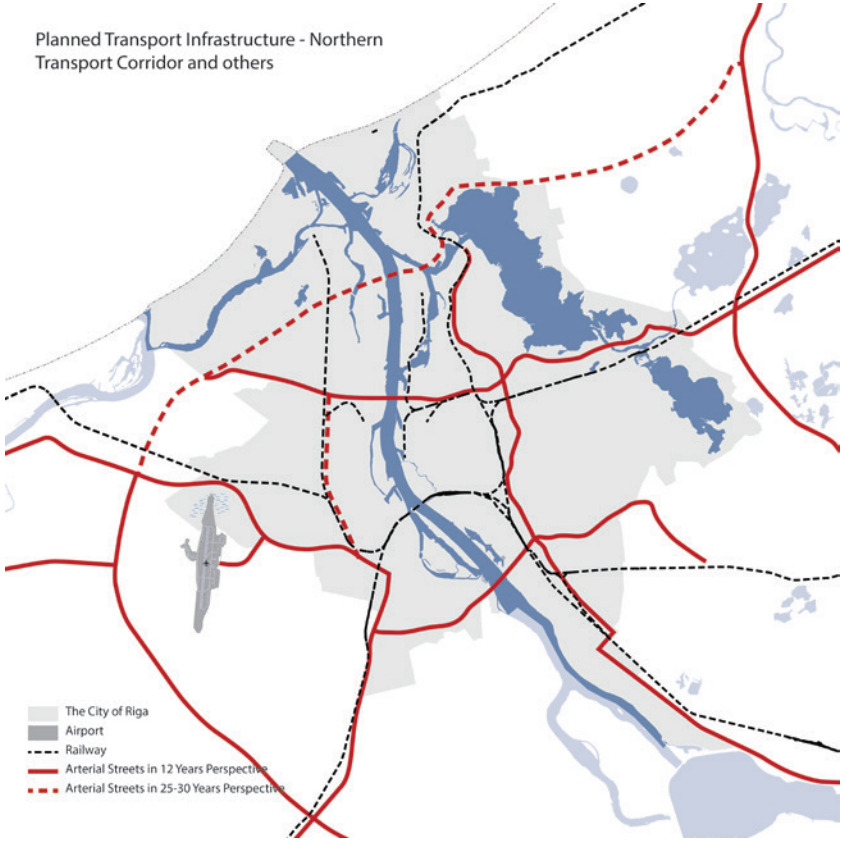


Image 38

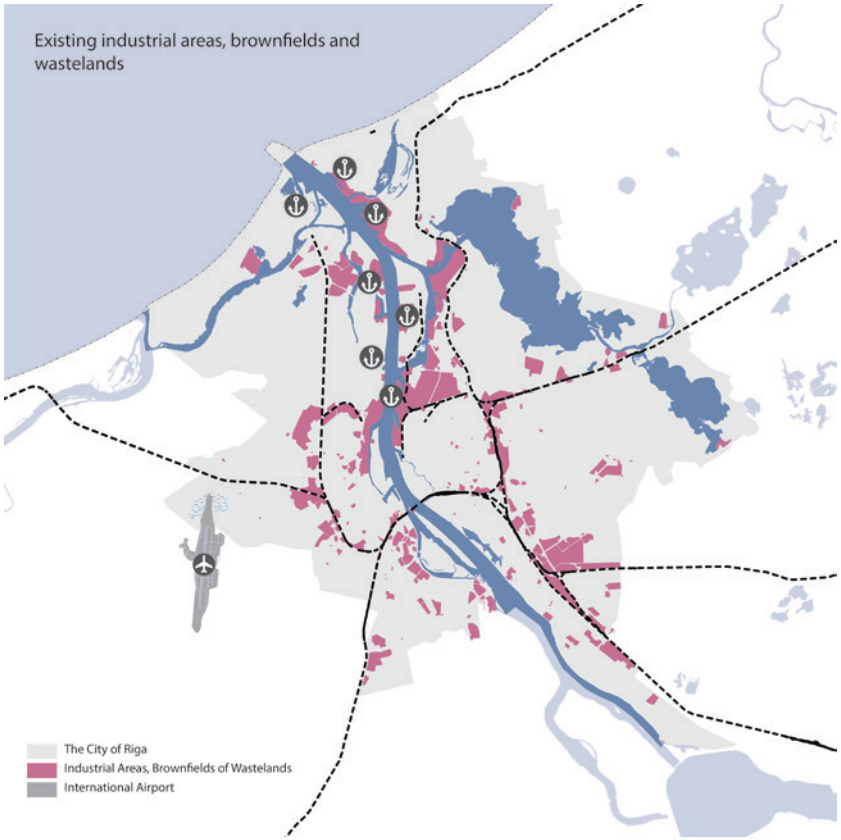


Image 39

1.7. INDUSTRIAL SITES AND WASTELANDS

During the industrialisation period in the 19th century Riga, as a port city, played an important role in manufacturing for the Russian empire. Most of the railway lines in the city was built in that time. All the factories were located along the railway to provide easy access to the port to transport goods.

Currently, most of the places of the former factories are unused and considered as brownfields. The port is still an important industrial part of the city, but most of the other ex-industrial sites has become a barrier in the city (Image 39). In the city plan, brownfields along the railway are marked as industrial sites. Some of them are still used by factories, but as they are very close to the city centre, they must be removed in future.

According to the Comprehensive Plan of Riga for 2006 – 2018, industrial areas together with manufactories and storage areas takes 10.7% of the total area of the city, while ports make up for 2.2% and railways 1.7% (Comprehensive Plan .., p. 18-19).

Overall, the loop around the city with railway and former industrial cites divides the city, but it has potential to be used for the city's renewal and new development projects.

1.8. STATISTICS

The first 4 maps represent the size of the neighbourhoods, population and amount of the employed people. Most of the population lives in the Southern part of Riga, because of the port and industry in the North.

The next 4 maps represent distribution of the educational facilities. Except kindergartens which are placed at most of the neighbourhoods, schools and universities are mostly placed at the centre of the city.

A very similar situation is witnessed libraries, culture, and sport facilities. Distribution of libraries and culture facilities are related to schools and universities, but most of the public libraries and main cultural events and facilities are located at the city centre.

The last 3 maps represent distribution of medical institutions, social care centres and public transport accessibility. There are medical institutions in most neighbourhoods, but there is slightly worse social care centres. Public transport is provided in all neighbourhoods; however it does not mean that it is fast and within easy reach.

All in all, the statistics shows that distribution of facilities that provides the life quality of the citizens is much related to the city's monocentric structure.

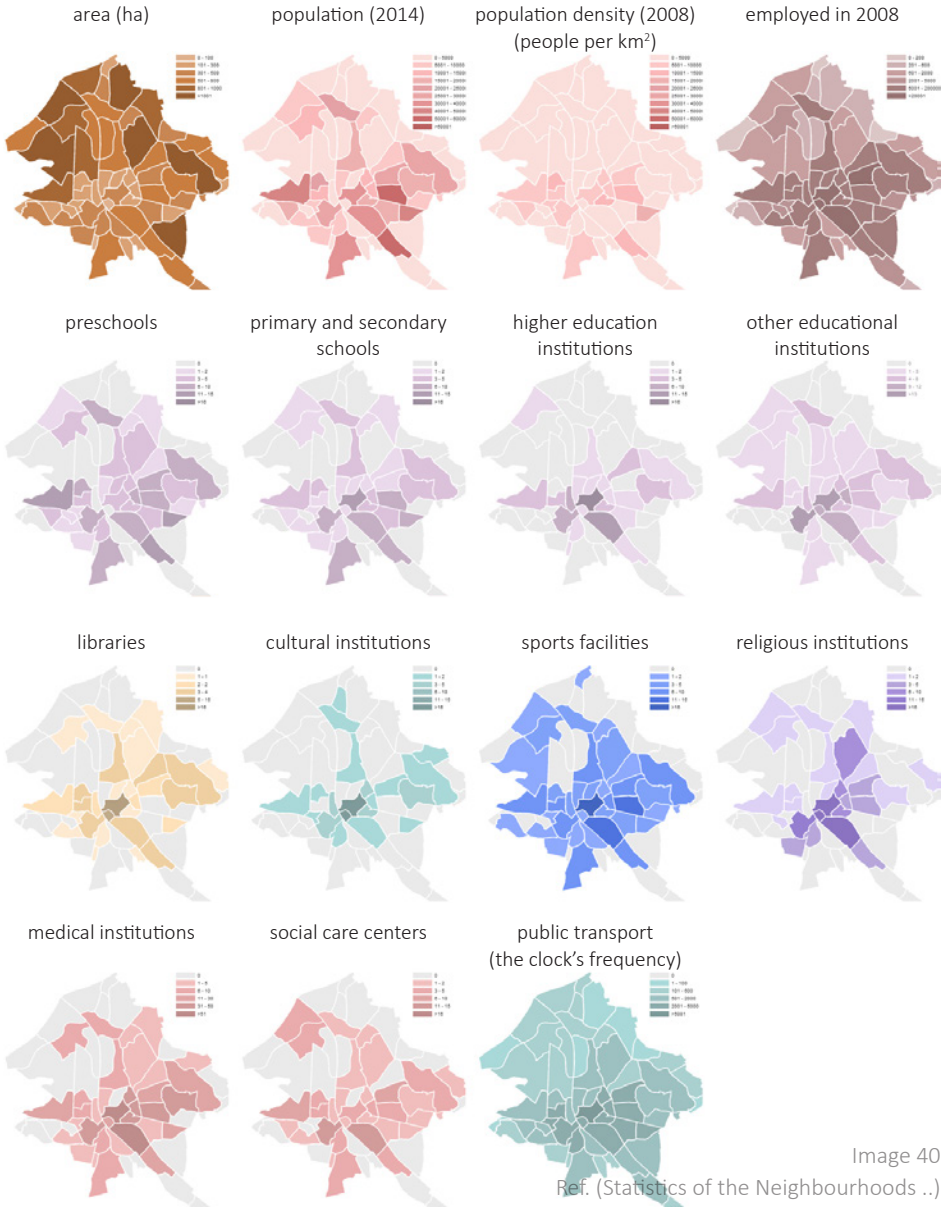


Image 40
Ref. (Statistics of the Neighbourhoods ..)

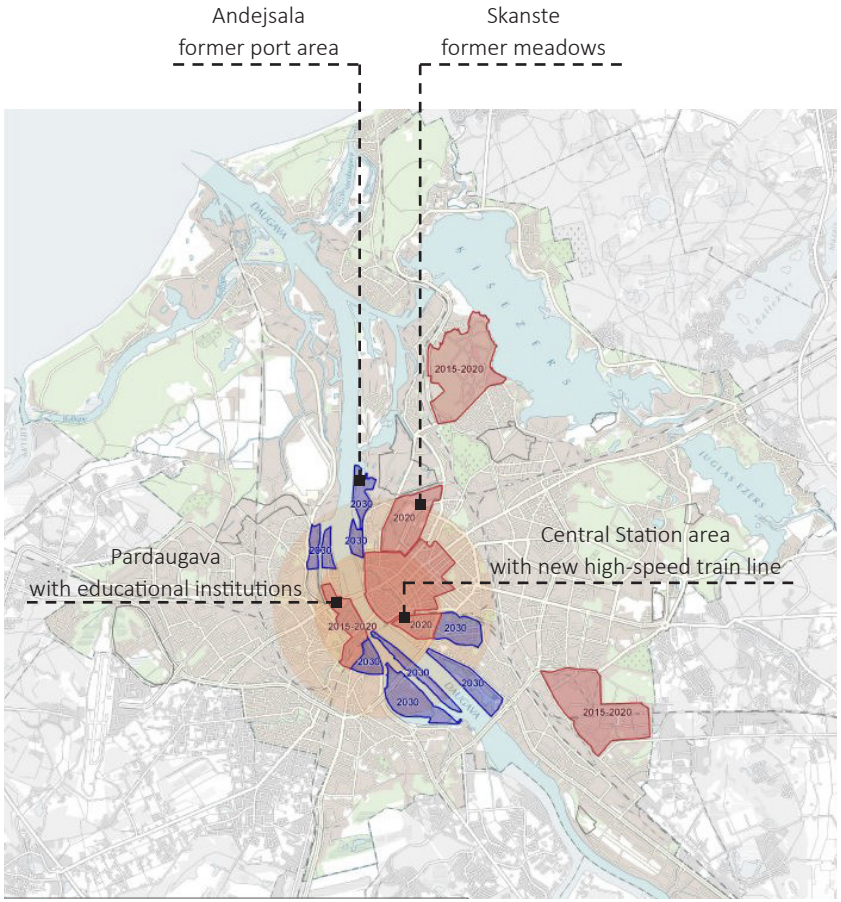


Image 41, Ref. (Riga 2030 ..)

1.9. MUNICIPALITY PLANS

Currently, the city's main development projects are based on transport infrastructure developments.

One of them is the Rail Baltica project which means a new line of rails in the city passing through the Central Station next to the Old town.

The second big scale project is arterial roads around the city to decrease transit through the centre (Image 42). As the last part of this project, the new bridge will be constructed over the river. This is planned to be used only by cars, although the Export Port has come up with the initiative to add a railway line to it. Additionally, as part of the arterial road loop around the city, a tunnel under the river is also planned.

Moreover, there are several mixed-use new city district development projects which are planned to be done in next 10-20 years (Image 41).

The main issue is that all the infrastructural plans deals only with the car traffic. It cannot be denied that it is needed to free the city centre from transit traffic, but it is clearly visible in the Structural plan 2030 (Image 42) that some parts of the arterial roads together with the railway and former industrial areas will increase the gap between historical city and suburbs.

Legend

- the city core
- priority territory for development
- priority neighbourhoods for revitalisation
- residential neighbourhoods for revitalisation
- family house areas (villas)
- recreational areas for revitalisation
- beach recreational areas
- green centres
- main industrial centres
- industrial areas
- strategic reserve territory
- transport system
- possible river crossings
- Rail Baltic connection to the airport
- Freeport of Riga, the passenger terminal
- Riga's International airport, the passenger terminal
- extension of Riga's International airport

Image 42, Structural Plan of Riga 2030
Ref. (Riga 2030 ..)

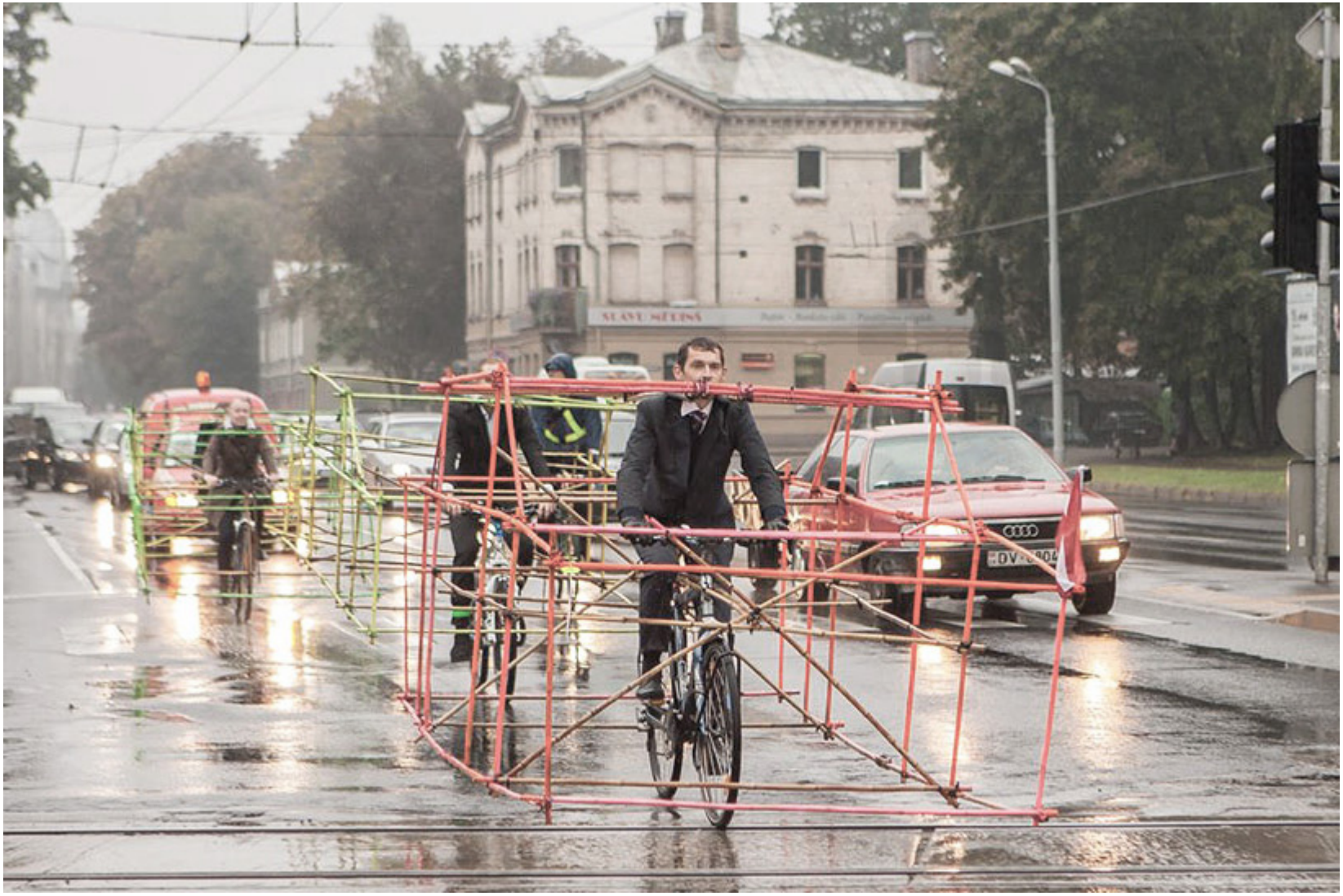


Image 43, A protest bike ride during European week of sustainable mobility 2014 in Riga, Ref. (Cyclists Craft, 2014)

1.10. MOBILITY OF CITIZENS AND GUESTS

MOBILITY – "THE ABILITY TO MOVE OR BE MOVED FREELY AND EASILY"

By Oxford dictionaries

The infrastructure of the city provides relatively convenient travels by car, but when it comes to non-motorised travels or public transport, the mobility can be a challenge.

Theoretically, according to the Comprehensive Plan of Riga for 2006 – 2018, pedestrian and bicycle mobility is prioritised over public transport and public transport is prioritised over cars (Image 44), but in reality very often a car is the fastest way to get around.

Approximately half of the citizens use a car daily, but only 4.2 % of the citizens used bicycle daily in 2013 (Rīgas pilsētas velosatiksmes..., 2015). However, the situation is improving every year (Image 45). The municipality is investing in bicycle infrastructure and public transport. In last 10 years many new bike lines have been built and part of the public transport lines are separated from car traffic.

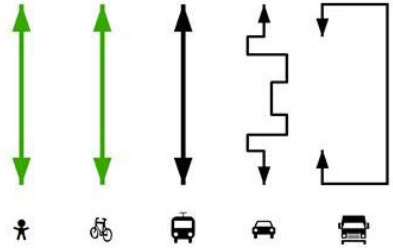


Image 44
Ref. (Riga 2030 ..)

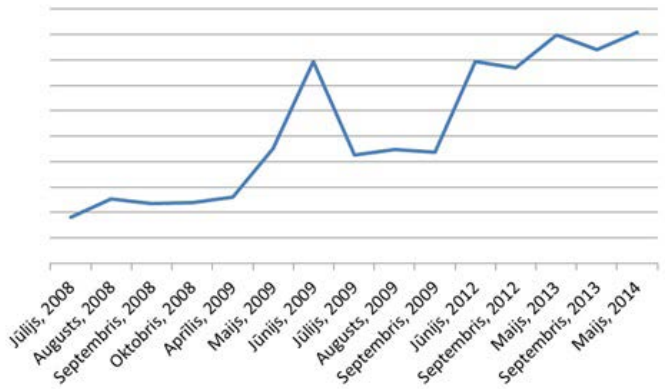


Image 45. Increase of amont of cyclists per year
Ref. (Rīgas pilsētas velosatiksmes..., 2015)

Cyclists

Pedestrians

As bicycle culture is relatively young in Riga, there are a lot of conflicts between car drivers and cyclists if cyclists are using car lanes on the streets. From 2015, the municipality has introduced regulations that cyclists should use car lanes instead of pedestrian sidewalks if there are no bicycle lanes provided. This caused a lot of controversy about the safety of cyclists.

One of the reasons why the municipality introduced regulations that cyclists should use car lines instead of pedestrian sidewalks was for the safety of the pedestrians. Many accidents have happened because cyclists shared the same space with pedestrians.

Image X shows a typical situation of conflict: the car is parked on the bicycle line and the cyclist is forced to choose the pedestrian sidewalk.

Image 46. Project “Mierigi!“ in September 2014, Miera Street, Riga
Ref. (Project “Mierigi!”)

Image 47. A conflict between cars, cyclists and pedestrians.

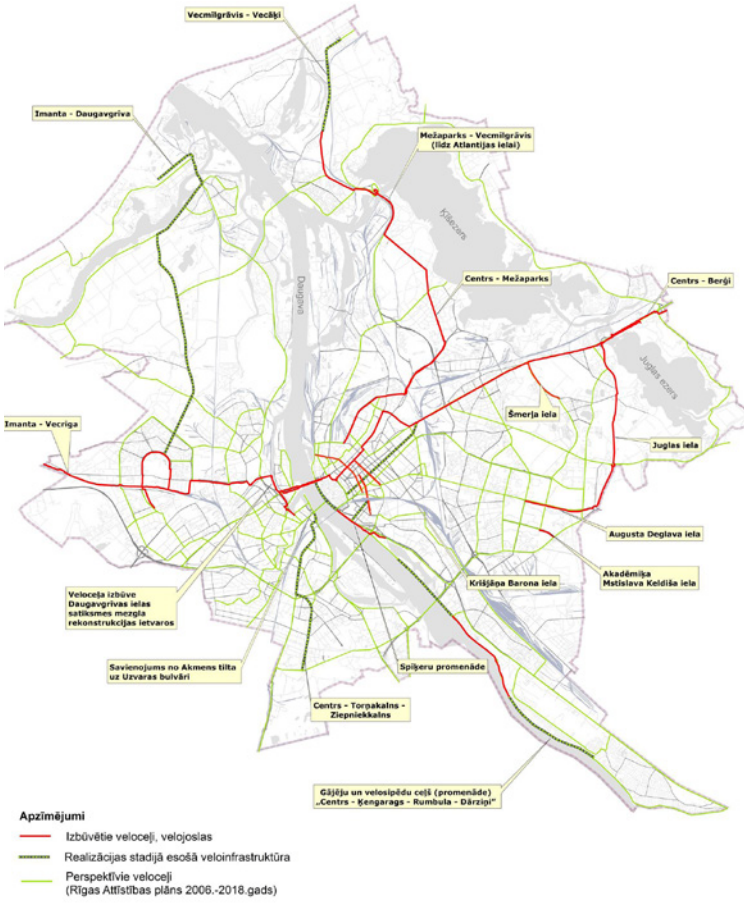


Image 48. Existing bicycle lanes (red) and planned bicycle lanes (green)
Ref. (Existing and prospective cycling ..)

Public transport

There are 4 types of public transport available in Riga as well as trains.

The trains are not integrated in the public transport system and works completely separately. They are mostly used for travels to other cities of Latvia. Passenger trains are electric and they are the fastest way of moving around in the city but their stations are poorly integrated in the city and all trains are obsolete.

The city has 9 tram lines, and they are the most convenient public transport in the city. Although the speed of trams can be increased from current 16 km/h to EU average 22,76 km/h by prioritising trams over cars (Pyrgidis, 2016). It can be done by organising the traffic lights and avoiding overlaps of tram and car lines.

Another relatively sustainable public transport are trolleybuses which cover much bigger area of Riga than trams, but they are slow and very often get into technical problems such as wires easily getting detached from the electrical overhead cables.

Lastly, almost the entire city is covered by bus and micro-bus lanes. They use diesel fuel and are comparatively fast, but they are affected by traffic jams and are polluting the city.

TRAINS

avarage speed- **34 km/h**
total length of the routes- 60 km
electricity, diesel fuel

All trains are outdated and need to be replaced with the new ones in comming future.

Separated from common public transport system of Riga.

Carries approx. 5 million passengers a year in the city borders of Riga,and approx. 650 million passengers in total

Ref. (Latvijas dzelzceļš ..)

TRAMS

avarage speed- **16 km/h**
(avarage in EU-15 22,76 km/h)
9 routes with total length 70 km
electricity

Can be faster if prioritised against general road traffic.

TROLLEYBUSES

avarage speed- **15,8 km/h**
19 routes with total length 100 km
electricity (diesel fuel)

Slow, get stuck in traffic, trolleybus wires can easily get detached from the electrical overhead wires.

BUSES

avarage speed- **20 km/h**
53 routes with total length 70 km
diesel fuel

Integrated in common public transport system of Riga.

Carries nearly 150 million passengers a year.

Ref. (Rīgas satiksme ..)

Image 49

PUBLIC TRANSPORT ACCESSIBILITY V.S. POPULATION AND DENSITY OF THE POPULATION

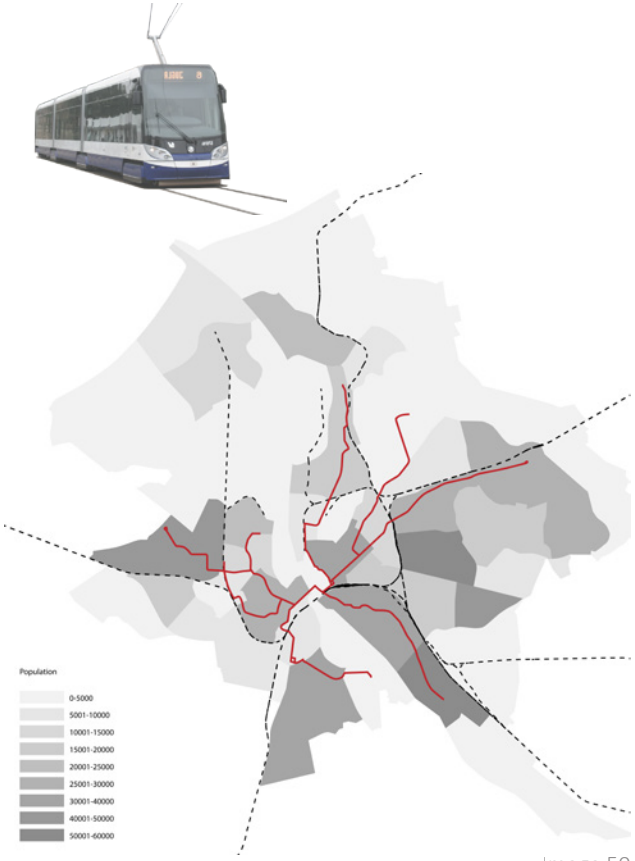


Image 50

1. Trams & trains v.s. population

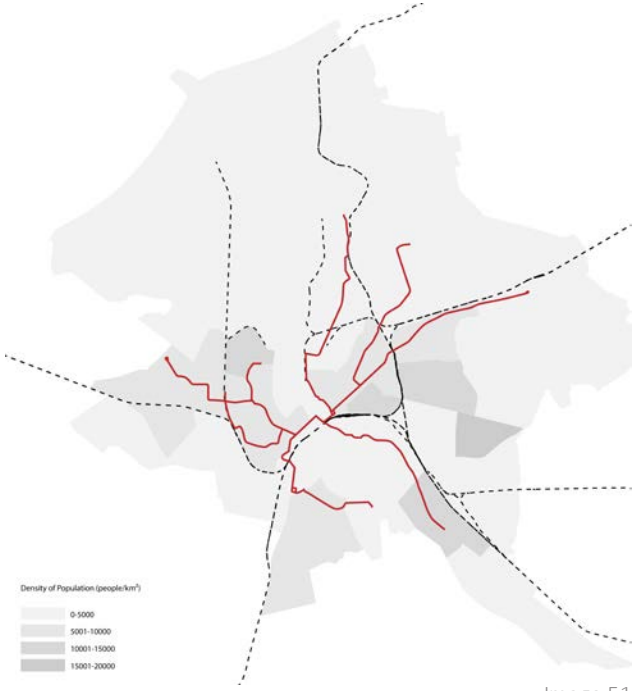


Image 51

2. Trams v.s. density of population

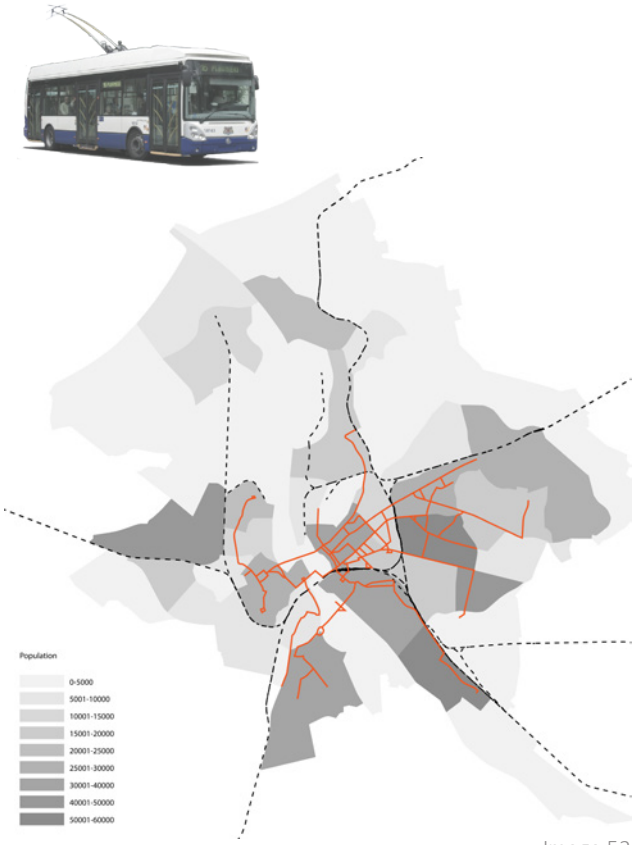


Image 52

3. Trolleybuses v.s. population

Image 53

4. Trolleybuses v.s. density of population

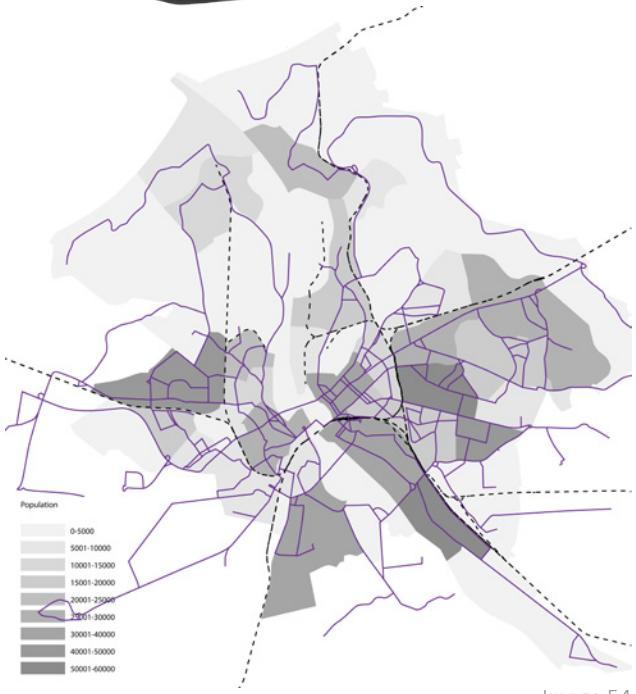


Image 54

5. Buses v.s. population

Image 55

6. Buses v.s. density of population

INDUSTRIAL SITES AND WASTELANDS V.S. POPULATION AND DENSITY OF THE POPULATION

Image 56

7. Industrial sites and wastelands v.s. population

Image 57

8. Industrial sites and wastelands v.s. density of population

Image 58

9. Industrial sites and wastelands v.s. population
THE MAIN MOVEMENT ROUTES

Image 60

10. Industrial sites and wastelands
v.s. density of population
THE MAIN MOVEMENT ROUTES

The first 6 diagrams show public transport accessibility in the neighbourhoods.

Maps no. 1 and 2 (Images 50-51) show that trams are covering very small area of the city. Trams pass through almost all of the most populated neighbourhoods except two of them – Purvciems and Pļavinieki in the East-Southern part of the city. Those neighbourhoods are covered by trolleybus and bus lanes.

Bus lanes covers almost entire city, thereby becoming the most accessible public transport in the city, but as it uses diesel fuel; it is definitely not the most sustainable type of the public transport.

The last 4 (Images 56-60) maps show distribution of the industrial sites and wastelands. Maps no. 9. and 10. (Images 58-60) demonstartes the barrier effect of the railway, industrial sites and wastelands. People from the suburbs and periphery crosses this barrier daily. Even if the destination is not the city centre, citizens travel through the centre, because almost all public transport goes through it.

CONCEPT - THE CITY SCALE

to create a polycentric city with convenient public transport connections between neighborhoods

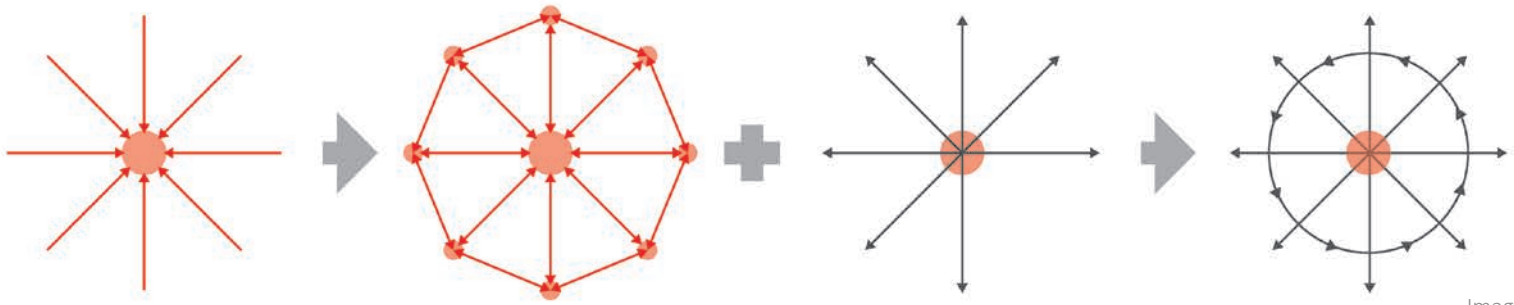


Image 61

Now **Riga is monocentric** with an active city center and residential areas in periphery

My concept for the future of Riga is to develop it in **polycentric city** with mixed used hubs in suburbs

Now **the city center** is the **main transport hub** and all the movement goes through the center

My concept is to develop mobility in the city by **railway and trams as integrated public transport basis**, and to create **new suburb centers at the tram+train stop hubs**.

1.11. CONCEPT

Currently, Riga is a distinctly monocentric city with an active city centre and residential areas in the suburbs and periphery. It increases social segregation in the suburbs and periphery. Suburbian neighbourhoods become sleeping areas with no social life while city centre is loaded with all different kind of activities and functions.

The same situation is true with the public transport. All the public transport routes meet at the centre creating a big transport hub next to the old town. With building a new high-speed railway line Rail Baltica, the existing central transport hub will become even bigger.

To evenly distribute the load of the central transport hub and to develop Riga in polycentric city, my concept is:

1. to develop mobility in the city by creating an integrated system of rail transport such as train loop and tram lines;
2. to develop mixed-use hubs in suburbs, where train the loop intersect or added with tram lines.

By creating mixed-use local activity centres in neighbourhoods with public transport stations as public life generators, the city could improve, not only by means of social sustainability in neighbourhoods, but also decrease the car use in the city as well.

1.12. STRATEGY

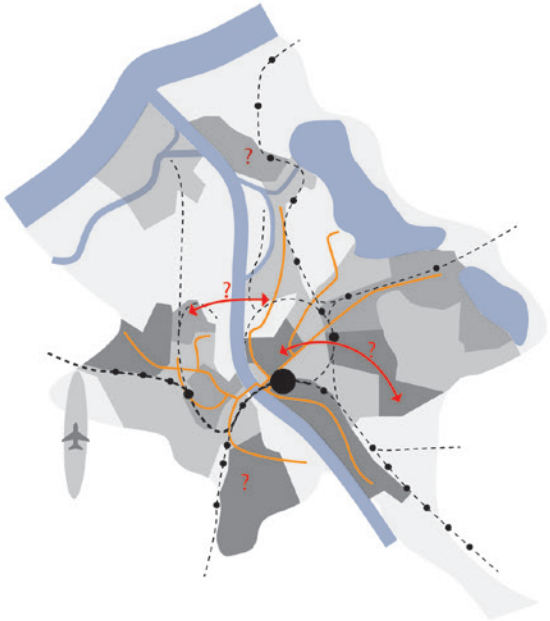


Image 62

Strategy - map 1

The most populated neighborhoods
and missing public transport links

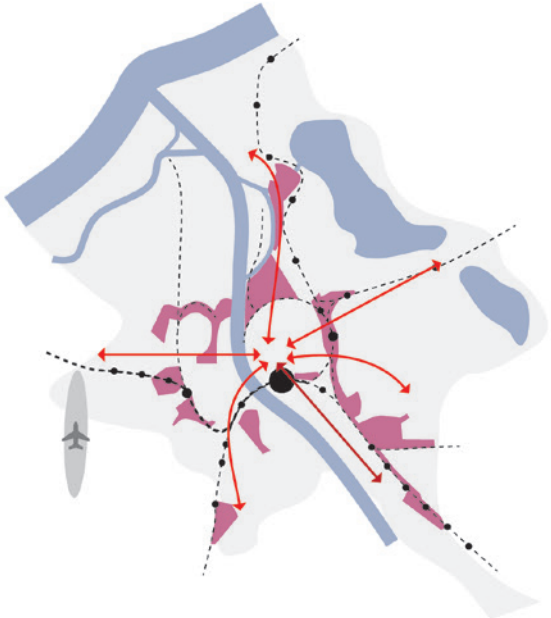


Image 63

Strategy - map 2

Industrial sites and wastelands
works as a barrier

Image 64

Strategy - map 3

Nearest future developments
according to municipality plans

The most significant future projects:
> high-speed train and multifunctional central train station
> new mixed use areas
> Museum of Contemporary Art
> Reconstruction of Stadium Daugava
> Acustic Concert Hall

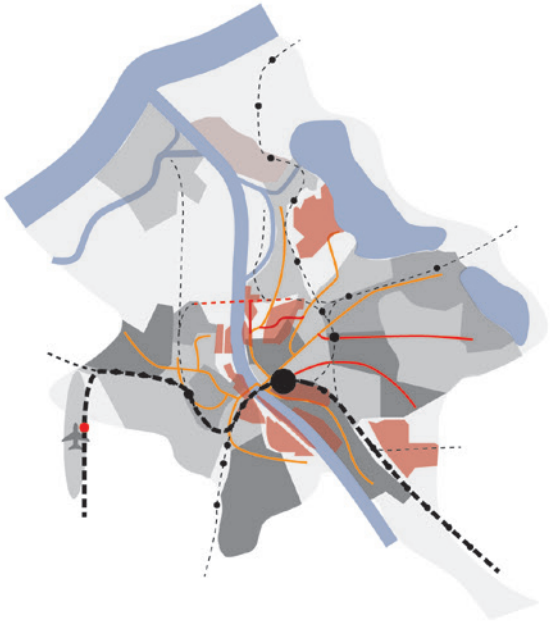


Image 65

Strategy - map 4

My strategy is to integrate the railway in the existing
public transport system and
to create 2 new tram lines to the most populated areas
to provide fast and sustainable
movement in the city

Image 66

Strategy - map 5

New integrated public transport system
trams + trains
with the potential to develop local hubs
at the places with the most potential users
>>> polycentric city

Image 67

Strategy - map 6

Problem zone:
Former industrial sites that devides few of the
most populated suburb neighborhoods
from the city center
with a 2 new tram lines passing through
creates a low activity gap
with a poor access to train stops

1.13. SUMMARY

New 7 mixed-use hubs based on train stations as city life generators:

1. (Existing) CENTRAL STATION with a new high-speed train;
2. (New) NATIONAL STADIUM connected to my new proposed tram line;
3. (Existing) ZEMITANI- connected to my new proposed tram line;
4. (New) SKANSTE - new development area with the Museum of Contemporary Art planned by the municipality, connected to an existing tram line;
5. (New) IĻĢUCIEMS - to provide connection to the densest neighbourhoods;
6. (Existing) ZASULAUKS connected to the existing tram line;
7. (Existing) TORNAKALNS - connects neighbourhoods and two culture parks, connected to the existing tram line.

Historically, Latvia has gone through a great range of historical events and political systems which has caused several rapid population declines and growths. For example in the 1990's the population of Riga has hit its peak throughout its entire existence, because of labour immigration from the Soviet Union. Whereas joining EU in 2004 and economic crisis in 2008 has led to the population decline again.

Considering its historical experience, it is therefore very important to keep the city compact, to relate new developments for the current population and improve living conditions for them.

Since the railway in Riga and lands along it creates a gap between the city centre and its suburbs instead of working as connector, my strategy is to integrate the railway in the existing public transport system and to develop 7 mixed-use hubs in the city (Strategy map 5- Image 66).

By comparing the distribution of the population, distribution of industrial lands and wastelands along with potential of public transport hubs, the conclusion is that one of the key problem areas that disconnects neighbourhoods in the city is the former industrial area between Purvciems neighbourhood and the city centre (Strategy map 6- Image 67).

Image 68

Image 69

2. THE CITY CENTRE OF RIGA

Officially the ‘Centre’ is a name for one of the neighbourhoods of Riga, but even the local people do not know the borders of the neighbourhoods, and ‘the city centre’ is usually used to describe everything between the river Daugava and the railway circle on the right side of the river (Image 70). In this paper, the term ‘City Centre’ is used to describe the inner part of the railway circle.

As mentioned before in the section of history, the centre is formed until the end of the 19th century and the central part of the city centre is a UNESCO World Heritage Site (Image 71), noticed by its collection of Art Nouveau/Jugendstil buildings and wooden architecture.

Besides the neighbourhood called ‘Centre’, there are 6 more neighbourhoods in the inner part of the railway loop: Old Town, Avoti, Grīziņkalns, Brase, Skanste and Pētersala-Andrejsala (Image 72). The problem zone, identified in previous sections, is located partly in neighbourhood called Grīziņkalns.

Streets in the city centre are mainly laid out in grid and shapes the rectangular building blocks. There are several parks; the largest of them is a former cemetery. In the North-Westerly part of the city centre is a large undeveloped neighbourhood called Skanste. Historically the area was urban pastures, but now it is one of the new development areas which are planned to be developed in a vibrant mixed-use district.

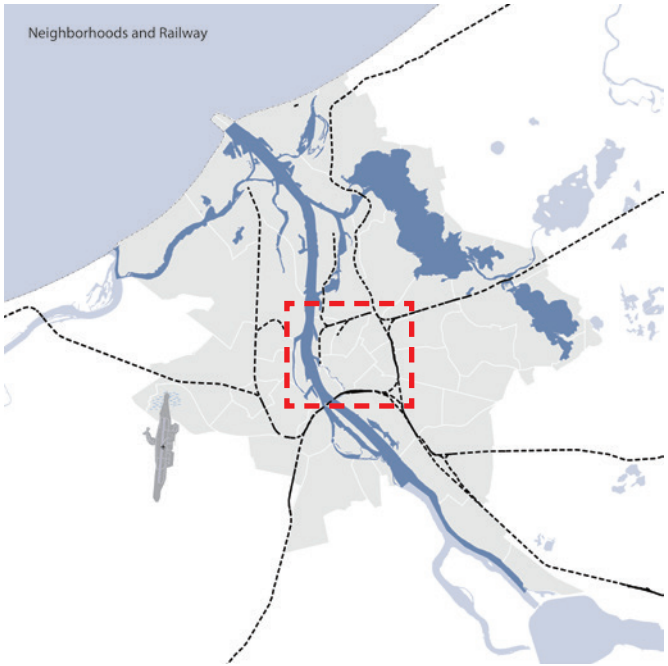
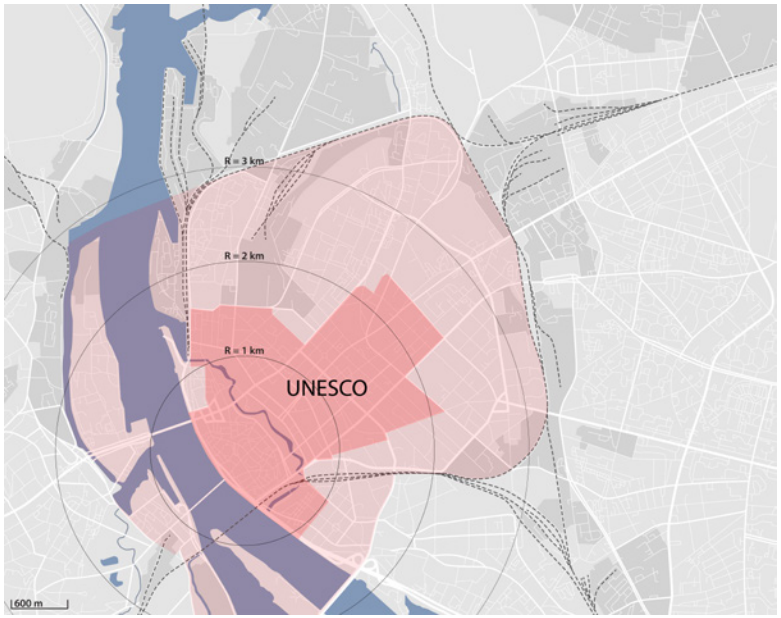
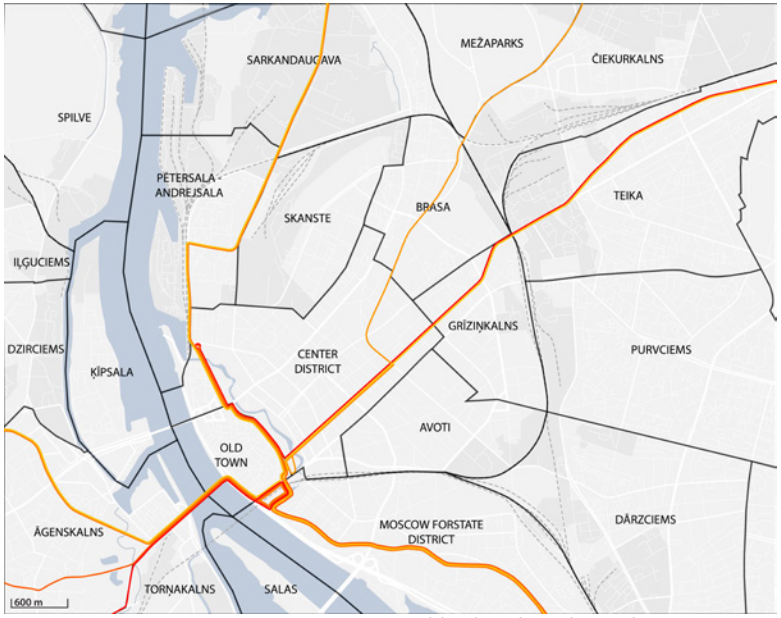


Image 70



UNESCO heritage site with its protection zone, Image 71



Neighborhoods and tram lines, Image 72

The city centre is crossed by several tram lanes (Image 72) and a lot of bus and trolleybus lines. Most of the public transport lines meet at the central station next to the Old town.

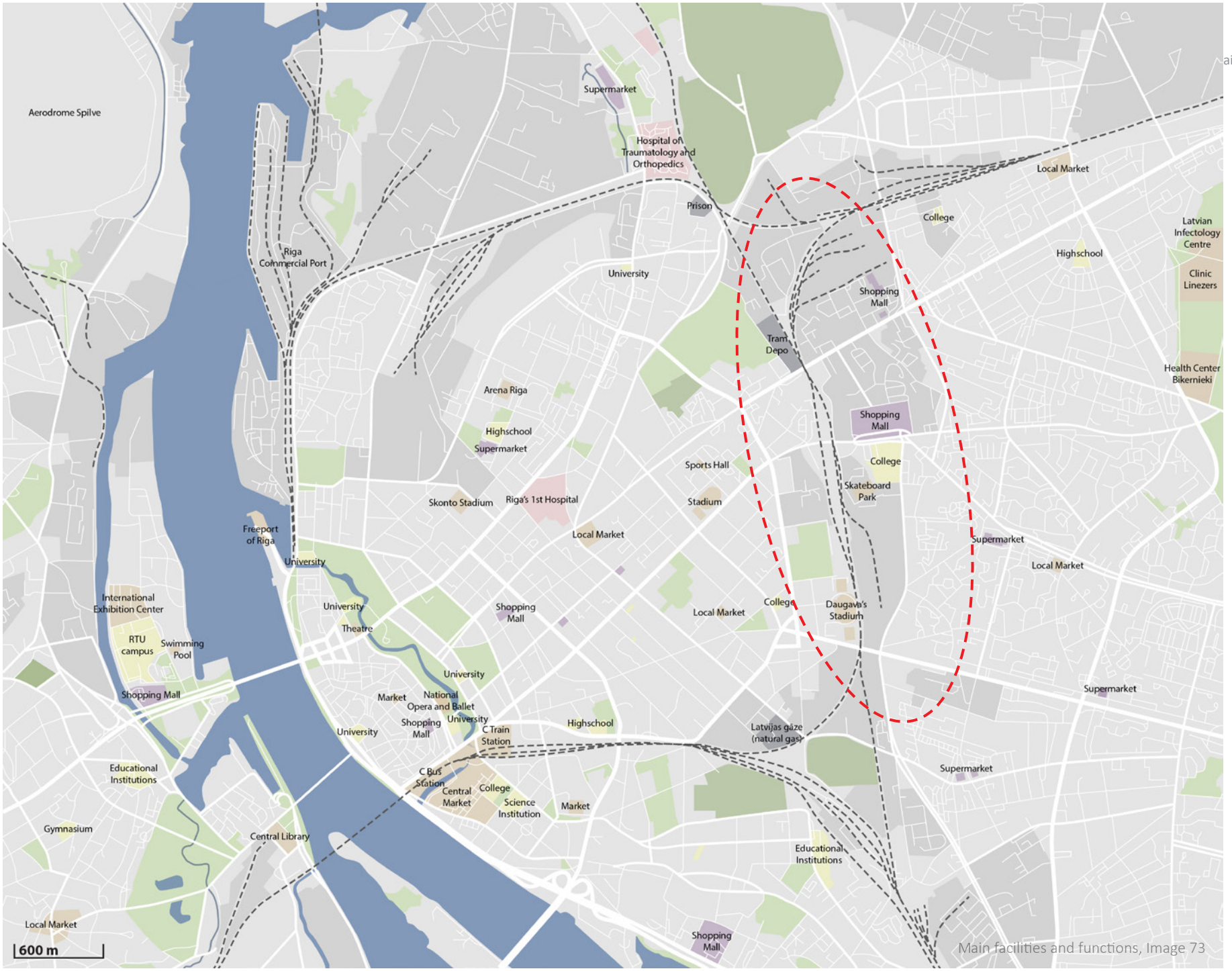
The Old town is the heart of the city and holds almost all tourist and night life of the city (Image 73).

The main transport hub with the central train station and the central bus station is situated right next to the Old town as well as the main market place.

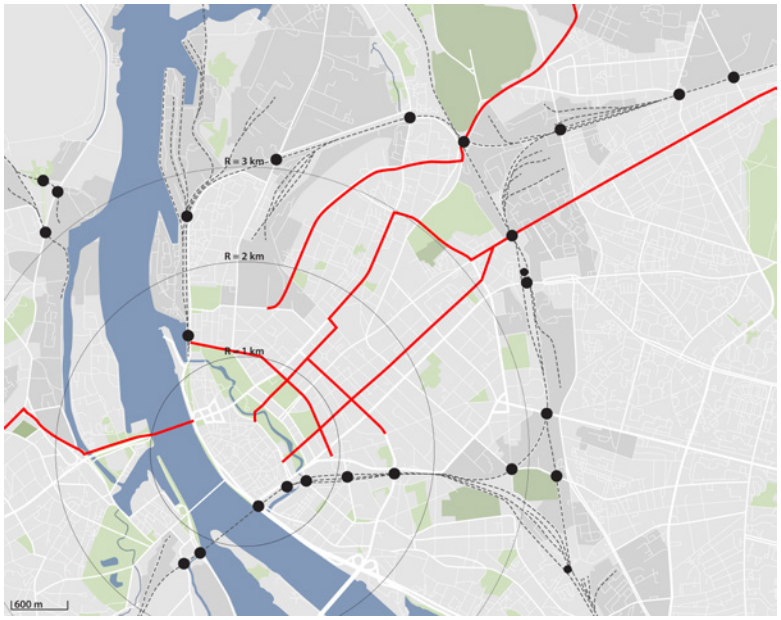
The Old Town is surrounded by the canal and several parks built at the place of former fortifications. Streets of the city centre are not very green and the centre suffers from the flooding when it rains heavily and from air pollution despite of several separate historical parks with a rich assortment of trees.

Most of the culture events take place at the Old town, the biggest parks, at the theatres or opera house which all are situated at the city centre. Almost all cafes and restaurants of the city are situated in the city centre, most of them at the Old Town.

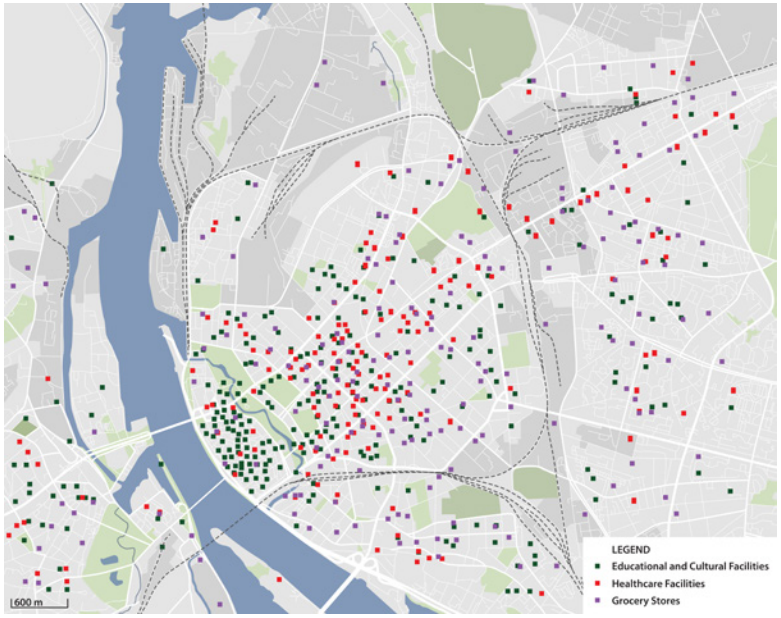
There are several stadiums at the city centre. The biggest stadium is called Daugava, opened in 1958, situated next to the railway. It is a stadium of national importance and it had hosted Latvian Song and Dance Festival, which is one of the largest amateur choral events in the world. In spite of the fact that there are several big stadiums in the city, Riga still does not have a stadium that meets international standards.



Main facilities and functions, Image 73



Bicycle paths, bridges and tunnels, Image 74



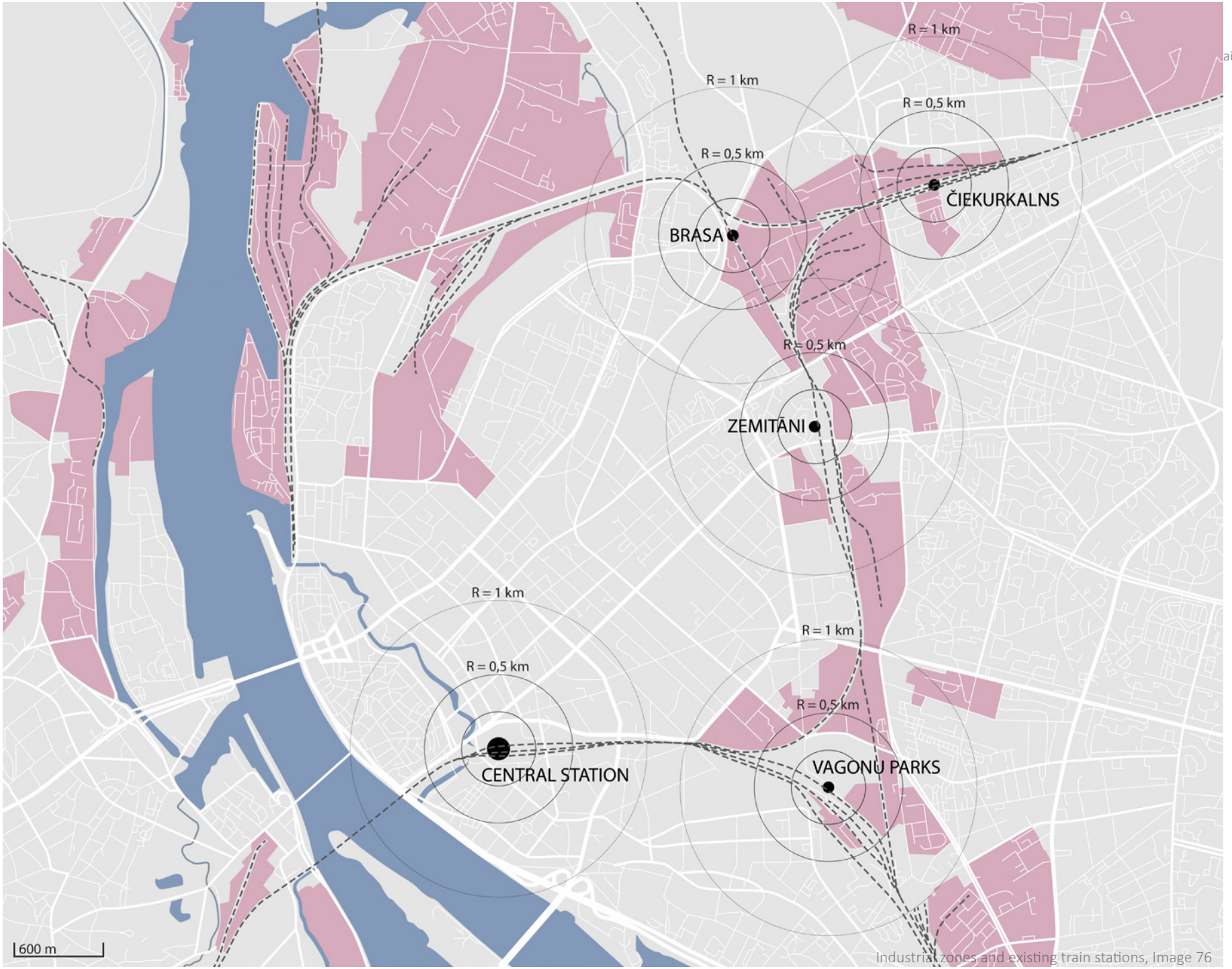
Public facilities, Image 75

Currently, one of the most discussed city planning questions is bicycle infrastructure. In recent years cycling has become more and more popular even despite of poor infrastructure to cater for it. There are only few streets with bicycle lanes (Image 74). The municipality of Riga are currently working on bicycle infrastructure development, however the process is very slow and the situation on the streets especially in summer time is quite dramatic, because of the rapidly increasing number of cyclists.

As mentioned before, the city is completely mono-centric which can be seen in the Image 75 where the coloured dots represent public facilities in the city such as educational and cultural facilities in green as well as healthcare facilities and grocery stores. Most of the public facilities are concentrated at the city centre, but there is a gap with almost no facilities along the railway.

Image 76 represents industrial zones of the city and also provides an answer why there are almost no public facilities along the railway – because nobody lives there. The former factory areas now are mainly used for storages and for small businesses that require warehouse-type spaces.

The main issue with these industrial zones is that they separate the inner city from the outer city but another important question is accessibility to the existing train stations. The only train station that is integrated in the city and works as urban hub is the main Central Station. But the others do not serve any other public functions other than being a station and does not work as urban hubs.



ailways

Industrial zones and existing train stations, Image 76

2.1. SUMMARY

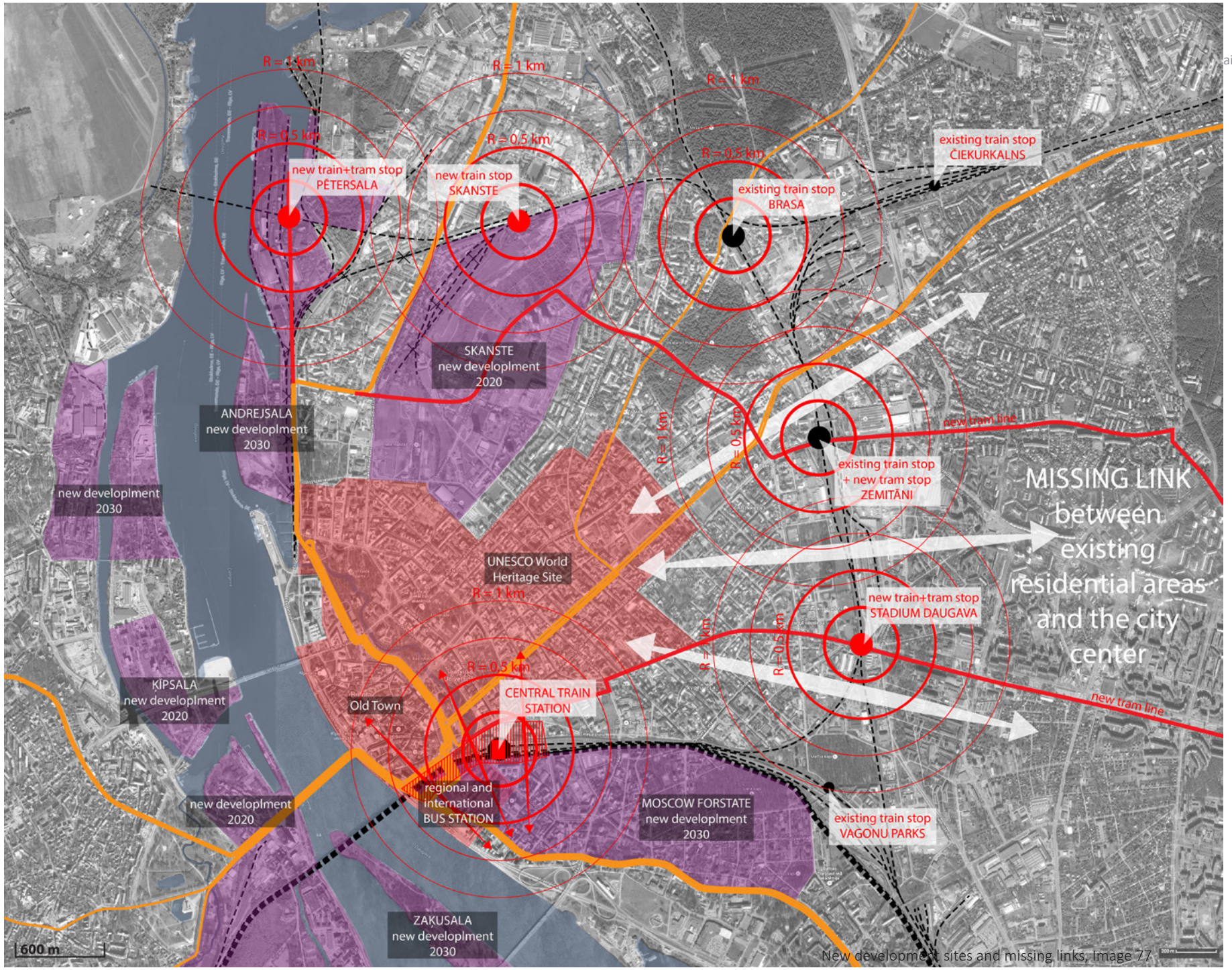
Largest future projects for the city introduced by the municipality:

1. New development area Skanste;
2. Central station area (includes the Central Train Station, the Central bus station and city's public transport hub;
3. Museum of Contemporary Art;
4. reconstruction of the stadium Daugava;
5. Acoustic Concert Hall.

The municipality of Riga has marked out potential development sites for the coming future of the city (areas in the purple colour, Image 77). Most of them are based on waterfront developments, one is based on the Central station development due to construction of Rail Baltica and another is the new development of the area called Skanste which is a former city's meadows, an unused plot that will be developed in a mixed-use area.

There have been long discussions about several missing public facilities in the city. The most discussed is the Contemporary Art Museum which now holds on-going international competition. The art museum will be situated in the new development area Skanste. Another actual near future project is the reconstruction of the stadium Daugava next to the railway but unfortunately the plan does not include access from the railway. Currently, the stadium is in very bad condition. It is located in a very complicated spot in terms of accessibility.

As mentioned before, my strategy suggests developing two new tram lines (lines in the red colour, Image 77) and integrated railway system. One of the new tram lines would connect the neighbourhoods in the city centre with the neighbourhoods in suburbs, and it would also pass the new Art Museum. The second tram line would also connect neighbourhoods on both sides, and it would add accessibility to the stadium.



New development sites and missing links, Image 77

2.2. SWOT ANALYSIS OF THE BROWNFIELDS AND INDUSTRIAL AREAS IN PROXIMITY TO THE RAILWAY

STRENGHTS

Closeness to the most active part of the city with culture life and other activities

Closeness to several parks

Accessability to public transport in walking distance (0.5-0.6km)

Railway crossings at least every 1,5 km

WEAKNESSES

Industrial land-use with cargo traffic and potential noise and air pollution

Lack of qualitative greenery

Train stops are too far from the existing residential areas

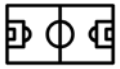
Lack of cyclist and pedestrian infrastructure, especially at the railway crossings

OPPORTUNITIES

Closeness to public facilities like schools, medical facilities and shops

Railway stations as potential city life generators

Stadium as an activity spot

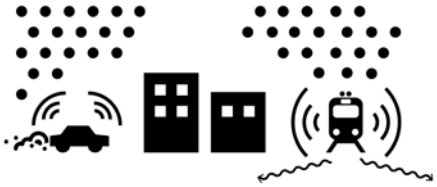


THREATS

Air pollution from the traffic and railway

Noise pollution from railway

Vibrations from railway



2.3. STRATEGIES

1 - Remove industries

Remove industries from the city centre and the closest suburbs to reduce cargo traffic, noise, air and soil pollution in the city.

2 - Mitigate pollution

Increase amount of vegetaion along the railway to decrease noise pollution from the railway and air pollution in the city centre.

Develop land and built forms to mitigate noise pollution and vibrations from the railway.

3 - Reduce the gap

Build closer to the railway to decrease the physical and mental distance between both sides of the railway.

Densify around the railway stations to generate urban life and encourage people to use trains as part of the city's public transort.

4 - Connect and activate

Connect new developments in close proximity to the railway back to the city with new infrastructure for pedestrians and cyclists.

Add new functions and activities along the railway to encourage citizens to use the place.

3. THE SITE

The site is located between the two new tram lines (Image 78) and it is the key area that divides the Eastern part of the Riga where the densest populated neighbourhoods are located, from the city centre.

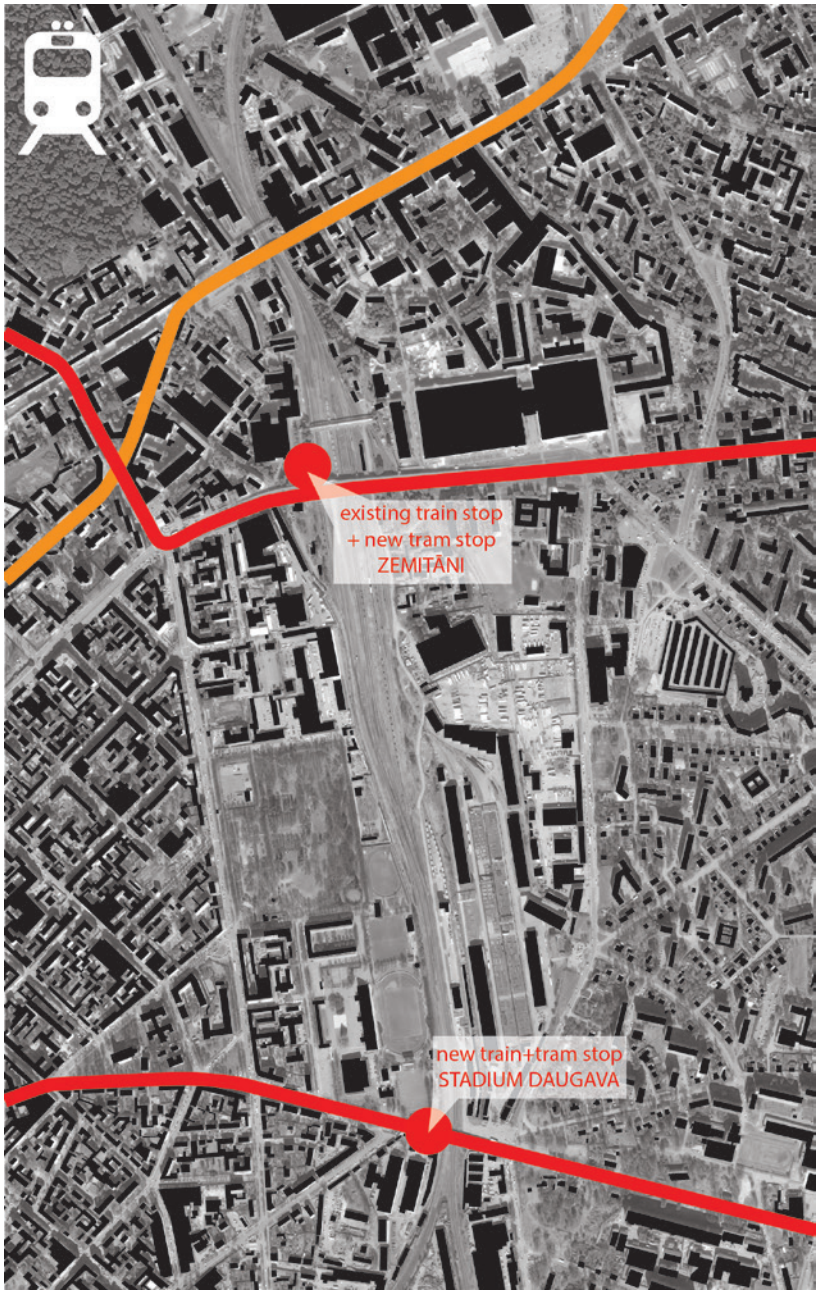
The main problem is that the railway creates a gap between the old city and the residential micro- districts which leads to increased use of cars, buses and trolleybuses (Image 46).

The site covers parts of three neighbourhoods – Grīziņkalns on the Centre side and Teika and Purvciems on the suburbian side. All the three neighbourhoods highly differs by their character (Image 98).

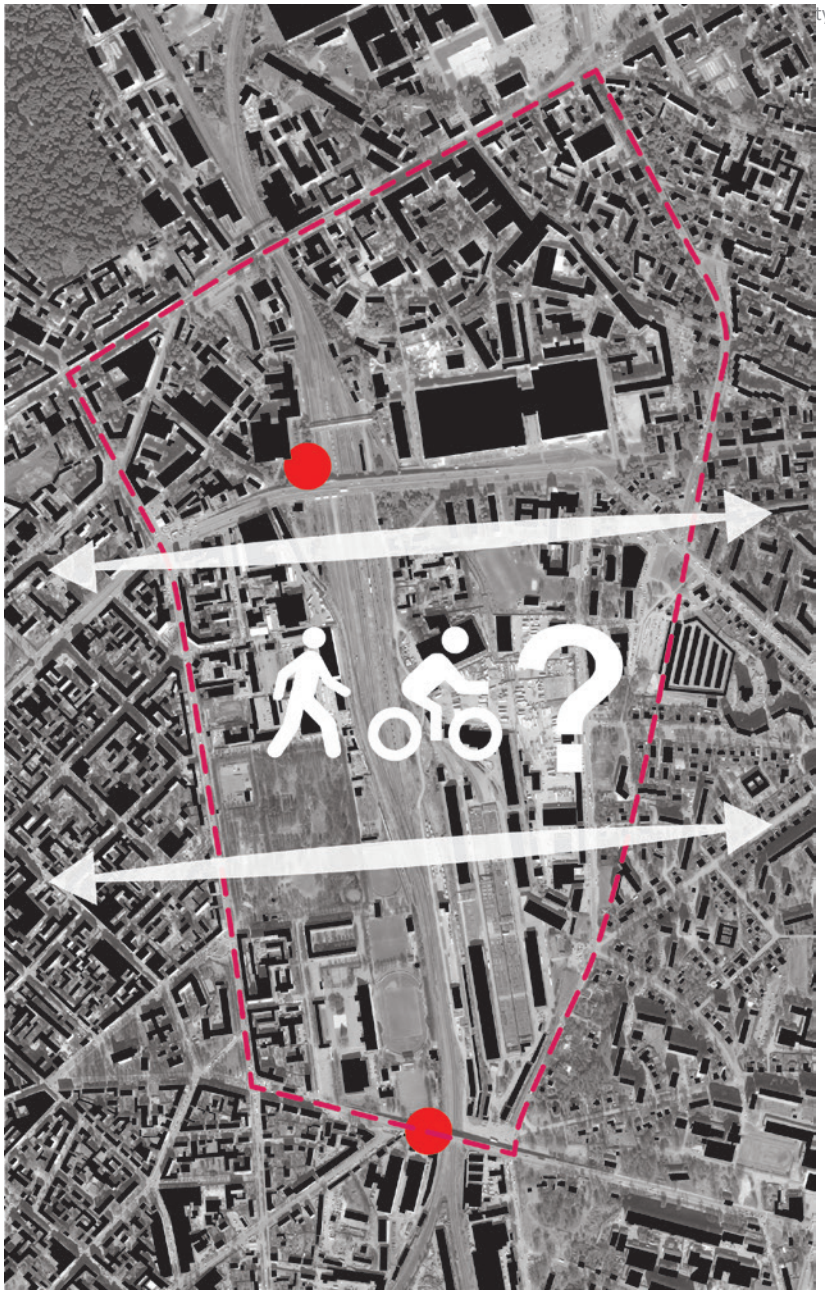
Grīziņkalns is a former residential area for factory workers. It has block structure with masonry and wooden buildings and a historical park. The park had been reconstructed and has become an active public space.

Teika is mainly formed by 1-2-storey family houses in functionalist style although there are some 5-story apartment houses and a former factory area with spectacular architecture.

Purvciems is a typical micro - district from the Soviet times with 5-12-storey apartment buildings and some single family houses.



New lines and new tram-train stations, Image 78



Missing connection for pedestrians and cyclists, Image 80


1


2

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11


12

Images 81-96


13


14

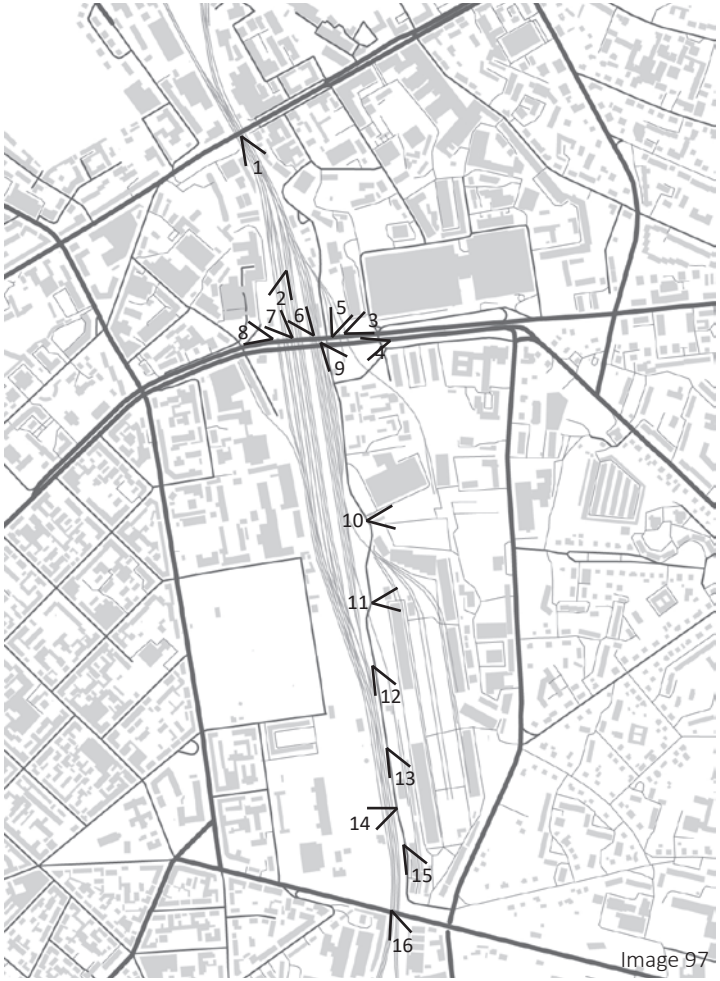


Image 97


15


16

GRĪZIŅKALNS

total area 151,7 ha or 1,517 km²
population 12947 (year 2014)
with 8534 people/km²

developed during the industrialisation period with factories, historicaly populated by workers of factories

block structure
with masonry and
wooden
architecture,
couple of churches
and parks, lack of
a single centre

8 kindergartens, 5 schools, 2 colleges

Grīziņkalns Park is the neighbourhood's central public space;
placed on a small hill – an old sand dune;
reconstructed in 2015 with a new playground, water basin and a skatepark next to the park

national importance stadium,
train station Zemitani, opened in 1872,
few factories - candy factories, factory of beverages

Character of the neighbourhoods, Image 98
Ref. (Statistics of the Neighbourhoods ..)

TEIKA

total area 468,2 ha or 4,682 km²
population 29990 (year 2014) with 6405 people/km²

planned and partly built in 1920s - 1930s
mainly 1-2-storey family houses, also five-storey apartment houses

mainly functionalist architecture
6 kindergartens, 2 schools

one of the greenest and most prestigious districts of Riga

part of the neighbourhood next to the railway differs and has more industrial character

PURVCIEMS

total area 501,7 ha or 5,017 km²
population 59940 (year 2014) with 11947 people/km²

mainly 5, 9 and 12-storey apartment blocks from the late Soviet times and early independence years (1980s–1990s)

also some single-family houses,
10 kindergartens, 9 schools, 1 colleges

neighbourhood built on a former marshland

GRĪZIŅKALNS

TEIKA

PURVCIEMS

Images 99-112

MAIN FUNCTONS AND FACILITIES

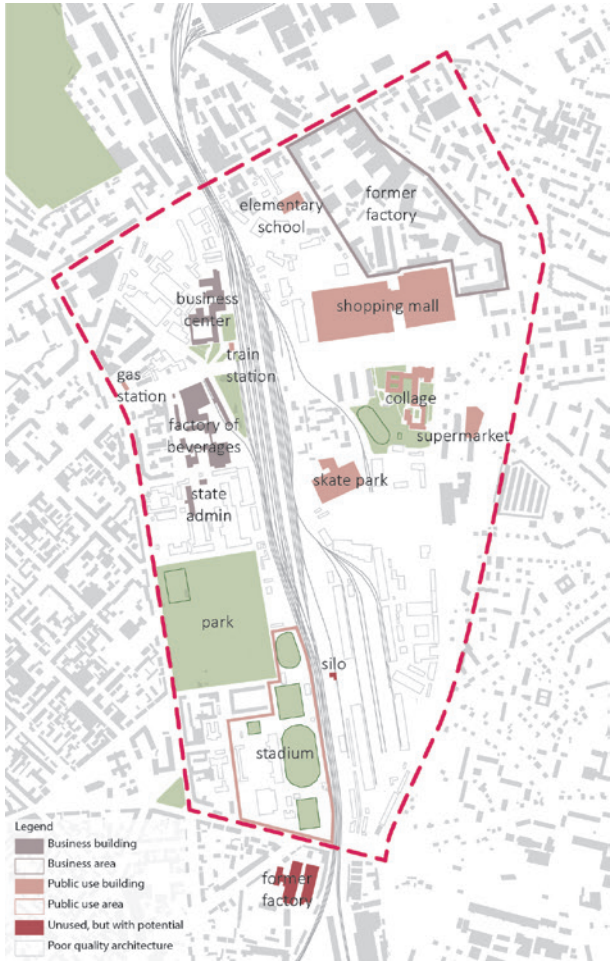


Image 113

3.1. FUNCTIONS

The site is rich with a lot of different functions (Image 113); however they are unrelated to each other and increases fragmentation of the area.

On one side of centre there is a stadium and a historical park next to each other. Those are rather intensely used areas especially in the summer time. The park is public, but the stadium is mostly used by sport events and schools.

Next to the park, there is a beverage factory called Latvia Balsam, founded in 1900. As the factory in Griziņkalns is quite small and has a long history, it should be kept. The factory is planning to open a museum to present their history, and that would increase the value of the neighbourhood.

A large company that trades metals are situated on the suburbian side of the railway. The area is covered with warehouses to store their production. The company delivers production from Russia, Ukraine, Poland, Germany, Finland and Sweden. Their goods are carried by trucks which creates pressure on the traffic and air pollution.

One of the big warehouses on the suburbian side is used by an indoor skate park. It is a very popular place for youngsters and kids.

Next to one of the bridges is one of the city's biggest shopping malls called Domina.

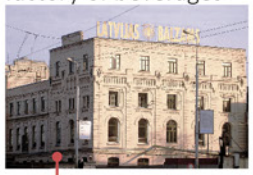
former factory

Stadium Daugava

Grizinkals Park

warehouses

factory of beverages



old parking building

tram depo

industrial

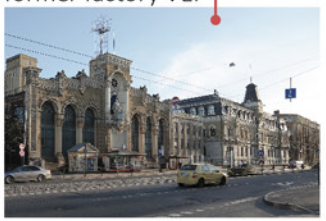
industrial

indoor skate park

Riga Tehnical Collage

shopping mall

former factory VEF



Images 114-127

3.2. STRUCTURAL ANALYSIS AND MOVEMENTS

THE SITE BORDER

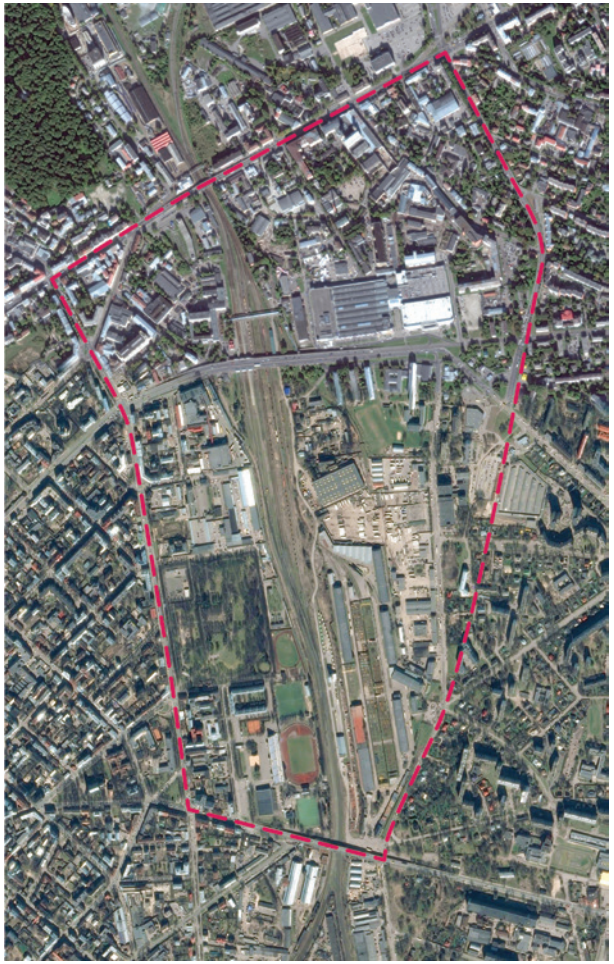


Image 128

BUILT STRUCTURE

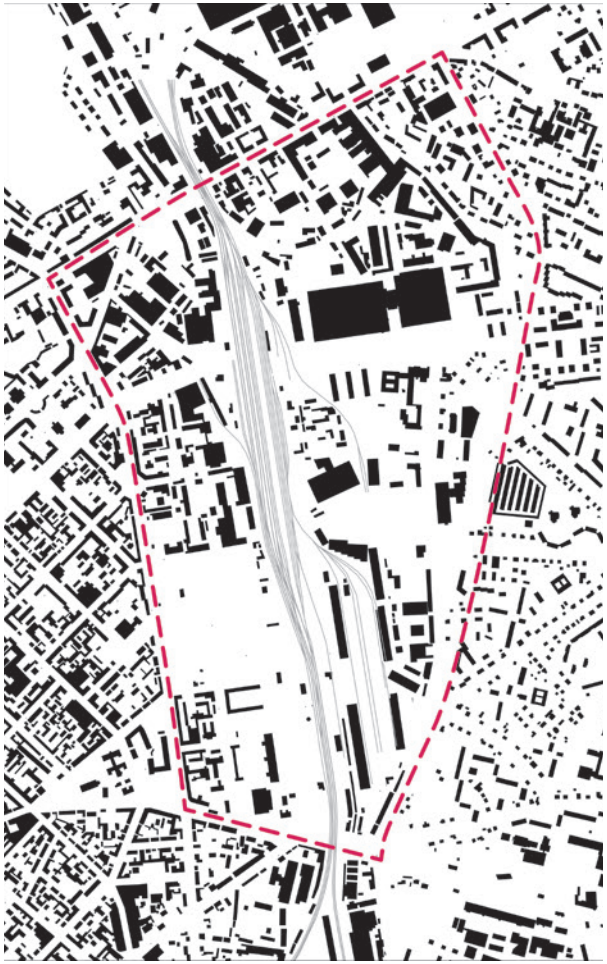


Image 129

INDUSTRIAL AND POST-INDUSTRIAL AREAS

Image 130

STREET STRUCTURE

Image 131

MOVEMENT

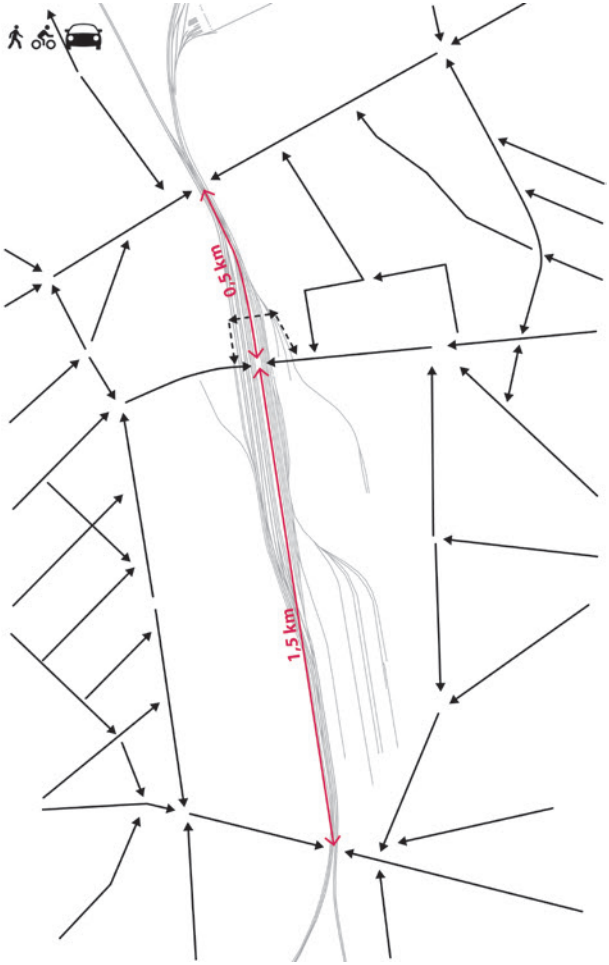


Image 132

MOVMENT ISSUES

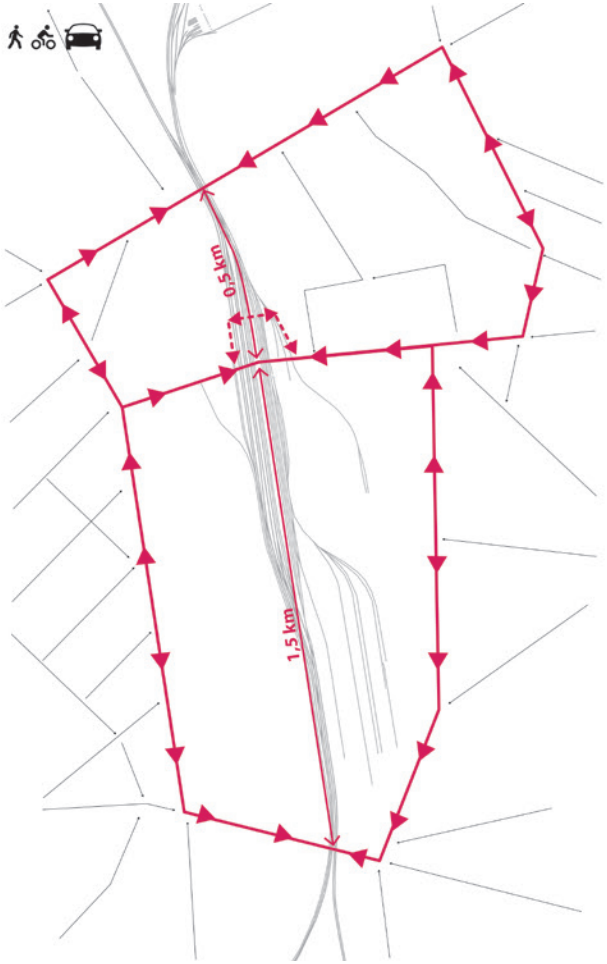


Image 133

RAILWAY CROSSINGS

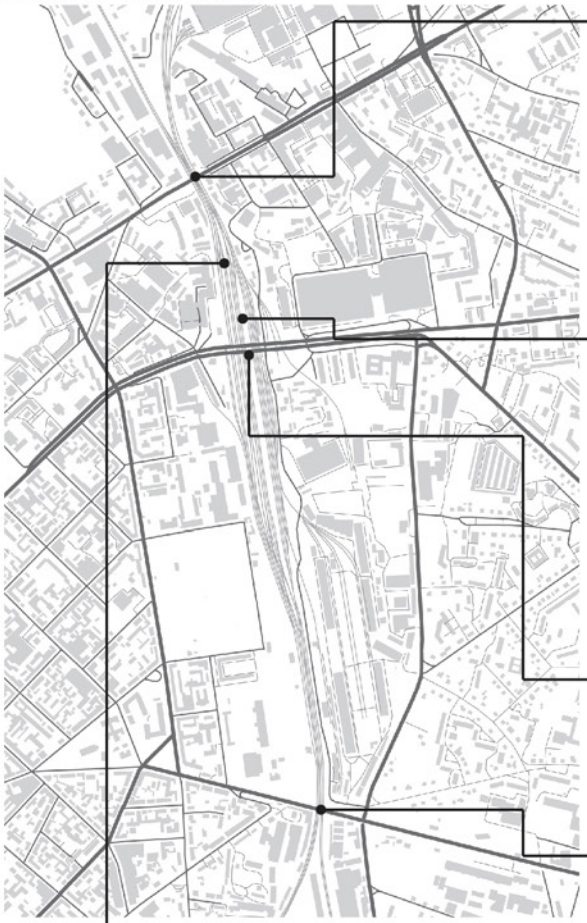


Image 134

VEF bridge

pedestrian bridge

Zemitani bridge

bridge of A.Degalava Street

Images 135-147

3.3. RAILWAY CROSSINGS

There are 4 bridges at the site to cross the railway. 3 of them are for motorised transport with pedestrian sidewalks and one of them is a pedestrian bridge.

VEF Bridge or also called Gaisa Bridge is situated in the North of the site. It is the oldest viaduct of Riga and it has always been crossed by trams. The first bridge was opened in 1906, it was bombed during the World War II and reconstructed afterwards. The current bridge is built in 1963 and reconstructed in 1991 (Infrastructure..). It is one of the few bridges in the city with a bicycle path (Image 58, page 74), but the bicycle path is very narrow and it is shared with pedestrians (Images 135-137, page 74).

Zemitāni Bridge is located next to the Zemitani train station. The bridge was opened in 1985. There are tram tracks on the bridge, but tram line was never built. Right next to the bridge there is a pedestrian bridge from the train station at Zemitāni to the shopping mall Domina. The pedestrian bridge has very steep stairs and no ramp (Infrastructure..).

The bridge of A.Deglava Street was opened in 1966.

All bridges are crossed by car streets, bus lanes and trolleybus lanes. There are pedestrian sidewalks on all bridges, but it is not pleasant walk due to the car traffic, openness, wind and other factors. There is no space for bicycles; cyclists are forced to share the space with cars or pedestrians.

Statistics shows that Zemitāni Bridge is the least used bridge for cycling in the Riga (Image 148) despite the fact that it leads to the one of the most populated areas.

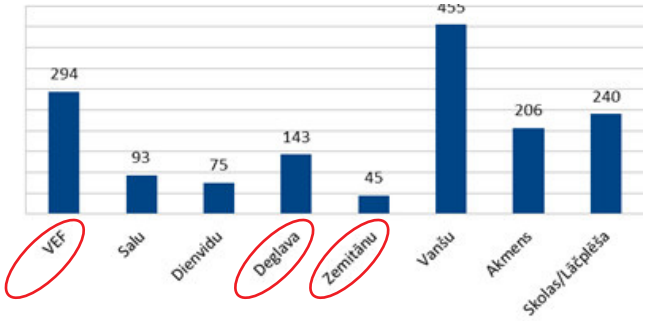
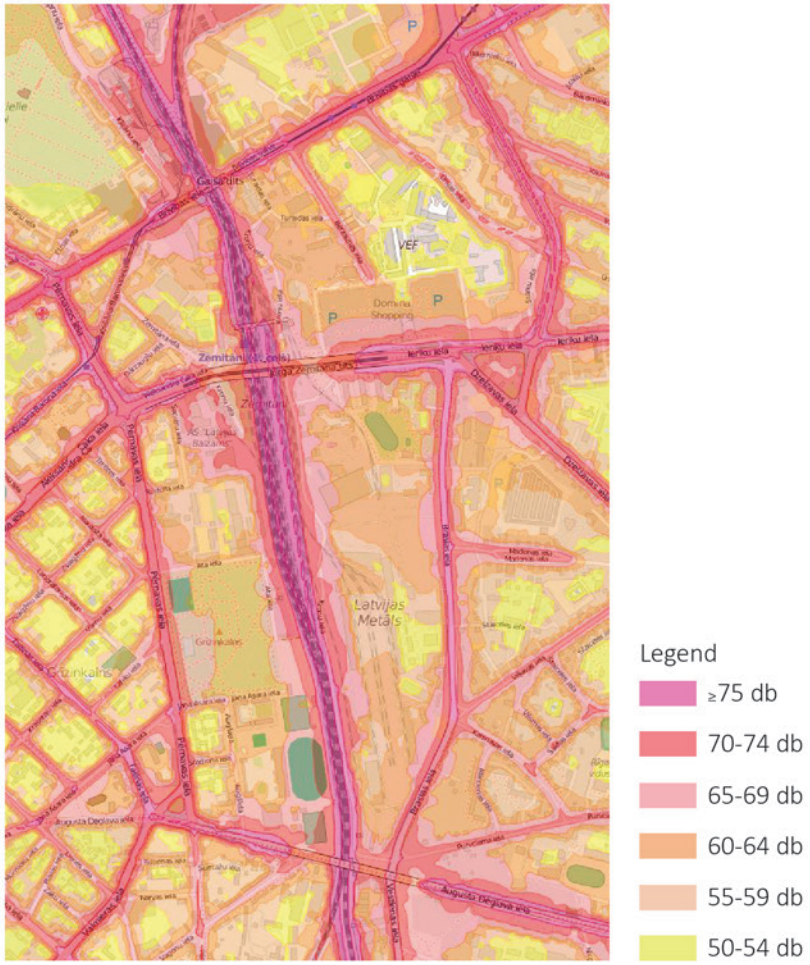


Image 148
Amount of cyclists per hour on main bridges, 2014-05-16 official Bike to Work day, Latvia
Ref. (Rīgas pilsētas velosatiksmes .., p. 4)

MAP OF THE NOISE POLLUTION

Avarage Day & Night Levels In Decibels

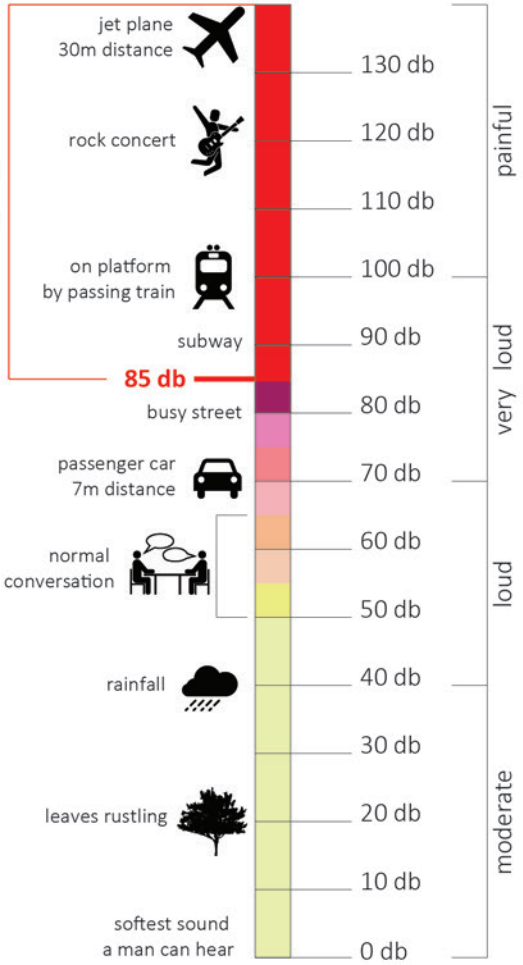


Noise map, Image 149

Ref. (Noise maps...)

Image 148

COMPARATIVE SOUND LEVELS



Labels of Noises, Image 150

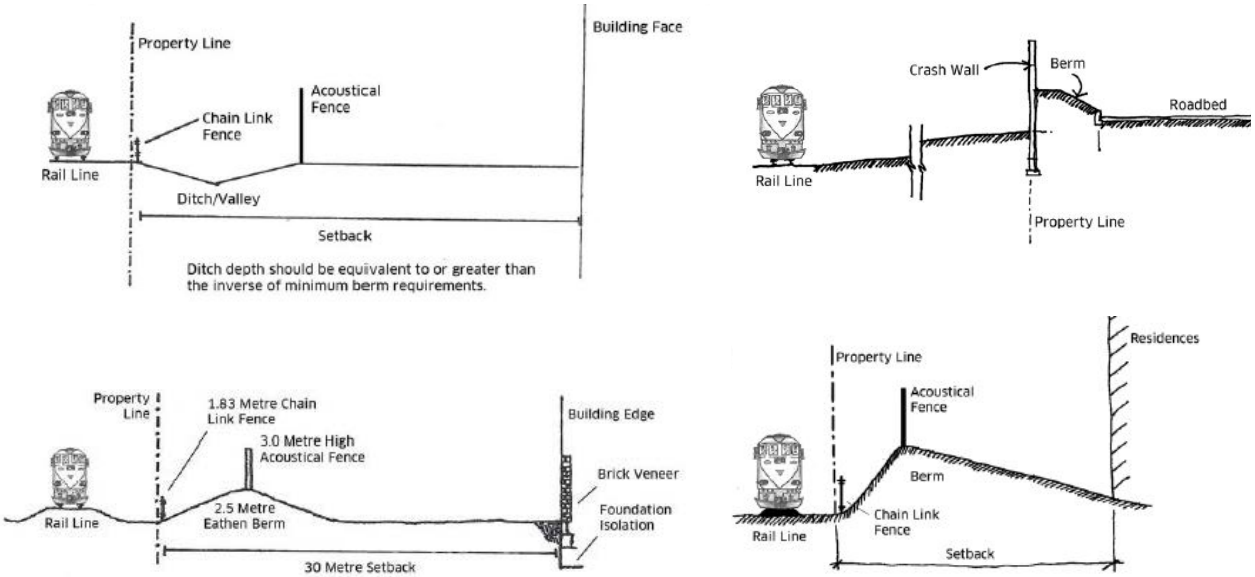
Ref. (How do we measure sound ...)

3.4. NOISE POLLUTION

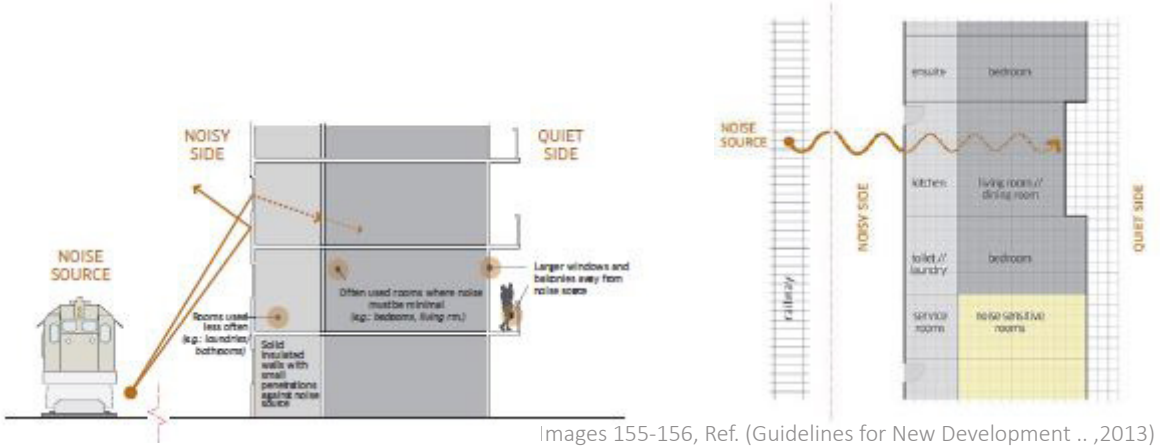
The site is highly affected by noise pollution and vibrations from the railway, roads and factories, but the noise pollution does not reach dangerous levels (Image 149). The spatial structure of the site with the vast open areas and warehouse buildings increases the spread of the noise generated.

With changing the spatial structure of the site and combining solutions for land forms and architecture, it is possible to significantly reduce the noise pollution.

The Railway Association of Canada has developed Guidelines for New developments in Proximity to Railway Operations (Guidelines for New Development .. ,2013) to protect new developments from noise pollution. One of their solutions is constructing berms. With these alongside walls and fences, it is possible to keep the railway on ground level and reduce the noise it creates.



Images 151-154, Ref. (Guidelines for New Development .. ,2013)



Images 155-156, Ref. (Guidelines for New Development .. ,2013)

3.5. ANALYSIS OF THE SITE - SUMMARY

STRENGTHS:

- **connected** to the other parts of the city and region by railway
- 3 neighbourhoods that meets at the site represents **3 different spatial characters and diversity of building typologies**
- **diversity of functions:** national stadium of importance Daugava, train station Zemitāni, big indoor skate park Monsterparks, outdoor skate park Griziņkalns, sports place Ghetto Games, factory of beverages Latvia Balsam, historical park Griziņkalns, Riga Technical collage, shopping mall Domina etc.

connected

&

diverse

ISSUES:

- **noise pollution and vibrations** from the railway
- **physical barriers** as railway, fenced industrial sites and limited access to the stadium
- **pedestrian and cyclist sharing non user-friendly railway crossings**
- **industrial character**
- **lack of urban life**
- **most of the buildings are bad quality warehouses or derelict factories**
- **unreadable street structure and chaotically built structure**

polluted

fenced

industrial

people un-friendly

Image 157

3.6. STRATEGY

Noise pollution from the railway (≥70db)

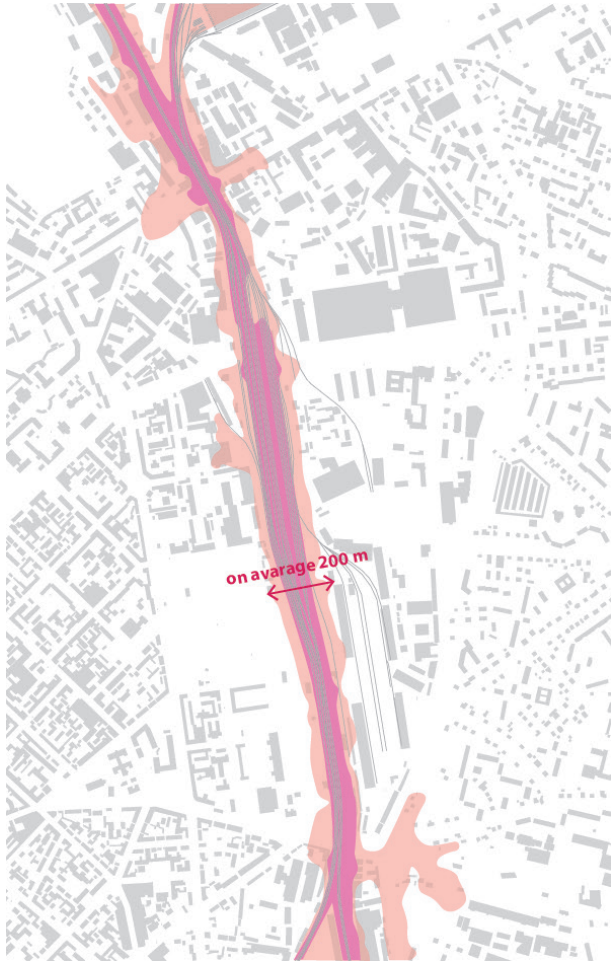


Image 158

Mitigate noise and vibratons by creating green protective zone (≥50 m where possible)

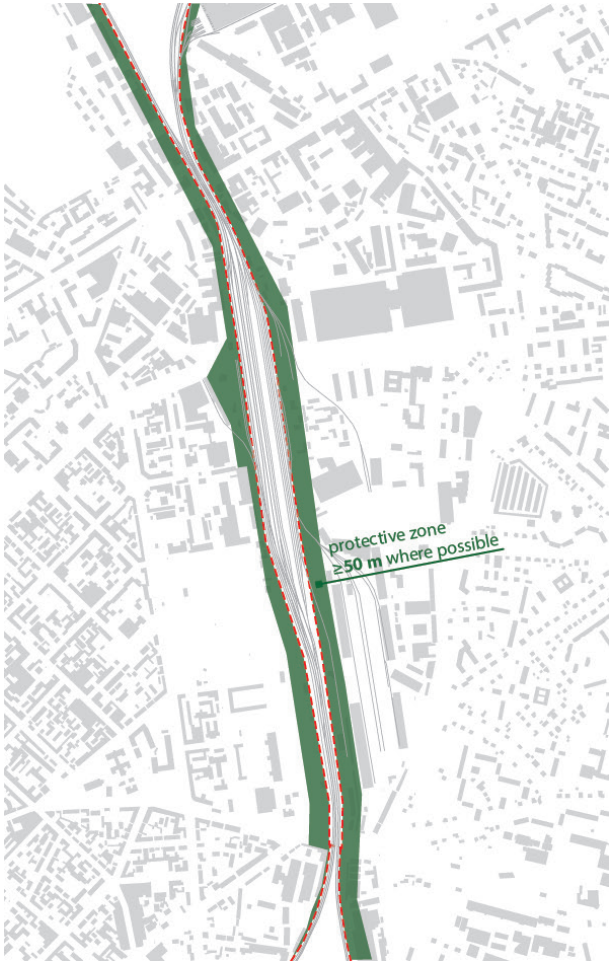
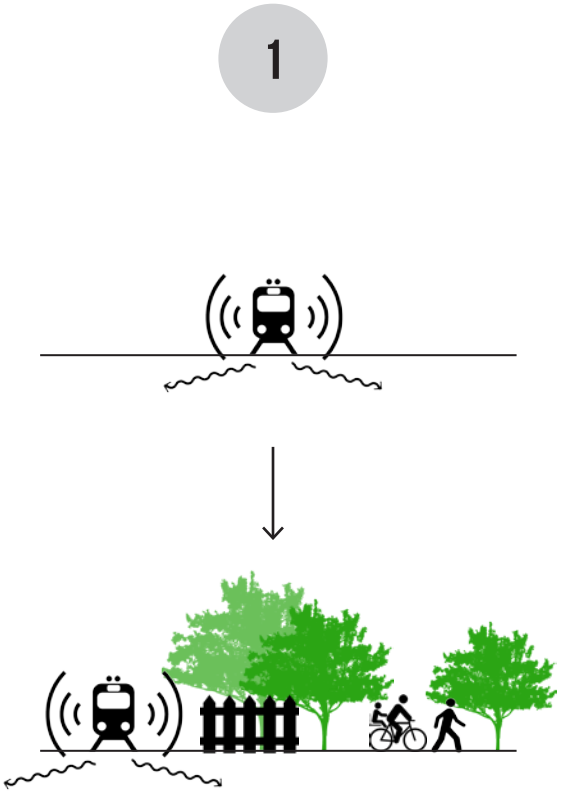


Image 159



Industrial zones with small factories, storages and post-industrial brownfields

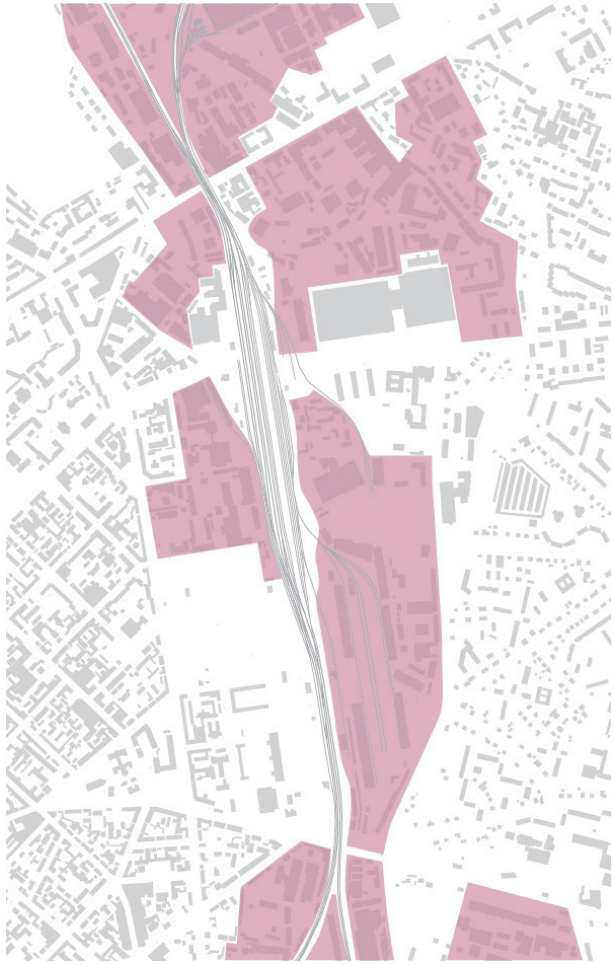


Image 160

Reduce the size of industrial zones by removing factories and storages that require cargo transport

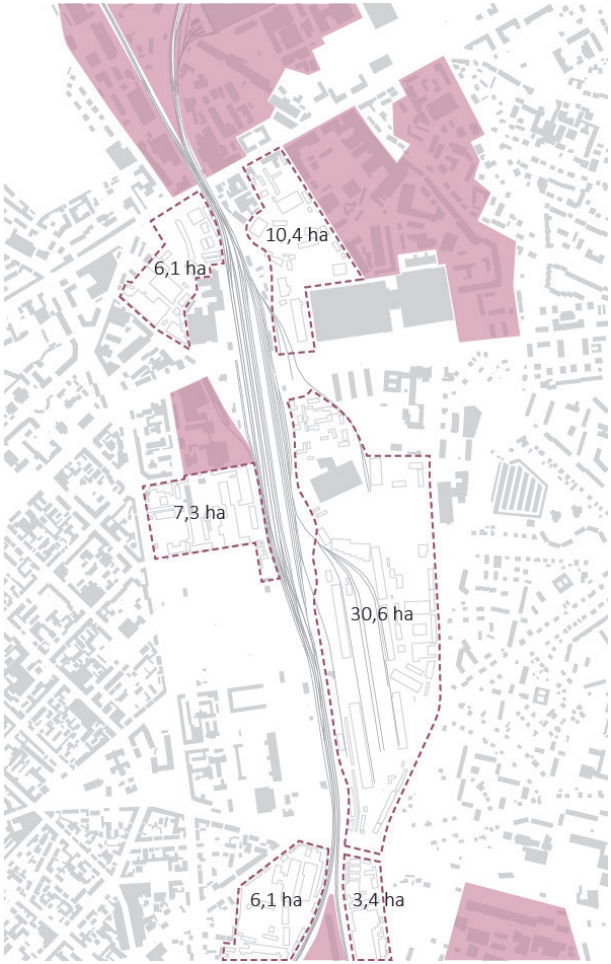


Image 161

2

63,9 ha of reclaimed lands

for new developments

Existing train station and tram line cuurently is surrounded by industrial zones, and access to the train station is disturbed

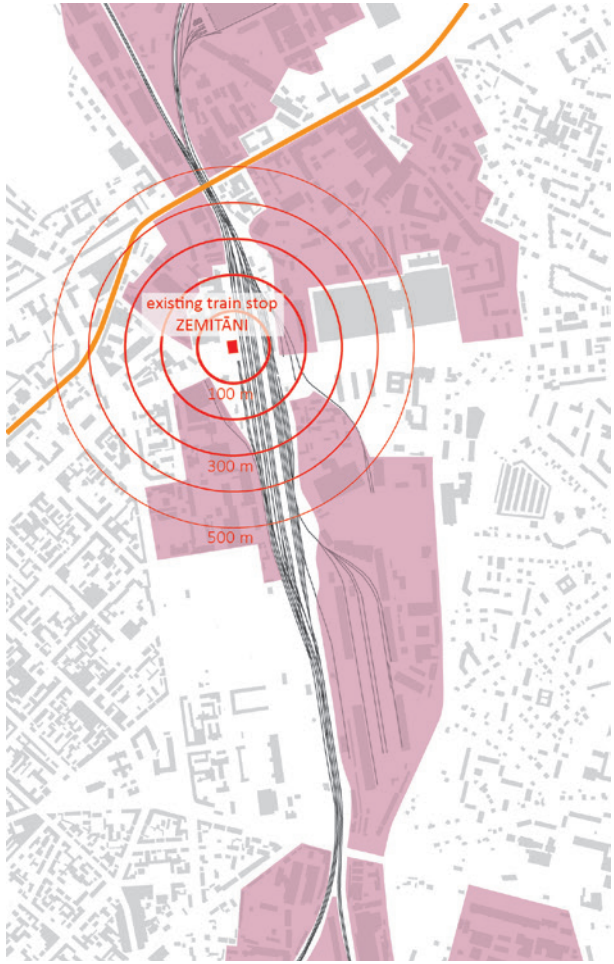


Image 162

Create transit based new urban centres with access to trains statin and tram stops by adding dense new developments at the place of removed industries

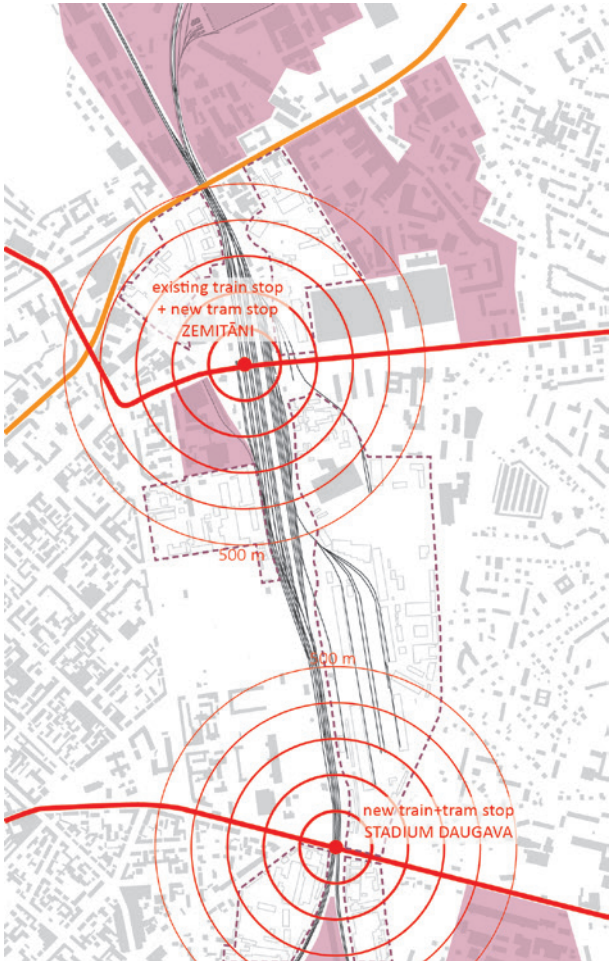
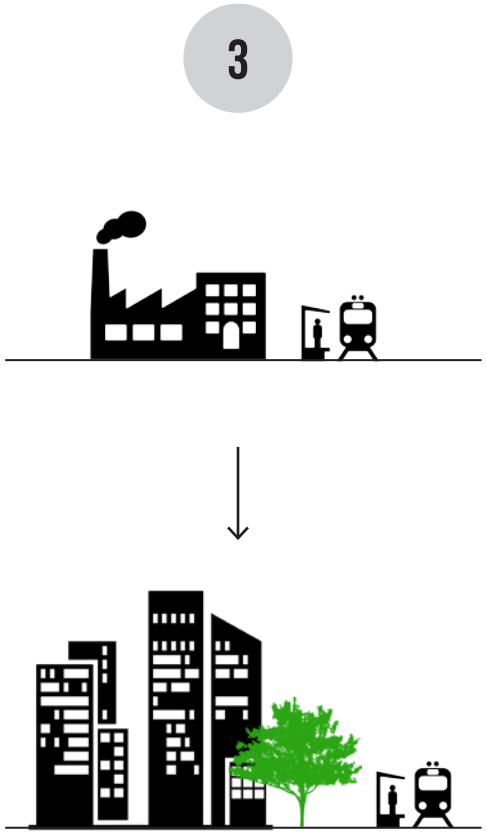


Image 163



Existing functions in the site, existing tram line with the stops and new tram lines and train stops are not connected to the neighbourhoods

Image 164

Connect new transit oriented hubs with nearest facilities and neighbourhoods by pedestrian and cyclist friendly network

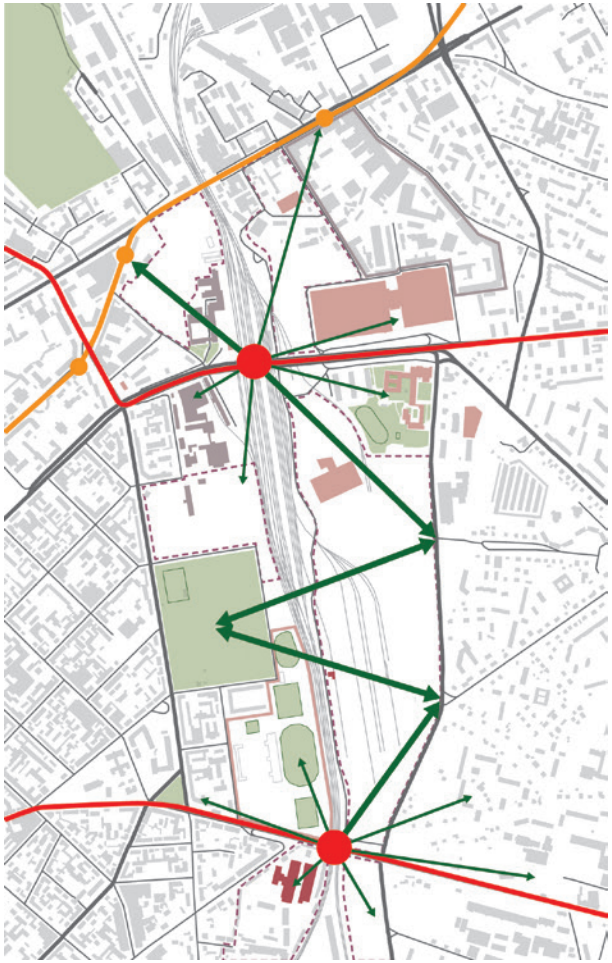
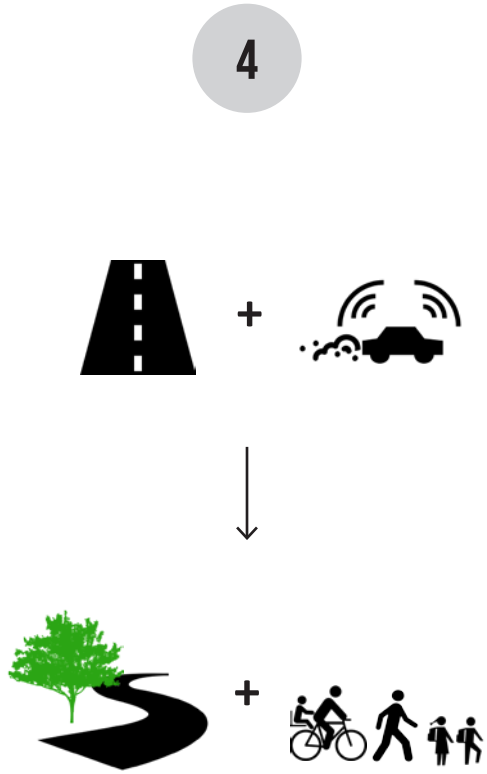


Image 165



Existing street structure at the city centre is based on convenient street grid
100 till 200 m x 100 till 200 m

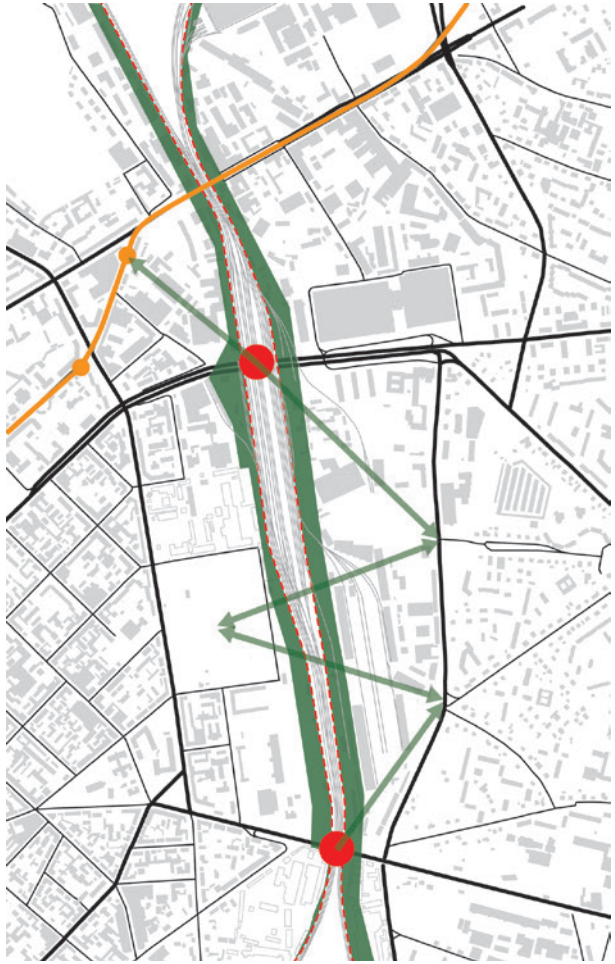


Image 166

Extend existing street grid and add new street grid according the one at the city centre

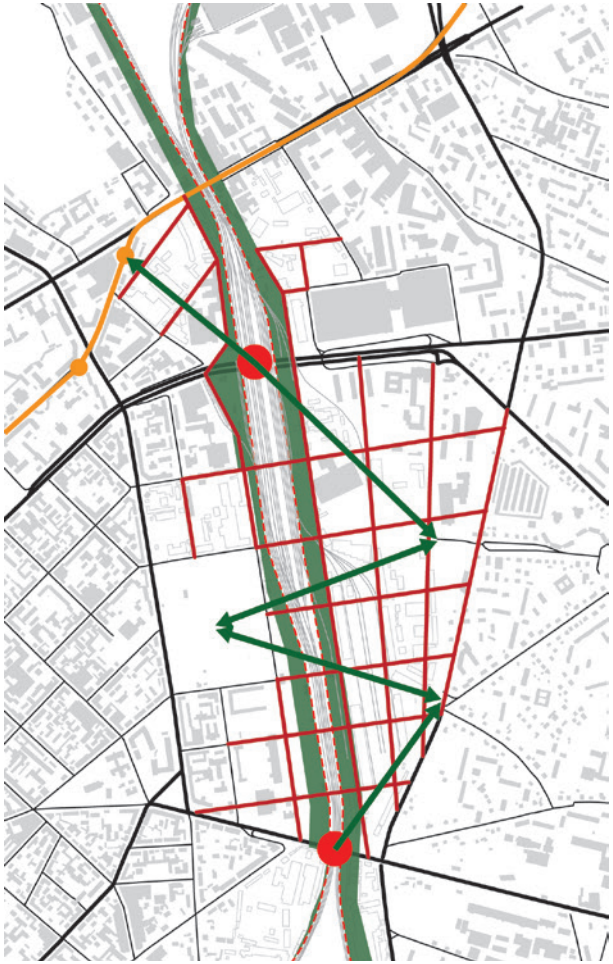
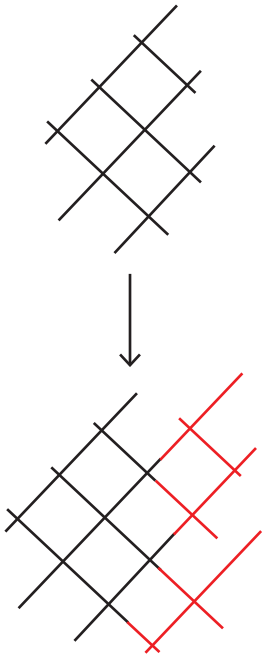


Image 167

5



Reclaimed industrial zones and brownfields with the new street grid and green pedestrian/cyclist friendly network

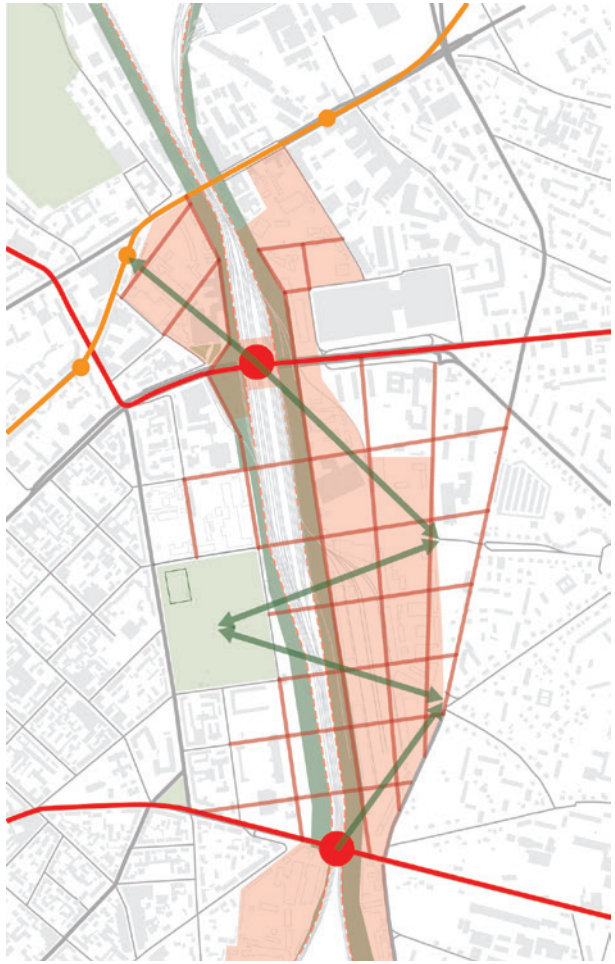


Image 168

Create two new transit-based urban hubs on the bridges in the South and North of the site and pedestrian/cyclist bridge in the middle

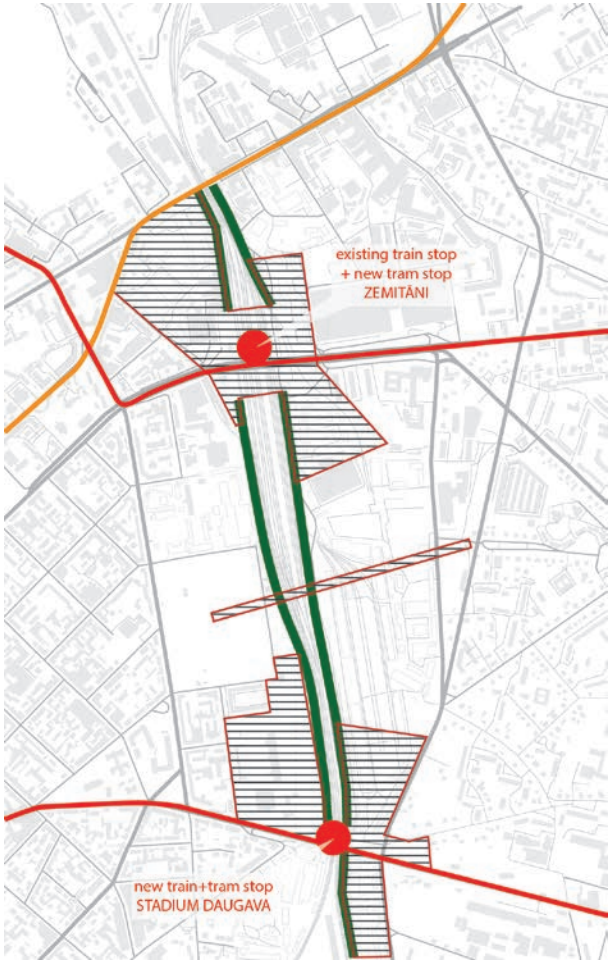
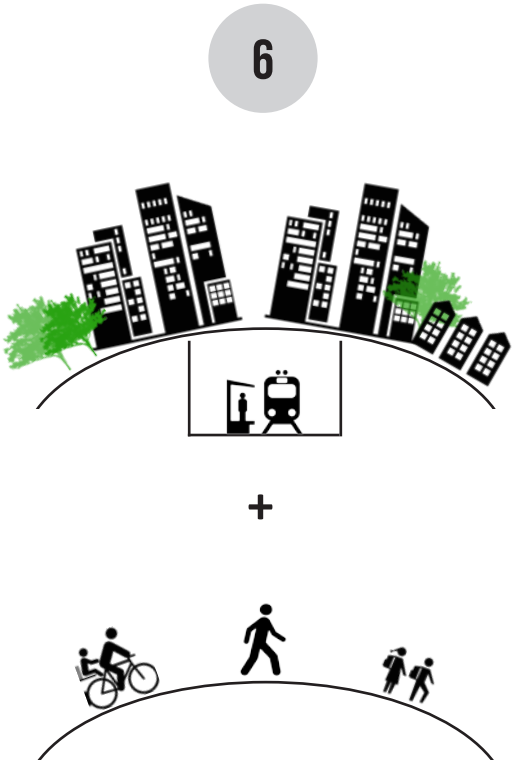


Image 169



4. DESIGN PROPOSAL

The proposal is based on an idea to connect neighbourhoods on both sides of railway, to make it easy to cross the railway by public transport, bicycle or on foot.

The new proposed mixed-use development will provide a space for **12 000 new inhabitants** and **15 000 new workplaces** with vibrant business areas and calm residential parts.

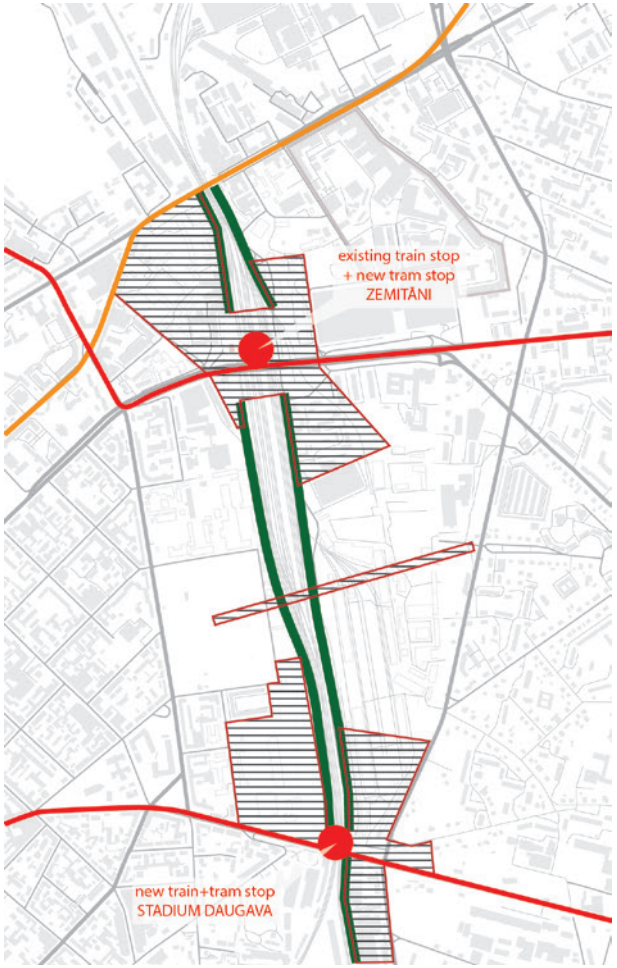
To strengthen the connections between both sides, I have proposed 3 bridges:

North Bridge connects the city centre and Teika. It is made as a vibrant mixed-use area, where there are tram stops at the main plaza with the train station. The plaza is surrounded by commercial and business buildings.

Middle bridge connects the new community centre with the historical park. The bridge is only for pedestrians and cyclists. Two green pedestrian-cyclist streets lead from the bridge to the neighbourhood Purvciems.

South Bridge is placed next to the Stadium Daugava. New sport facilities are placed on both sides. A tram line crosses the bridge and a new train station is proposed to provide accessibility to the stadium. The issue with car parking is solved by placing a car park under the elevated bridge.

A new park along the railway is proposed. The park is designed to reduce noise pollution. All the buildings are placed approx. 50 metres from the railway and along the railway a 2.5metres high berm with acoustic fence is proposed.



4.1. MASTERPLAN

TOTAL PROJECT AREA: 90 ha
including stadium: 12 ha
including park along the railway: 15ha
TOTAL FLOOR AREA: 1 150 000 m²
Avarage FAR = 180% (150%-250%)

Existing indoor skate park
with outdoor elements

Park along the railway
with berms to protect buildings
from noise pollution

Historical park
on artificial hill

Stadium of national importance
Daugava

New market place
with workshops and small
busineses

NORTH INTERSECTION

Train station + tram stop
City life generators
Mixed-use vibrant area
on elevated platform

5-9 storey buildings
Commerce&business

MIDDLE INTERSECTION

Pedestrian bridge
Community center

Residential area
2-6 storey buildings

SOUTH INTERSECTION

Train station + tram stop
Stadium + mixed functions
Hotel, 5-9 storey buildings

4.2. LAYERS OF THE MASTERPLAN

PUBLIC TRANSPORT NODES

1 existing tram line

2 new tram lines

2 new tram + train stations

GREEN NET

A park along the railway

Green pedestrian streets
that connects transport nodes, parks and neighbourhoods

3 new plazas:
2 train + tram nodes
1 community centre

BUILT STRUCTURE BY FUNCTIONS

Mixed-use (commercial, offices, residential) buildings along the railway

Residential buildings placed further from the railway to protect them from the noise

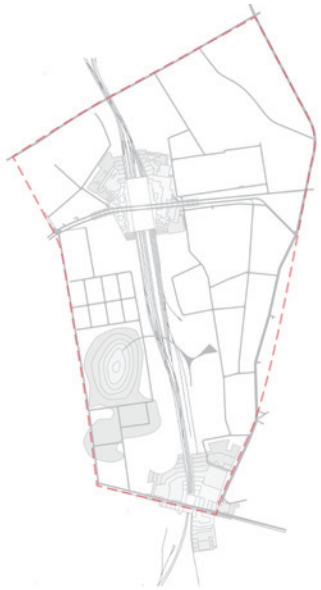
Sport facilities
2 stations
Comunity centre
Education facility

STREET NET

Main streets for cars

Regular on the left side

Asymmetrical on the right side



RELIEF AND BRIDGES

3 railway crossings:

North bridge

Middle bridge connected to relief of the park

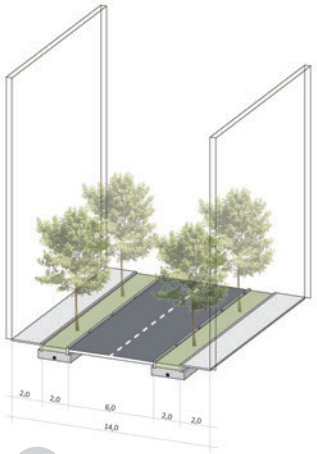
South bridge

All bridges are elevated ¬10 m, slopes mainly 1:20

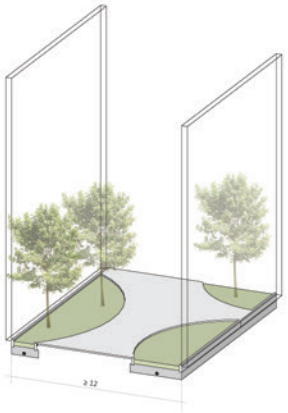
4.3. STREET SECTIONS AND DIAGRAMS OF THE NEW DEVELOPMENTS

1 main street with tram line
North & South intersections

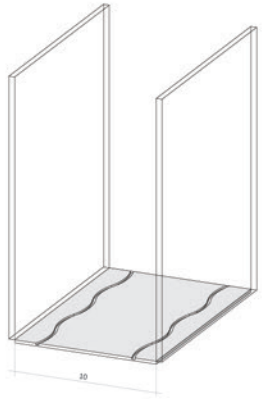
2 magistral street along
the East side of the site



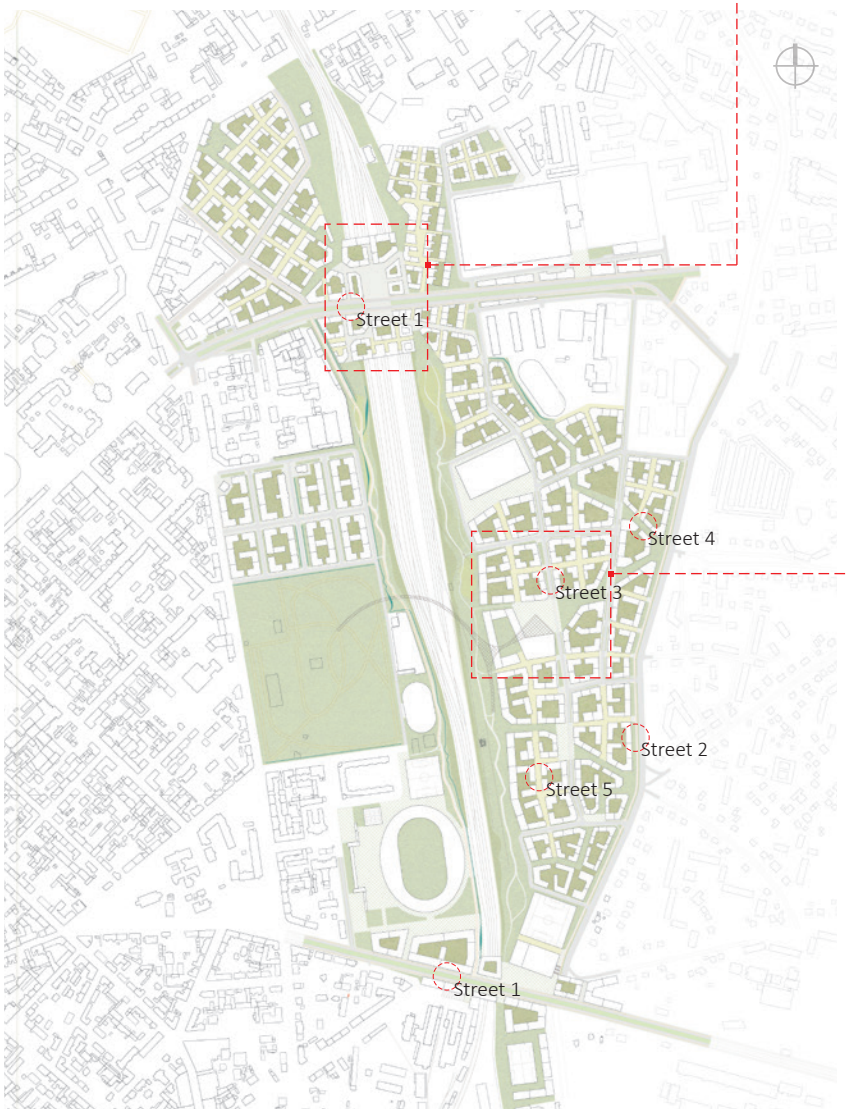
3 neighbourhood street



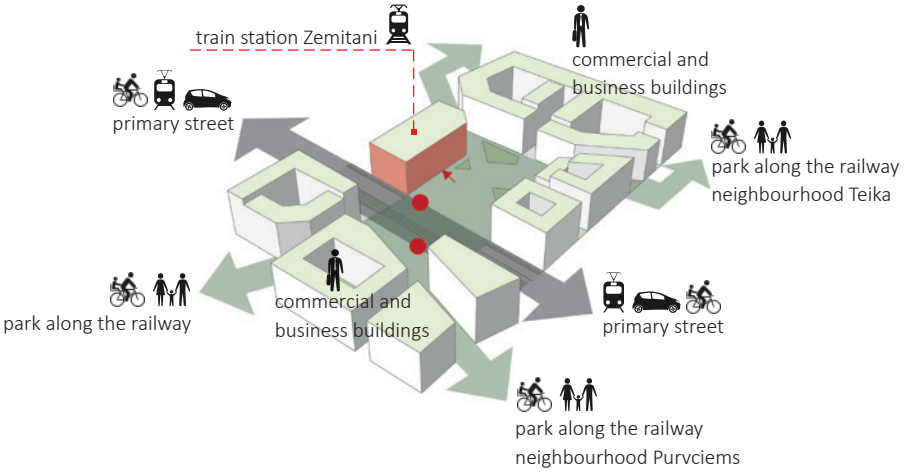
4 green pedestrian street



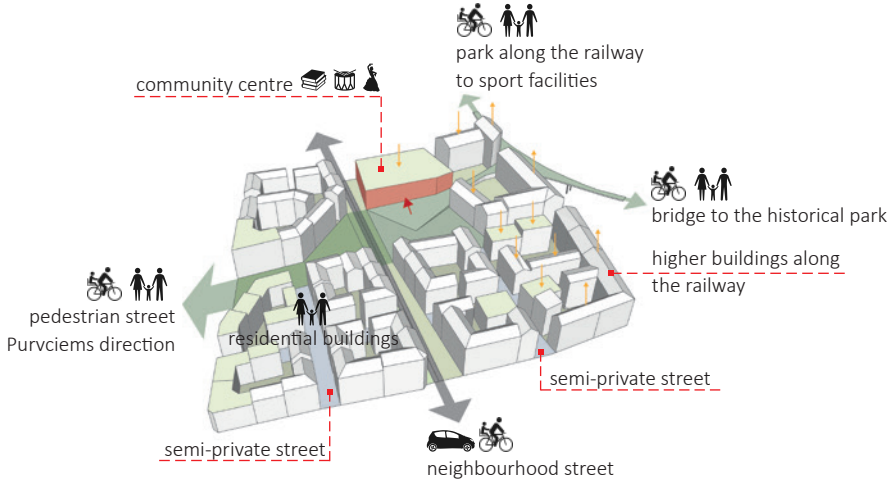
5 semi-private street
with shared space

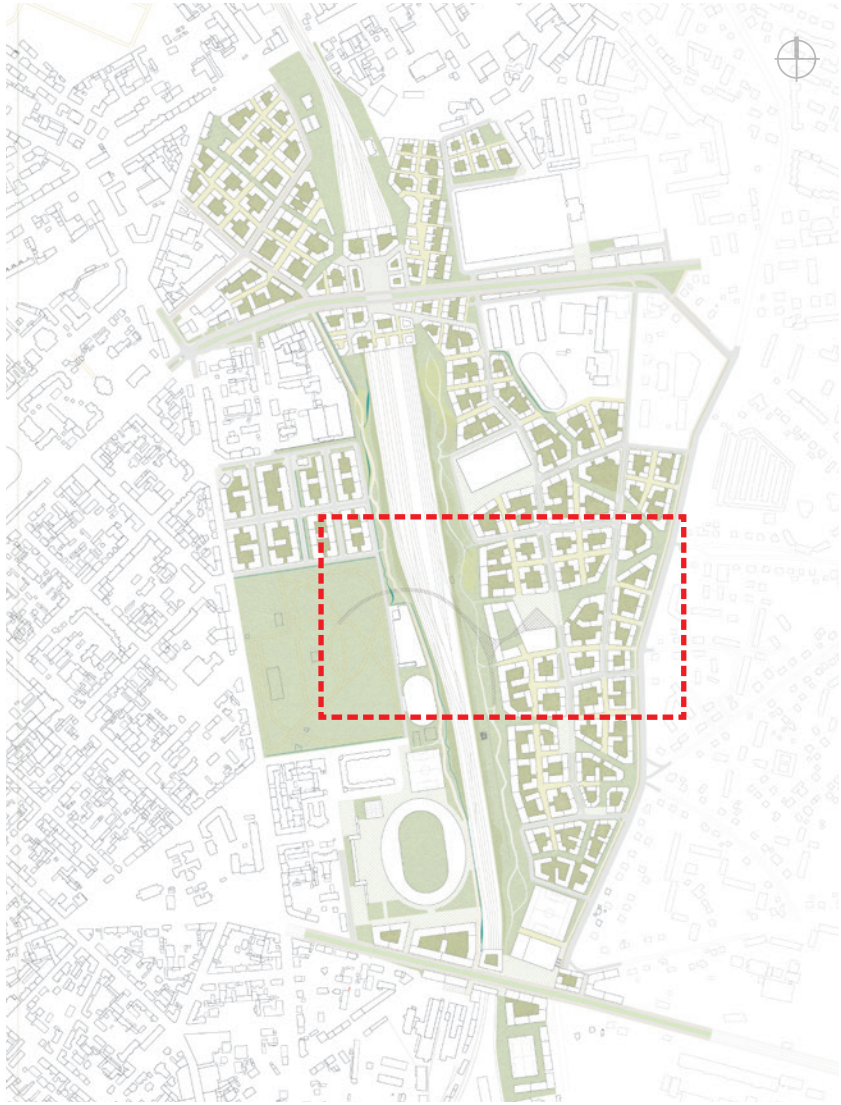


Main Plaza of the North Intersection



Community Center and Pedestrian Bridge





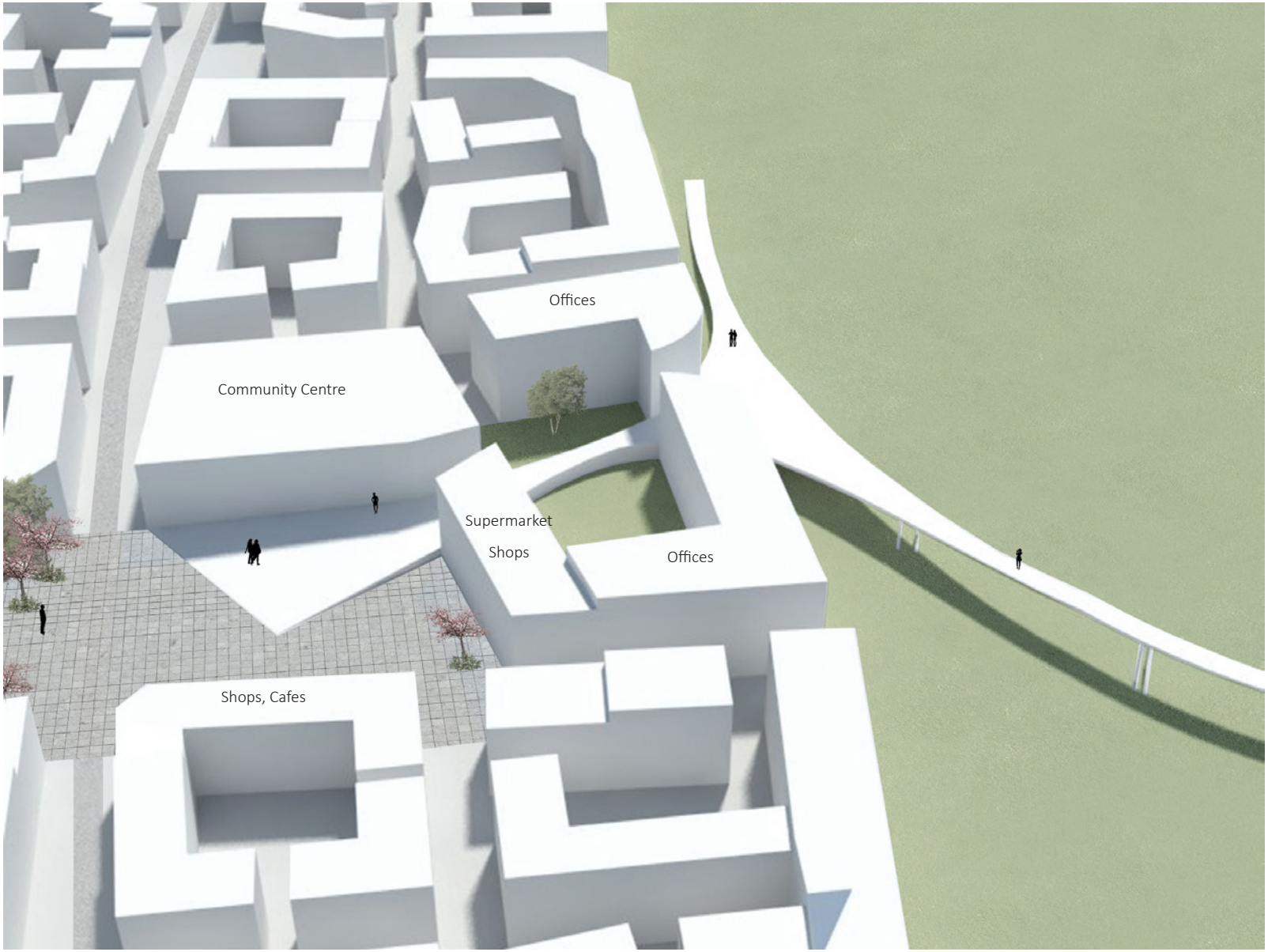
4.4. MIDDLE BRIDGE WITH COMMUNITY CENTER

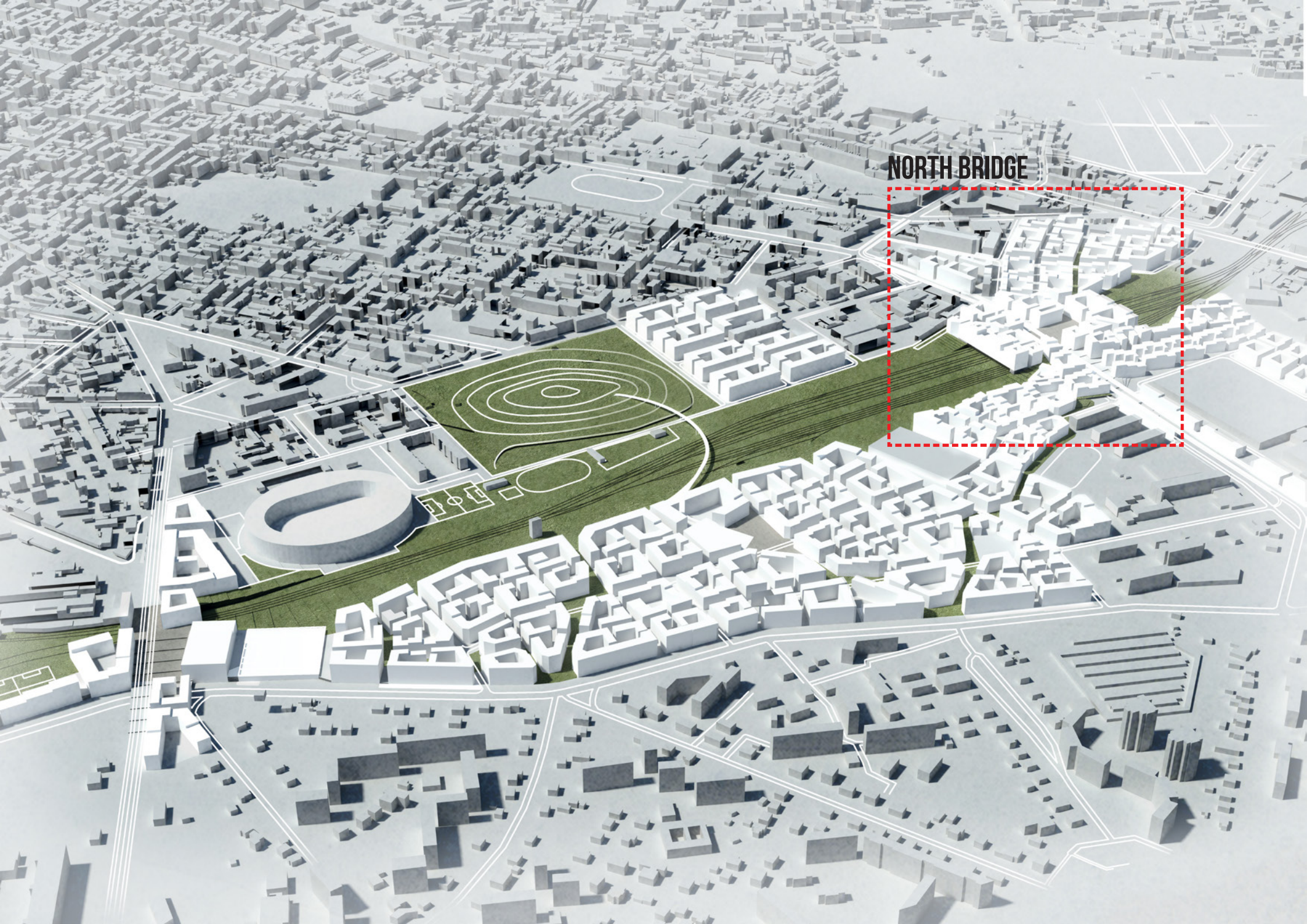
The middle bridge with a plaza and community centre is designed as a local centre for the new neighbourhood. The bridge also connects the plaza with the historical park on the other side of the rails, and it will be only for pedestrians and cyclists. The bridge goes through the business-retail building and lands at the plaza. The last part of the bridge is wider and gives an opportunity to develop detailed design solutions for under-bridge space on the park side along the railway as well as on the community centre side. At the area where the bridge goes through the building, more intimate, small, public courtyard park can be designed while at the part where bridge lands at the plaza, more urban design solutions can be applied.

The community centre at the plaza would provide a place for a small library, local events, exhibitions, small concerts etc. The South side of the plaza can be used for local cafes and shops.

The East side the plaza turns into a green pedestrian street that leads to the existing neighbourhood Purvciems. This part is crossed by a local road, but pedestrians are prioritised over cars to make the plaza and pedestrian street as one common space.

The middle intersection is designed to become a meeting place for the neighbourhood's residents and its guests, and will provide access to public facilities for daily needs.


Offices
Community Centre
Supermarket
Shops
Offices
Shops, Cafes


NORTH BRIDGE

4.5. NORTH BRIDGE WITH VIBRANT URBAN LIFE

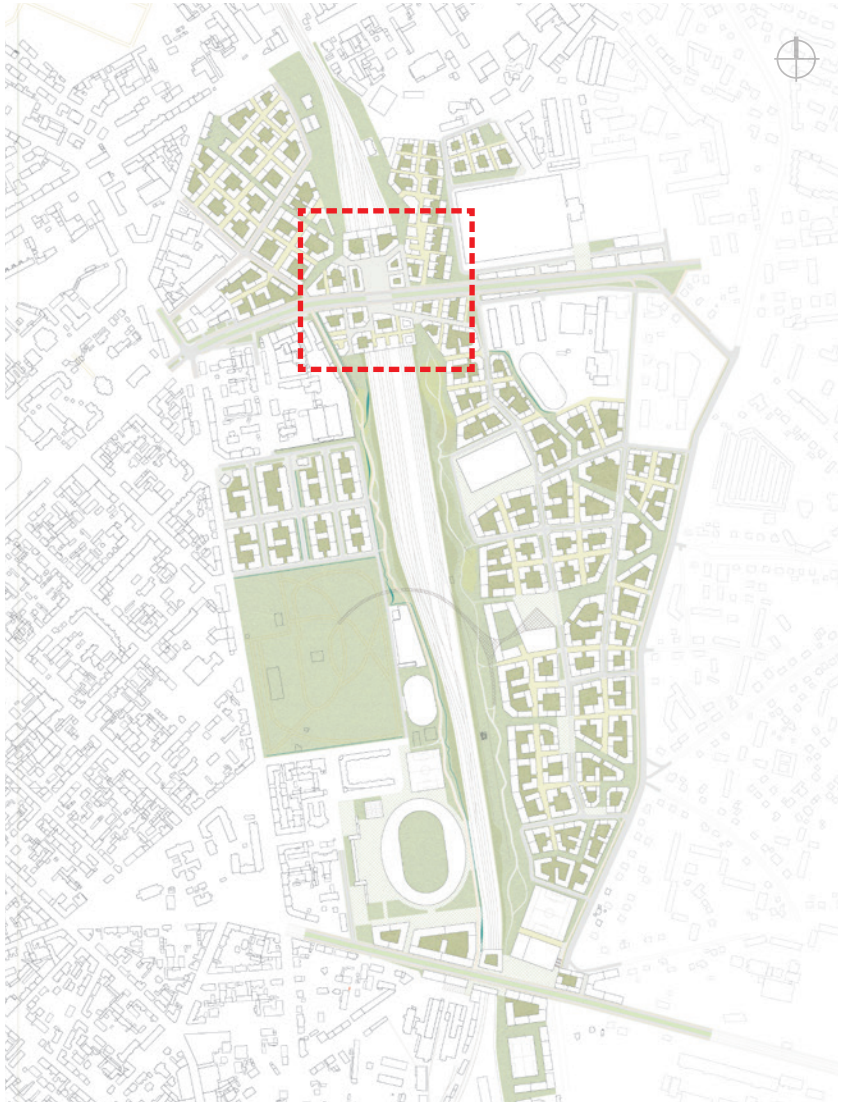
The North Bridge is designed as a vibrant and dense mixed-use hub where the new tram line meets with an existing train line. The bridge is designed to work as:

- a local centre,
- a connection between the neighbourhoods,
- the second biggest station in the city,
- a new business centre with convenient connections with other parts of the city.

At the middle of the bridge a new urban plaza is designed. It will be a central transit hub with the train station and a tram stop. Other use for buildings will include business and commerce-oriented programs such as offices, shops and other public facilities.

The highest buildings on the bridge have 8 floors over the ground level and 3 underground floors for car and bicycle parking. This part is the most dense part of the all new proposed area with FAR=250%. The buildings that are placed on the edge of the bridge with their facades facing the railway are higher. They will create a wall that will protect plaza and streets on the bridge from the noise of the trains.

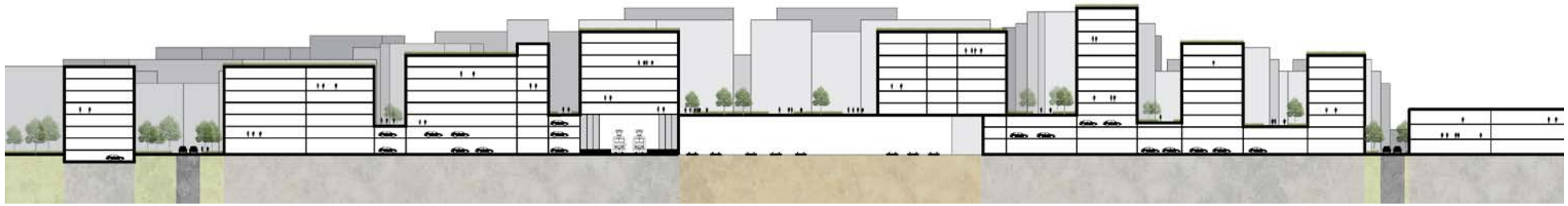
The slope of the bridge is 1:20 to provide accessibility except the southern slope where the bridge meets the park along the railway. As this part has good solar access, the slope can be solved by more specific design solution.

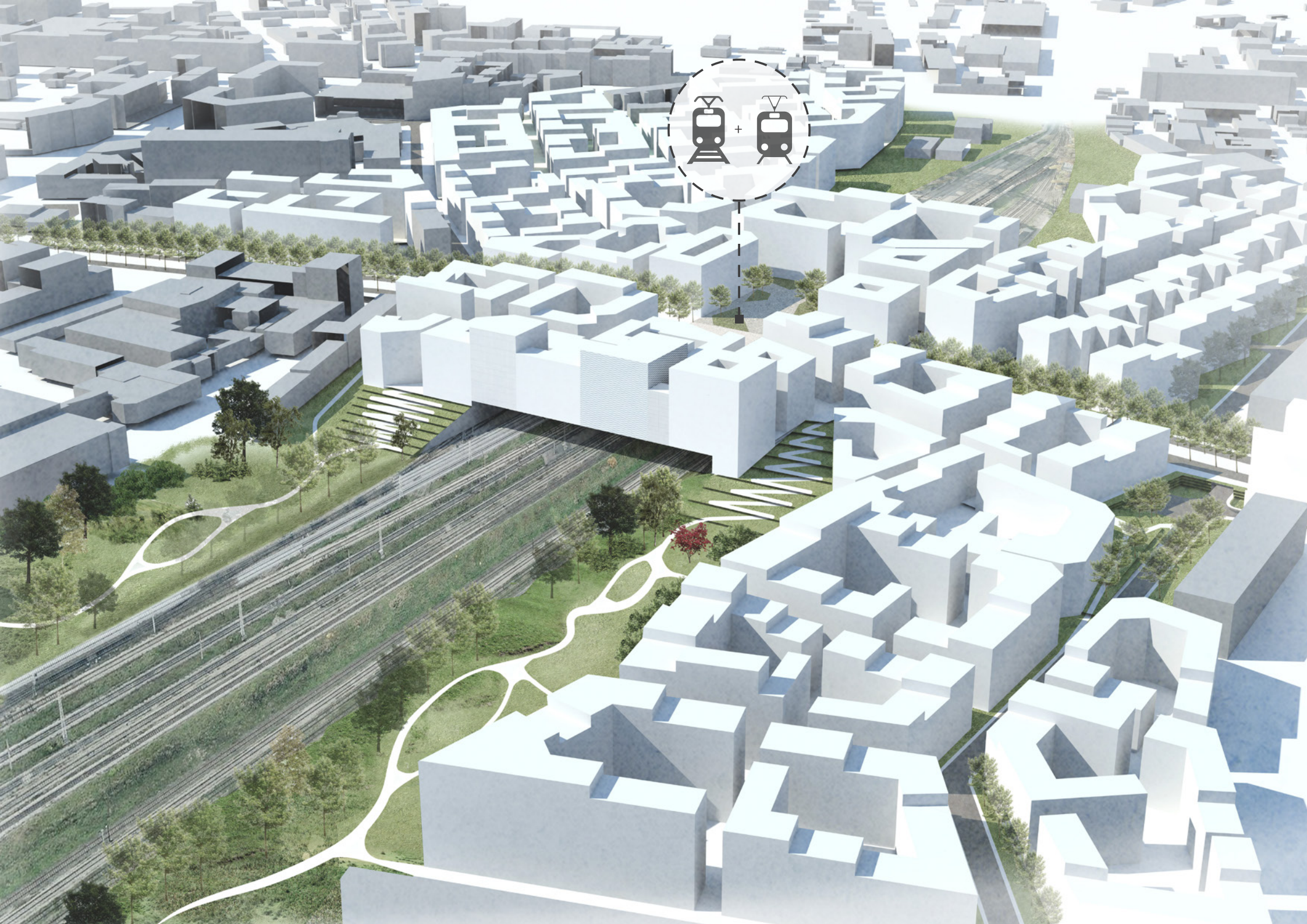


Considering that the city centre suffers from air pollution because of the motorised transport, the underground part of the bridge is designed for car and bicycle parking.

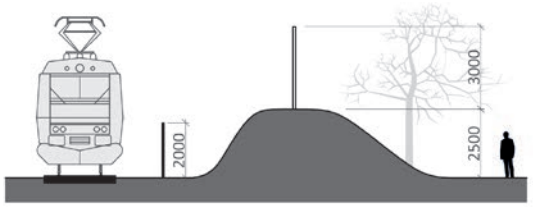
Since the aim of the bridge is to create a transit-based urban hub and integrated transport system with trams and trains. It will provide fast and convenient connections to most parts of the city and the underground parking will give an opportunity to leave a car and use public transport or bicycle.

Currently, many European cities go for car-free city centres, and this could be a part of solution to free-up the city centre of Riga from privately owned cars.





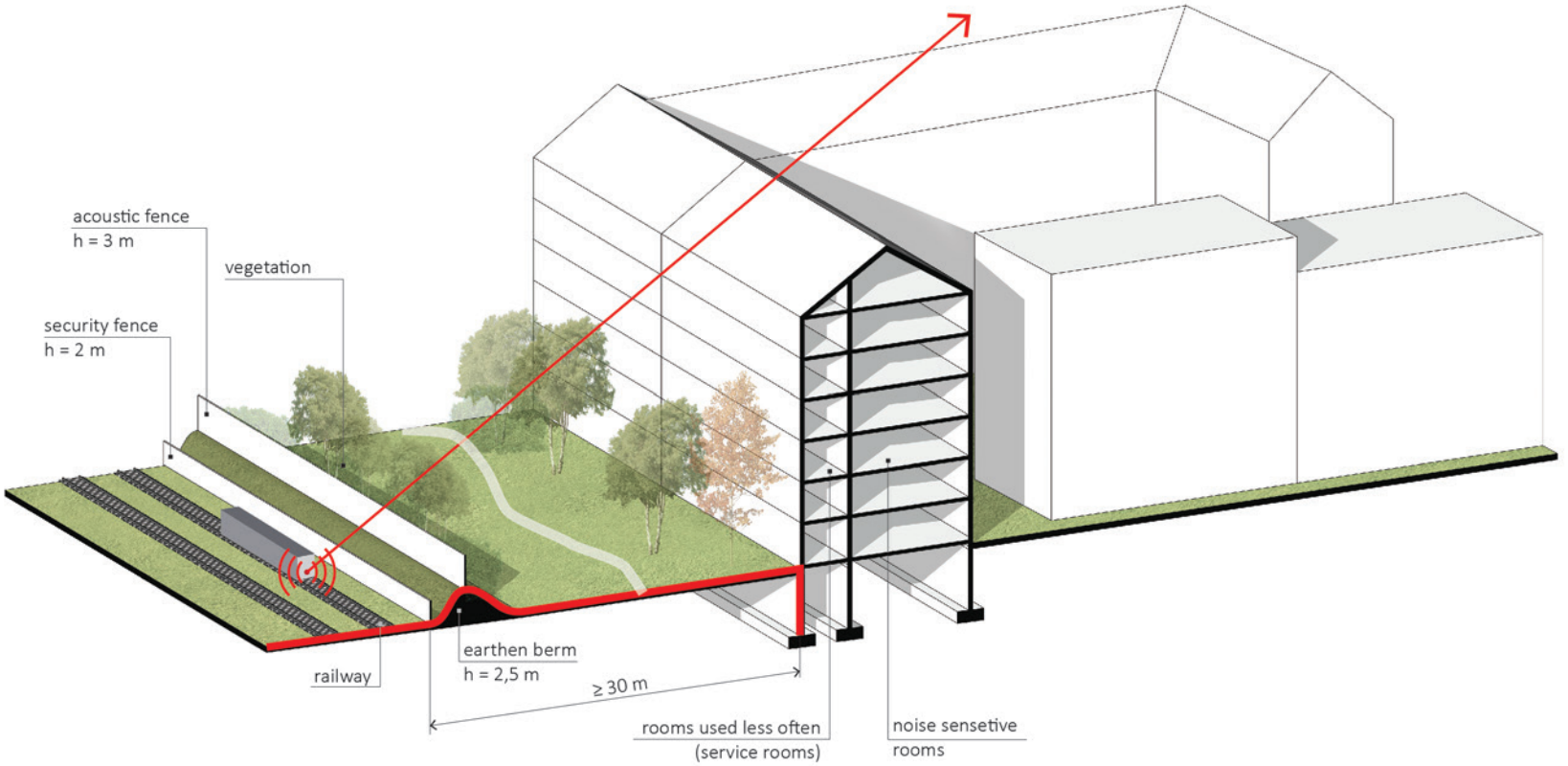
4.6. MITIGATION OF THE NOISE POLLUTION AND VIBRATIONS



Vibration-sensitive facilities can be built near operating railway lines if proper design considerations are implemented. Noise pollution and vibrations are two main issues with building close to a railway.

To mitigate noise pollution, a berm with acoustic fence is designed and buildings along the railway are higher with gabled roofs to divert noise from entering the new neighbourhood. Additionally, berms are covered with vegetation and a park along the railway is designed to not only provide safety zone, but also reduce noise and air pollution from diesel trains.

To mitigate vibrations, the construction of buildings requires vibration isolation. It also can be implemented in rail track construction to reach maximum effect.

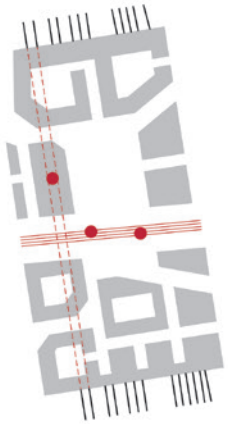


4.7. DETAIL PLAN

The purpose of the plaza is to create a new, vibrant urban hub between the neighbourhoods based on the accessibility to the public transport. The plaza is planned as a meeting place and a place where to change transport from tram to train and vice versa.

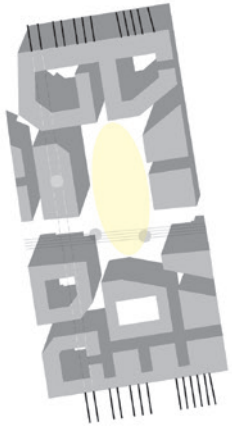
The main building on the plaza is the train station Zemitāni, all the other buildings are commercial or business oriented. The main entrance of the train station is at the plaza level, but the trains go under the plaza under the bridge.

The elevation of the bridge provides a space for indoor car and bicycle parks. That would be a place where people can leave their cars and continue their way on bicycles to decrease amount of cars in the city centre.

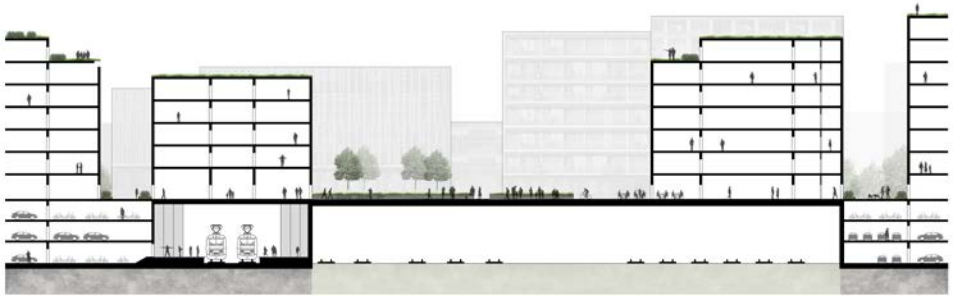


access to train and tram

potential pedestrian flow



solar access




ZEMITANI

4.8. DEVELOPMENT STAGES

The project is divided in 6 phases and complete development is supposed to be reached in 50 years.

The first two stages for the coming 10 years mainly address development of the park along the railway to mitigate noise and vibrations to make the areas liveable and activate them by creating a recreational space for citizens that can be used for sport and other activities. To generate life in the area, two housing areas will be developed (5,7ha with 1500 units and 4,6 ha with 1100 units) and stadium Daugava with its supporting buildings. In first 10 years, one of the tram lines are developed partly, but the one that passes the stadium is to be developed completely.

In next two stages the Northern Bridge is completed as well as tram line that crosses it, and in the last two stages all the middle part is developed.

STAGE 0 - now

STAGE 1 - in 5 years

STAGE 2 - in 10 years

STAGE 3 - in 20 years

STAGE 4 - in 30 years

STAGE 5 - in 40 years

STAGE 6 - in 50 years

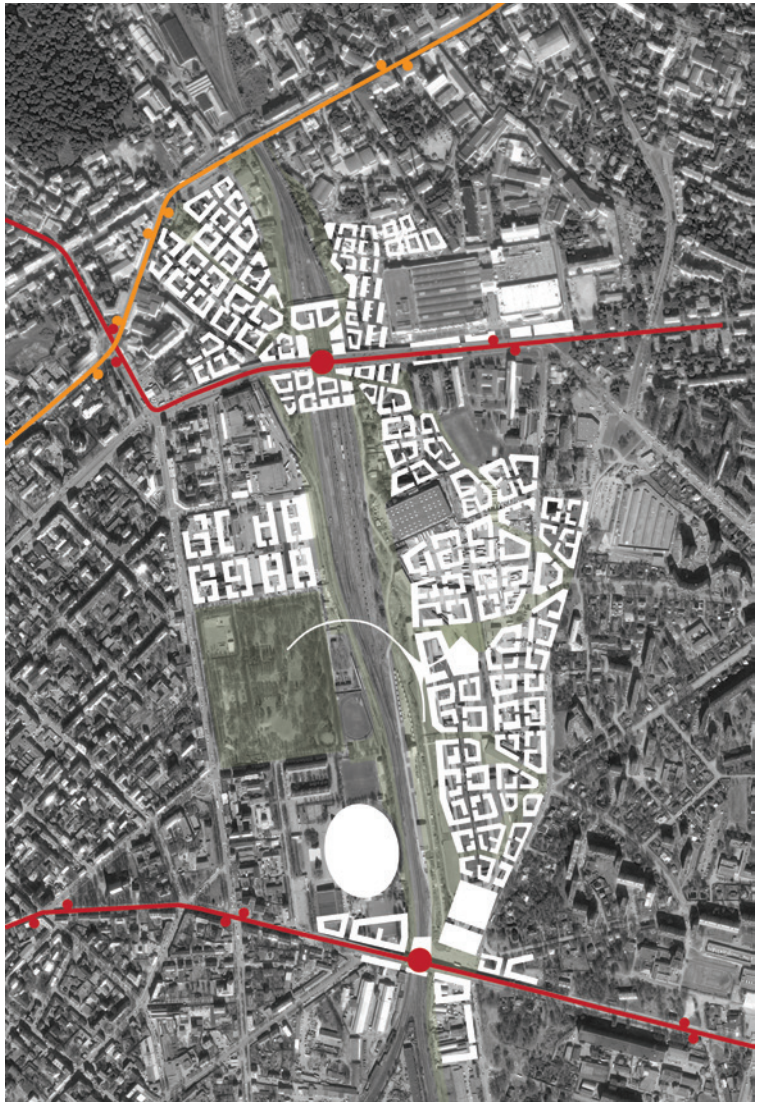
4.9. SUMMARY

2 NEW TRANSIT ORIENTED URBAN CENTRES
WITH TRAIN STATIONS AND TRAM STOPS ARE CREATED
- a business and commerce oriented hub in the North and sports oriented hub with the stadium Daugava in the South of the site.

3 PEDESTRIAN AND CYCLIST FRIENDLY RAILWAY CROSSINGS
are designed within 500m distance from each other.

A NEW PARK ALONG THE RAILWAY IS DESIGNED
TO MITIGATE NOISE AND AIR POLLUTION AND FOR SAFETY REASONS
The park can be extended along the entire railway circle to add a green belt to the city centre which suffers from air pollution. Additionally, it can connect both sides of the railway and be used by citizens for recreation as well as sport activities.

TOTAL PROJECT AREA: 90 ha
including stadium: 12 ha
including park along the railway: 15ha
TOTAL FLOOR AREA: 1 150 000 m²
12 000 NEW INHABITANTS
15 000 NEW WORKPLACES



Connect and activate

CONCLUSIONS

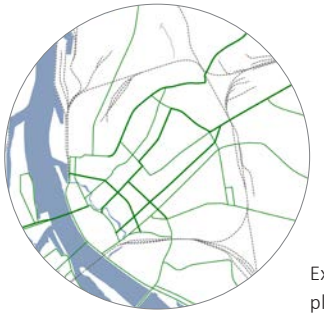
To conclude the thesis, I want to return to the strategy for the whole city and the railway loop around the city centre.

In a first part of my thesis, I analysed mobility in the city and I discussed cycling as rather new type of moving around in Riga with a very poor infrastructure at the moment. My concept was to create a polycentric city where new suburb hubs are based on public transport accessibility and transit. But what is to happen between these new hubs along the railway? How can the brownfields and wastelands in proximity to the railway be developed in a larger scale? These questions I have tried to answer by zooming-in the railway loop in the second and third part of my thesis.

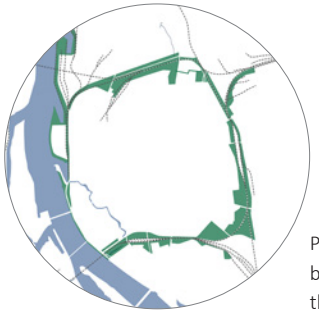
Even if in general Riga is considered to be quite green, the city centre is not that green and it is suffering from air pollution due to motorised traffic. One of the future goals for the city is to develop cycling infrastructure and decrease use motorised traffic. If we look at the existing green structure and existing cycling infrastructure, they are not connected at all except the ones along the city's canal park next to the old town. Historically, around the middle of the 19th century, when the city was even smaller than the city centre now, Riga got this new park with canal around the old town in a place of former fortifications. Now it is a great opportunity to make the city greener by creating a new arc of parks along the railway with a new transit-based hubs.

By remediating sites along the railway, mitigating noise and vibrations, and adding new

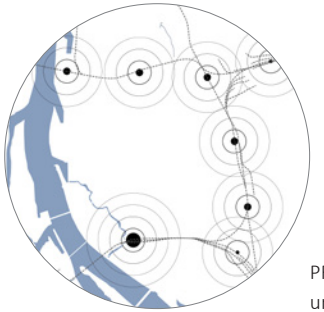
Existing green
- parks and cemeteries



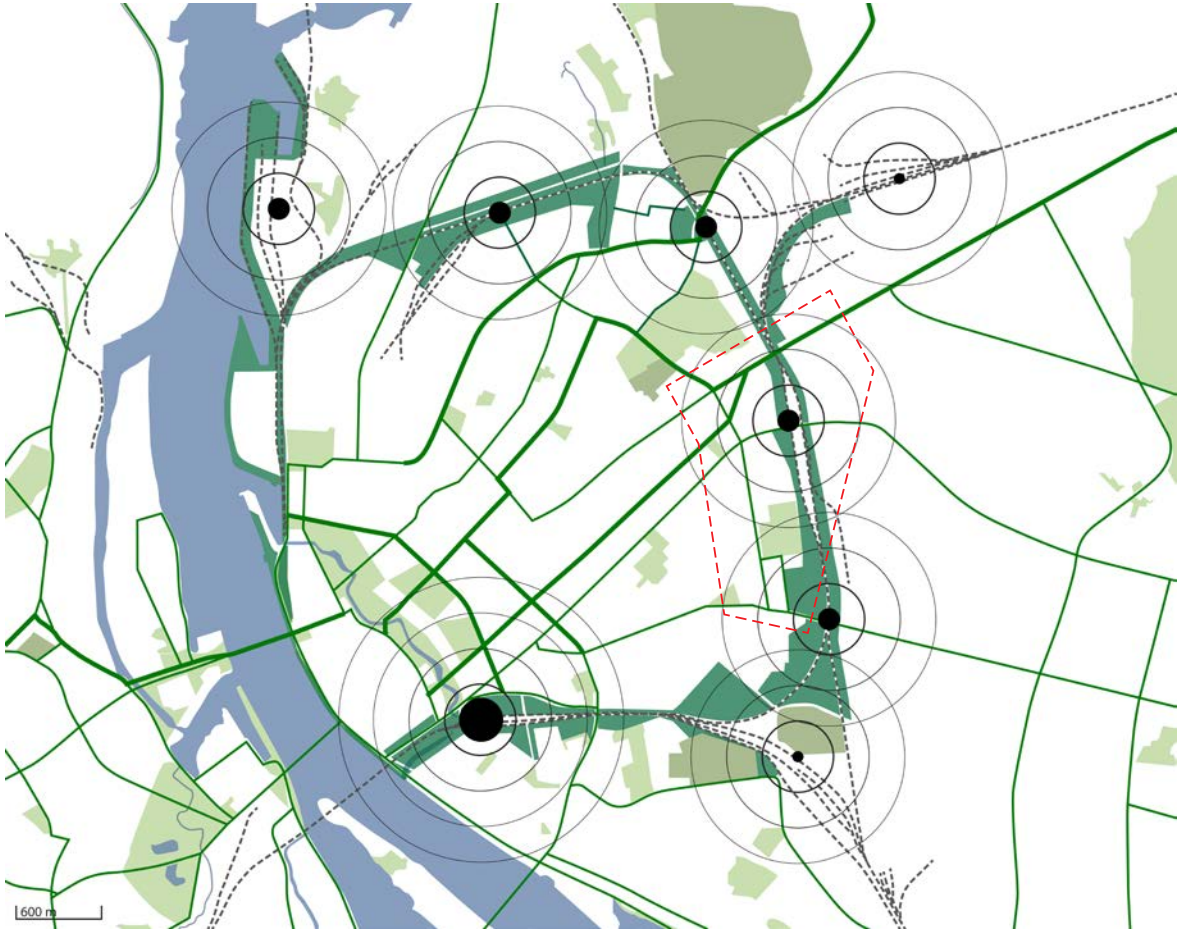
Existing bicycle paths and
planned ones (by the Municipality)



PROPOSAL- New pedestrian and
bicycle-friendly green belt around
the city cente along the railway



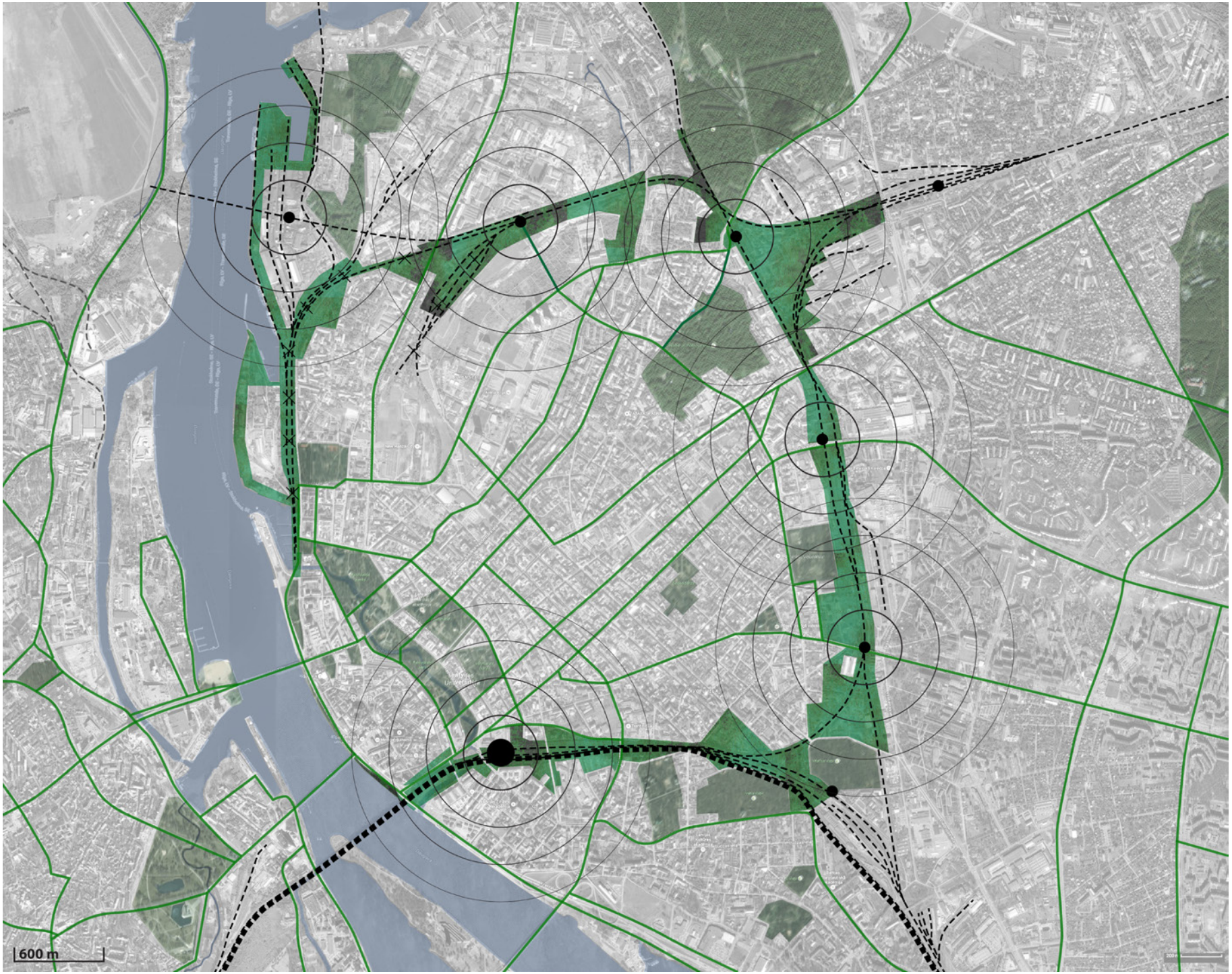
PROPOSAL- New transit based
urban hubs



functions and activities like jogging/skiing trails, bicycle paths, sport fields, temporary exhibitions, markets and others, the city can gain a new green public space where it is fast to go by bicycle without traffic jams, and it is convenient for daily exercises and leisure time.

This new, approximately 20 km long, stretch of park can be divided in smaller areas with different characters and functions. Moreover, it can be connected with existing pedestrian and bicycle infrastructure to give opportunity for people to choose greener routes for their daily commute.

By developing a green loop with mixed-use local transit hubs instead of railway loop with industrial sites, the city will be better connected and greener with a grater biodiversity. The air pollution will decrease. The citizens will have more convenient options of getting from one place to another and a new place for unlimited activities.


600 m

BIBLIOGRAPHY

Printed Sources

Altbergs T., Augustāne K., Pētersone I. (2009), Dzelzceļi Latvijā. Rīga: Jumava. 199 pages.

Banister D. (2003), Transport and Urban Development, Routledge, 304 pages

Bākule I., Siksna A. (2009), Rīga ārpus nocietinājumiem. Pilsētas plānotā izbūve un pārbūve no 17. gadsimta līdz Pirmajam pasaules karam. Rīga: Neputns. 247 pages.

Bertolini L., Spit T. (2005), Cities on Rails: The Redevelopment of Railway Stations and Their Surroundings, Routledge, 256 pages

Bruinsma F., Pels E., Priemus H., Rietveld P., Bert van Wee (2007), Railway Development: Impacts on Urban Dynamics, Springer Science & Business Media, 419 pages

Caune A. (2014), Rīgas Vidzemes priekšpilsēta pirms 100 gadiem, Latvijas vēstures institūta apgāds, Rīga, 279 pages

Cervero (1988), The Transit Metropolis: A Global Inquiry, Island Press, 480 pages

Hauck T., Keller R., Kleinekort V. (2011), DOM publishers, Berlin, 335 pages.

Pētersone I. (2009) Latvijas dzelzceļi: pagātne, tagadne, nākotne. Rakstu krājums. Rīga. 5 lpp.

Pyrgidis C. N., (2016), Railway Transportation Systems: Design, Construction and Operation, CRC Press, 475 pages

Rīga. Enciklopēdija (1988), Rīga: Galvenā enciklopēdiju redakcija, 823 pages

Saveur J., (2003), (Re)claiming the Underground Space: Proceedings of the ITA World Tunnelling Congress 2003, Amsterdam, The Netherlands, A.A. Balkema Publishers, Volume 2, 1175 pages

Electronic Sources

Baltic Railways Network Maps [online] (2008)
Available: http://riga.mashke.org/Bernsteinkuestebahnen/Maps/maps_eng.htm [2016-03-02]

Climate Information [online], Environment, Geology and Meteorology Centre of Latvia
Available: http://www.meteo.lv/lapas/laiks/fakti-un-noderiga-informacija/fakti-un-noderiga-informacija?id=1717&nid=1016 [2016-03-01]

Companies profile – Landscaping in Urban Planning [online], EuroLandscape web page, 97 pages
Available: http://www.hollandschap.nl/wp/wp-content/uploads/downloads/2013/11/Buroprofiel-Stedenbouw-NL_versie-3_-CMYK_reduced-web1.pdf [2016-03-18]

Comprehensive Plan of Riga City 2006 – 2018 [online], Explanatory Memorandum, Planning Department of Riga City Council
Available: http://www.rdpad.lv/wp-content/uploads/2014/11/RTP_Paskaidrojuma_raksts_ar_grozijumiem.pdf

Cyclists Craft Car Skeletons to Critique Vehicle Size on Roads [online], (2014), web-based architecture + design magazine
Available: http://www.designboom.com/design/latvia-cyclists-car-skeletons-vehicle-size-10-10-2014/ [2016-04-18]

Durven dromen van een Groene Rivier, De Visie Van De Stad Op De Ontwikkeling Van De Strategische Ruimte Groene Singel [online], (2009), Stad Antwerpen, 57 pages
Available: http://www.antwerpen.be/docs/Stad/Stadsvernieuwing/Synthesenota_Groene_Singel_(S).pdf [2016-03-18]

Existing and prospective cycling routes of Riga [online], Traffic Department of Riga City Council
Available: http://www.rdsd.lv/velosatiksme-riga/velosatiksme-riga [2016-04-18]

Facts about Rail Baltica [online], (2014), Rail Baltica official portal
Available: http://railbaltica.info/facts/ [2016-03-14]

Guidelines for New Development in Proximity to Railway Operations [online], (2013) Railway Association of Canada and the Federation of Canadian Municipalities
Available: http://www.proximityissues.ca/asset/image/reference/guidelines/2013_05_29_guidelines_newdevelopment_e.pdf [2016-03-14]

Historic Centre of Riga [online], UNESCO World Heritage List
Available: http://whc.unesco.org/en/list/852 [2016-03-21]

How do we measure sound waves [online], web-page for a public health campaign
Available: http://www.dangerousdecibels.org/virtualexhibit/6measuringsound.html [2016-03-14]

Infrastructure [online], encyclopaedia of Riga history
Available: http://www.citariga.lv/lat/grizinkalns/infrastruktura/ [2016-04-11]

Noise maps [online], Department of Housing and Environment, Riga City Council
Available: http://mvd.riga.lv/lv/troksnu_kartes/ [2016-03-14]

Northern Corridor, Maps of general character [online], Official web-site of the Northern Transport Corridor
Available: http://www.ziemelukoridors.lv/Projekts/Vizu%C4%81l%C4%81inform%C4%81cija/tabid/87/Default.aspx [2016-04-20]

Latvijas dzelzceļš, auditēti gada pārskati [online], official web-page of Latvia Railway
Available: http://www.ldz.lv/lv/audit%C4%93ti-gada-p%C4%81rskati [2016-03-07]

Project "Mierigi!" [online], (2014) web-based architecture magazine
Available: http://afasiaarchzine.com/2016/06/fine-young-urbanists/ [2016-03-12]

Riga 2030 [online], Sustainable Development Strategy of Riga until 2030, Planning Department of Riga City Council
Available: http://www.rdpad.lv/wp-content/uploads/2014/11/ENG_STRATEGIJA.pdf

Riga in Figures [online], (2016), Municipal portal of Riga,
Available: https://pasvaldiba.riga.lv/EN/Channels/About_Riga/Riga_in_numbers/default.htm [2016-03-14]

Rīgas pilsētas velosatiksmes attīstības koncepcija 2015.-2030.gadam [online], (2015), Planning Department of Riga City Council
Available: http://www.rdsd.lv/uploads/media/557550c430e1f.pdf [2016-04-18]

Rīgas satiksme [online], official web-page of Public Transport in Riga
Available: https://www.rigassatiksme.lv/en/about-us/ [2016-03-07]

Overkappingsonderzoek Antwerpse Ring, Synthesenota [online], (2000), Stad Antwerpen, 80 pages
Available: http://www.ademloos.be/sites/default/files/meccano_docs/20120713_Eindrapport_overkapping-sonderzoek.pdf [2016-03-18]

Sketch of The Finger Plan [online], case study, MUSE field school
Available: https://musemcgill.wordpress.com/case-studies/copenhagen-denmark/ [2016-08-11]

Statistics of the Neighbourhoods [online], Planning Department of Riga City Council
Available: http://www.apkaimes.lv/stat/ [2016-04-16]

Sustainable Development of Riga [online], (2014) Planning Department of Riga City Council
Available: http://www.rdpad.lv/riga-cela-uz-ilgtspejigu-pilsetu/ [2016-04-20]

The Finger Plan, A Strategy for the Development of the Greater Copenhagen Area [online], (2015), Ministry of the Environment, Denmark, 42 pages
Available: https://danishbusinessauthority.dk/sites/default/files/fp-eng_31_13052015.pdf [2016-08-11]

Urban development in Antwerp Designing Antwerp [online], (2012), Stad Antwerpen, 170 pages
Available: http://www.antwerpen.be/docs/Stad/Stadsvernieuwing/9746949_urbandevelopment_English.pdf [2016-03-18]

Voorburg Leischendam – Sijtwende [online], project description, EuroLandscape web page
Available: http://www.hollandschap.nl/en/projects-nl/residential-environment-design/voorburg-leischendam-sijtwende/ [2016-03-18]

Images

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