

Coming home to the:

CAPITAL OF MUSHROOMS

Joris Šykovas Thesis project
Lund University, LTH, School of architecture
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LUNDS TEKNISKA HÖGSKOLA

Lunds universitet

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Thesis topic:

Create and test a mushroom based building envelope material with insulative properties and adapt in an architectural scenario - Railroad and marketplace building in Kaunas, Lithuania.

Thesis goal:

Experiment with growing mushroom based material in various molds. Experiment with shapes and sizes of the material by applying it to a specific typology in various forms.

Abstract:

Mushrooms have already been proven to be a reliable and versatile material for various design purposes. For my project I am experimenting with expanding the possibilities of mushroom matter as a building material and also contemplating mushroom as a metaphor for local culture in relation to Lithuanian people as a whole. Developing mushroom matter into a building material designed for a specific site opens the possibility of having an ecological and cheap material that also has a connection to the local people in more than one way. The origin of the building material might suggest specific character for the site, e.g. in cases like Bath, UK, the stone type is largely associated with the city and vice versa. I propose a material type that can be grown into specific shapes and adapted to the weather conditions of northern countries as well as being grown from local mushrooms, providing prosperity to the local economy, which in turn should help reverse the emigration problem prevalent in the country that is not showing any signs of stopping. A significant and symbolic site was chosen for the trial test of a new building envelope type - a railway station, which has only been adapted to service the European gauge railway this year. The physical connection with Europe in this case might open the floodgates back to the country, encouraging people who had left to consider coming back to enjoy the literal and metaphorical fruits of the homeland.



CAPITAL OF MUSHROOMS

A poetic summary of the thesis project



In this small country there are no mountains to be seen. If there's a sun it doesn't stay so long. And winters are slushy and barely white it seems. There are a lot of people that chose to fled away and Western countries they picked as a place to stay. They fled and came back, but not that often so there's a feeling of missing something. So in this town that has a station, there will be layd a new connection. Towards the West, towards Europe and so the trains could come and depart. And for that reason the site I've chosen is perfect for trying something rather potent. Something that has not been tried before: building out of mushrooms that sounds silly that's for sure. The mushrooms that are thriving in this place called Lietuva. They need the dampness and sometimes that cold summer is just enough, for them su sprout and proudly spread. They seem so happy but why aren't we here?

01. Introduction to the capital of mushrooms

Kaunas is the second largest city in Lithuania. But that only means that there are close to 300 000 people living in it. Locally it is known as the center of the country because of its geographical location. Two Lithuanias biggest rivers meet here and thus form the shape of the city's topography. The valley is where the oldest parts of the town is located. There used to be a great castle which protected the city from the invasions of the Teutonic orders. Now the castle is surrounded by the footprint of 600 years of continuous expansion. The is a newtown reagon which was built during XVII-XX century. It mostly consists of low rise brick buildings which were restricted in height because of the city status as a fortress. During the first independence period in the early XX century architecture flourished and up until today Kaunas is regarded as the city of modernist architecture.

Today the city is experiancing twofold decay. The people are leaving the city and fleeing to western Europe to work in better paying jobs. From its heydays Kaunas has lost almost a 100 000 people. Lithuania as a whole has decreased in numbers closing in on 900 000 . The second problem is a bit more global. Since the climate is changing rules for the architectural engagement has also shifted. Stricted qualifications meant that architecture is really suffering. The quality of it is being determined by the factor of wats per square meter in spite of the happines and quality of life that it brings. The buildings are getting duller, windows are getting smaller, people are buildings walls between the outdoors and themselves. Time has come to turn ourselves to the nature and ask ourselves how can we use millions of years

of natural experiance that we witness through our windows to make architecture better, grener, more adaptable and ever so interesting.

In the land of Mushrooms there is a station that sits on the edge of the city . Surrounded by the hills and by the river in the south it lays there empty and dull, reminiscing times when people were not free. The city has changed and people changed with it but the station remains the same. Still bearing artifacts of the occupation.

Kaunas is the first major stop in the Baltic region to be connected to Europe via European gauge railway. That means for the first time ever there is an unbraikable bond that connects us, Lithuanians, to the west, tightening us together with our similarities and differences into a one cohesive family. That means that for the first time a Lithuanian that has spent



- Rail Baltica Reute and Location of Lithuania

Introduction to the capital of mushrooms



- Railway network of Lithuania and Kaunas in the center

several years in emigration can buy a ticket and after several hours be in the center of his hometown without the hassle of luggage size checks and delayed flights.

The city is here and it is waiting. Slowly adding to the existing environment, fixing stuff what's broken and from time to time shaming natives by building something silly. It is still the same city that it was before but the lack of people is taking its toll. The central part, where the old buildings are, is sparsely populated. The buildings need refurbishment and the quantity of people is not enough to support public goods and services up to the level that would be nice to have. Indeed the density of the city is nothing close to European cities of the same size. Malmö, for instance, takes up half of the same area as Kaunas does and both cities have the same population. Kaunas needs people

and needs them a lot. And the area that I'm focusing on, the railway station area, is one of those that require a lot of help.

Established somewhere around 1850, Kaunas railway station with all its tracks and buildings takes up a mesmerising area. The station building alone is the size of Copenhagen's station, the city that is several times the size of Kaunas. The preposterous waste of area is contributing very much to the feel of the space. It looks semi-abandoned. There are no rush hours, because the flow of people simply vanishes in the vastness of the territory. If you stay on the platform for a considerable amount of time you'd think that the station is not in use sometimes. And then there's the urban qualities of the site, which are lagging a lot behind the standards of European cities. The station building and tracks, in tandem with the six-lane street that's right outside

Introduction to the capital of mushrooms

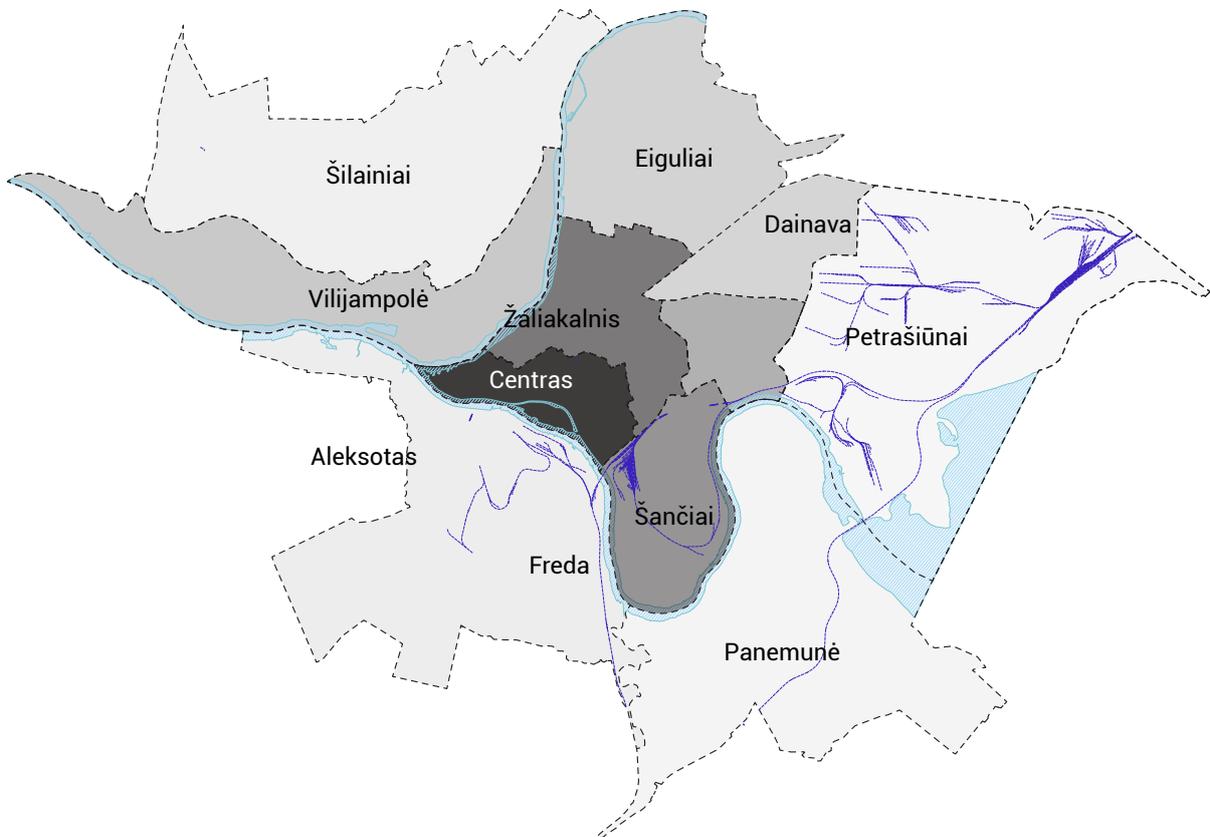
the station form a colossal barrier and slashes the city in two parts. The smaller area, Sančiai, only reachable by car from the town center. Or you'd had to take a long route around the station and all its belongings to get there by bike.

It's not a site that would draw people to come to Kaunas would be my ultimate conclusion in regards to the architectural and urban qualities of the site. Although some parts of the city are very attractive my goal is to change this area to become one of the points in a seamless transition across the town that is simply happy by itself and not afraid to show it.

Emigration is the subject of great importance to a nation that is only three million strong. The country which has been occupied four times in the last 150 years and still managed to sustain its language and traditions the greatest blowback is that during the recent period of freedom the country waves goodbye close to 900 000 of its citizens. Difference

being that people are still alive and well but scattered all around Europe with not a lot of incentives to come back. The great demise of the cities and countryside left the country with infrastructure to accommodate much larger communities. The economic downturn of the 2008 has also exposed the country's instability in providing cheap energy to its citizens and so the mass emigration began. It was accelerated by the introduction of cheap fair airlines, which is still the go-to means of reaching the homeland.

I propose another solution, partly inspired by the railway link, to reconstruct the railway station, the symbol of movement and coming back in order to greet the people who are coming back and convince them to stay with the power of architecture. The architecture that would be grown from the same forests people had spent their weekends hunting for mushrooms when they were young. That is the case for the Capital of Mushrooms.



-Kaunas city density map and railway system

02. City style and the tradition of migration

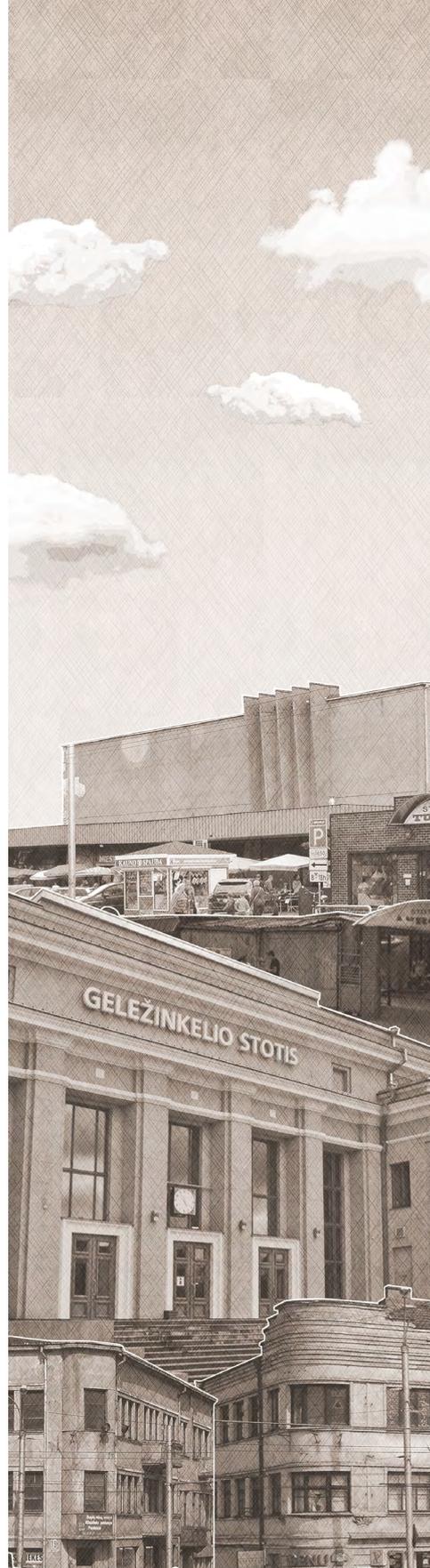
Kaunas is very proud of its architectural heritage. And to prove that Ministry of culture has submitted the whole Kaunas city center comprised of buildings between 1919-1940 to the Unesco world heritage commission. It was a period of change to the country and the city that represented the then interim capital of Lithuania. Post WWI Lithuania had its capital occupied by Polish military and the whole structure of government had to move to Kaunas. Thereafter the city had undergone one of the most visibly pleasing periods of its existence. The sheer amount of modernist inspired architecture is truly underwhelming in a Kaunas sized city.

During the interwar period Kaunas has seen the influx of people almost doubling its population. The city grew and so did the urban environment. Trade between Lithuania and western Europe began its new wave and it seems that the country has begun to integrate into the newly reformed European continent with lots of nations springing up and declaring independence.

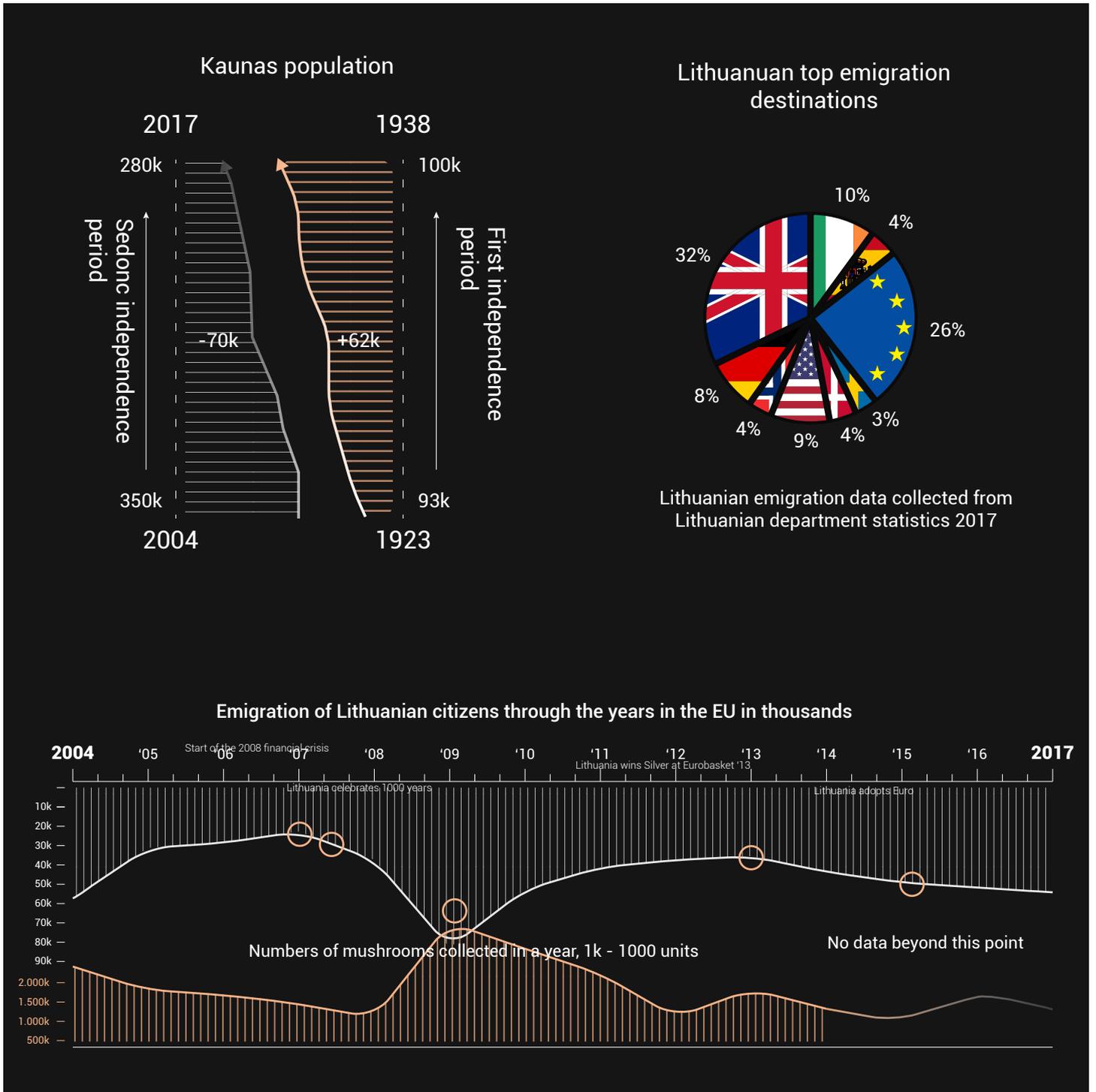
The links between countries began to form, new routes and destinations began to appear as Lithuanians for the first time in 120 years were free to travel wherever they wanted. This however has not diminished but actually increased the population of Lithuania and Kaunas. It is clearly visible that during the period of first independence Kaunas has gained around 70% of its citizens whereas during the second independence period and right after joining European Union the city has lost around 100 000 people (70 000 during the EU years). Staggering statistics prove that a delicate coherence between building up something new and the growth of people does exist.

This project however focuses on how architecture could spark and be a symbol of new era of growth. Growth that would comprise of people and their quality of life. During the past few years the Reimmigration has started to show signs of growing.

- Architectural diversity of Chosen site



City style and the tradition of migration



-Comparative statistical data was gathered from the Lithuanian statistics department. 1923, 1938 Annals of Statistics of Lithuania.

City style and the tradition of migration

- Architecture examples from Kaunas

And that growth at least is the first sign of cultural recovery that could start a new period of architecture splendour mimicking the interwar period. Pictured on the right are just a couple examples of the cities architectural heritage which comprises the style of the city itself. Components of international style weaved together with national symbolism formed a unique network of buildings which is still there today, only in greatly reduced quality since the occupation years, during which the restoration and preservation was not on the list of priorities.

So it is very clear that movement of people did a great impact on the city and its architecture. Now due to the lack of density in the city the quality of life is diminishing and the need to live in the center is no longer primary. Even people who chose to stay in Lithuania would rather build themselves a house in suburbia and commute to the center where still the most office buildings are located.

The city has a very distinct style which is visible almost in every occasion. The style of architecture, clothing, politics and even the way people talk, although being just 100 km away from the capital the city is distinct and relevant.

Map on the other page shows the distinct green areas of the city which has a lot of vegetation woven in the city urban fabric. Close to the center of the town there are massive amount of forest parks which are a proud feature of Kaunas and a historic relic also. The two rivers are forming a shallow edge which is where the old city castle stands because of its defensive properties. Railroads which are marked in blue are quite underused in this city. Although the river which spans the whole Lithuanian countryside only has several railway bridges, this route has great potential being in the natural bottleneck of Baltic states and Europe.



City style and the tradition of migration

- Map of Kaunas showing vegetation and railroads



03. Static reality of the site

When laying the railway lines topography is usually the main determinant that dictates the route. At least that how it used to be during the 19th century. In Kaunas case it is a bit different. The city is located in the valley lodged between two rivers. Those rivers called Nemunas and Neris formed quite steep valleys around themselves forming a natural barrier which has also influenced the original location of the city itself. Non the less in the XIX century when the railway was being laid the town has already reached the lowland limits of the valley and has started to climb upwards. In order to spare the buildings the railway had to accommodate the shape of city limits. Also in order to have a functioning station you have to build at least one massive bridge over the rivers. So multiple of factors led to the current slot that the stations occupies. Even the tunnel had to be built t to accommodate the selection of the site. It is now the only tunnel still used for railway service in Lithuania.

The site is wedged in the place where a small stream used to be. The tunnel gorged out of the hill and then lodged between a narrow steep of hilly terrain and the broadest river of Lithuania.

The plain is largely empty of trees compared to the bushy hills. And you would have to look west to see the early XX century houses with very luscious courtyards and streets. Although there are some trees surrounding the station that will further impact the architectural proposal.

Typologically the stations is surrounded by a bus stop, some random housing from the early XX century, several buildings that were dedicated to station services but are now derelict. Neighboring buildings are mostly to the north and the south of the station since the main building is cut of from the city by a large carriageway with six lanes.

The carriageway is another major problem that the project takes up. It is the major distributor to the loneliness that



- An areal topographical view (station in red)

is suspended in and around the station building. There are two underground passageways that lead to the station under the cutting road (M. K. Čiurlionio). Those places are cold, dark and a hazard for crime. None the less there are still some shops that are renting out places in that underground passage.

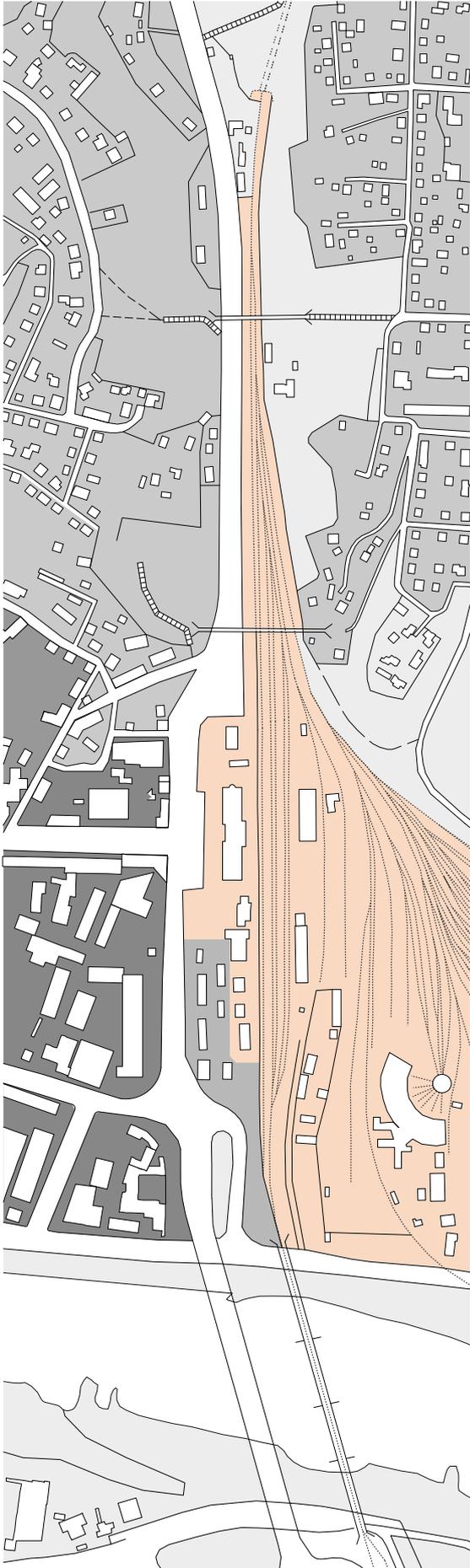
Moving on to the diagrams in the next page describing the age of built up area around the station. It is clear that this place has seen little or no improvement in the architectural sense. The M. K. Čiurlionis street was widened without the concern of the pedestrian. Lack of typological and straight forward density of the site has diminished the feeling of rush that one would associate with public transport hubs.

Other diagrams show the displacement of natural features around the area and the proximity to potential recreation areas. Station and railway area is wedged in a scenic area that has a lot of potential of becoming a park. But next to the station the greenery is sparsely scattered, without forming any significant public area. This is assessed in the site plan which encourages more density and more dedicated areas to be designed next to the station.

Proposal will try to negotiate with existing structures without damaging intervention to the site and its historic displacement, but it will also correct the car oriented urban features that dominate the area.

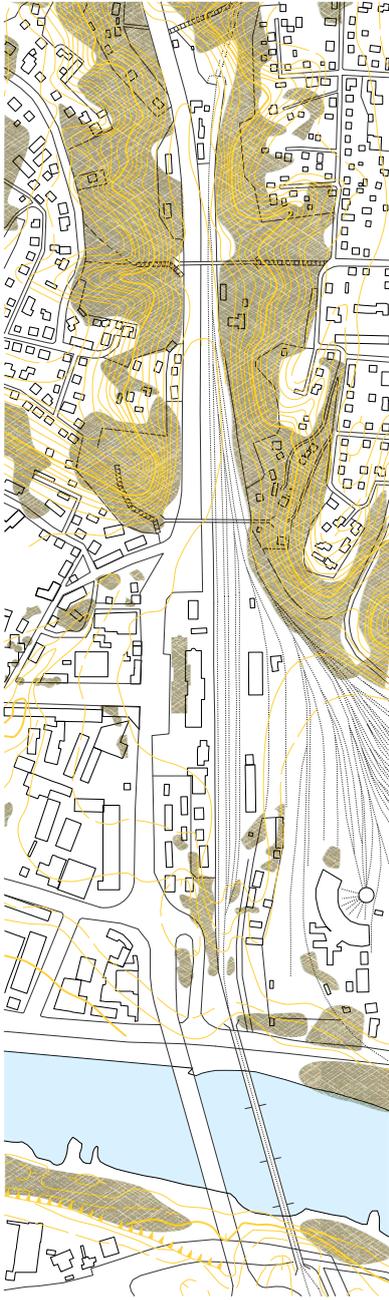


Static reality of the site



- Map of Surrounding area functional disposition

- Station area
- High density city built up
- Detached housing
- Forest area
- River

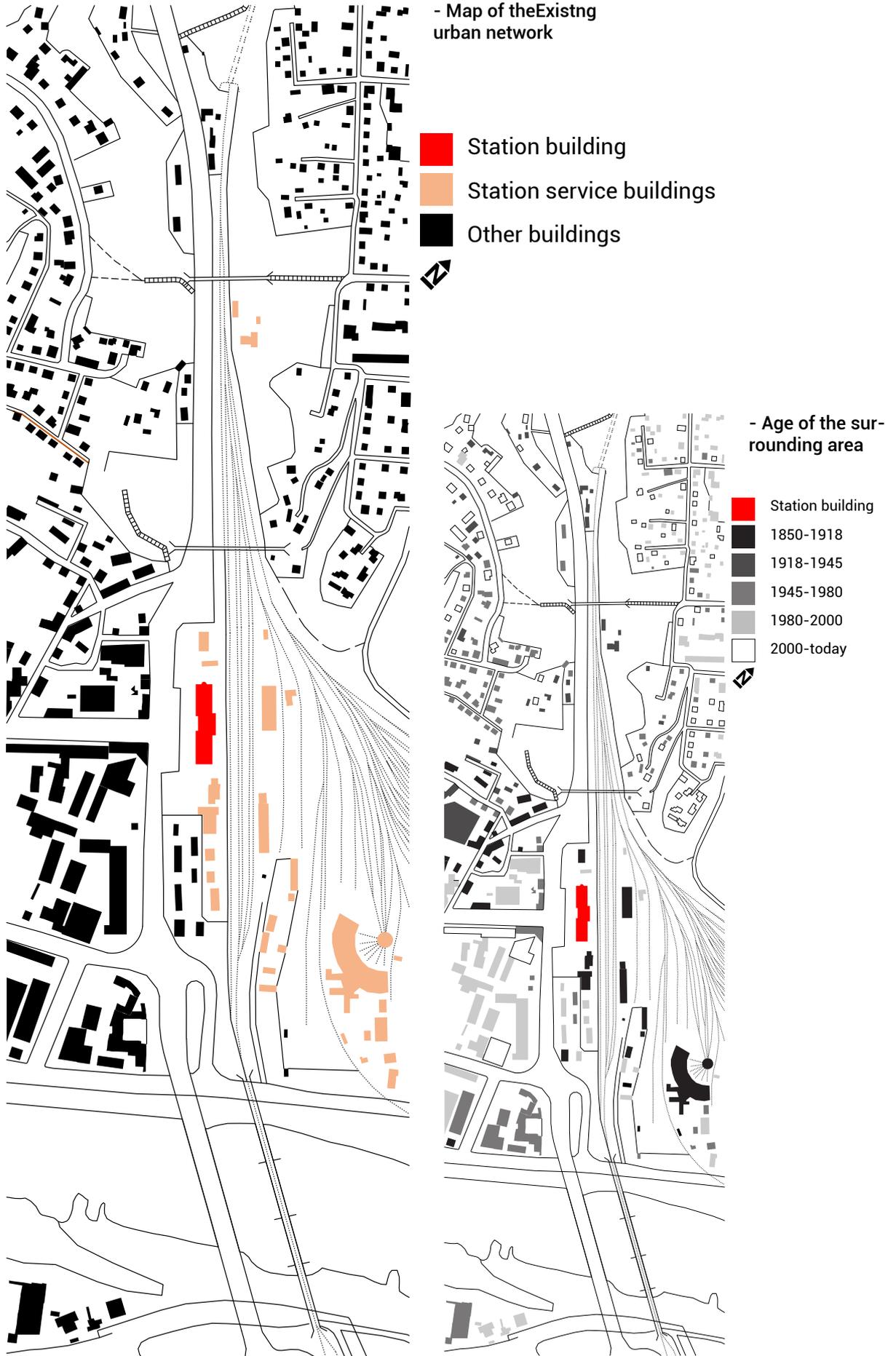


- Map of natural features around the station

- Station building
- Forest area
- Contour lines
- River



Static reality of the site



Static reality of the site

Diversity of the site is truly unique. It would appear that the station is actually the end of the city and since the busy streets are on one side of the station and the lush forests are on the other side. The buildings work more like a wall than a station and that is shown in the pictures taken from 2016 summer till 2017 spring.



- View towards Vytautas street (west)



- View towards upper Sanciai (east)

Static reality of the site



Static reality of the site



- View of the station



- View from the foot bridge



- View from the platform

Static reality of the site



- View of the hills surrounding the station



- Architectural diversity



- Architectural diversity

04. Mushroom wonders

Mushroom is supposed to be the next plastic, replacing the fossil fuel derived materials in exchange to clean and sustainable mushrooms. This notion is enforced by various projects that circle around the design pages such as mycelium chair by Eric Klarenbeek (pictured on the right) is one of the examples how forced growth in 3d printed molds develops into a unique and easily reproducible design.

The case is that mushrooms, while growing can occupy any shape. Because mushrooms or mycelium grow by spreading their tentacle like rhizomorphs which are the instrument of spread. Rhizomorphs can penetrate soils and loose debris to spread enormous distances. The network develops and overcomes the volume that it is restrained by. Second picture on the right illustration the possibility of having a modular design controlled by the mold. Since mushrooms grow endlessly it is of importance to control that process in order to gain a certain quality of the object one is trying to grow. Just like in ordinary clay brick burning time is crucial in creating an object that can withstand pressure and bending in a way an ordinary brick can.

There has been one waste experiment in using mushroom bricks for human scale buildings and it is pictures at the bottom of this page. The Moma Hy-Fi pavilion designed by New York based company *The Living* is a prime example of how mushroom construction can be used in a large scale. The structural integrity of the pavilion is based on wood beams that form a rigid structure inside upon which the mushroom layer takes its stability. The truly remarkable features of having a compostable building something that interested me for this project. I was intrigued how mushrooms because of their growth patterns and living cycle develop an insulation property which is exceptionally important in a northern climate country that is Lithuania. The second property that intrigued me is that although mushrooms that we see in forests are differentiated by color shape and texture, are very similar



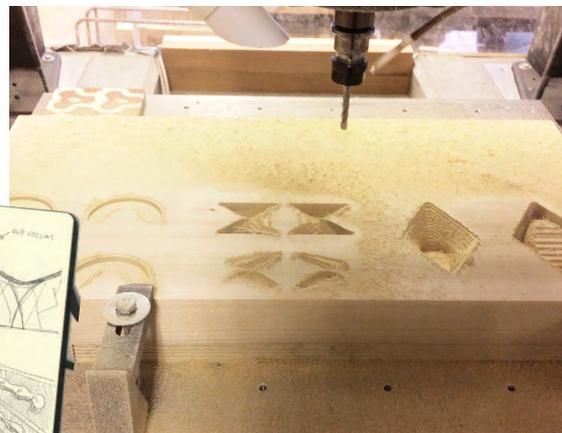
- Mushroom bricks and mushroom buildings

Mushroom wonders

in their developmental form (mycelium networks). That means that all kinds of mushrooms can be used in the growing mushroom bricks with variable results in color, texture but not in insulation properties. This means that a locally sourced mycelium could be obtained to grow certain type of building material which later can be used to locally in order to boost certain local architecture traditions. So based o the local supply of mushrooms a certain trend of local architecture could develop. A trend that is both architecturally sound, derived from nature and local

Having that in mind I started sketching the ideas of what that mushroom brick component might look like and what would it do. I took several attempts at making concept bricks and actually growing them in a very scaled down form.

Proces of growing a concept brick begins with buying a ready made mixture of mycelium and corn shawings.



- Sketches of the station and mushroom bricks

- Brick making process

Mushroom wonders



Then I carved the concept brick modules into the wood in order to make vacuum formed plastic molds in which I would later grow my mushrooms. I chose modular brick design largely because of its traditional brick design and the values described in Franck Verene's article *The Nature of Computational Things*. On how working from the minute parts of the module can help bridge the major scale to the minor without losing quality and the interest in between. The modules grew into steady bricks which were the start of the experiment process.

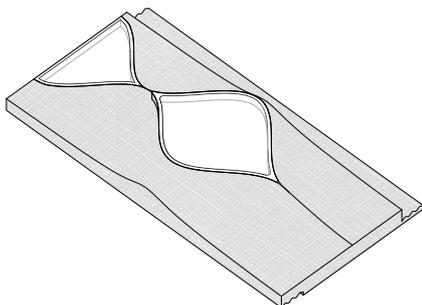
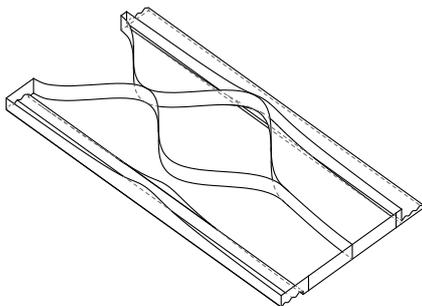
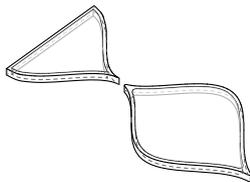
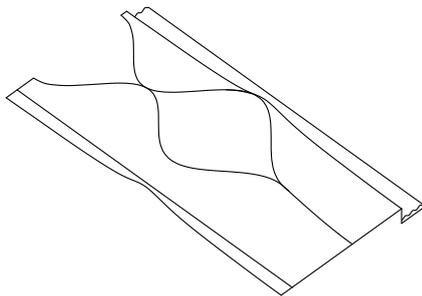


- Cnc carved wood negative for vacuum forming the plastic shell



- Process of making mushrooms into facade material

Mushroom wonders



After growing first batch of bricks I've devised a solution to grow them in greater numbers and bigger scale. Pictures on the left is a process during which the mushrooms are grown inside a plastic form which also houses a glass packet and ventilation tuber. The mushroom overgrows everything inside the mold and stabilizes it. You just have to remove it out of the mold and transport it to the building site. The modules can be changed in order to accommodate the shape of the building walls and roofs as in this projects case.

Brilliance in this design that it is very sustainable. Since the growing mushrooms use up air c02 and then also you can put various ingredient in the mix thus trapping the potential dangerous gases inside building structure.

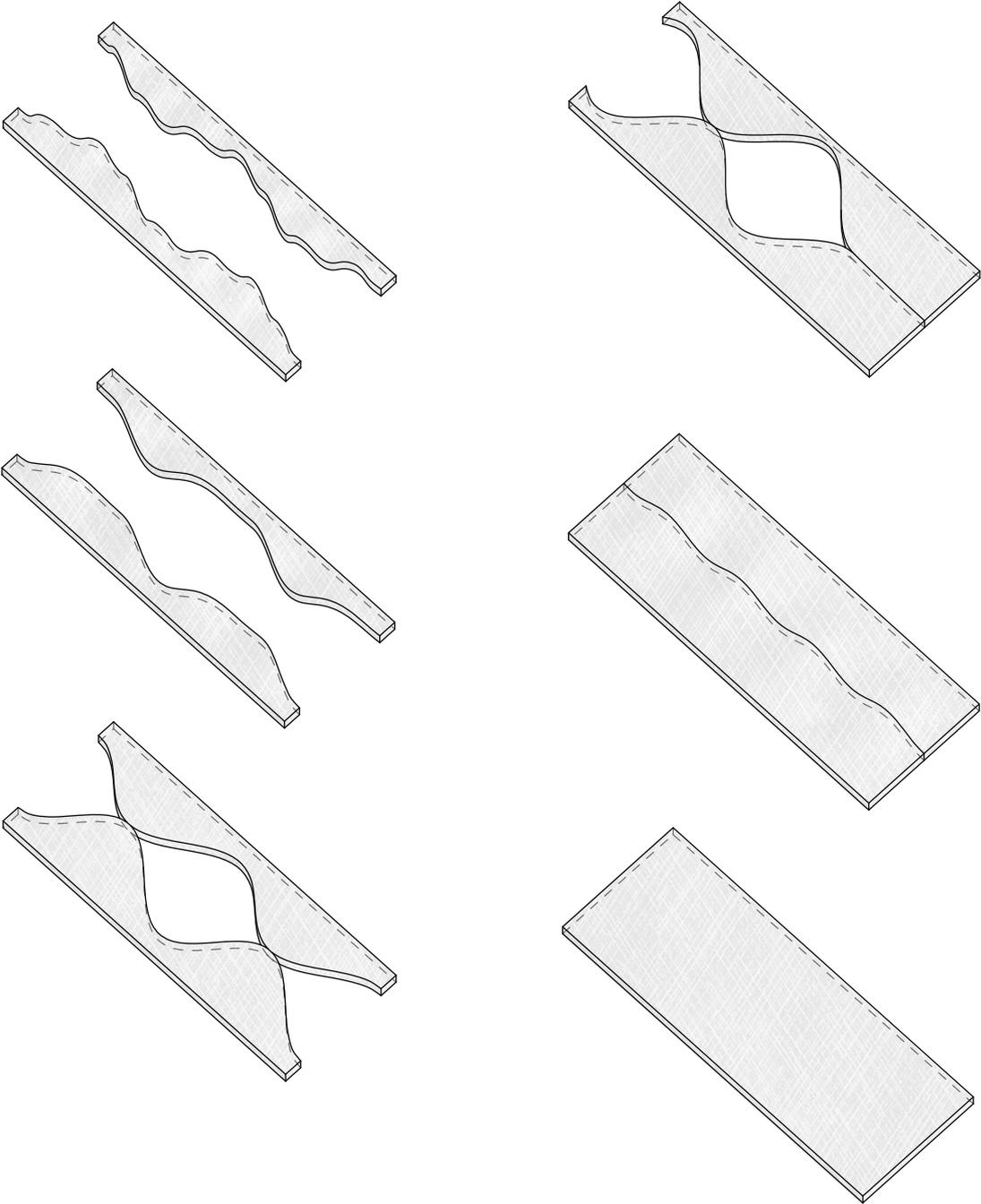
- Mushroom brick segment prototype photo



Mushroom wonders

Different kinds of variations can be achieved using variable sine wave algorithm that I have devised for this project. According to the need of light variable voids can be adjusted producing different shapes of a segment with different light providing qualities. As seen in the picture below one algorithm can pro-

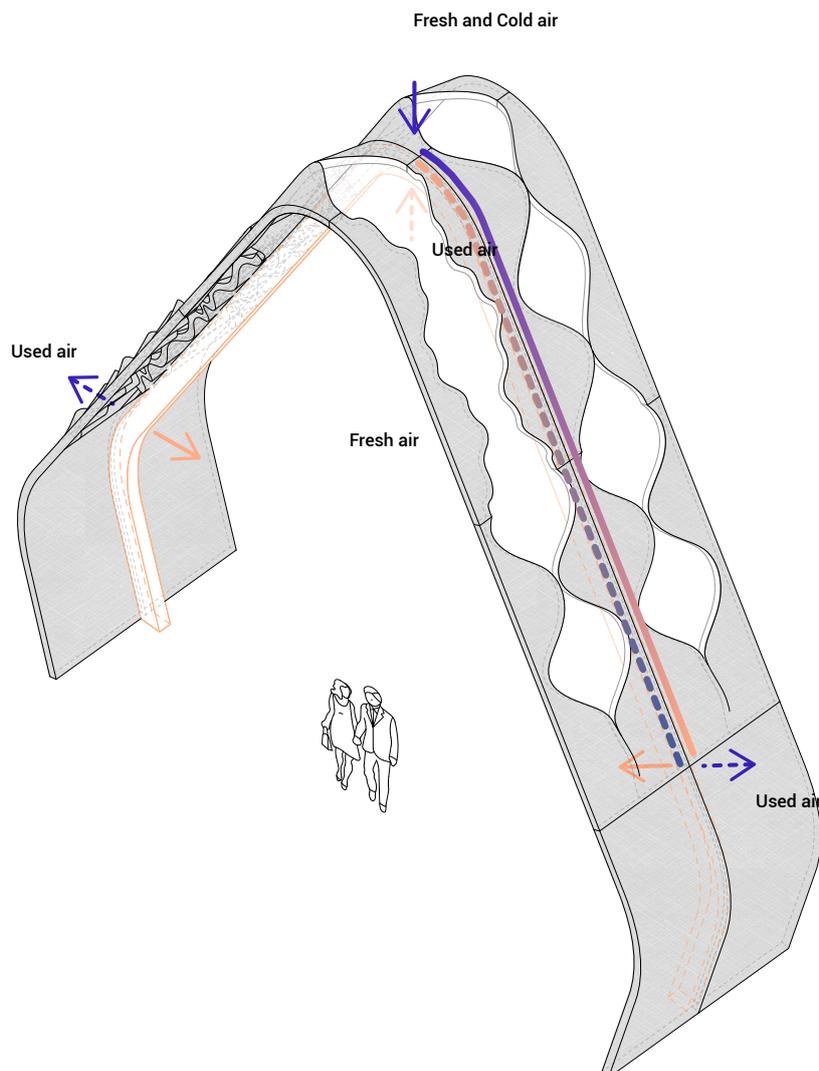
vide endless amounts of different brick forms which latter can be addapted to the facade.



Mushroom wonders

Ventilation takes a crucial part in making a building sustainable. Proposed way of ventilating the entire waiting hall is hidden inside the layer that surrounds the station. The air travel is described in the picture. Warm goes upwards and is collected in the ventilation tuber which are hidden in the mushroom segment. The warm air starts to let go of its heat immediately to the cold air stream which is also collected at the

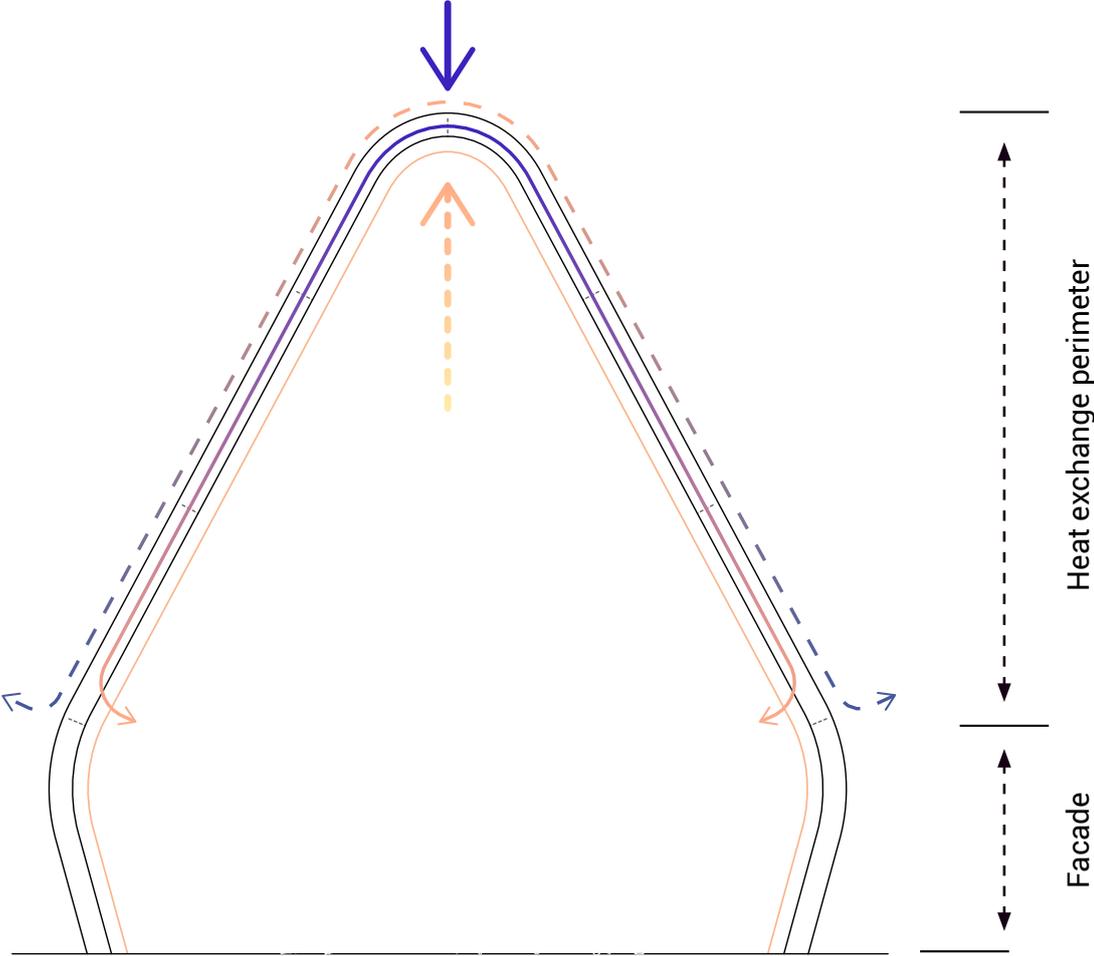
top of the building but from outside. Heat exchanging pipes are laid all along the perimeter of the segments. The warm used air suddenly becomes cooler as it leads out through ventilation pipes outside. The now warmer fresh air is delivered to the people on the inside of the building. The whole circulation takes place naturally without the need of additional ventilation units since every segment of the wall acts as a recuperator.



Mushroom wonders

The same action works throughout the building and thus there is no need for ventilation chambers and heating units. The sheer volume of people provide the head for themselves. If for any case there is a need for additional warmth the electric units may be placed to nudge the difference between the produced

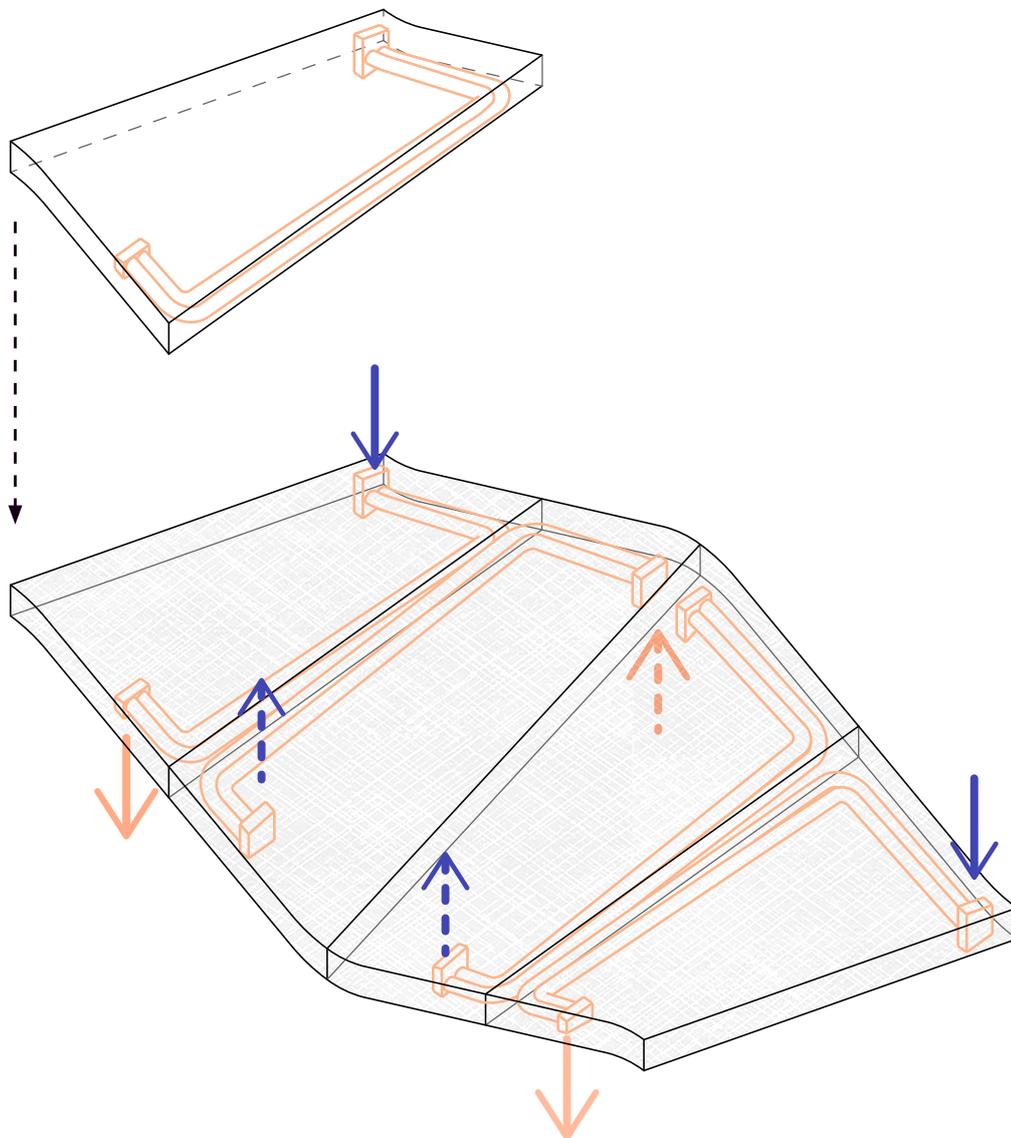
temperature air to the needed temperature. Picture in the section below is the recuperation leght and the route of the air.



Mushroom wonders

Same procedure is used in the marketplace roof. Pitched section of the structure collects the hot used air and directs it towards the lower part of the roof structure. Air gets cooler as it transfers the energy to the new, fresh air that is gathered from the bottom of the roof structure (pictures in grey). Ventila-

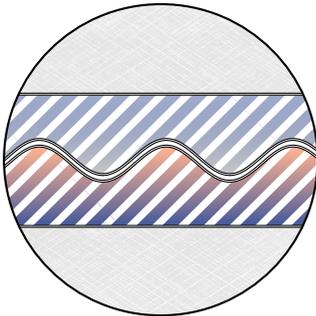
tion tubes are hidden in the middle of the structure and are assembled like puzzle pieces. Pieces are precasted just like the ones which are used for the main station building.



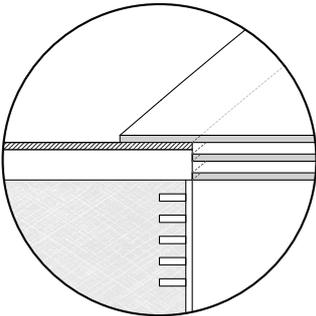
Mushroom wonders

- Mushroom brick details

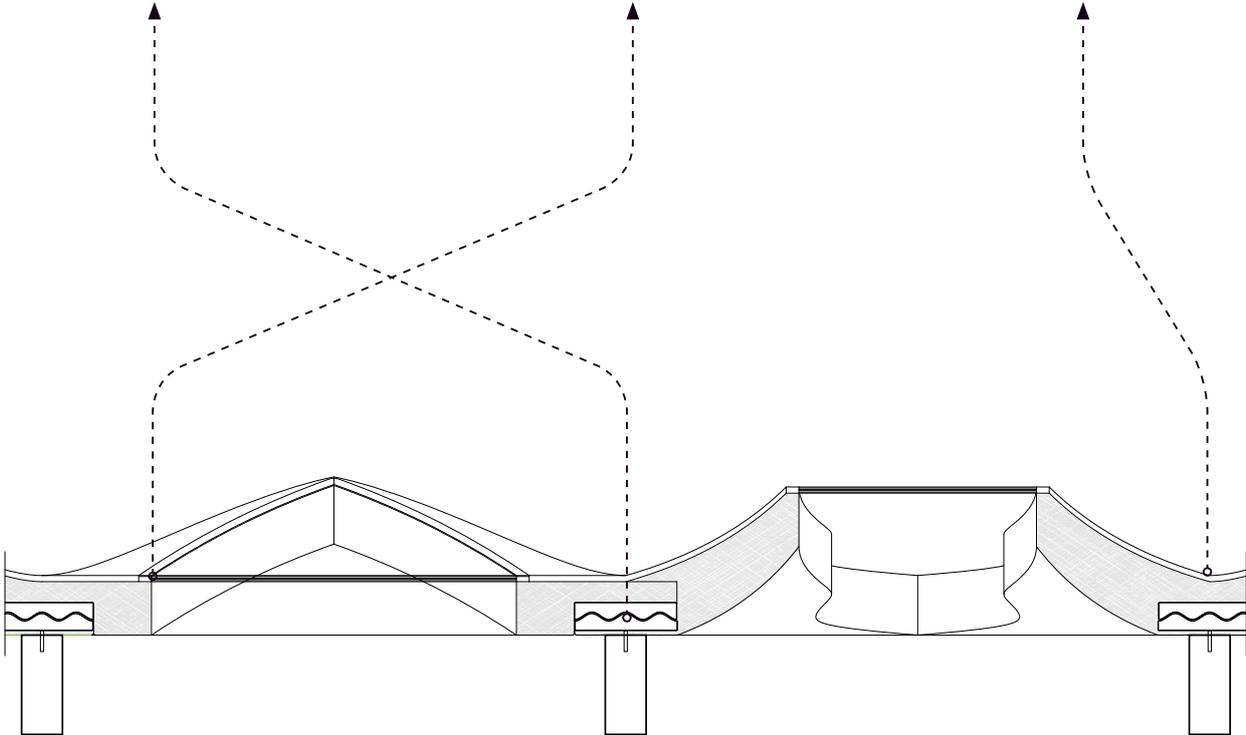
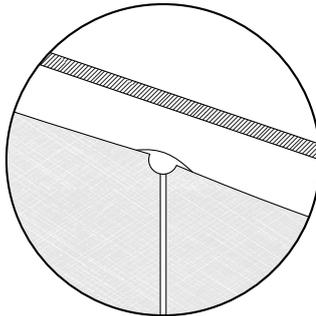
Integrated heat exchance pipes made from extruded PLA plastic



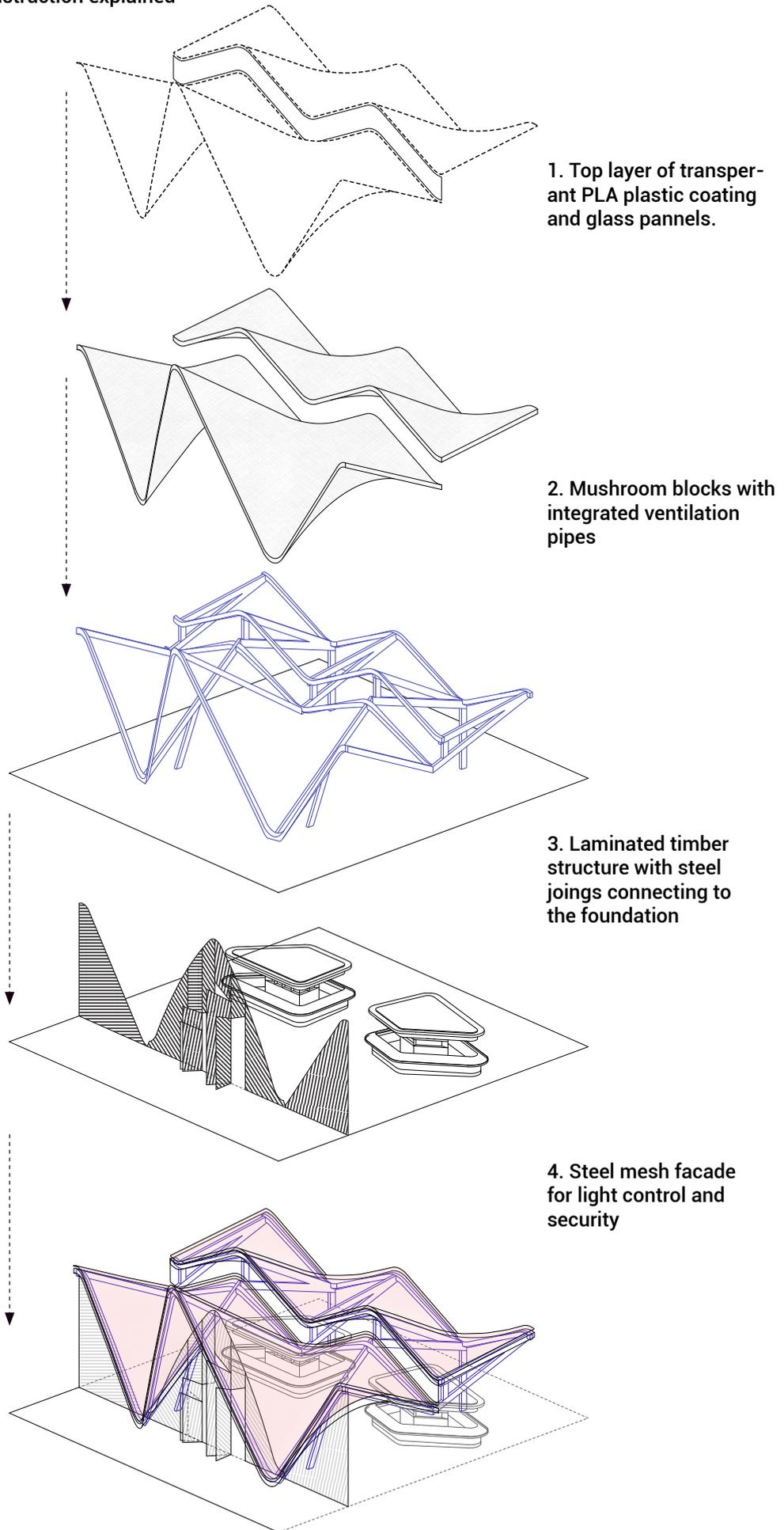
Triple glazing panels which are grown into into the brick



Silicon seals prevent mushroom from damping



- Mushroom wall section



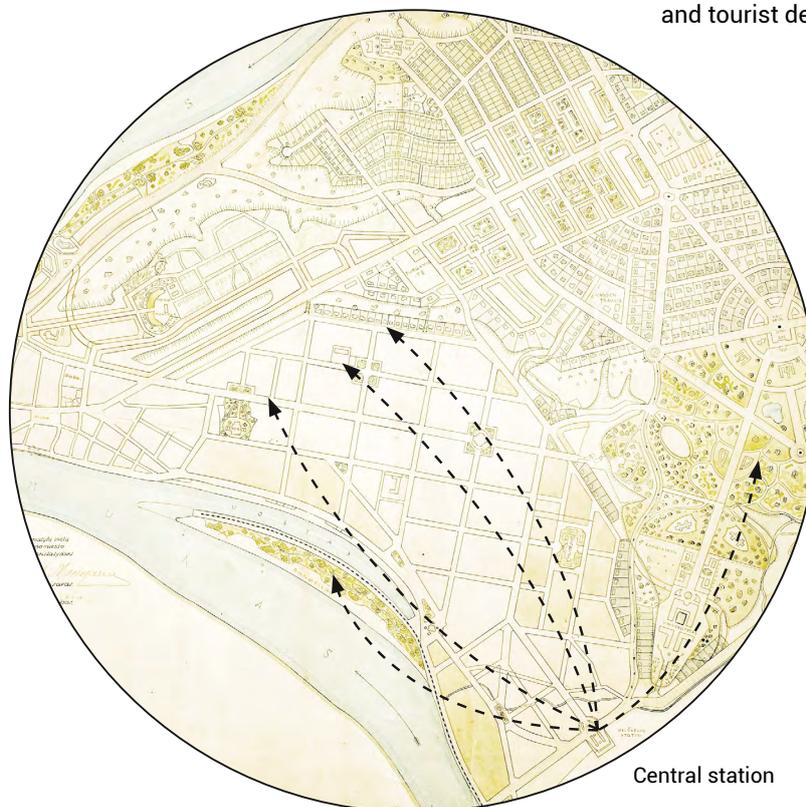
05. Proces of Re-Lithuanization

For most people coming back to live in Lithuania the station would be the first building that they would go into. So I devised a process of Re-Lithuanization, a five step program for Lithuania to be reminded what it is like to live in this country. Metaphorically and physically those steps are manifested in and around the station. Basketball court built right next to the building, Brewery works in one of the wings of the old station, they can meet their friends wherever, or they can go to the marketplace to gorge on Lithuanian goods picked out in forests and fields of their home country. This whole scenario is based on reminding people what it's like to get home and that it takes people to make places great to live.

For the holiday makers arriving at the station a quite different program should be presented. Since Kaunas is the second largest city in Lithuania there are things to see here, so everyone is presented with

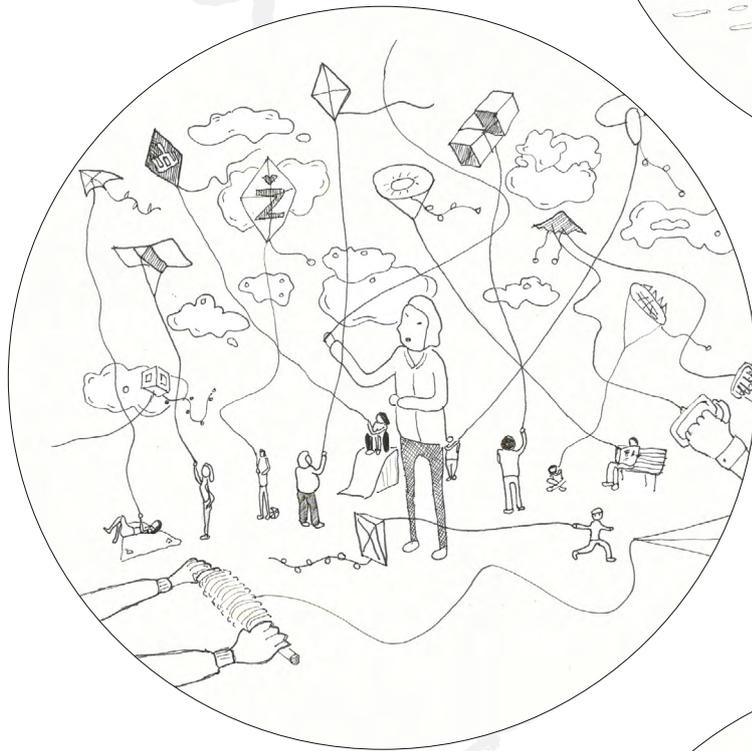
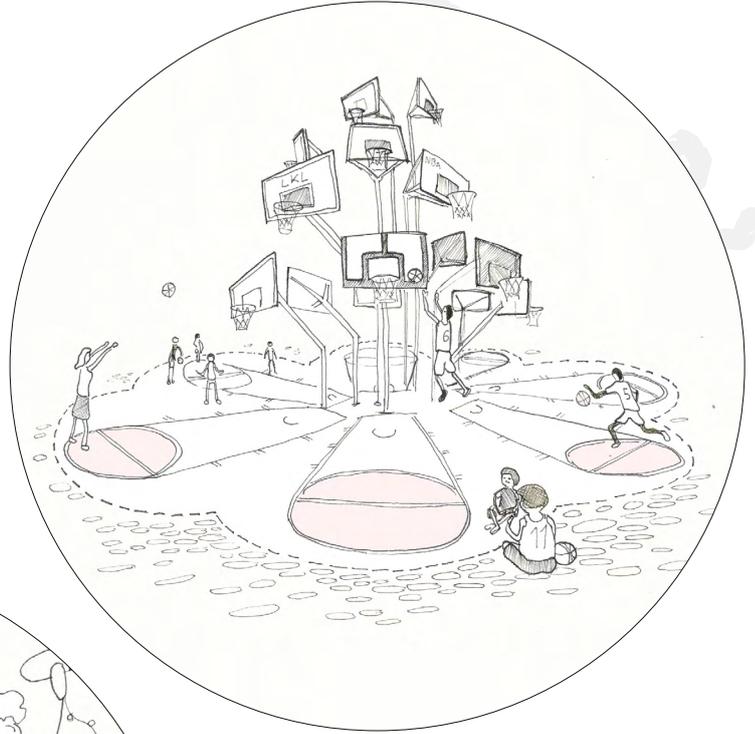
maps and features to visit while going around town. It does not stop with Kaunas since Lithuania is quite a small country, almost all the cities can be reached within a two hour radius from Kaunas so there is a map inviting people to travel onwards and use the railway to get to know the country.

- Map of Kaunas Garden City project and tourist destinations



Basketball - second religion

There is a saying stating that there are three million coaches in Lithuania. And it's not that far away from the truth. Since 1937, when Lithuanian marked its first international victory in European basketball tournament the sport has become almost like a second religion. To a small country victories are a way to remind ourselves that we are stronger together.

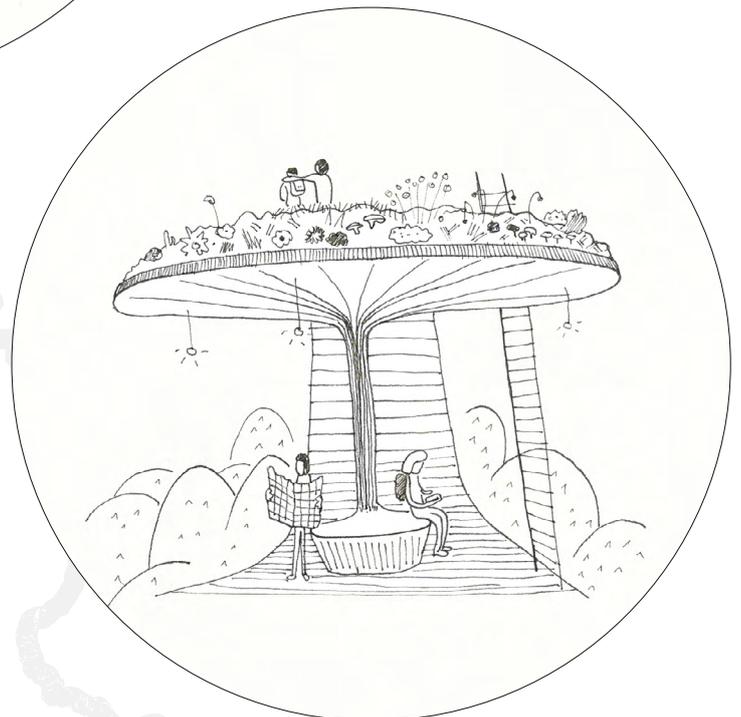


Hunting for luck

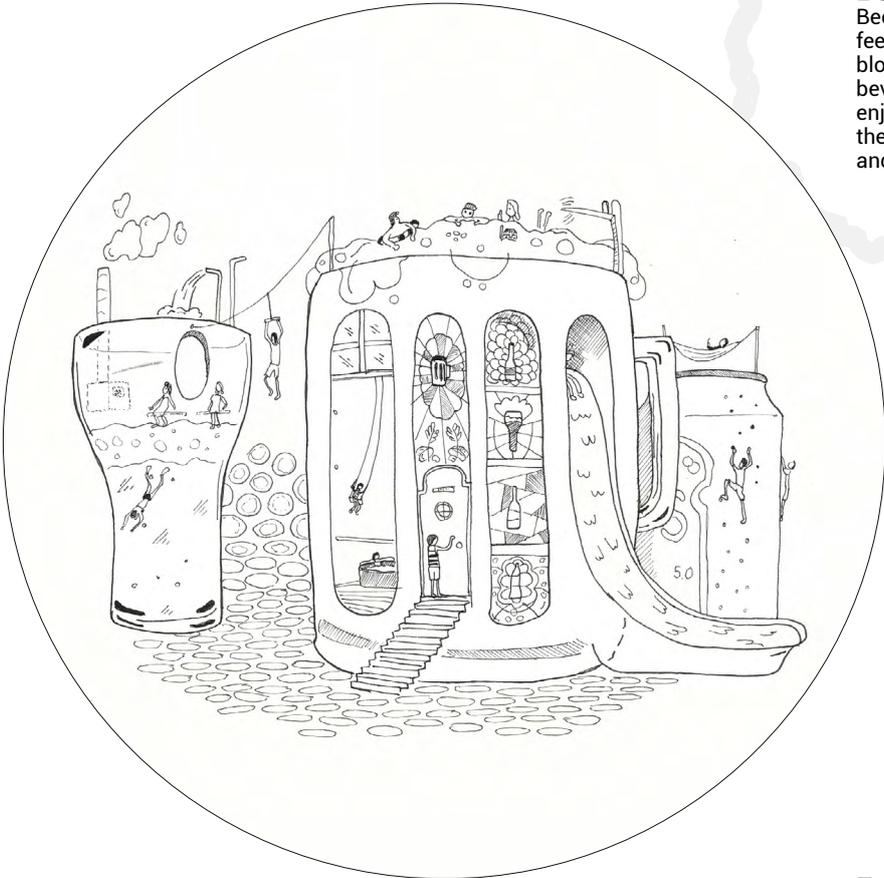
It has been said that Kites bring luck. For good measure every Lithuanian who reimmigrates into the country should take up kiting to better his or her chances of making a good living in the his or hers home country.

Giving friend a call

Knowing your neighbour is essential in all cultures but in a country which has waved goodbye to so many of its citizens it is crucial to maintain friendships that would encourage people to stay and make their own luck instead of borrowing some from others.



Process of Re-Lithuanianization



Beer baths

Beer is essential part of being and feeling lithuanian. With small breweries blooming across the country the beverage is for locals and tourists to enjoy. You can take the train and tour the country just by visiting small towns and small beer makers all year round.



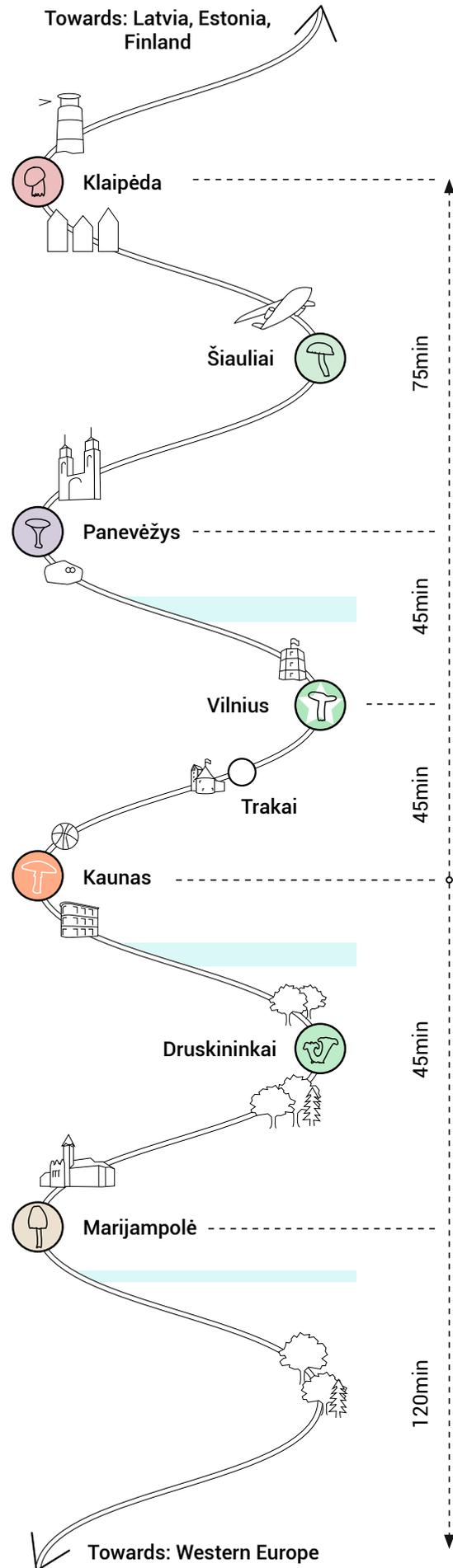
Forest kingdoms

Forests take up more then 30 % of the countries territory and for centuries have been the go to place for leisure and food. During the occupation Lithuanian guerrilla fighters used to hide in the wood plotting rebellions against the occupying forces.

Process of Re-Lithuanization

A mushroom picking Route across Lithuania

One can see so much more of the country when travelling by train. So take a trip to the nearest city and explore the land of mushrooms. Chose a location whichever way since Kaunas is right at the center of the country and every little town or city is within two hours of travel.



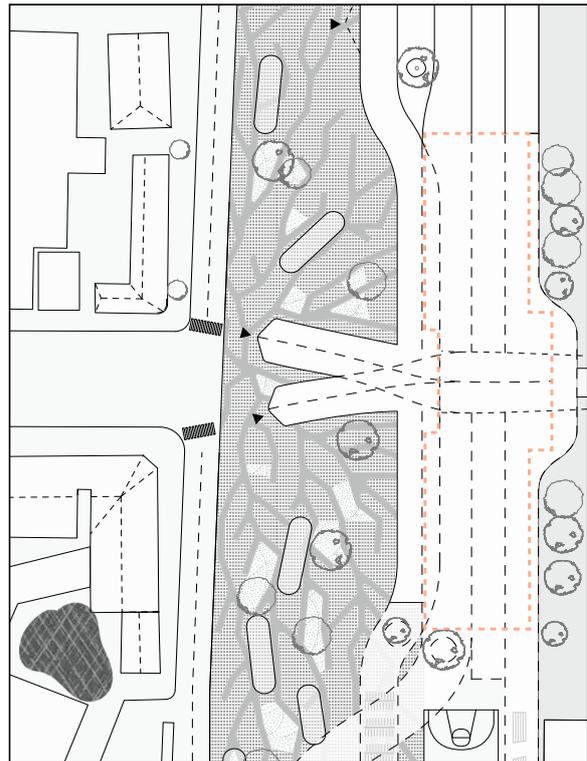
06. Site specific

The previous station had a lot of problems. Because of its location not a lot of natural pedestrian traffic could take place here. Actually the station was a dead end for some streets and was really and unenjoyable place to be. That will change with the help of mushrooms. The buildings itself is transformed with removal of its roof. The structure is still preserved and reused but undressed to show of what it is made of.

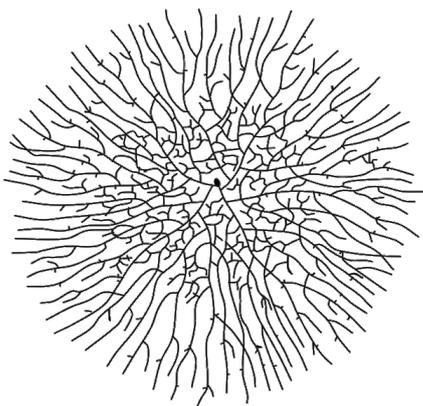
Urban solutions that were added:

- Station building is physically closer to the city
- City has a new public place which is actually usable and attractive
- The Upper Šančiai district is connected to the city via the station viaduct
- New buildings are proposed to increase the density of the area
- Marketplace building is added to serve as the addition of the existing marketplace and further liven up the station with more amenities

rows in a very pleasing manner. It spreads out forming a network that could span tens of meters. The pattern was used as an inspiration public space paving layout.



Mycelium which is a building block of mushrooms grows in a very pleasing manner. It spreads out forming a network that could span tens of meters. The pattern was used as an inspiration public space paving layout.

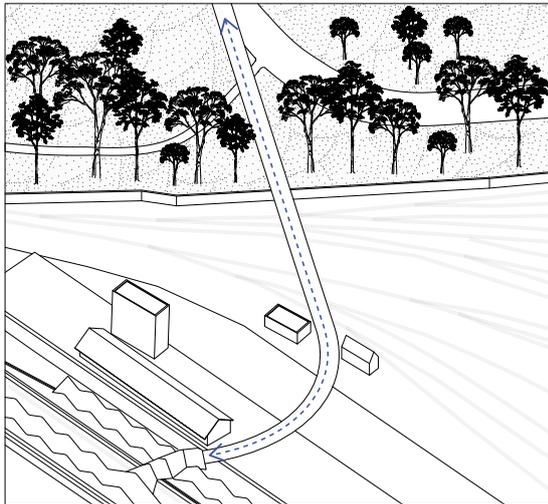
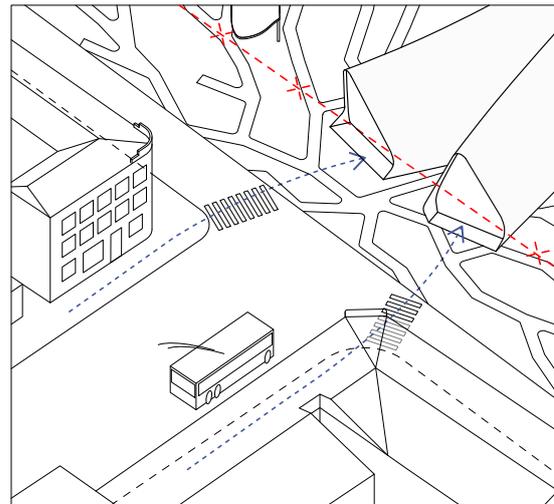


Symbols for site drawing

-  Shell of the old station New station
-  Neighboring houses and buildings
-  Proposal for new construction
-  New paving
-  New grass bumps
-  Mycelium inspired paving
-  "Mushroom" canopies
-  Trees and forests

1. Putting people closer to the building

Changes to the existing urban structure allows the station to get much closer to the city. Current street is too wide and does not allow pedestrians to move freely. Project suggest narrowing the street which would allow for pedestrians to move without the need of underground passages. The architecture is directly responding to the flow of commuters and

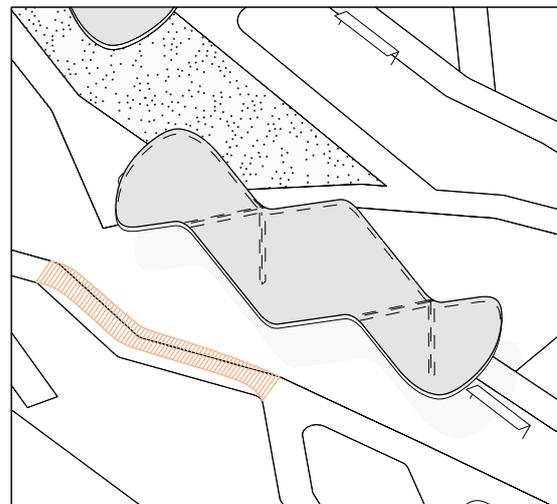


2. Establishing new connections

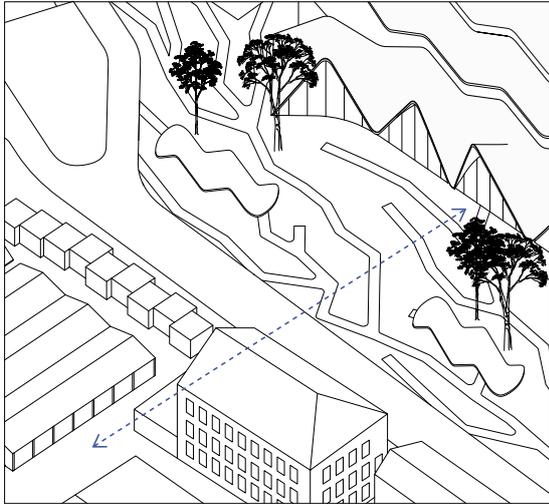
The Upper Šančiai is a part of town cut off to the center of the city by the railway lines. Proposed bridge would allow for a fluid access to that part of the city and also encourage flow of people to which will liven up the station and the surrounding areas.

3. Public mushroom area

New canopy structures which take their form from mushroom caps are designed for public areas to be enjoyed despite the weather conditions. The mycelium, which is the fundamental substance responsible for mushroom growth is responsible for the inspiration regarding square paving. The lines represent mushroom networks which form under the ground and is represented in paving and seating around the square



Site specific

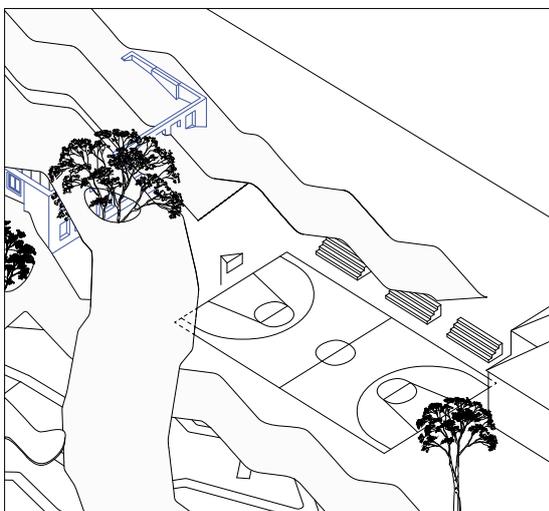
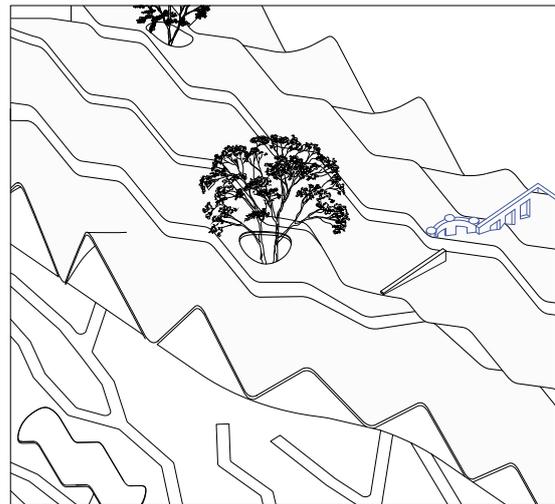


4. Expanding the market

The existing market is expanded by building an additional covered market building next to the station. This will increase the density of the area and will liven up the place. The market will sell Lithuanian goods to the European travelers and will remind those coming back of the delicious taste of Lithuanian produce.

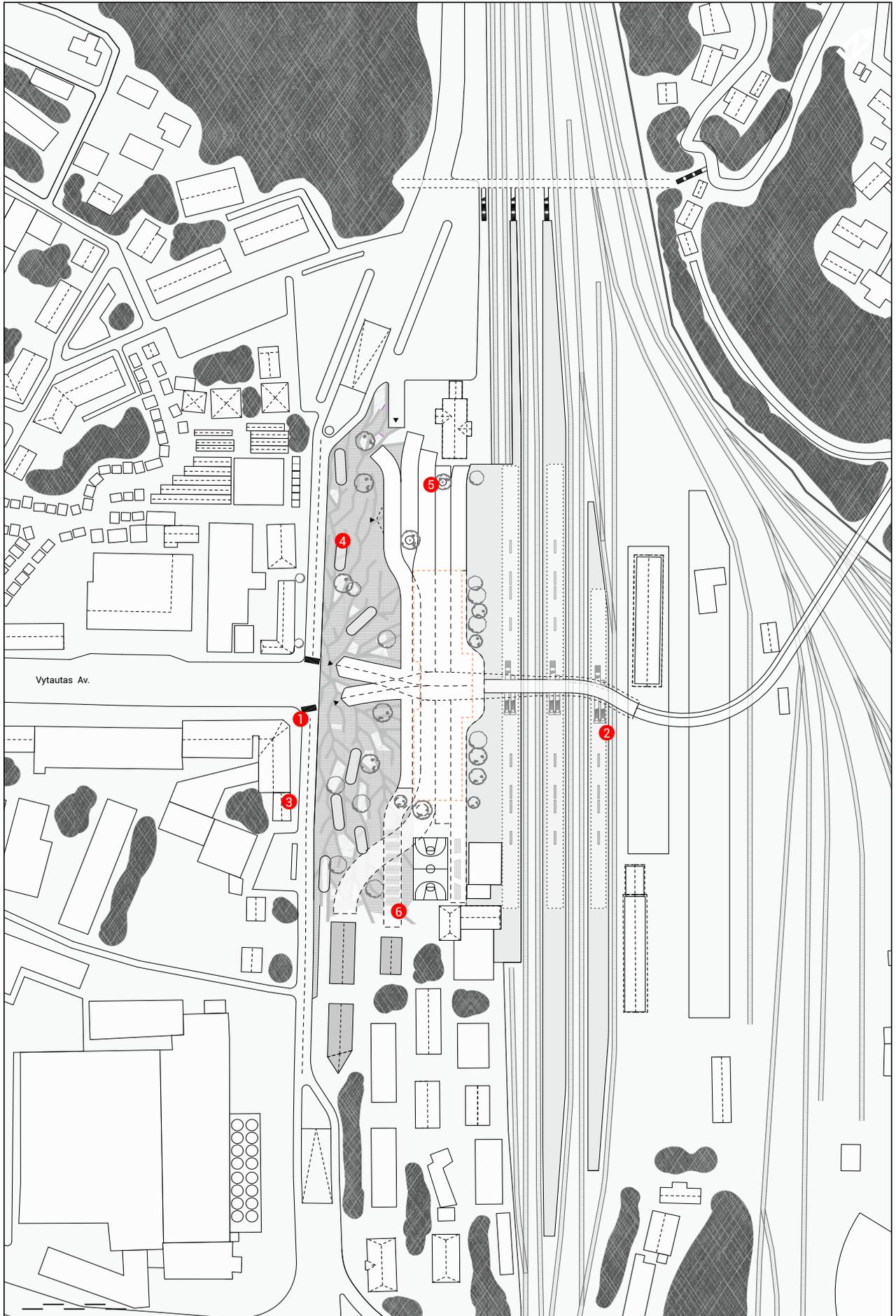
5. Preserving the existing trees

Current station is surrounded by several old trees which are around 100 years old. With architectural tweaks those trees can be saved and incorporated into the expanded architectural ensemble.



6. Playing a little

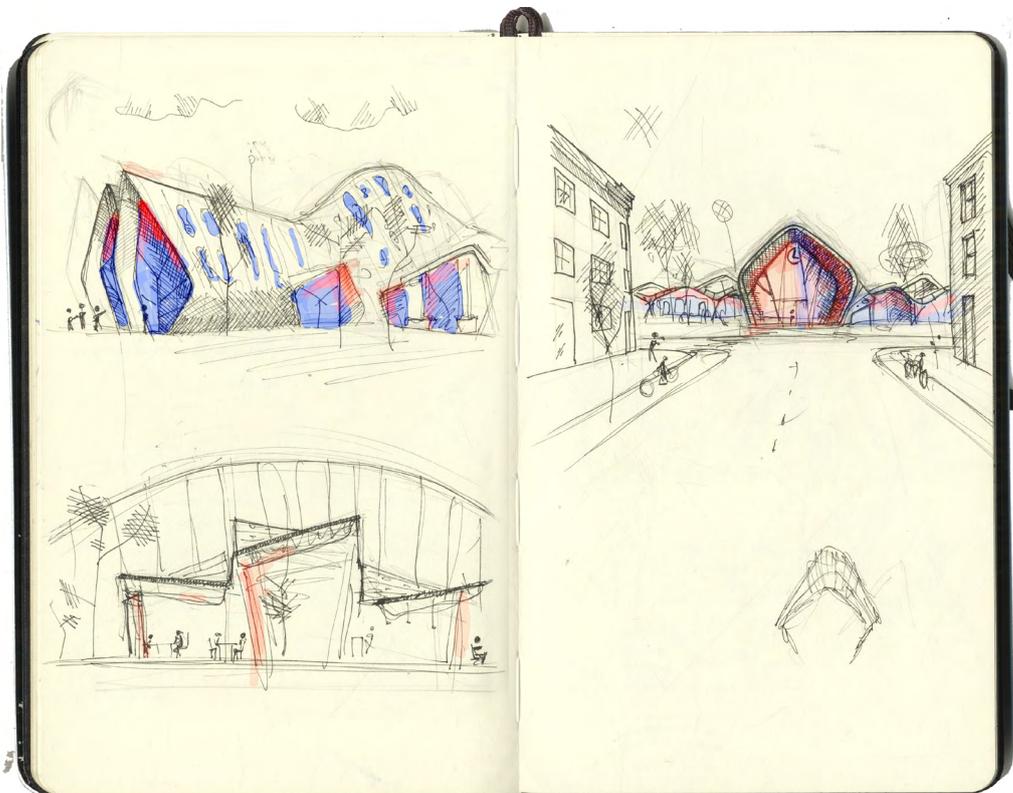
The place around the station was not fun and now it can be changed for good. Lithuanians have a long basketball traditions and the sport is considered second nature to all people. That is why it is crucial to have an outdoor places where travelers could learn about Lithuanian sport heritage and maybe practice some throws themselves.



07. To the trains

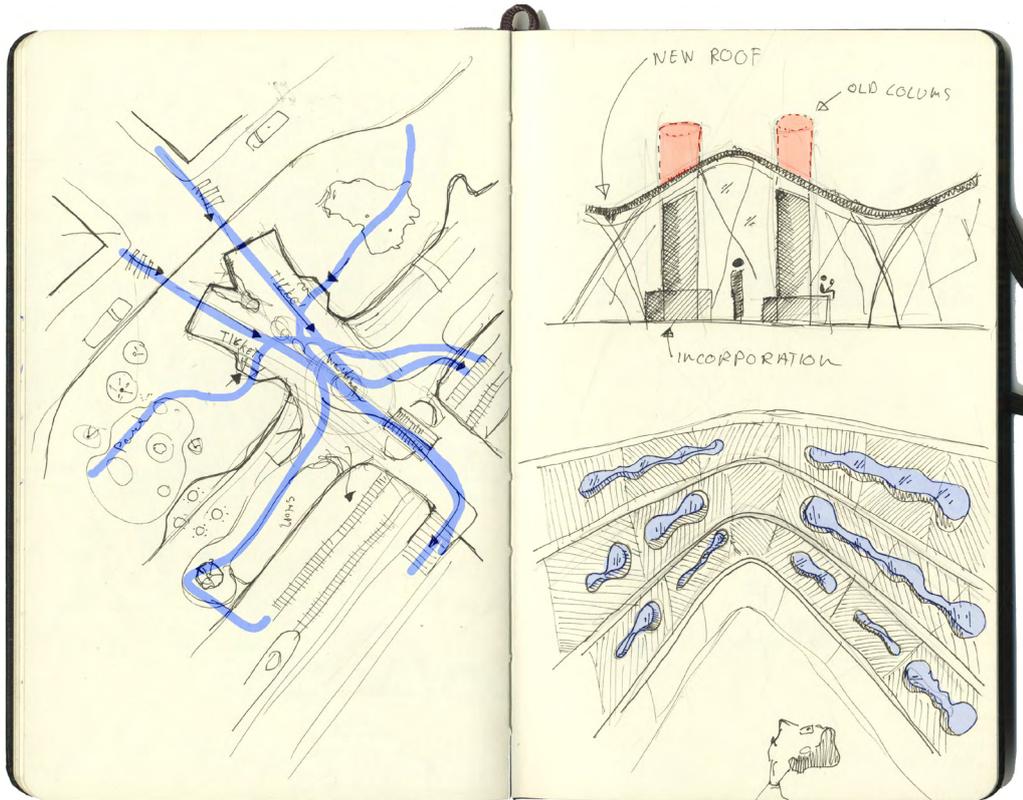
The project began in two scales. Urban scale was to find the problems with current urban surroundings and then design solutions which would make the site more attractive for people to stay. The other scale was minute. I worked with mushrooms and the detailing of the facade. At last the two have merged to form a railway station and a marketplace but the shape of those two have not been without doubt. Sketches below tell the story of the facades came to fruition and how the sketching has developed into design experiments. Sketches show the development of the outer shape of the building while the other diagrams show the development of the facade texture and module displacement which happens in grasshopper sim-

ulations. The different tiles were applied to the same surface hoping to produce different results of detailing. Several designs were tested with the final one proceeding towards the end stage.



- Sketches for the station

To the trains

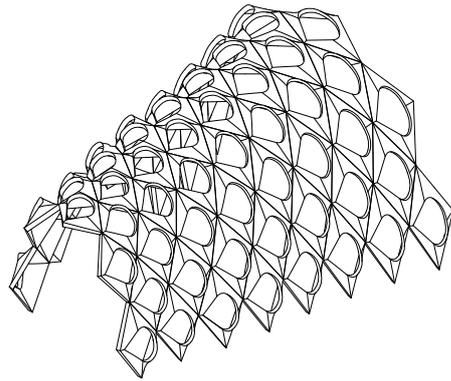
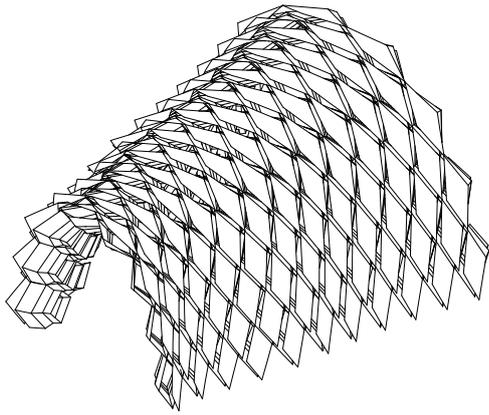


- Sketches for the station

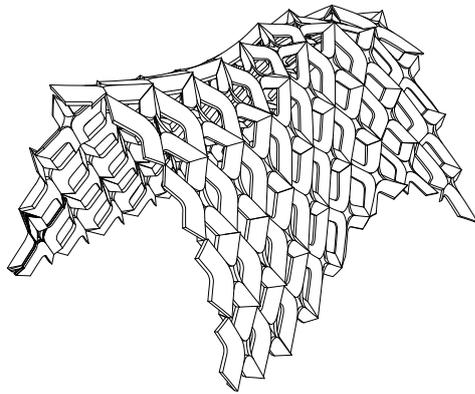
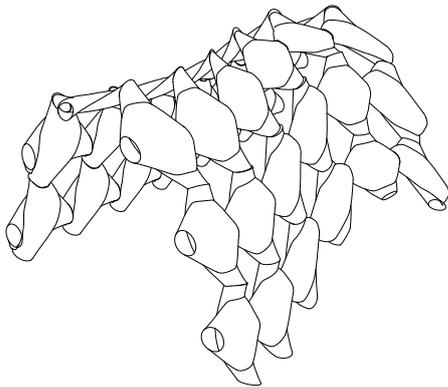


- Sketches for the station

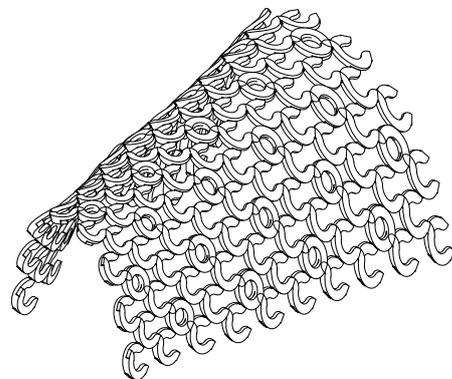
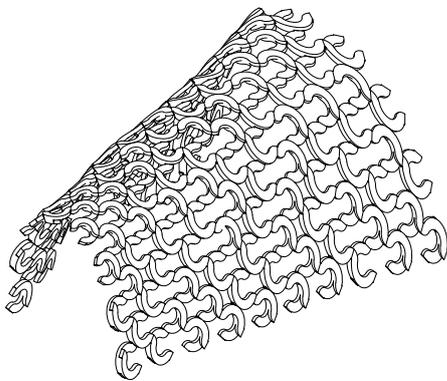
To the trains



- Module shape test



- Module shape test



- Module shape test

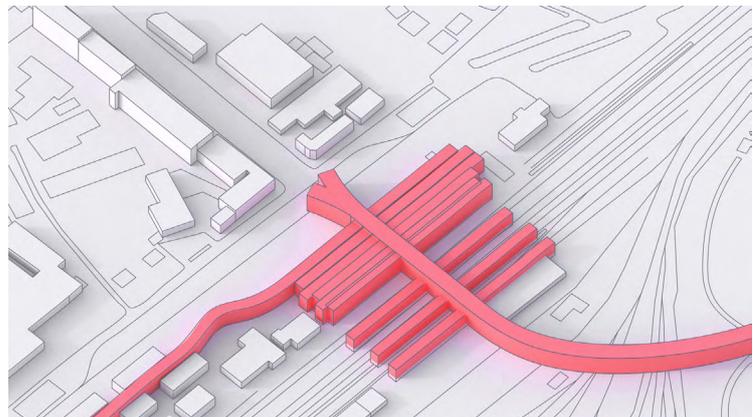
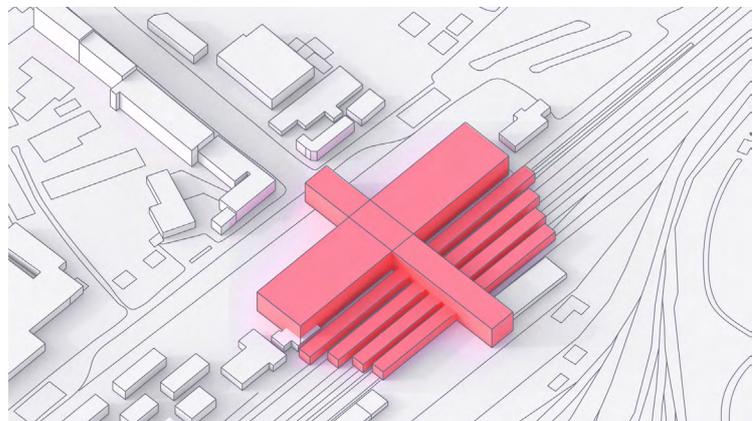
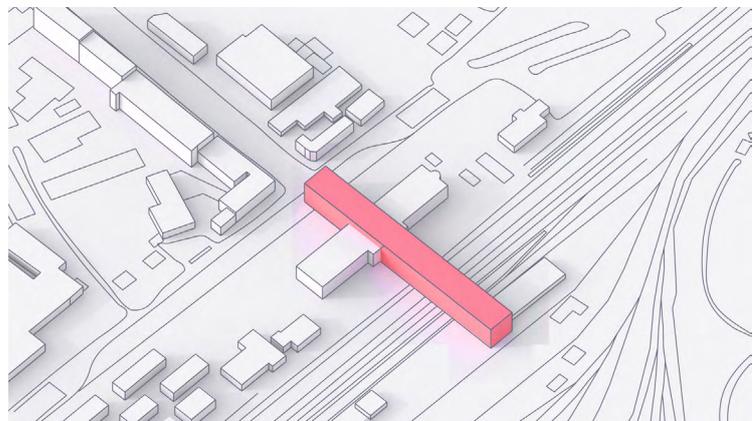
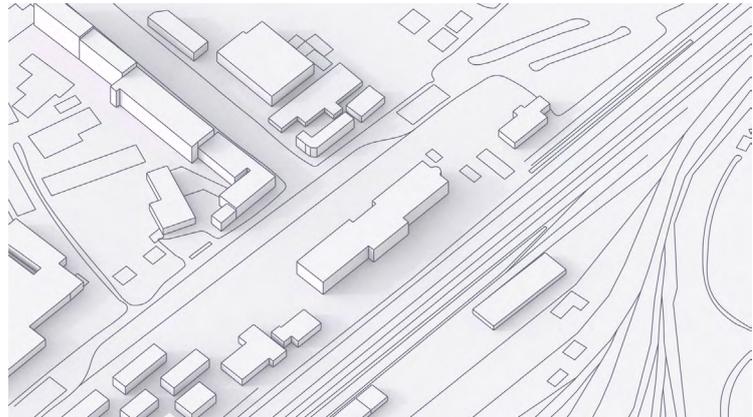
- Initial shape tests

The development of the station building began with intersection that was needed for the initial flow of people to be established. Second stage was reimagining the existing station as a playground for new architecture possibilities. In this case it was the roof that changed the most, because parts of the old building are protected as the building is in the national registry of landmarks. This required additional experimentation with regards to preservation and exploitation of existing structural material and elements.

Next step was to design the new platforms since the existing one do not meet the standards of long train service or did not even exist.

For the last step the physical connections with the upper šančiai region was required since the space is very isolated because of the railway station being there. So a foot-bridge and a cyclist path was established as a crucial part in forming a flow of people required for the station architecture to make sense.

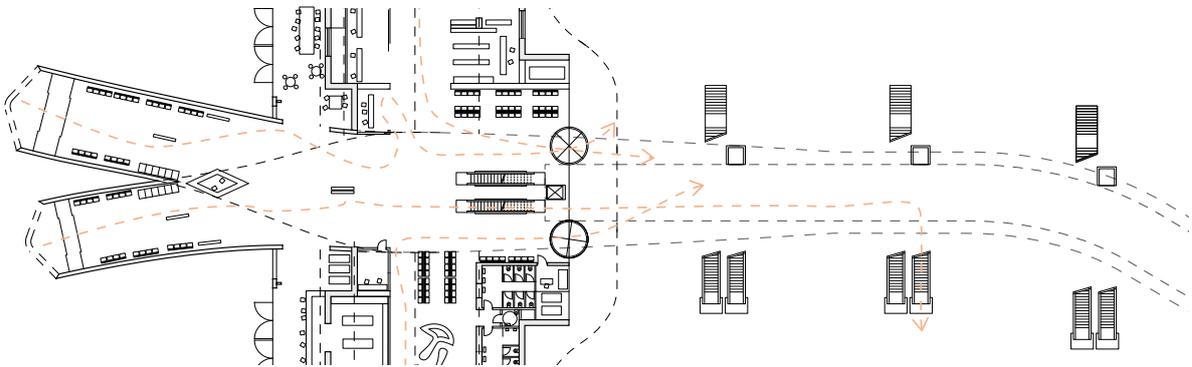
The last was the addition of outdoor structures, canopies, resting stops and annexes which adds up to the quality of the public place.



To the trains

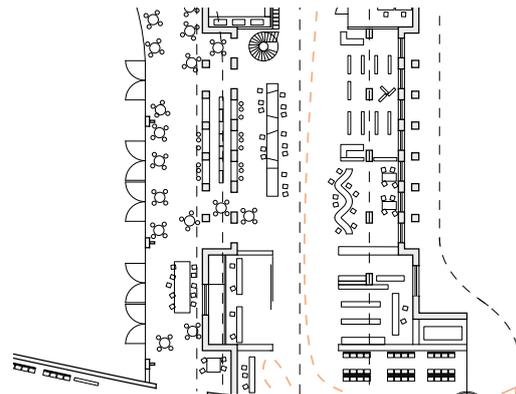
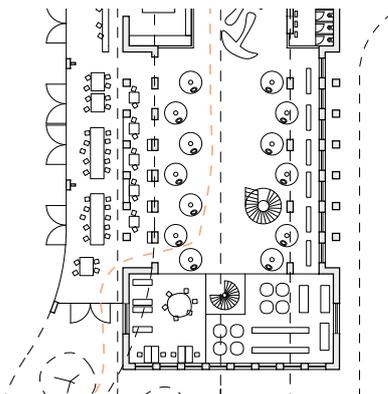
The journeys begin and end in the station so my objective was to create a feasible plan for the flow of people to occur naturally. The existing station was parallel to the tracks which means that the flow of passengers could choose from several entrances only to exit through one leading to the trains. With the new plan people are "gathered" into two branched volumes which do correspond

with pedestrian walkways outside. There are no unwanted turns. Only a curved passage through the waiting hall towards your platform. Current station has an underpass which is demolished and a new elevated walkway is installed to bring in more natural light.



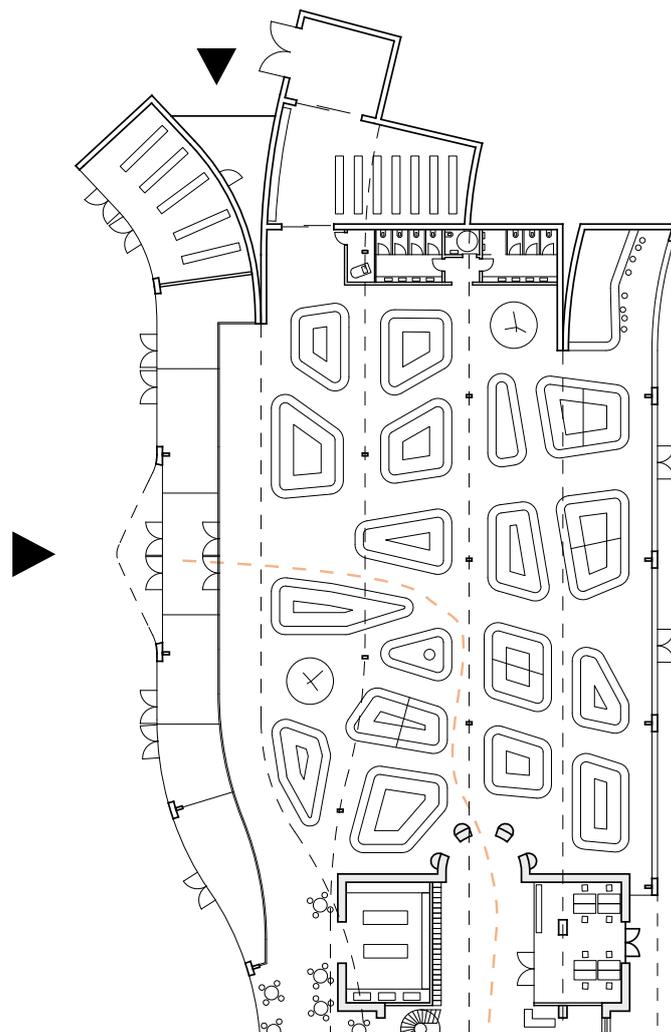
Existing volume is reused and expanded. The now almost abandoned spaces are filled with passenger necessities shopping and also cultural pride facilities - restaurants and bars. Center line is dedicated to the commuters for the fastest walking route and around it the services are located. Restaurants and cafes are facing the city to the south west thus getting more natural sunlight and

avoiding the noise that the trains produce. This placement allows the cafes to be semi independent from the main building and work different hours. The shops inside are scattered around the edges of the existing building walls. On the southern wing the brewing mechanisms are placed on display in order for the waiting public to gaze and keep themselves busy while waiting for the trains.



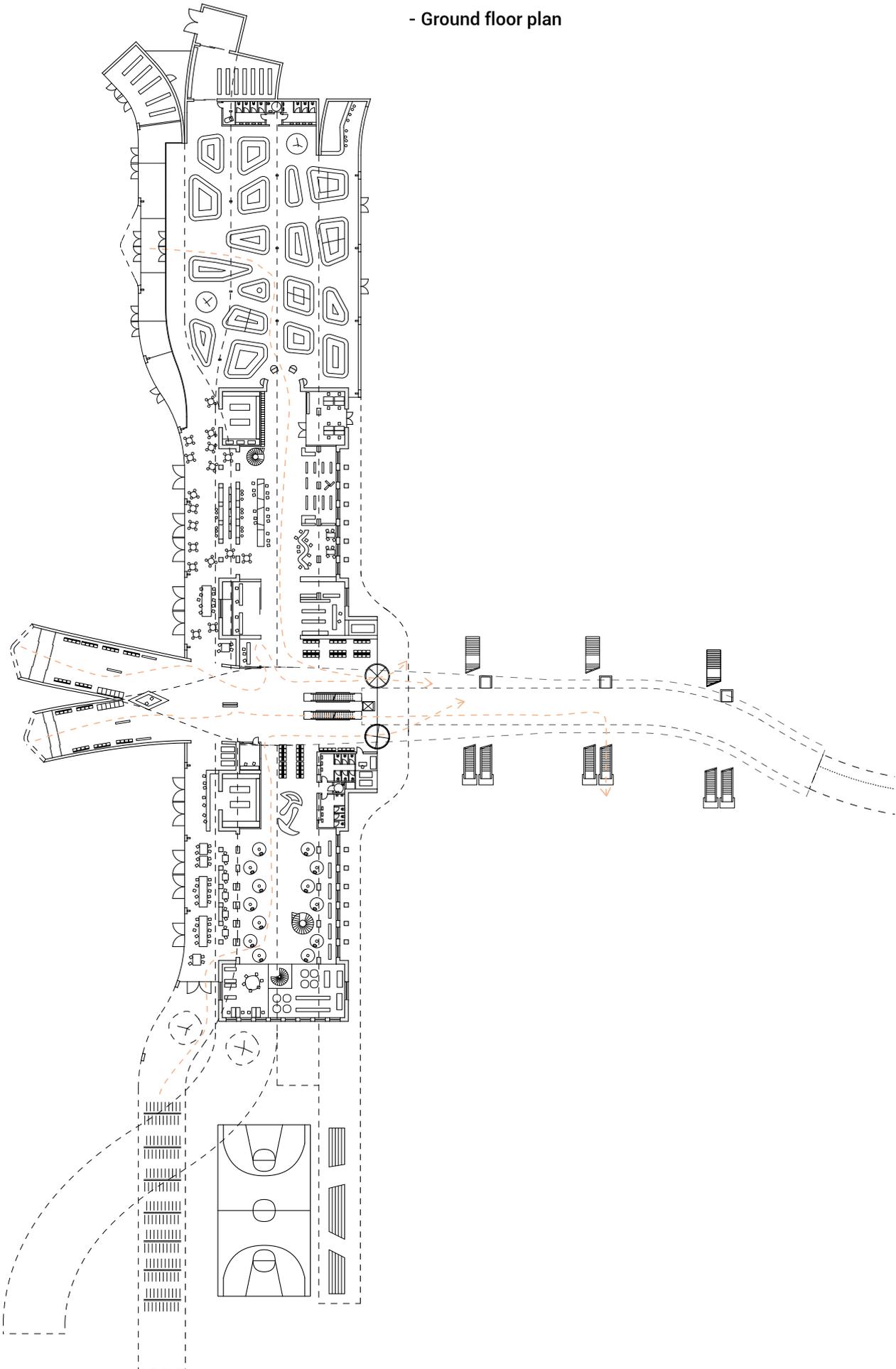
Marketplace is the brand new addition to the existing station. New construction shares the same roof as the station but is considerably different in structural terms and planing. The space is a one open plan only divided by the stalls and several trees that are keeping within the architectural surroundings. On the south west side the shops that have their own entrance are placed around a single main entrance to the market. Through this entrance you can see two major walkways leading you towards the platforms but with a slight bend letting you shop as you go. Market is also

connected to the station interior via seamless entry and a new corridor spanning the south west facade. On the north the loading dock is located together with toilet facilities and washrooms. The refrigerator room is also located on the northern side. You can see on the site plan how the new marketplace accommodates the existing protected wooden building. The stalls are stainless steel structures with filleted edges allowing for a quick movement between them.



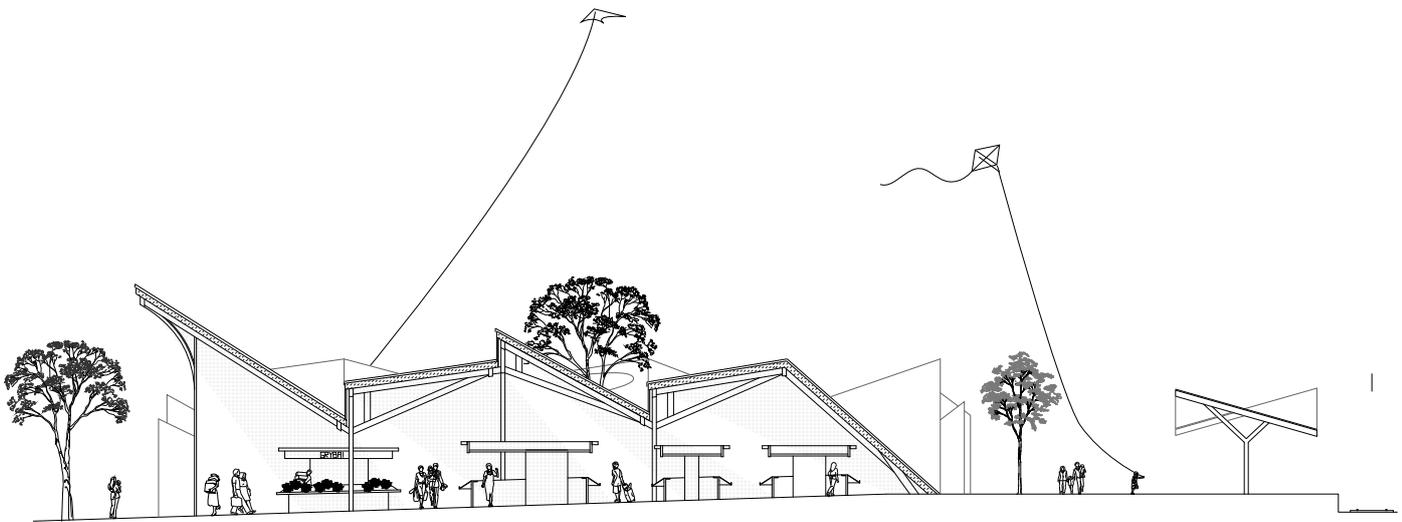
To the trains

- Ground floor plan

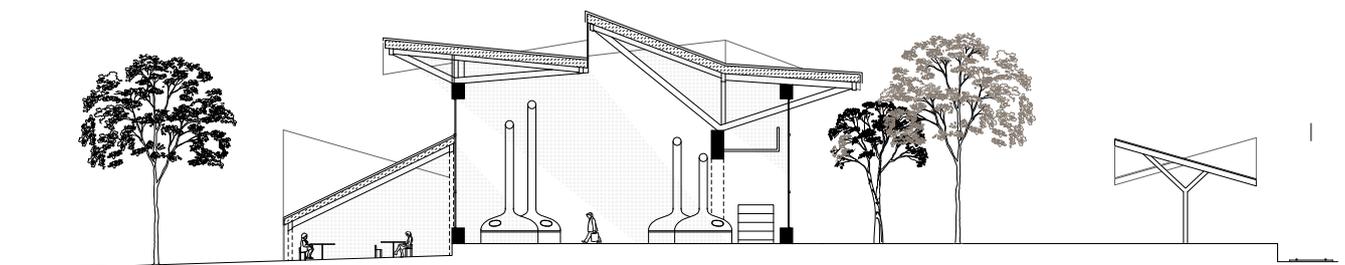


Sections reveal the structural outcome of the grasshopper infused sine wave roofing solution. The wavy form derived from variable sine functions shows of in the section with all its glory. The roof allows natural sunlight to penetrate into the market and also gathers up water and snow which are

plentiful in Lithuania.. Marketplace roof is supported by laminated wood beams and columns connected in a seamless network. The ground is slightly angled to avoid stairs which are present in the current station arrangement. Station section also reveals the dismantlement of stairs almost all the way throughout the building.



- Section through the market building

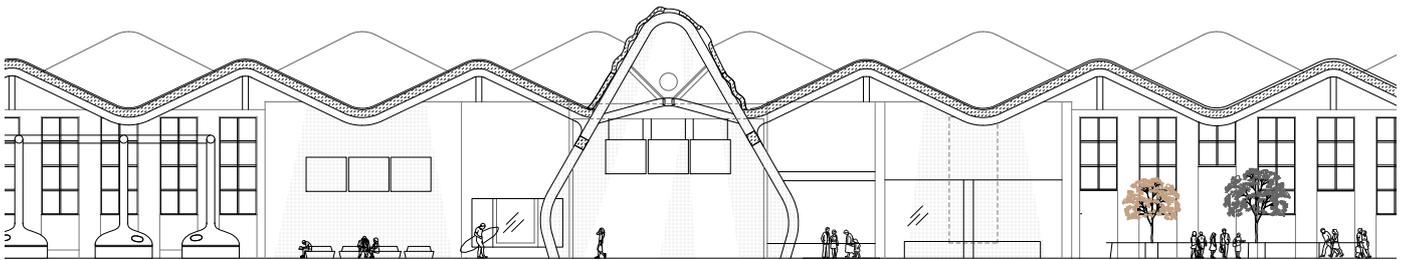


- Section through the station

To the trains

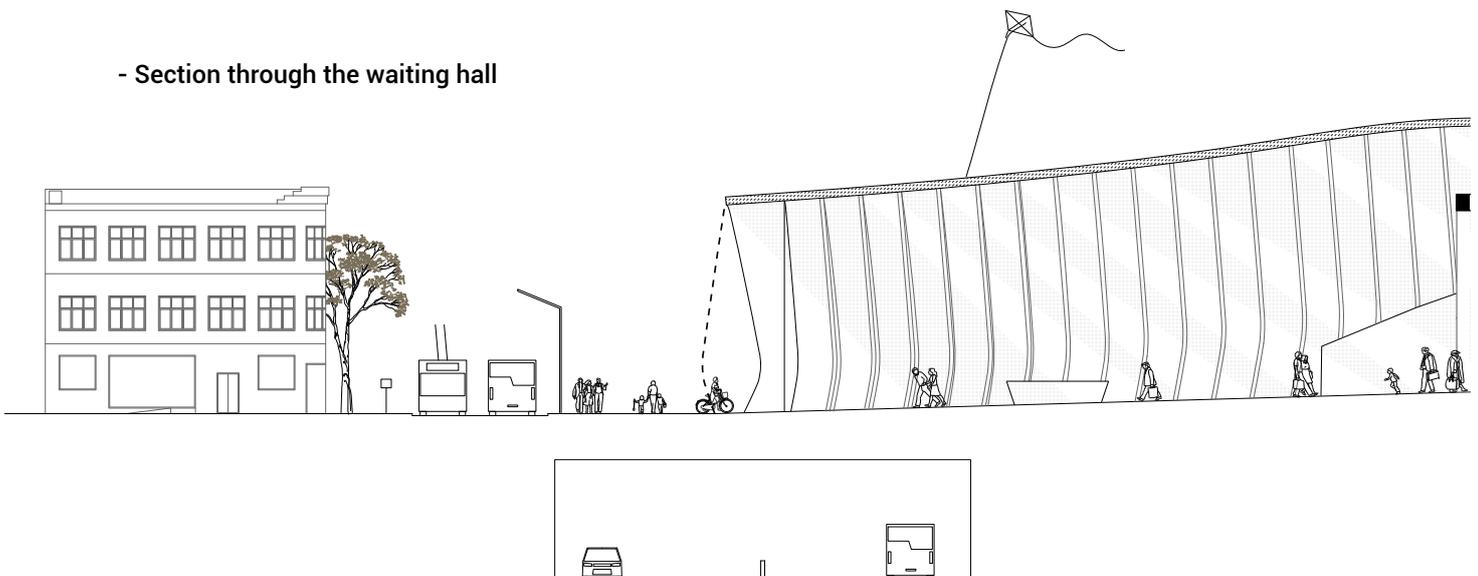
Old and new building collide in the center of the building. The old walls are maintained as structural reinforcement for the new roofs. But the new central part of the station has its own support with laminated wooden beams spanning throughout the station length. Beam intersect one another and form a

structural shell that supports the roof and the walls. Portals are also shaped from the laminated wood and conjoined with the structural shell.



- Section through old and new structures

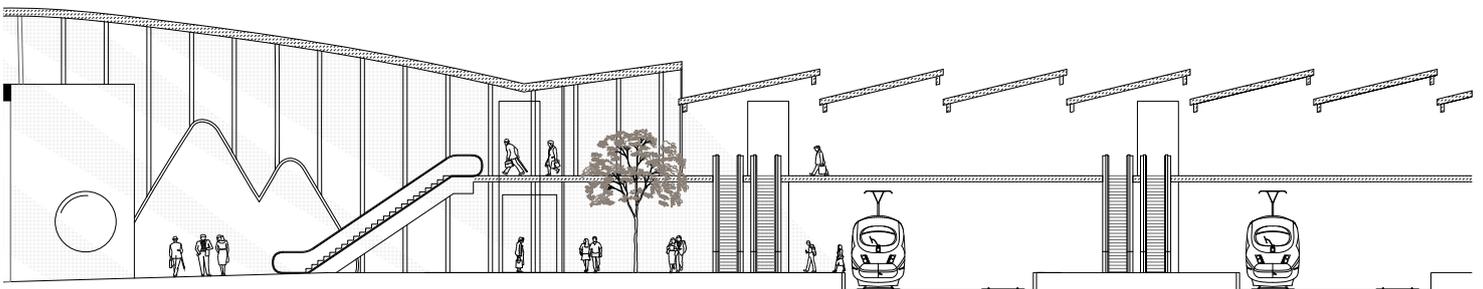
- Section through the waiting hall



To the trains

Cross section that goes from the street to the platform describes in essence the idea of the "go straight" solution for the station. It is a straight route that is step free except for the elevated part where the escalators takes you up to the platform. There is also an elevator for the disabled personnel and

cyclists. In this section one can see how platforms stay at the same level that they are now but the floor is slightly angled to accommodate the people going in and out of the station.



To the trains



- Waiting hall rendering

To the trains



- Waiting hall rendering

To the trains



- Marketplace rendering

To the trains



To the trains



- Aerial view rendering

To the trains



To the trains



- Marketplace entrance rendering

To the trains



To the trains



- Platform rendering

To the trains



To the trains



- Platform rendering

To the trains



To the trains



- Market entrance

To the trains



To the trains

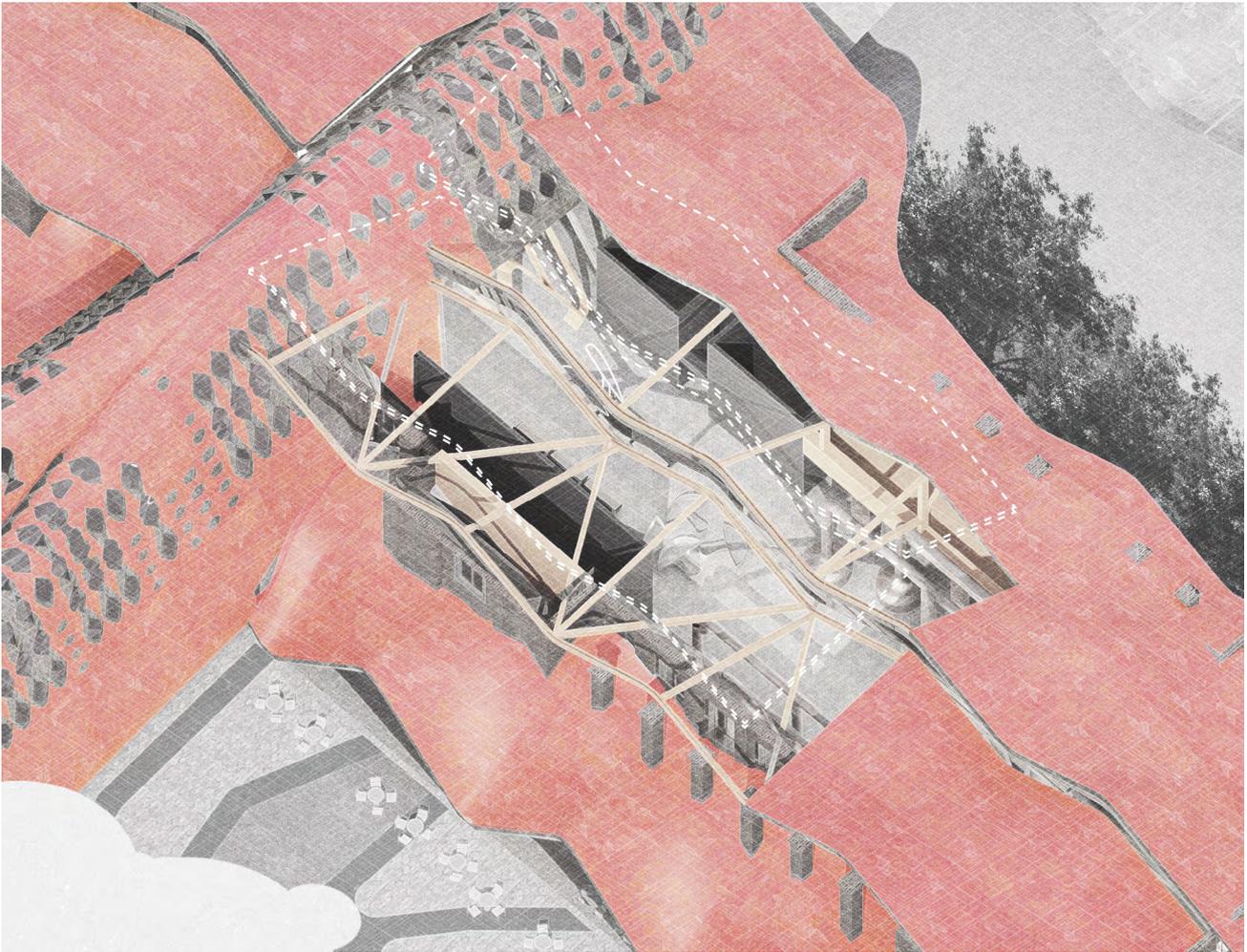


- Plaza rendering

To the trains



To the trains



- Roof structures

To the trains

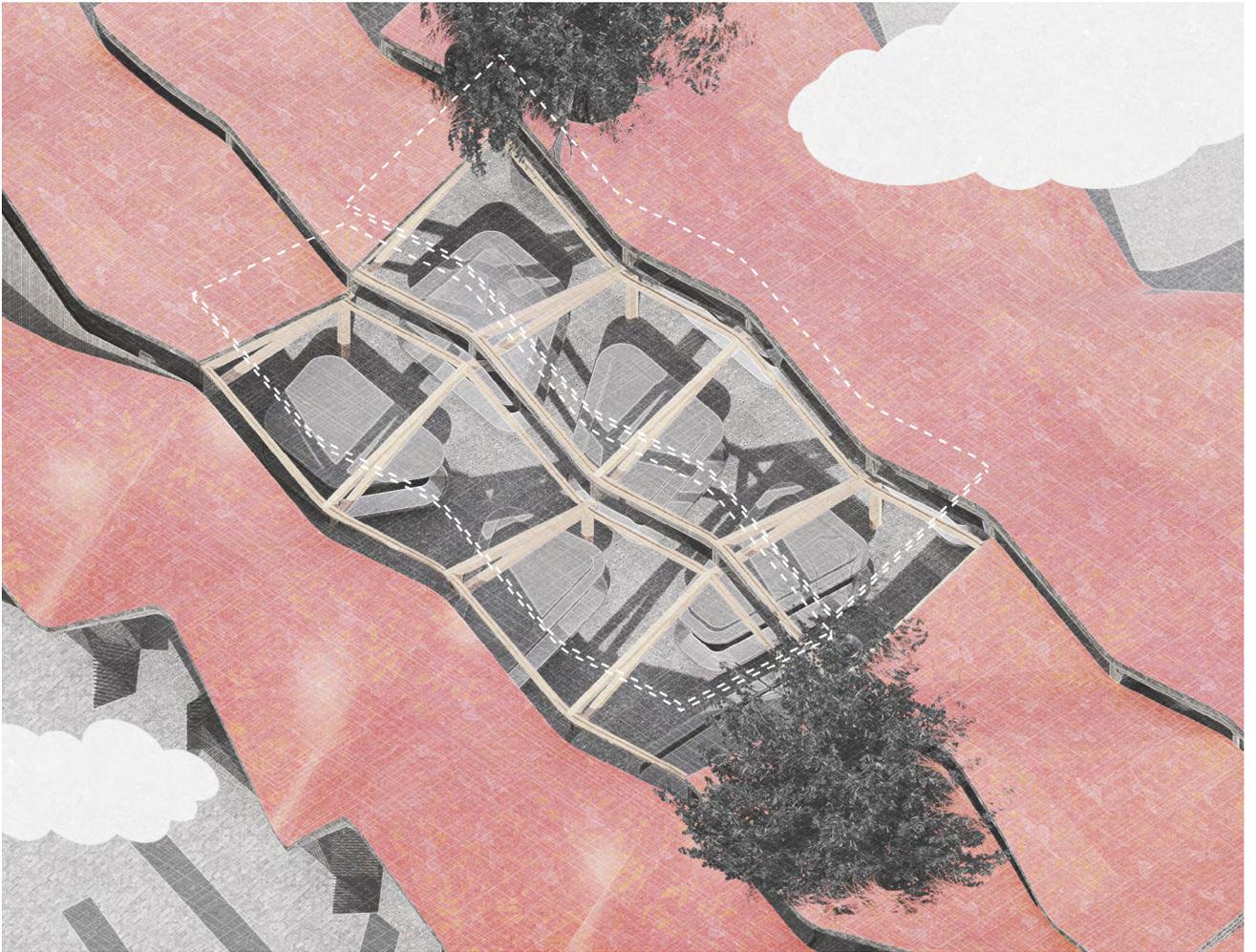


Image sources, bibliography

Images:

City style and the tradition of migration:

<http://visit.kaunas.lt/lt/ka-pamatyti/tarpukario-architektura/>

<http://www.autc.lt/en/architecture-objects/183>

<http://tarpukaris.autc.lt/en/search/object/881/officers-club-ramove>

<http://www.autc.lt/en/architecture-objects/171?id=171>

Mushroom wonders:

<http://www.ericklarenbeek.com/>

<http://philross.org/#2013/12/09/fungal-polyominoes/>

<https://www.theguardian.com/sustainable-business/2015/jun/19/three-ways-we-will-build-the-cities-of-the-future-from-waste> (amy barkow)

Process of re-Lithuanization:

<http://www.maps4u.lt/lt/maps.php?cat=87>

All other images either procudes or rendered by Joris Šykovas

Bibliography:

- David Benjamin, Danil Nagy, Carlos Olguin -Growing details, Architectural Design article, July/August 2014
- Gary William Flake - The Computational Beauty of Nature, ISBN: 9780262062008, MIT press, 1997
- Franck Varenne - The Nature of Computational Things, 2014
- Giles delalex - Go with the flow, ISBN 9515581672, 2006.
- Nicholas Negroponte - The Architecture Machine: Toward a More Human Environment, ISBN-10: 0262640104, MIT press, 1973
- Kevin Lynch - what time is this space, ISBN: 9780262620321, MIT press, 1976
- Michael Pawlyn - Biomimicry in Architecture: 2nd edition, ISBN: 9781859466285, RIBA publishing, 2016



THE END



Capital of Mushrooms
thesis project by
Joris Šykovas
2017