

Summary of Tallinn airport and Ülemiste business area mobility analysis'

(metaYLE)

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References to the original report:

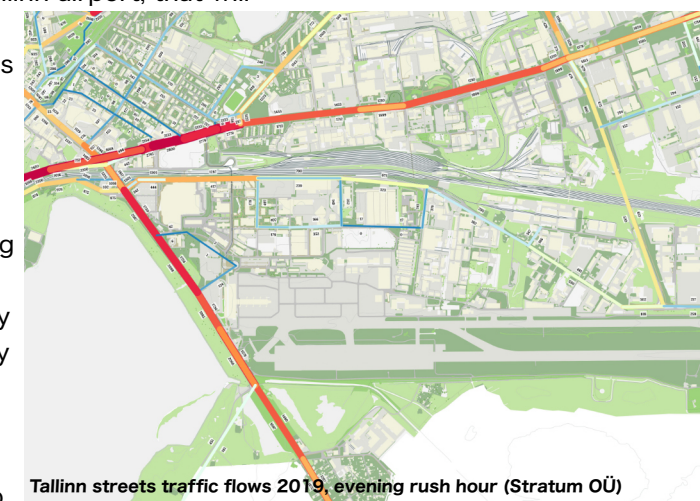
SPINUNIT, 2020. Lennujaama ja Ülemiste äripiirkonna liikuvusuuring.

Summary of Tallinn airport and Ülemiste business area mobility analysis

THE AIM OF THE MOBILITY ANALYSIS WAS TO IDENTIFY AT WHAT DEVELOPMENT STAGE THE CURRENT CONNECTIONS (BOTH STREET CAPACITY AND WELL AS PUBLIC TRANSPORT) CANNOT SERVE THE GROWING PASSENGER VOLUMES IN THE AREA AND WHAT KIND OF NEW CONNECTIONS (ROADS, LIGHT TRAFFIC JUNCTIONS, PUBLIC TRANSPORT ETC) WOULD BE NEEDED.

Fast growing Ülemiste area that encompasses Tallinn airport, Rail Baltica train station and Ülemiste smart city development (Ülemiste City) holds the greatest developing potential both in regards to Tallinn regional as well as the national scale. When developing such new centers, that are located slightly outside the traditional city core, it is even more crucial to ensure that new infrastructure connections (both local and international) succeed to provide the desired socio-economic benefits e.g. good connections with the city center and the city region on a wider scale. Soon to be built Rail Baltica terminal and railway is the opportunity of the century for both Tallinn region as well for the developers in the Ülemiste area, that will thoroughly change both the physical appearance and regional role of the area.

The mobility analysis of the Ülemiste area is needed due to new planned development projects in both the Ülemiste business district (Ülemiste City) and Tallinn airport, that will continue to increase the passenger volumes in the area. Tallinn airport expects to grow passenger numbers and develop a new terminal building along with a business district, simultaneously Ülemiste City is rapidly growing as a smart business district. The area additionally has two malls and will also soon become one of the regions' main transportation nodes due to Rail Baltica development. However, the existing street network of the area is already about to reach its capacity and expectations for good public transport connections and related mobility services among the workers and visitors of the area are constantly growing



Current situation in Ülemiste area:

ÜLEMISTE AREA IS SHIFTING CLOSER TO CITY CENTER due to surrounding urban development in Tallinn region (incl the development of nearby Peetri residential area in Rae municipality)

MOBILITY AND TRAFFIC IN THE AREA IS NOT SYSTEMATICALLY MONITORED. Furthermore, public transportation capacity is not analyzed in the Ülemiste area or in Tallinn city in general. Pedestrian movement and mixity of potential trajectories has not been modelled, which is especially crucial for districts and areas where a large volume of people arrives at the same time (rush hours).

TARTU ROAD AND ÜLEMISTE JUNCTION HAS ALMOST REACHED ITS FULL CAPACITY. At the same time traffic flows related to Tallinn regional growth are constantly increasing.

REGIONAL GROWTH HAS A LARGE IMPACT ON THE DEVELOPMENT OF THE ÜLEMISTE AREA. The congestion on Tartu road is not a result of development in the Ülemiste area but rather a result of the population growth in municipalities surrounding Tallinn. While the mobility split in Tallinn is more

balanced between car mobility and other modes of transportation, the regional modal split almost entirely relies on car transport. Thus the future mobility challenge is to change the modal split on a regional scale, not only in Tallinn city.

THERE ARE NOT ENOUGH ALTERNATIVES IN THE AREA FOR TARTU ROAD (incl Ülemiste junction) that would help to integrate the city-wide transportation network with the Ülemiste area. Alternatives are for example Keevise street extension across the railway or Kesk-Sõjamäe extension over the railway or Small-Ringroad, that should as a prioritize enabling fast public transportation opportunities from the Ülemiste area.

TARTU ROAD IS CURRENTLY UNABLE TO PROVIDE A FAST PUBLIC TRANSPORTATION LINK WITH THE CITY CENTER due to its current capacity and high congestion (there is a lack of public transport priority lanes and green wave). Tartu road has the biggest potential of being the main connection with the city center where there would be an opportunity to considerably decrease the trip duration to the city center while simultaneously reducing the car traffic entering the city center.

BOTH MORNING- AND EVENING RUSH HOURS ARE CONCENTRATED TO ONLY 45MIN that puts further pressure on both street network capacity as well as public transportation capacity. Effort should be made to diffuse the rush hour duration.

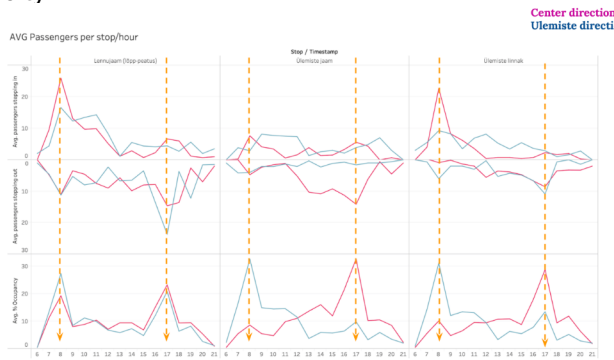
THE ÜLEMISTE AREA HAS BEEN SO FAR DEVELOPED BASED ON THE PLANNING PRINCIPLES FOR SUBURBAN AND INDUSTRIAL AREAS. The land use of the area is monofunctional, most of the developed and planned uses are office buildings, that makes the area predominantly active during morning and evening rush hour. Multifunctional development goals should be continued by planning new functions that have different users (incl residential function) and thus diffuse the incoming-outgoing traffic in the area. NB! Different types of land use varies in trip generation.

RAILWAY IS ONE OF THE BIGGEST BARRIERS IN THE AREA, that especially obstructs pedestrian and light-traffic movements and is considerably increasing public transportation trip duration to the Ülemiste area as well as to the airport. Most people refuse to cross the railway in order to

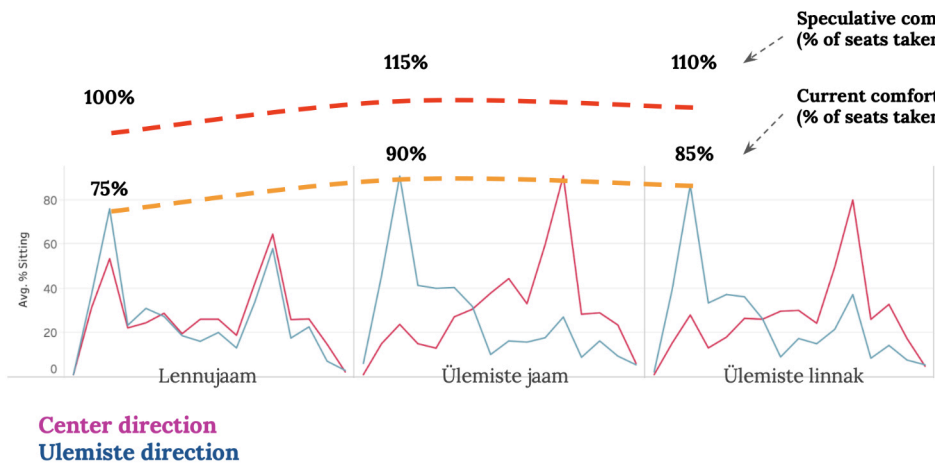
which for example also makes Tram nr 2 less attractive.

SECOND MOST SIGNIFICANT BARRIER IS THE TARTU ROAD AND ÜLEMISTE JUNCTION that is about to reach its full capacity due to large traffic volumes and lack of alternative connections. Tartu road is congested at rush hours and is uncomfortable and time-consuming to cross for pedestrians and cyclists alike.

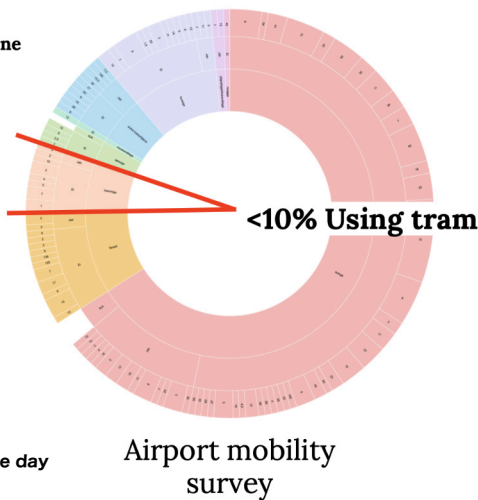
ÜLEMISTE FREIGHT STATION IS A RISK ELEMENT in terms of the future development in the area and should thus be relocated to the outskirts of the city. The freight station also poses another barrier to the area, that further enforces the spatial distance of the area from the rest of the city.



TRAM NR 4 HAS ALREADY CHANGED THE MODAL SPLIT OF THE AREA. The percentage of passengers arriving to the airport with public transport has increased 6%. People subconsciously prefer the tram to bus, however the tram has due to its popularity almost reached its full capacity at rush hours. This means that the comfort line for passengers during rush hour has been reached and other interventions are needed to further



Tram nr 4 Tondi-Lennujaam enterings and exsits in Lennujaam, Ülemiste and Ülemiste City stops during the day



car traffic. This is a characteristic trend in the whole area, as the peak load has accumulated during rush hours and will continue to accumulate as the area is further developed. Outside peak hours public transportation is underutilized. There is a need to spread the passenger volumes throughout the day through increasing functionality of the area.

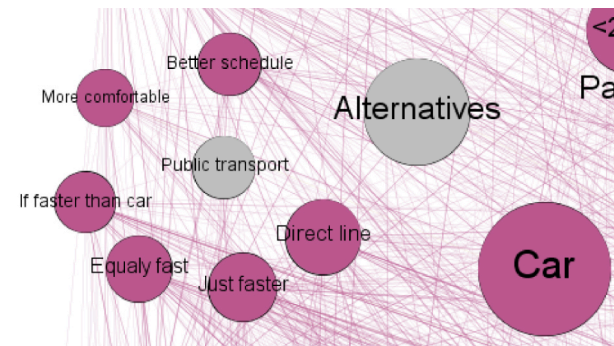
THE CAPACITY OF THE TRAM IS CURRENTLY ALSO RESTRICTED DUE TO LONG TRIP DURATION. Average speed is only 14km/h. The trip duration by tram from city center to airport is almost twice as long as by car. In order to make people prefer public transportation over car, the duration of the trip should not exceed 1,5 duration of trip by car.

A SURVEY WAS CARRIED OUT AMONG THE WORKERS IN ÜLEMISTE AREA AS PART OF THE MOBILITY ANALYSIS. The results of the survey illustrate, that 95% of the workers are ready to change their mode of mobility. Thus people are ready to prefer other modes of mobility to car use, if there would be comfortable opportunities. 45% of workers come only by car and 22% only by public transport.

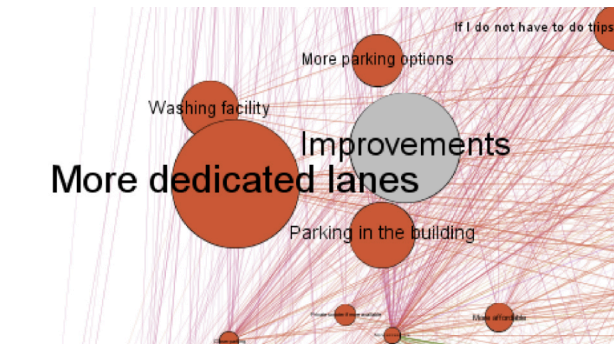
THERE IS A CRUCIAL RELATIONSHIP BETWEEN CAR USE AND TRAIN USE. Trains hold a great potential in order to attract current car users to prefer public transport. 31% of the people working in the Ülemiste area have access to train connections near their home. If the train schedule should be more convenient and offer comfortable interchanges in locations such as Kristiine, Tondi, Järve ect.

TALLINN PUBLIC TRANSPORTATION NETWORK DOES NOT ENSURE EQUALLY COMFORTABLE AND FAST CONNECTIONS TO ÜLEMISTE AREA FROM DIFFERENT CITY DISTRICTS. Train and tram connections are predominantly used from the city center direction and North-Tallinn, bus is used from Mustame, Haabersti and Lansnamäe districts (this shows public transport accessibility). Uncomfortable interchanges in city center (incl lack of direct lines to Ülemiste) make public transportation uncomfortable and time consuming for the users, thus

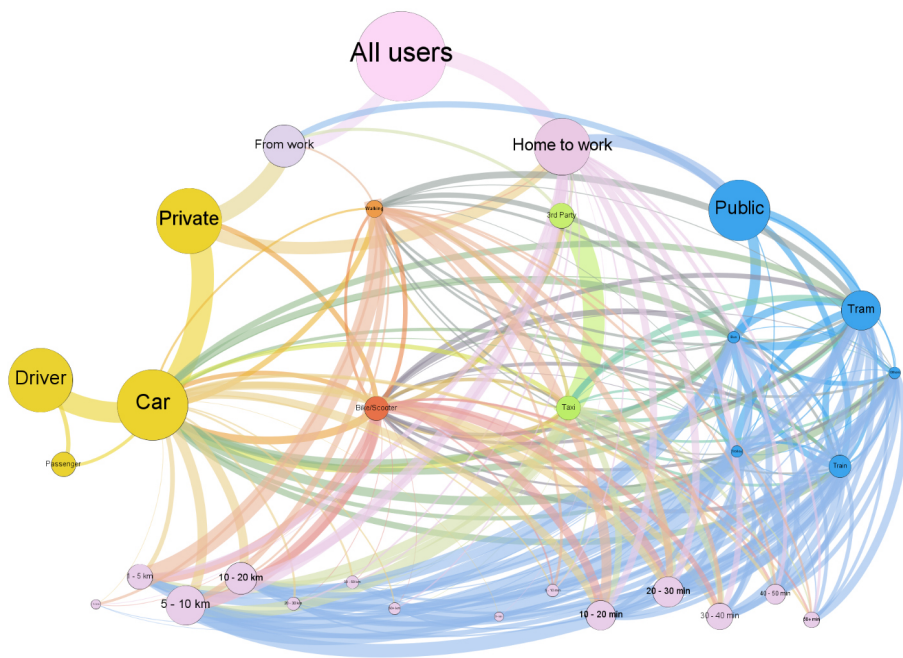
cars are predominantly preferred. From Pirita, Viimsi, Nõmme and Peetri it is still considerably faster to come to the Ülemiste area by car. To minimize trip duration, people from Viimisi and Prita prefer to drive through the city center.



Excerpt from the survey. What would make you prefer public transport?:



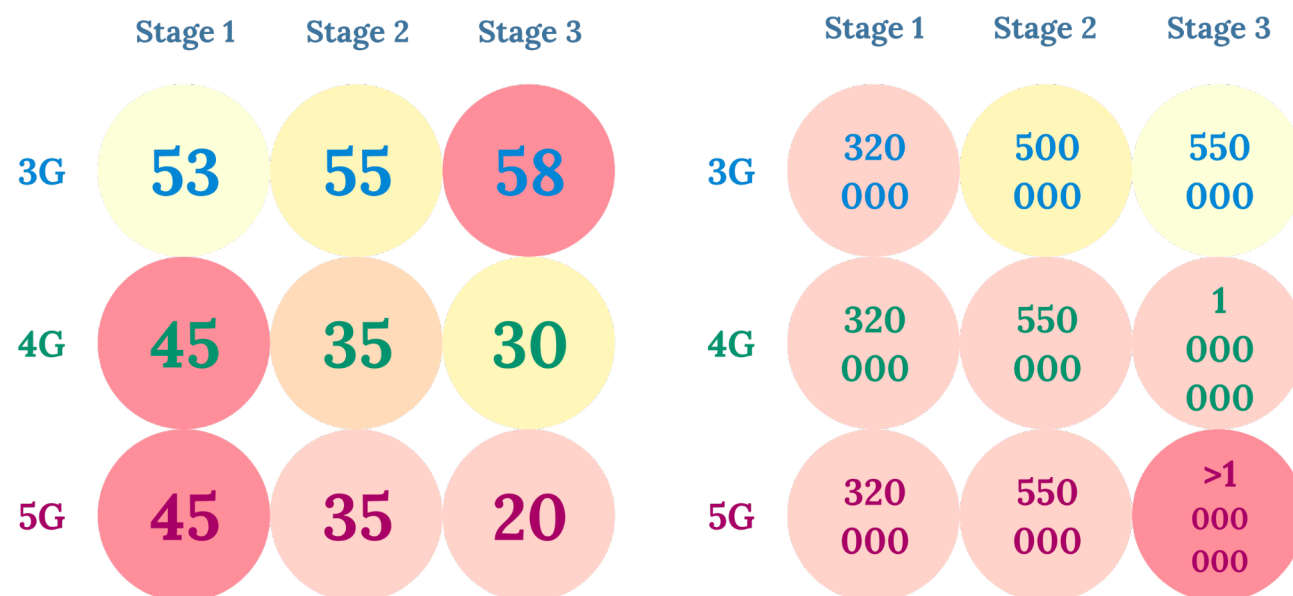
Excerpt from the survey. What would make you cycling to work?



COMPARISON OF THE SCENARIOS

The initial analysis task provided four predefined scenarios that were used to evaluate the feasibility of various development stages in the area. The task of the mobility analysis was to define minimum requirements (thresholds) for each development stage from both infrastructure development as well as modal split perspectives and provide strategies that through a set of different activities would ensure the completion of proposed development stages (development volume in m2). Three more detailed regional strategies were envisioned as the result of the mobility analysis, that focus on the development of both Tallinn airport and Ülemiste area.

The main takeaway from the strategies is that further development of public transport, light traffic and walkability opportunities in the area will have the biggest socio-economic benefit and enable to realize larger development volumes in the Ülemiste area (both in airport and in Ülemiste City) in mid- and long-term perspective.



Public investments into connections and accessibility. The scheme on the left side shows the estimated modal split of the various strategies (currently car use as the main mode of mobility is 53%) ja need for investments.

Thus public transportation connections and high quality public space and streetscape should be the shared priority of all stakeholders (city of Tallinn, land owners and developers) in the area. This summary provides a more detailed overview of two proposed strategies - 3G and 4G. The third strategy 5G is in detail described in the research report and is concentrated on the changes and opportunities brought by self-driving cars and new mobility services.

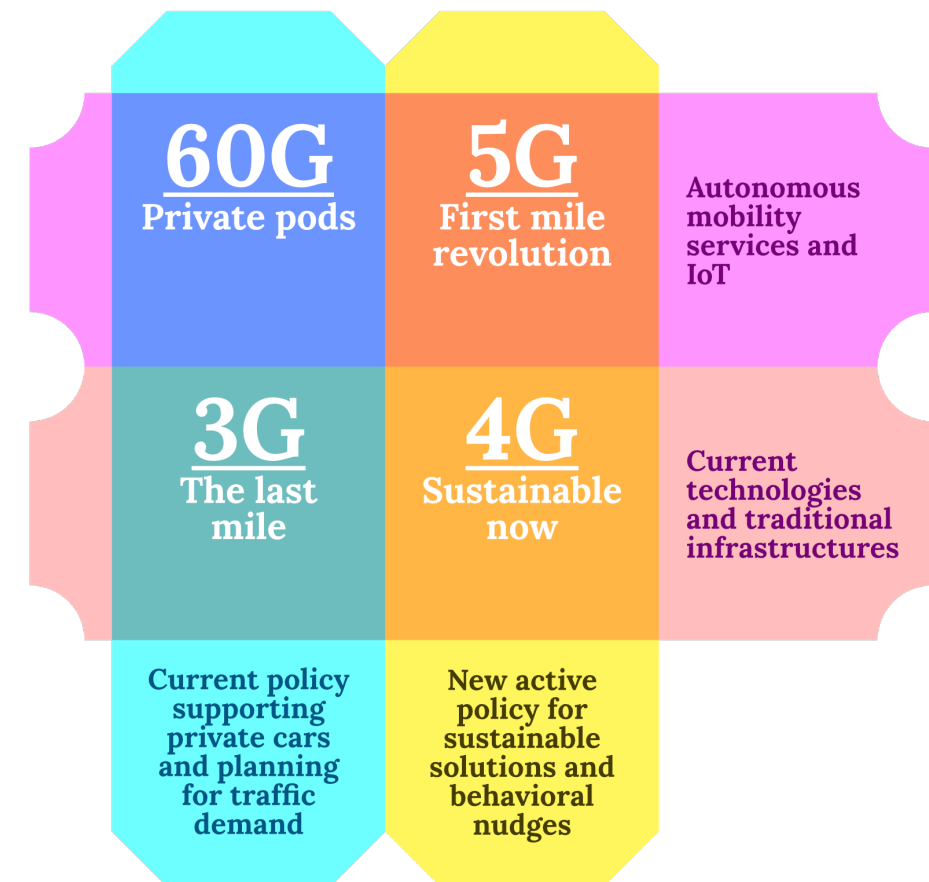
Development volumes in Ülemiste area. The scheme on the right side shows the brutto area of new construction in the area and need for investment per every development stage.



Main difference between 3G ja 4G strategy:

-3G strategy requires smaller investments in the first stages, but does not enable to reach the desired modal split due to increased car use. Development volumes are thus limited (only half of the desired volume).

-4G strategy requires larger investments in the first stage and enables to reach the desired modal split as investments are simultaneously directed to railway, light traffic and public transit and investments to road construction will be reduced (excluding new infrastructure directed at shortening the trips of public transit and light traffic).

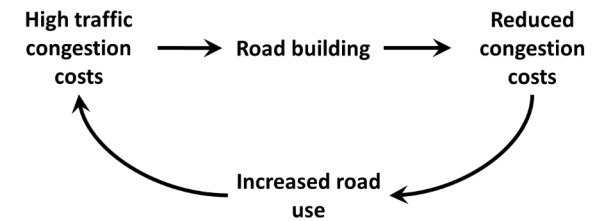
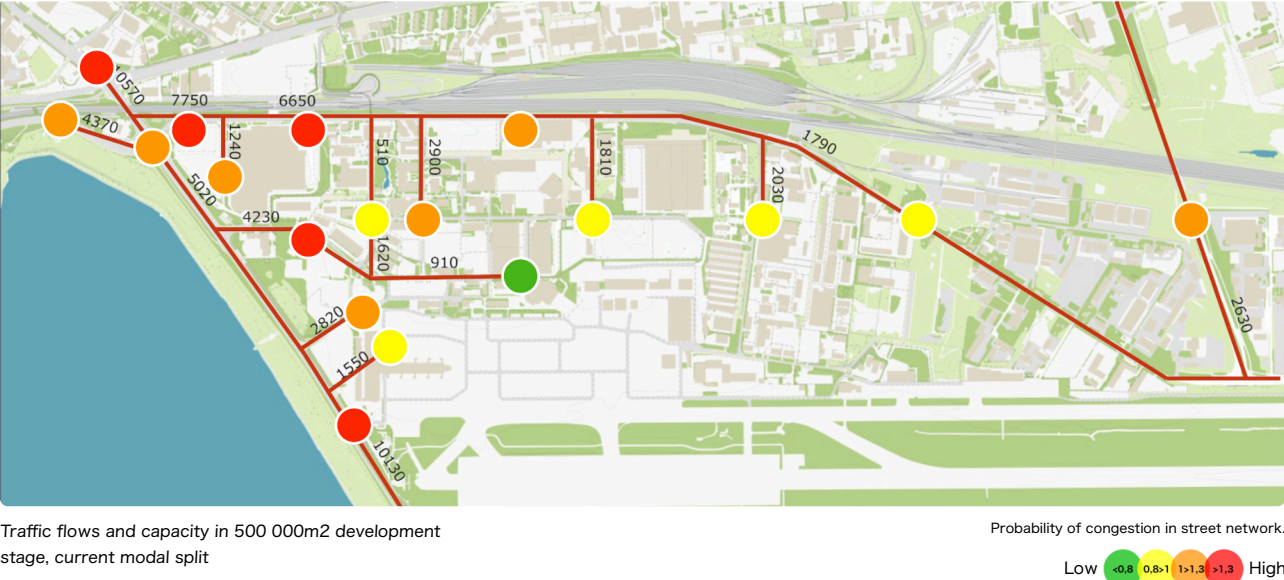


3G SCENARIO

The focus of 3G strategy is on individual mobility whereby most of the infrastructure investments in the area are serving the needs of car users (widening existing roads and constructing new ones), that will result in continued growth of car based mobility. The weakness of 3G strategy is that in the first stages it fails to make enough investments in order to direct the modal split towards more sustainable modes of transportation.

Even if all the planned road infrastructure will be constructed (including Kesk-Sõjamäe tunnel and Tallinn small ring road) this infrastructure still

fails to serve all the increasing passenger volume that result from both new development in the area as well as the regional growth of Tallinn. Thus additional change in modal split will be needed in addition to new infrastructure projects.



(Floyd, 2013; Stromberg, 2015) indicates that investments to road infrastructure (increased capacity) directs people to further prefer car use.

3G strategy is a vicious circle that results in induced demand as the investments into new road projects also encourage growing car passenger numbers (or other individual mobility services) and related congestion.

Overview of the feasibility of the proposed development stages through different (predefined) scenarios:

CURRENT INFRASTRUCTURE AND SERVICE LEVEL + CURRENT MODAL SPLIT.	CURRENT INFRASTRUCTURE + CHANGED MODAL SPLIT INCREASED CAPACITY OF SUSTAINABLE MODES OF TRANSPORTATION BASED ON EXISTING PUBLIC TRANSPORT CONNECTIONS AND INFRASTRUCTURE.	NEW INFRASTRUCTURE + CURRENT MODAL SPLIT + NEW PUBLIC TRANSPORT CONNECTIONS.	NEW INFRASTRUCTURE + CHANGED MODAL SPLIT + NEW PUBLIC TRANSPORT CONNECTIONS ONLY SCENARIO THAT ALLOWS TO REALIZE ALL PROPOSED DEVELOPMENT STAGES
Scenario is not possible, as Tartu road capacity is reached already during the first development stage. Increased passenger volumes mainly result from regional growth, not the internal development in the Ülemiste area. Without any changes in the street network or changed modal split it is not possible to further develop the Ülemiste area.	Scenario is not possible as a spontaneous change in the modal split has a very low probability considering the past mobility development trends in Tallinn and region. The number of public transportation users has been steadily decreasing and the number of car users has been increasing. From Ülemiste area mobility analysis it appears that as a result of the extension of the tram connection to the airport, it is possible to rapidly change the modal split in the area. However, further changes in the modal split are unlikely to happen without any infrastructure investments (positive signals for the users). The modal split that follows the current street network capacity should be decreased from current 53% car users to maximum 45% car users in order to complete the first development stage.	Scenario is possible and described step-by-step as 3G strategy. Without a change in the modal split it is possible to complete development stages I and II, but not development stage III. In order to also complete development stage III it is necessary to also change the modal split. Large infrastructure investments are required to complete stage II. In order to complete stage I, Tartu road capacity should be improved.	Scenario is possible and it is described step-by-step as 4G strategy It is possible to complete all the development stages if all proposed infrastructure projects and new transportation connections are realized. In order to fulfil the scenario, the modal split should be 30% of car drivers (currently 53%). The modal split limit for Tartu road is 45% car users, thus already in the first stage the strategy should focus on restricting any further growth of car use and if possible, reduce it to maximum 45%.

4G SCENARIO

It is possible to realize all the development stages according to the 4G strategy “Sustainable now” lasting until year 2050.

4G is a mobility strategy that combines investment to railway, light traffic and public transport and reduces investment to road construction (excluding new road infrastructure that is aimed at increasing the connection speeds of public transportation and light traffic).

The main message of the strategy is that improving public transportation, light traffic and walkability has the largest socio-economic benefits and enables larger construction volumes in the Ülemiste area (Ülemiste City and airport) both in mid- and long term perspective.

Until individual car based mobility remains the most comfortable and fastest way for reaching Ülemiste, the modal split will not (spontaneously) change. Without changing the modal split, it is not possible to complete all development stages planned for the area until 2050 (development in Ülemiste City, airport terminal and business district).

Thus providing good public transport connections and high-quality public space should be the shared goal of all involved stakeholders. Public and private cooperation is needed to ensure a positive cumulative effect that improves citizens' everyday lives and has socio-economic benefits both for the city and the developers.

In terms of the strategy management, it is crucial that all different activities of one stage are carried out simultaneously.

Many activities should be timed together with the construction of Rail Baltica terminal, which is one of the most important upcoming changes in the Ülemiste area. In order to ensure maximum benefit for urban development (both in terms of spatial development as well as mobility) a string of related activities should be carried out during and after the terminal construction.

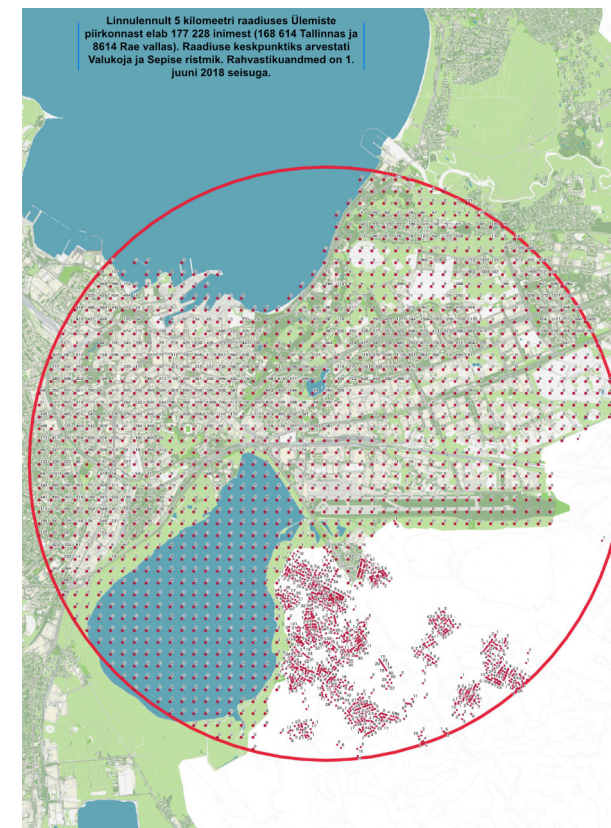
4G strategy is in line with Tallin Region Sustainable Mobility Strategy (2019) and Tallinn and Harjumaa Tram and Rail Transport Feasibility

Study (2019) ‘Tallinn ++ and tram’ scenario, according to which it is prognosed that in the impact area of new public transportation lines 10,9% car users will shift from car to public transport by 2030 (22,9% by 2050). According to the calculations in Tallinn Region Sustainable Mobility Strategy (2019) and Tallinn and Harjumaa Tram and Rail Transport Feasibility Study (2019), **it can be claimed that in order to pursue 4G strategy, public investments should not be considerably increased but rather redirected and the socio-economic benefit of given strategy will be the highest (BCR – benefit-cost ratio depending on the price of the ticket will be 5,2 - 4,1).**

Strategy activities with the biggest (or quickest) impact on modal split:

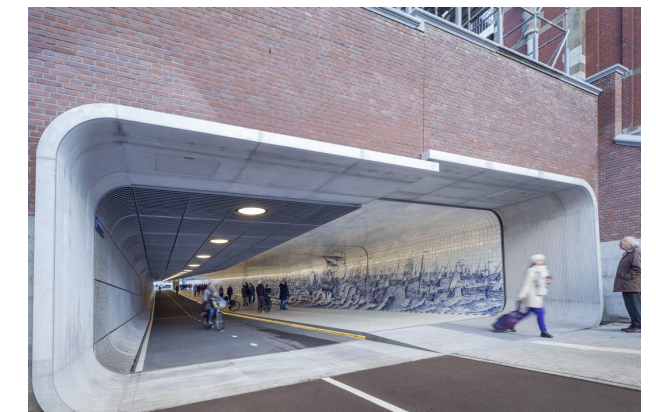
1

ÜLEMISTE SHOULD BE COMFORTABLY ACCESSIBLE IN A 5KM RADIUS WITHOUT HAVING TO USE A CAR (5KM IMPACT AREA CA 177 228 PEOPLE). There are about <180 000 persons living in the 5km radius of Ülemiste area, for whom the most comfortable way for reaching Ülemiste should be with public transportation or bike (scooter). In order to achieve this goal, a fast and representative light traffic network is needed (incl railway passages and light traffic bridges). More street surface should be given to pedestrians and to the health network in order to balance the car centered street network.



2

RAILWAY SHOULD NOT BE A BARRIER DIVIDING ÜLEMISTE AREA FROM THE REST OF THE CITY (CENTER). New passages for light traffic and pedestrians should be timed simultaneously with Rail Baltica terminal. To ensure faster public transportation connections Kesk-Sõjamäe tunnel is needed. In order to ensure the biggest socio-economic benefits, this action should be timed together with the removal of the freight station (and possible redevelopment of its former site). Cyclists and pedestrians should be encouraged to access the area through wide and attractive passages (over Tartu road, Ääsi passage, Lõõtsa passage).



Amsterdam central station

3

RAUDTEE EI TOHI OLLA BARJÄÄR, MIS ERALDAB ÜLEMISTET ÜLEJÄÄNUD LINNAST - To ensure that the public transportation system is able to compete with the car, it is important to reduce the number of interchanges en route to and from Ülemiste are as well as add separated fast bus lanes in order to increase public transportation speed and extend the final stops of various bus lines to Ülemiste City area and airport. Multimodal stations, city rail connections and bus lines passing the city center (no need to change in center) are most needed.

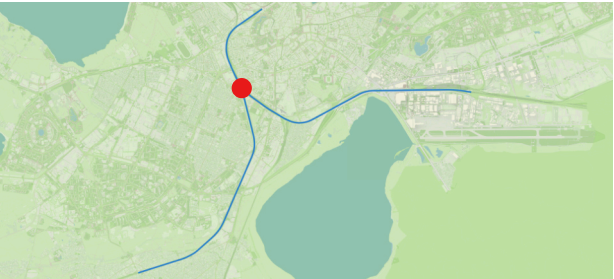
In order to change the modal split towards more sustainable modes of transportation, the travel time with public transportation should not exceed 1,5 of the travel time by car. For example the tram connection should in this case be at least 3min faster. During rush hours the tram capacity and thus the line of comfort for passengers is almost exceeded, therefore the schedule of the trams should be denser (current interval is 7min) or the capacity of the trams should be larger (extra cart that would also mean extending the length of the stop).

QUICK STEPS	BIGGER INVESTMENTS
Bus lines passing through city center to shorten trip duration and increase compatibility	Development of inter-city train connections (for example pendulum train to Kristiine, Balti jaam and Nõmme).
Create dedicated bus lanes from the expense of car lanes. Bus lanes should be added to Tartu and Peterburi roads, as well as streets within Ülemiste City. To increase connection speeds some priority bus lines should be directed through Keevise passage.	Development of multimodal stations (HUBs) to Kristiine and Tondi.
Harbor tram should be linked with airport.	Peetri tramline and White tramline towards Lasnamäe direction.
Tram speed should be raised by creating green waves on Tartu road.	Kesk-Sõjame tunnel with public transportation priority.
Tram nr 2 can be extended to the airport (tram intervals should be raised).	Tallinn small ring road with public transport priority. If this infrastructure would be built, it would be crucial to aim at opportunities to increase public transportation connectivity and accessibility on a regional scale. The ring road would become the city's main public transportation corridor allowing shorter trip durations that link east-west parts of Tallinn. There should be a Park & Ride area at the intersection with Tartu road to allow transfer from car to public transportation lines going to the city center.
Train schedules should be compatible with work hours and especially rush hours. Cross-city bus network should be optimized (more effective demand based connections from various districts, raising connection speeds). Following bus lines could be extended to Ülemiste City and airport - rearranging route of Bus nr 15, extending the lines of Bus nr 17, bus nr 50, bus nr 3.. New buslines - B1 would help to better connect Lasnamäe with Ülemiste City, airport and RB terminal. B2 - bus line would create a circular connection between RB terminal, airport, Ülemiste City and Pae park/Kadriorg park (KUMU). This line would help to connect districts in the vicinity of Ülemiste and thus reduce the barrier impact of the railway.	Tallinna ringraudtee - Tallinna ringraudtee muudab Ülemiste piirkonna uueks regionaalseks keskuseks. Ülemiste ja Vesse jaamale lisandub perspektiivsena ka Smuuli jaam. 

4

TO ÜLEMISTE WITH A TRAIN. A third of people coming to the Ülemiste area could use train connections, but scarce train schedules and uncomfortable interchanges do not offer enough selection. In the first stage, train schedules during rush hour should be more frequent (currently there are >1h gaps during rush hours). In long term perspective, a city train or pendulum train system should be created that would be operated by ELRON or some other operator. This would enable not only to improve Ülemiste accessibility, but improve connectivity in the whole city area. End stations could be in Nõmme (or Laagri) and Vesse in east-direction. Stations should be connected to Park& Ride or other last kilometer solutions that enables to leave the cars at home. Vesse station is also the back-up and car-loading station of Rail Baltica. In case of end stops, the station should have a second platform, where the train can directly start the journey back (in Vesse it exists already).

Kristiine and Tondi should have multimodal stations that enables to swiftly change modes of transportation. .



5

DEMAND BASED OFFER AND DYNAMIC PRICING OF PARKING. Public transport connection speeds (incl nr of interchanges) and demand at rush hours (both to Ülemiste City and airport) should be regularly monitored based on real-time GPS data and if needed, the schedules should be accordingly changed or line network optimized. As city-center Viru bus-terminal capacity is exhausted, new perspective public transportation terminals should be created to Kristiine and Ülemiste, that due the central location enable a large quantity of interchanges and to shorten the trip durations.

Additionally the need to change transport mode in the city center should be reduced, trip duration should be shortened by lines that pass the city center via different routes (east-west and north-south lines).

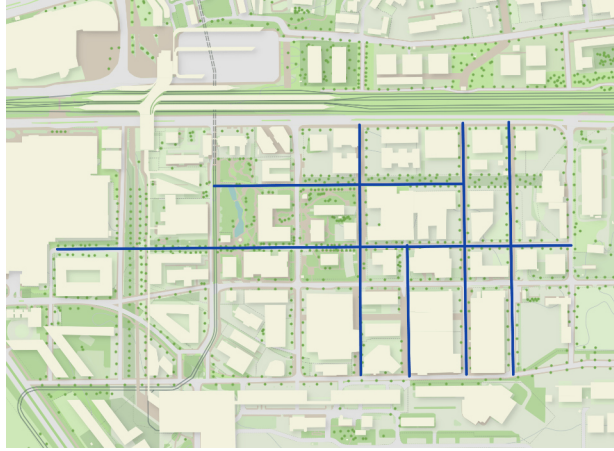
Smart parking systems can be used to diffuse rush-hour within the area (dynamic pricing) and to divide cars arriving simultaneously between parking houses in different locations.

6

TARTU ROAD HAS THE BIGGEST POTENTIAL OF BECOMING A FAST CONNECTION TO THE CITY CENTER, WHERE PUBLIC TRANSPORTATION TRIP DURATION CAN BE SIGNIFICANTLY REDUCED. Tartu road capacity is already at its maximum, diffusing traffic within the Ülemiste City area will not solve the issues with congestion. Tartu road is a national highway that is additionally used by long-distance traffic (this cannot be changed only by changing the local street network). Airport junctions have already reached full capacity at rush hours. For passengers it is crucial to arrive at the airport without wasting time in traffic jams. Modal split can be changed with better public transportation connections towards city-center direction, however cars should become a less dominant mode of transport for arriving at the airport (currently 73% of passengers arrive by car). Tartu road capacity and adjoining streets should be more balanced in order to avoid bottlenecks (and overinvesting). Light-traffic bridges or tunnels crossing Tartu road should be added (perspective link with Ülemiste lake green corridor). Tram route should be extended towards Tartu road to Peetri and Jüri, which would enable to shift Tallinn city “gate” (incl Park&Ride opportunities) away from Ülemiste area and enables to reach city center by tram or by train (Rail Baltica station in Assaku).

7

STREET NETWORKS IN THE AREA SHOULD BE DENSIFIED by adding new streets and creating streetscapes that enable good microclimate and other conditions for walking and light-traffic.



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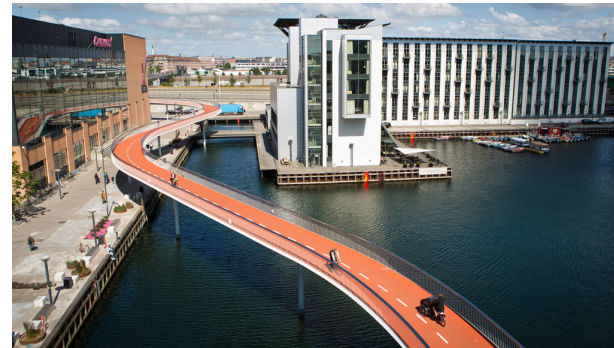
ATTRACTIVE AND DENSE CITYSCAPE. More street surface should be allocated to pedestrians and health networks to balance currently car dominated streetscapes. The goal in the Ülemiste area would be to reach all locations within 5min walk from the public transportation stop and 10min walk from the train station. Development of monofunctional office space can in time become an obstacle for further development in the area, as arriving and leaving the area only happens during a very narrow time-frame (rush hour). Thus the Ülemiste area needs to be more varied with different functions that enliven the area around the day and evening as well as balance various mobility rhythms. At least 30% of the area's land use in the future should be allocated for residential function.



Italy , Milan Porta Nuova, Promenade Varesine, Milan

9

CONSTRUCTION OF TALLINN BICYCLE STRATEGY LIGHT TRAFFIC ROAD NETWORK Seamlessly connected and safe cycling network will considerably help to change the modal split as well as improve the appearance of cityscape and year-round opportunities for cycling (incl fast-lane or urban promenade towards city center through Majaka and Gonsiori streets, that unites European square with Tammsaare park and rest of the city center).



Bicycle Snake, Kopenhagen,- Visitdenemark.

10

IN ORDER TO ACHIEVE THE DESIRED MODAL SPLIT, IS IMPORTANT TO SYSTEMATICALLY MONITOR MOBILITY CHANGES IN THE AREA. In all related research more attention should be given to the experiences and expectations of public transportation users, pedestrians and cyclists, as well as the quality of public space and microclimate.