Analysis of intra-settlement mobility and public transport accessibility solutions in the planned Apametsa settlement area

SUMMARY

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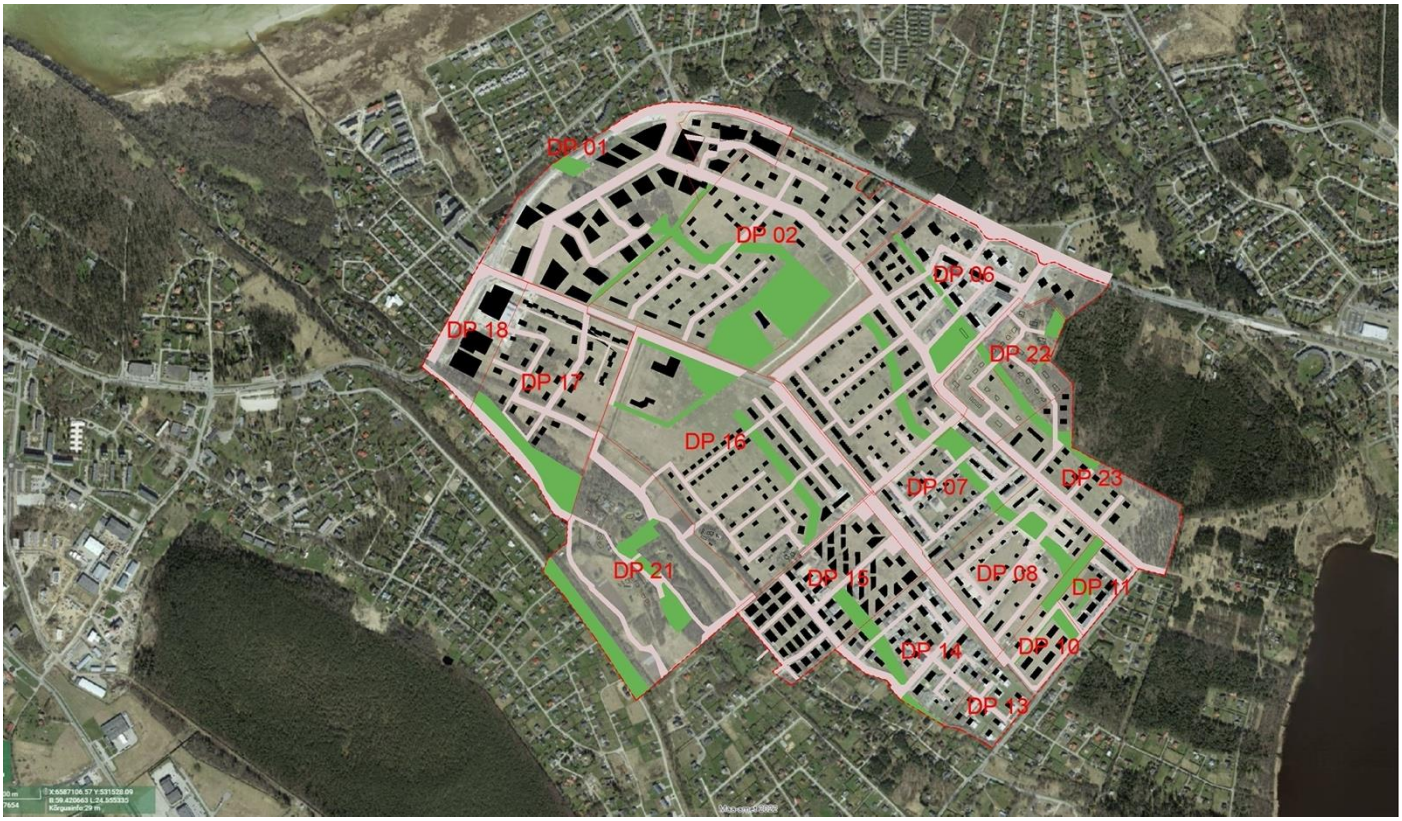
SUMBA

INTRODUCTION

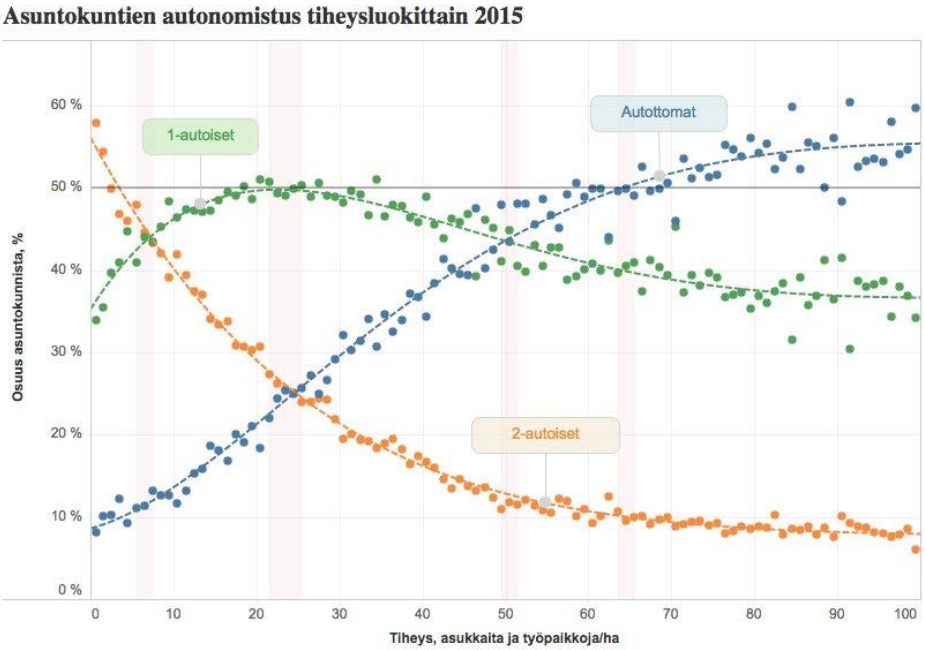
According to the baseline, the main objective of the project is to provide recommendations on how to maximise sustainable mobility and minimise car use in the new development area. There are a large number of factors influencing mobility choices and they work in complex. Focusing only on the development site or external factors will not have a significant impact on the mobility choices of the population. Reducing car use can be understood in many ways. The authors of the analysis understand it as improving the future viability of the whole development area for developers, local authorities and residents. Recent developments have shown that a car-centred society is vulnerable to one factor - fuel prices - and is not in line with Estonia's strategic objectives. The analytical part of the project is based on expert knowledge and theoretical part, and the theoretical part is in turn based on the experiences of different countries in reversing urban sprawl into a sustainable community. This means tried and tested solutions that work. The aspects described in the conclusion cover, in the authors' view, most of the possibilities for influencing people's mobility choices.



THEORETICAL FOUNDATIONS OF SUSTAINABLE MOBILITY

nfluencing the choice of transport modes in an area:

- → **Population density is a macro-indicator that, according to the statistics in Finland's „Kaupunkiseudut: Ristiinvalotuksia ja rajanylityksiä“ (Mäntysalo et al. 2019), has the following relationship with car ownership:**



The horizontal axis is the number of dwellings and jobs per hectare, the vertical axis is the percentage of car ownership. The blue line is households without a car, the green line is households with one car and the orange line is households with two cars. The density is a direct result of the type of building, the size of the plot, the layout of the street space and also the parking norm. Density also determines the distance to the nearest amenities and public transport stops. Density also determines the number of passengers served by each public transport stop, which also determines the optimal frequency of service. Frequency of service can be considered as one of the most important indicators of the quality of public transport, together with the availability in time of destinations from the stop. **Optimal population density is therefore one of the basic conditions for limiting car use.**

- **Functionality.** The extent to which an area is provided with the functions necessary for life determines how much of the community's daily needs can be met within the area, and the extent to which the area is self-sufficient/sustainable. Where access to different functions requires travel outside the area, the distribution of travel modes is determined by their competitiveness in time. In this case, public transport is generally at a disadvantage, except for rail transport. However, rail transport requires the population density described in the previous section to be efficient. Functionality also determines the main mode of transport for those who do not themselves travel by car, mainly children in the context of the demography of the new Apametsa area. The RAKE Centre of the University of Tartu has defined the different levels of necessary services (functions), each subsequent higher category including the previous necessary services:
    - Basic local services (population 500 or more): nursery school, primary school grades I-II, leisure centre (sports hall, activity and recreation rooms, branch library), food and grocery shop;
    - Basic local services (population from 1500): sports hall, outdoor sports field, community centre, youth centre, library, social worker, day centre;
    - Local quality services (population 4500 and over): secondary school, primary health centre, pharmacy, dental clinic, nursing home, cultural centre, swimming pool, building and gardening supply shop, municipal service point.

  This list provides guidance on what needs should be met from the first days of development and how service provision should keep pace with population growth. If an area is not served, it will generate forced movements, which will generally materialise as car trips if public transport connections to the nearest services are not time-competitive. If services reach the area later, residents will have become accustomed to car use and it will be more difficult to change direction.

- **Competitiveness of modes of transport** to external destinations. Both the accessibility of the service, as described in the previous section, and the accessibility to jobs in the region are important. While locally accessible services have a major impact on reducing involuntary movements, in terms of jobs, local jobs can cover only a small part of the needs - location is not usually a key parameter for job choice. Competitiveness is mainly determined by travel time to destinations. For daily commuting, cycling is competitive between 2 and 5 km, but given Estonia's tradition, the share of cycling may reach the order of 10% in the coming decade. Public transport has a much higher potential purely due to the location of Apametsa.

→ **The structure of the development area** will have a significant impact on access to both local amenities and public transport stops. The existence of centres and neighbourhoods is necessary for the emergence of a variety of functions, public transport stops as well as a community. A centre should be within easy walking distance of the entire site and contain a range of necessary functions. The "Sprawl Repair Manual" (Tachieva 2010) highlights the structural differences between a car-enhancing metropolitan structure (left) and a neighbourhood/centre structure (right) that encourages car-free travel:

The pedestrian-friendly block-based street structure (right) is linear in character, avoiding dead-end streets and allowing alternative shortcuts for walking on each street. In terms of vehicular traffic, the structure also allows for a variety of routes and reduces the concentration of vehicular traffic on particular streets. The structure of the city with dispersed residential areas and a few other points of function generates a situation where other functions and public transport are not conveniently accessible and the car becomes the main mode of transport choice. The planning area's green spaces as pedestrian/cycle shortcuts and high quality space also have a clear positive role in mobility choices.

→ **Structure of a street crossing**. The pedestrian and cyclist accessibility of the entire street network is a fundamental and highly influential prerequisite for residents to make local journeys on foot or by bicycle and to use public transport for external journeys. The cross-section is directly linked to a good quality streetscape,

which should include landscaping and elements for sitting and resting. However, the design of a cross-section alone has minimal impact on the choice of transport modes if services are scarce in the area, the layout is appropriate to the character of the urban area and public transport is not competitive. Of the standard cross-sections outlined below in the Prague Design Guide for Public Space Planning (2016), the top two categories of street cross-sections are appropriate in the context of Apametsa, depending on the street layout..

- → **The nature of the major roads that pass through and around the area** will have a significant impact on the choice of transport modes. The roads crossing the area must be clearly urban in character, with all the necessary elements and qualities. Speed limits are certainly crucial here, and must be appropriate to the character of the street (i.e. no more than 30 km/h in residential areas) and supported by the design of the physical environment. Passing roads must allow for crossing the road at bus stops as well as for walking and cycling parallel to the road. The speed limit must support a low noise and high safety environment.
- → **The structure of the public transport network** determines its competitiveness. According to "Modelling the mobility of the Tallinn region" (2021), effective public transport requires both an integrated supra-regional network and hierarchy and dispersed network as principles of its design. Hierarchy implies that the main routes serving movements between regions should be fast and direct, complemented by back-up routes. If main lines are

diverted to serve different areas instead of a direct route, their speed and hence competitiveness will be reduced. The main routes must form a dispersed network covering the region, generally allowing a number of real alternatives to the route. Interchanges need to be provided by network hubs throughout the region, with an optimal number of major hubs served by a large number of trunk lines in different directions. Backbones link regions and trunk lines. The opposite of a dispersed network is a centralised network, where a single hub predominates and links between regions are weak.

→ **The parking normative** will have a significant impact on terraced and apartment buildings, as well as on buildings with other functionalities needed to achieve optimal population density. Existing Estonian planning practices and standard norms are too high to achieve a denser and more linear living environment, precluding the construction of sufficient building volume on properties.

ANALYSES

In order to identify the mobility situation in the Apametsa development area and make recommendations, we carried out the following analyses:

- **Density of the development area.** The average density of the development area would be around 35 dwellings per hectare for 10 000 inhabitants. In terms of this figure, Finnish statistics would suggest that only 30% of households could be without a private car. In practice, however, even this proportion presupposes good access to services and competitive public transport.

- **Access to services.** As it stands today, the Apametsa area has an important basic function in the form of a grocery and convenience store and a local quality pharmacy. This reduces the need to travel to meet basic daily needs. At the same time, the location of the store is convenient, particularly for passing motorists, and is too peripheral to the overall development area for the purposes of leveraging the Apametsa multifunctional neighbourhood centre. It is also beyond the optimal walking distance for residents to the east, up to 1.6 km (20 min). This is all the more reason to ensure good cycling access on the Apametsa street network and cycle parking at the shop, as the distance of up to 1.6 km (6 min) is ideal for cycling.

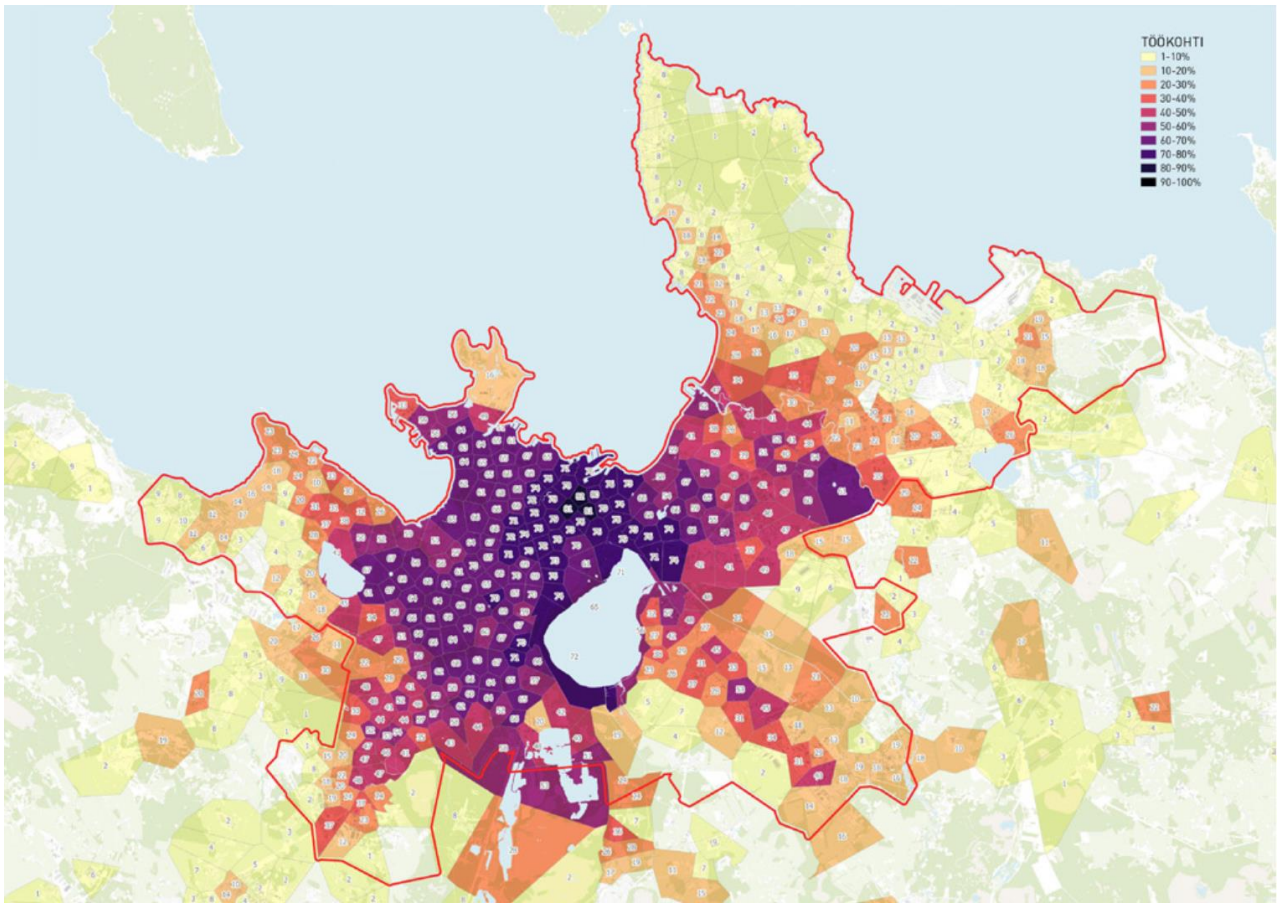
The nearest service centres with the widest range of necessary services are:

- Tabasalu: by car 6 min, on foot 25 min (2 km), by bike less than 10 min, by public transport 24 min.
- Rocca-al-Mare: by car 11 min, walking 1h 5min (5,3 km), cycling 20 min, public transport 26 min. o Rocca-al-Mare: by car 11 min, walking 1h 5min (5,3 km), cycling 20 min, public transport 26 min.

Both service centres are clearly more attractive to car users and their location relative to Apametsa does not allow for a shift towards car reduction.

→ **Access to services workshop.** In order to assess the feasibility of establishing local services, we conducted a workshop with the participation of the parties involved in the development of Apametsa: developers, landowners, Harku Municipality officials, Harku Municipality councillors, representatives of local communities, experts. The workshop discussed the need for different functions/services to be built in Apametsa and the possibilities of building them. In general, perceptions supported the need to plan for an independent/sustainable community, but views on implementation were more varied. Within the current planning framework, it is difficult, if not impossible, to deliver services. The need to analyse the whole area and its functionality in a holistic way, rather than individual detailed plans, was recognised. As the area is fragmented in terms of both ownership and planning, it is difficult to ensure that common interests and needs are promoted without "running over" some parties. Individual landowners or developers themselves cannot and are not motivated to address collectively needed planning issues within their planning area. The current low competitiveness of public transport is a perception shared by all actors. In conclusion, the workshop participants understand and agree on the assumptions and needs for sustainable mobility, but at the same time recognise that implementing such plans at a good level will be an extremely difficult process, and one that will probably require changes to today's planning. The joint consultation of all parties involved was a first step in this process, which must continue.

→ **Access to jobs**. The availability of jobs within a 60-minute public transport ride from the Apametsa development in the Tallinn catchment area ranges from up to 10% (light yellow) in most parts, 10-20% (lighter orange) in the peripheral areas of Rannamõisa road, and less than 1% (colourless) in the south-western part of the development area:



It builds on today's public transport service and points directly to the need for a better public transport network, integrated with the urban bus network and allowing fast access beyond Rocca-Al-Mare and Tallinn city centre. It is not so much the type of public transport (bus or tram) that is critical, but the network of fast lines and the hubs that support them, allowing fast and convenient transfers with frequent departures in all major directions. One such important hub is Rocca-Al-Mare in the Tallinn region network. From Apametsa's point of view, the hub must connect the current dominant Õismäe-Centre direction with other important directions such as Mustamäe and Ülemiste. This means that stops in the different directions must be close to each other and the time required to change direction must be kept to a minimum. For speed/availability reasons, the main lines with stops on Rannamõisa road are important for Apametsa but for many residents this is too far for daily commuting. This implies that there is also a need for a feeder line through the Apametsa area to reach the main high-speed lines (with coordinated connections). A cycle-friendly street network with good parking facilities at public transport stops would allow for a good combination of cycling and public transport but this solution is unlikely to be prevalent.