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Original Article

CORRELATION BETWEEN PUBLIC TRANSPORT STOP DEMAND AND THE NUMBER OF PEOPLE LIVING IN DIFFERENT DISTANCES IN REGIONS

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Highlights:

- the distance to the nearest public transport stop has a greater impact on public transport use in low-density areas such as suburbs and rural areas than in urban environments;
- research shows that accessibility analysis allows for the identification of optimal stop locations that maximize residential coverage without increasing travel time due to excessive stops;
- the distance of 1.5 km to a public transport stop was identified as a critical maximum threshold beyond which public transport demand significantly decreases;
- the results can help decision support systems optimize stop locations.

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Abstract. Properly developed public transport infrastructure, a well-organised public transport route network and mixed territorial development contribute to regional development, strengthen the regional labour market and help reduce social exclusion. Mobility issues in sparsely populated areas receive less attention from policy makers and territorial planners than in cities. The accessibility of public transport in sparsely populated and difficult to reach rural areas is less studied. The need for public transport for residents depends not only on the distribution of places of work, education, and leisure of residents, on their transport mobility, but also on public transport infrastructure and the supply of transport. It is accepted that in European cities the average distances to public transport stops are less than 500 m. In remote, sparsely populated areas, the distances are much greater. The analysed foreign examples showed that in rural areas the distance varies from 500 m to 4.5 km. Collectively, these studies demonstrate that no consensus has yet been reached on the optimal walking distance to public transport stops that would ensure adequate service accessibility for residents of sparsely populated areas. The purpose aim of this study, based on data from one Lithuanian region (Klaipėda district municipality), is to identify statistically significant distance thresholds that influence public transport use by integrating Geographic Information System (GIS) based spatial population data with passenger demand analysis, thereby creating a data-driven basis for optimizing public transport stop locations in sparsely populated regions. The study was conducted in 4 steps. In the Step 1, a database of stops was prepared, where groups of stops serving the same population were combined. In the Step 2, data on the need for stops were collected and the main service distances of stops that will be studied were determined. In the Step 3, the population of residents living at selected distances from specific stops was calculated, thus forming the main database that will be studied in the Step 4. In the Step 4, the level of dependence between stop demand and population was found at different distances. The study showed that the maximum distance at which the dependence remains strong is 1.5 km from the stops. Longer distances do not seem attractive to residents and they no longer consider public transport as an option for making a trip and private vehicles are most often chosen. It has also been found that with smaller distances between stops, the speed of public transport decreases significantly and thus increases travel time for residents who already travel long distances, thus taking up a significant part of their daily journey, and at the same time the correlation between 500 m and 300 m does not have a significant difference. Based on this, it is not recommended to arrange stops more often than every 500 m in rural regions.

Keywords: public transport, accessibility, pair correlation, population, stop demand.

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Notations

Abbreviation:

GIS – geographic information system;
POP – population living within the mentioned distance from the stop;
PTA – Klaipėda public transport authority “Klaipėdos keleivinis transportas”;
SRA – simple regression analysis.

Variables and functions:

n – sample size;
r – Pearson correlation coefficient;
x – independent variable;
y – dependent variable;
β_0 – constant;
β_1 – coefficient to independent variable;
ε – random error component.

1. Introduction

Many advanced countries pay great attention to the planning, modernisation, and development of the public transport network. Properly developed public transport infrastructure, a well-organized public transport route network and mixed territorial development contribute to regional development, strengthen the regional labour market and help reduce social exclusion. Many countries invest heavily in public transport to make it not only more environmentally friendly, but also more comfortable, attractive, fast, competitive, and readily accessible. To foster a sustainable living environment, public transport must be developed consistently and remain equally accessible to all population groups, regardless of gender, age, or place of residence. Mobility issues in sparsely populated areas receive less attention from policymakers and territorial planners than in cities. The accessibility of public transport in sparsely populated and difficult to reach rural areas is less studied. An efficient public transport system contributes to sustainable economic growth and healthy social development of the region, which in turn ensures people's safety, considering the mobility of goods and services to meet today's and future needs.

The need for public transport depends not only on the distribution of places of work, education and leisure of residents, on their transport mobility, but also on public transport infrastructure and the supply of transport. The European standard (EN 13816:2002) provides a system to analyse the functional and technical quality of urban public transport, in which accessibility is named as one of the elements of public transport quality. Živković & Abramović (2025) argue that the most important thing is to ensure sufficient connections and reduce travel time as much as possible so that public transport can compete with individual transport. When planning public transport infrastructure in sparsely populated regions, one of the most important criteria is the distance between the stop and the place of residence of residents. This indicator is directly related to the accessibility of public transport, the mobility of residents and the efficiency of the transport system. The transport planning literature emphasizes that physical accessibility is an essential part of the quality of the public transport system, as it determines the ability of residents to use transport services and choose them as an alternative to individual transport (Murray *et al.* 1998; Truden *et al.* 2022). Studies show that residents' decisions to use public transport often depend on how much time and effort is needed to reach the stop (Tsioulianos *et al.* 2020). Many transport planning studies have found that the optimal distance to a bus stop is usually around 300…400 m, and as this distance increases, the likelihood that residents will use public transport decreases (Kaszczyszyn, Sypion-Dutkowska 2019). Therefore, when planning bus stop locations, it is necessary to ensure that the largest possible proportion of the population can reach the stop on foot in a relatively short time.

It is accepted that in European cities the average distances to public transport stops are less than 500 m. In remote, sparsely populated areas, the distances are much greater. Turkish researchers who studied public transport in Istanbul noted that in the central part of the city, public transport accessibility is on average, while in suburban areas the average distance is more than 4.5 km, therefore they concluded that when choosing the most appropriate average distance to public transport stops, the characteristics of the area under consideration should be taken into account (Altan, Ayözen 2018). It is accepted that in regions the distances that passengers cover when walking to a stop are much greater than in cities, because a person is ready to walk a longer distance, knowing that there cannot be densely located public transport services in sparsely populated areas. The importance of distance to a stop is particularly evident in sparsely populated regions, where residential density is lower and settlements are often more widely spread out. In such areas, the public transport network is usually less frequent, so even a small change in the location of a stop can have a significant impact on residents' access to transport services. Research shows that as the distance to a stop increases, the likelihood of using public transport decreases, as residents are more likely to choose alternative means of transport, such as a private car (El-Geneidy *et al.* 2014; Rajchal *et al.* 2024). This is particularly relevant in sparsely populated regions, where residents often live more widely and the public transport network is less frequent. In such areas, even a small change in the location of a stop can significantly affect residents' ability to reach it. If a stop is too far from their place of residence, residents may choose. However, the greater the distance to a public transport service, the less motivation a resident has to choose this service. This dependence, when the spatial distribution of a trip is described using the so-called trip complexity function, which describes the decreasing number of trips as the distance between regions increases, was also examined by Pyzik *et al.* (2018). This function describes how the distance of a trip (often measured in travel time) affects the probability of its completion (Michalski *et al.* 2015). When we talk about public transport accessibility or the distance of stops from residential areas, we are usually speaking about limits indicating the maximum travel time that is considered acceptable. How far residents are willing to walk for a public transport service and when they lose interest in public transport because the distance to the service is too big and the only alternative left is a private car (Silva *et al.* 2023).

When designing a regional public transport system, balanced access to regional public transport stops is envisaged. Michniak (2010) in his work defines the spatial accessibility of regions as the ease of a public transport system when travelling between areas of a region or from another region. It is very important that all residents are accessible and could use the public transport system. Previous studies proves that accessibility determines the demand for transport in villages and settlements. Accessibility is a very important factor in social mobility, as it promotes mobility and social inclusion (Ranković Plazinić, Jović 2018). Furthermore, the distance to the stop is closely linked to aspects of social equity in the transport system. Sparsely populated regions are home to various social groups, including the elderly, young people or those who do not have access to their own car. For these groups, public transport is often the main or only means of transport. If stops are too far from their homes, mobility restrictions may arise, making it difficult to access jobs, education or healthcare (Currie 2010). Passengers in sparsely populated areas, where the bus stop network is not well developed, face the so-called "1st- and last-mile problem" (Wang, Odoni 2016).

Bos (2017) defines the 1st- and last-mile as the distance from the place of residence to the nearest transport hub, from which it is possible to travel in several directions. The accessibility of public transport becomes crucial to maintain the share of public transport trips, since in low-density areas most trips are made by private cars, and the limited mobility of older people living there must also be considered. Also, people with disabilities, older people, adolescents, the poor and social care workers for older people/people with disabilities suffer the most from the consequences of transport-related social exclusion.

Based on the collected data, Ranković Plazinić & Jović (2018) found that the acceptable walking distance to a bus stop in regions is up to 700 m, and by bicycle – from 700 m to 2.945 km. Meanwhile, Stentzel *et al.* (2016) defined the maximum distance to public transport stops as 1000 m, and in the case of transfers, the distance between bus stops is 250 m. Longer distances to bus stops are more acceptable for people living in more remote rural areas than for those living in more accessible rural areas (Ranković Plazinić, Jović 2018).

The South Moravian region of the Czechia adopted a distance standard that the nearest stop should be within 2 km of each residence in the region (Šťastná, Vaishar 2017). The results of the study by Trembošová *et al.* (2020) showed that there is a certain threshold in terms of travel distance, time and number of transfers, which leads to the choice of travelling by private car. The distance between public transport stops varies in different areas: 300…500 m dominates in the city, while in the countryside it takes much longer to reach the stops (Sun *et al.* 2018).

Akbari *et al.* (2018) define accessibility to a regional public transport stop as 800 m. Many studies use this walking distance, but other studies show that many passengers are willing to walk much further for health reasons (Hansson *et al.* 2019). For example, 90% of Amsterdam (Netherlands) residents who travel on regional public transport buses walk distances of 1.2…1.5 km (Brand *et al.* 2017). In the Australian suburb of Perth, journeys to stops are even longer, with many passengers walking as much as 2…3 km to public transport stops (Ker, Ginn 2003).

Bruzzone *et al.* (2020) examined the difference in attitudes towards bus use between urban and suburban areas. Respondents living in suburban areas said that they would like to use their cars less and switch to bus services – but do not do so due to the shortcomings of the public transport system. They highlighted that they had to walk more than 1 km to reach the nearest bus stop and complained about too long waiting times at the bus stops. Hansson *et al.* (2021) also indicated that 1 km is the limit to walk to a bus stop.

The opposite result was shown by a study by Bos (2017) in rural areas of the Netherlands. It turns out that people living further from the nearest bus stop use public transport more often. Of the respondents in the area studied who lived more than 3 km from the nearest bus stop, 46% used public transport daily, compared to only 32% of those who lived less than 500 m from the nearest bus stop. According to other Netherland's travel survey data, distances to all activity locations are longer in rural areas, and journeys by car and public transport are significantly longer compared to urban areas. Interestingly, rural residents who choose to cycle or walk tend to travel shorter distances than their urban counterparts who use active transport (Pot, Piesch 2024).

The scientific literature also emphasizes that the assessment of public transport accessibility must be based on spatial analysis methods. The application of GISs allows for the assessment of real pedestrian routes, population distribution/density and stop accessibility zones. Such analysis allows for the identification of territories where public transport accessibility is inefficient and for making informed decisions regarding the installation of new stops or the adjustment of the location of existing stops (Ekanayake *et al.* 2019; Talpur *et al.* 2024). In addition, studies show that modelling public transport accessibility allows for the optimization of the transport network in such a way as to achieve a balance between system efficiency and population accessibility (Murray *et al.* 1998). Modern studies emphasize the importance of using GISs in analysing the distance to public transport stops.

In summary, it can be stated that the analysis of the distance between a public transport stop and a place of residence is one of the most important factors in planning transport infrastructure in sparsely populated regions. Research shows that properly selected stop locations can improve transport accessibility, encourage public transport use and reduce spatial mobility inequalities. Therefore, the transport planning process must rely on population distribution, pedestrian accessibility and spatial analysis methods to create an efficient and socially sustainable transport system. In addition, all these studies only show that there is still an ongoing debate worldwide about the maximum acceptable distance to a public transport stop for residents of sparsely populated areas, beyond which they are no longer willing or able to use public transport services.

The aim of this study, based on data from one Lithuanian region (Klaipėda district municipality), is to identify statistically significant distance thresholds that influence public transport use by integrating GIS-based spatial population data with passenger demand analysis, thereby creating a data-driven basis for optimizing public transport stop locations in sparsely populated regions.

The article has 4 main sections:

- the Section 1 of which analysed the experience of countries in analysing the existing and necessary distances to public transport stops from the place of residence;
- the Section 2 describes the methodology of the conducted research;
- the Section 3 presents the results of the dependence between the average number of passengers boarding a group of stations on a weekday and the number of residents living within difference distances;
- the Section 4 presents conclusions and discussions on what else makes the path for public transport service in the regions and at what distance it is recommended to install stops from residential areas so that public transport is still considered an alternative to a passenger car.

2. Methodology

Public transport accessibility analysis often uses mathematical functions that describe how the probability of using a service decreases with increasing distance. Such functions are called "distance decay" functions and they allow for a quantitative assessment of the accessibility of stops and modelling the distribution of potential passengers in an area. In transport planning and GISs studies, exponential or gravity functions are most often used (Murray *et al.* 1998; El-Geneidy *et al.* 2014). These functions show that the number of passengers decreases exponentially with increasing distance from a stop. This means that residents living closest to a stop have the highest probability of using it, while this probability decreases rapidly with distance from the stop. Such models are often used to analyse the distribution of passengers and determine the service area of a stop (El-Geneidy *et al.* 2014). The "distance decay" effect is particularly important when planning public transport infrastructure in sparsely populated regions. In such areas, residents often live at greater distances from each other, so even a small change in the location of a stop can significantly change the level of accessibility for residents. Studies show that as the distance to the stop increases, not only the probability of using public transport decreases, but also the overall efficiency of the transport system, as the number of potential passengers decreases (Currie 2010). Therefore, when planning stop's locations, it is important to analyse the relationship between distance and stop usage in order to determine the optimal range of accessibility and the maximum distance that residents are still willing to cover on foot. The novelty of this study lies in its integrated and data-driven approach to determine optimal accessibility of public transport stops in low-density regions, combining spatial analysis with empirical passenger demand data. Unlike many previous studies that rely on generalized or normative accessibility thresholds (e.g., fixed distances such as 400…500 m in urban areas or up to 2…3 km in rural areas), this study empirically determines distance thresholds based on actual passenger flow data and population distribution. By analysing real boarding data (automatically collected every day) from a ticketing system together with spatial population data, the study goes beyond theoretical assumptions and provides context-specific, evidence-based accessibility distances. This is particularly important in sparsely populated regions, where standard thresholds may not reflect real travel behaviour. The study introduces a methodological innovation by integrating GIS-based spatial analysis and statistical modelling. Using GIS tools (ArcGIS Pro, *https://pro.arcgis.com/en/pro-app/3.5/get-started/get-started.htm*), it is possible to accurately calculate the population distribution over several distance bands (from 500 m to 5 km), and statistical methods (correlation and regression analysis) are applied to quantify the relationship between population proximity and stop usage. This combined approach allows the identification of statistically significant distance ranges that directly affect passenger demand, which are often not considered in traditional transport planning studies.

2.1. The area selected for the study

The planned study requires a reliable and consistently collected database. It is already common in cities / intergraded metropolises to collect and analyse such data, but the data on rural areas required for our study was collected only in the regional Klaipėda district municipality (Lithuania).

Klaipėda district municipality is an administrative-territorial unit in western Lithuania. It is a ring municipality that surrounds the 3rd largest city in Lithuania – Klaipėda (e.g., Figure 1). The area of Klaipėda district is 1319 km^2, the population according to 2025 data is 69256 (2020 data – 55807), population density of 50.08 inhabitants/km^2. Public transport in Klaipėda district is organised by the PTA and includes 10 internal bus lines (100% of service within Klaipėda district boundaries), 22 bus lines connecting with regional center – Klaipėda city, and 3 regional bus lines (connecting at least 3 regional municipalities, including Klaipėda district municipality), total number 391 stops with total 1.9 million trips (boardings) in 2025. The passenger is provided with a real-time planning system tool that shows the actual arrival of buses, thus providing the opportunity to be assured that the bus will arrive and when it is appropriate to arrive at the stop, without wasting time waiting.

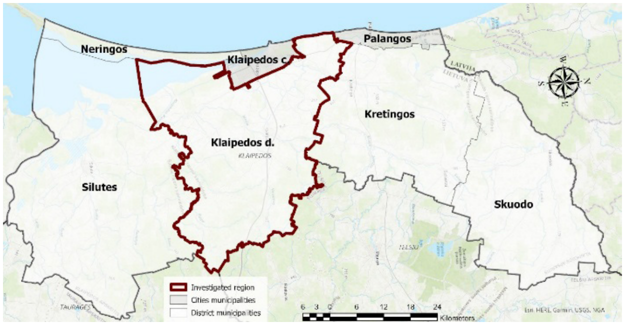

Figure 1. Location of the investigated region municipality (compiled by the authors). The background source used to create the figure is the World Topo Map from ESRI (*https://www.arcgis.com/home/item.html?id=30e5fe3149c34df1ba922e6f5bbf808f*)

2.2. Research methodology

The entire study is divided into 4 steps. Steps 1–3 are spatial data processing and collection, which was performed using the ArcGIS Pro software (*https://www.esri.com/en-us/arcgis/products/arcgis-pro/overview*), and Step 4 is data analysis, which was performed using the MATLAB software (*https://se.mathworks.com/products/matlab.html*). Steps of the research methodology:

- Step 1: identification and aggregation of clusters of stops;
- Step 2: acquisition of demand-related data for stops and determination of statistically significant distance thresholds from stops;
- Step 3: computation of population distributions across specified distance bands;
- Step 4: analysis of the relationship between passenger flows and the spatial distribution of the population.

The steps of the research methodology are shown in Figure 2.

Step 1. Identification and aggregation of clusters of stops. The initial dataset for the Klaipėda district comprised 391 public transport stops. However, an individual analysis of each stop would be methodologically inappropriate, as 2 and in some cases up to 4 stops often serve the same catchment area while accommodating trips in different directions. In most instances, such stop pairs share the same name and are positioned on opposite sides of the roadway, thereby serving routes in opposing directions. Consequently, these stops effectively serve the same population, differing only in travel direction or purpose. For analytical purposes, it is therefore reasonable to aggregate such stops into a single unit by summing the trips they generate (e.g., Figure 2, Step 1). Following this procedure of identification and aggregation, the resulting analytical sample consisted of 212 stops.

Step 2. Acquisition of demand-related data for stops and determination of statistically significant distance thresholds from stops. The database of analysed indicators consists of 2 types of data, namely geographical data of stops and their demand, which were obtained from PTA. Stop demand was recorded for 2 weeks from 13 October 2025, to 24 October 2025 (week 42 and 43), taking to account number of trips (boarding's) at each stop per 1 working day (e.g., Figure 3). The analysed period was chosen with the aim of capturing the peak of daily travel, when the maximum part of the population has to travel to and from work every working day. The summer and winter seasons were excluded for this period. The summer season was excluded due to holidays, winter, because sometimes the harsh climate of the country forces residents to use possible transportation methods or work from home. 2 weeks were taken to cover a larger range of regular trips, and a period was chosen that is not affected by the aforementioned days, holidays or preparations for them. Weeks 37 and 46 were analysed for comparison, both the number of trips in hourly intervals and the total did not differ (the total week number is 19 thousand, the difference from the average between individual intervals is –1.39% / +1.36%). No event or influence of public or school holiday periods was recorded on these days, which could distort the data. From these days' stop demand (determined departure trips), an average of one working day was derived, which was taken as the basis for stop demand. Public transport operating hours are from 5 a.m. to 11 p.m. The dynamics of trips for both weeks studied correspond to a typical working day pattern (Figure 3). Data collected from account-based ticketing system, validations all types of information carries – travel cards (1…30 days' tickets), travel cards (e wallet money used for single trips), contactless bank cards.

As evidenced by the literature review, different countries, and even subnational regions within them, apply varying service catchment areas (i.e., radius from public transport stops) that are deemed sufficient to meet the demand for public transport services. Reported service distances range from approximately 500 m to as much as 4…5 km, depending on local conditions. In Lithuania,

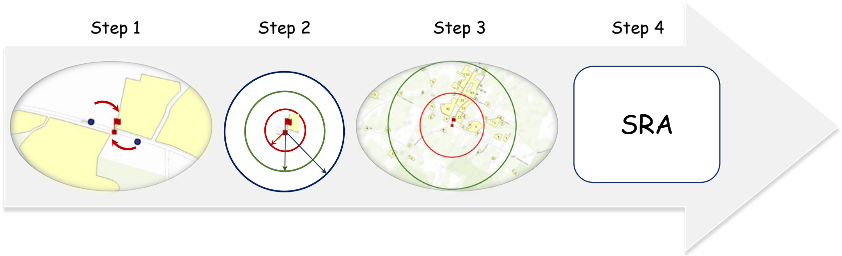

Figure 2. The steps of the research methodology (compiled by the authors). The background source used to create the figure is the World Topo Map from ESRI

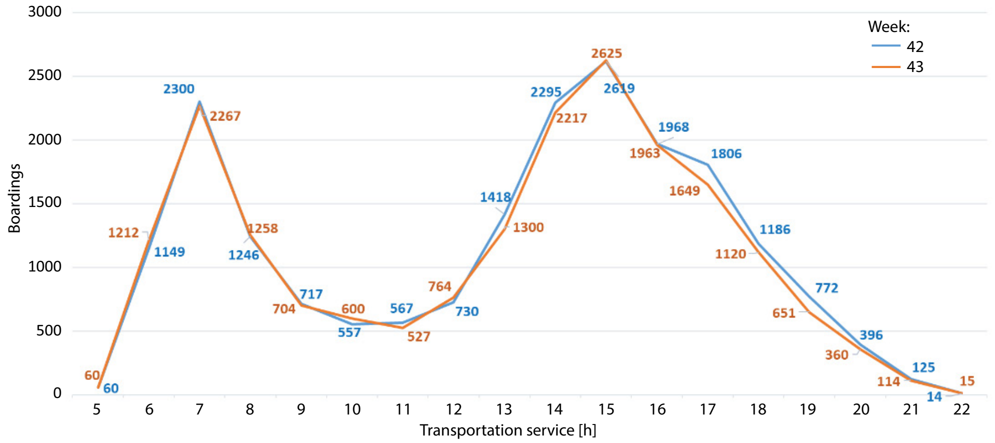

Figure 3. Daily trips (boardings) by hour on weeks 42 and 43, 2025 (validations of e-tickets – data provided by PTA)

until now, the accessibility threshold for public transport in sparsely populated regions and low-density areas has typically been defined as a distance of 2 km, and in some cases up to 3 km. Consequently, for the purposes of this study, analytical distances between 500 m and 5 km were selected, with measurements recorded at 500 m intervals.

Step 3. Computation of population distributions across specified distance bands. Detailed population data are not collected frequently in many regions. The most accurate population data for Lithuania were obtained during the 2021 general population census, whose detailed data on the Lithuanian population at the census-tract (quarter) level are publicly accessible via an online GIS platform. Consequently, these data were employed to estimate the population located within the specified distance from each stop (e.g., Figure 2, Step 3).

Step 4. Analysis of the relationship between passenger flows and the spatial distribution of the population. Simple variable analysis is performed between each distance variables to calculate correlations between pairs (passenger flows and population amount in various distances) of variables. In this research have been calculated a Pearson correlation coefficient (r), which shows the strength of the correlation between 2 variables (Polhemus 2005; Heumann *et al.* 2016):

$$r = \frac{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)\cdot\left(y_i - \bar{y}\right)}{\sqrt{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2 \cdot \sum_{i=1}^{n}\left(y_i - \bar{y}\right)^2}}. \quad (1)$$

The closer the correlation coefficient is to +1 or –1, the more it indicates a positive (+1) or negative (–1) correlation between the variables. A positive correlation means that as the values of one variable increase, the values of the other variable also increase. A correlation coefficient closer to 0 indicates that there is no or weak correlation. An ideal positive correlation is +1. An ideal negative correlation is –1.

The correlation strength of the correlation coefficient is interpreted based on the following ranges (Her, Wong 2020):

- $\left|r\right| < 0.40$ – weak correlation;
- $0.4 \le \left|r\right| < 0.69$ – moderate correlations;
- $\left|r\right| \ge 0.70$ – strong correlation.

SRA is performed with statistically significant indicators (p-value < 0.05). The statistical significance of the Pearson coefficient is assessed by a significance test, but it is important to recognize that the p-value obtained in the significance test does not provide any information about the strength of the correlation between the 2 variables (Her, Wong 2020). In fact, since a sufficiently large sample was studied (212 pairs), the statistical test was found to be significant.

The linear relationship is determined between the dependent variable (y_1, y_2, y_3, y_4) and the statistically significant indicator. Expression of a SRA model (Mendenhall *et al.* 2016):

$$y = \beta_0 + \beta_1 \cdot x + \varepsilon. \quad (2)$$

Using this methodology, it is possible to determine the threshold distance beyond which the number of passengers decreases significantly and apply this information when planning public transport infrastructure. In this way, it is possible to optimize the location of stops, increase the accessibility of the transport system and ensure a more efficient operation of the public transport network.

3. Results

During the analysis of the compiled database, it was observed that 2 records exert a distorting influence on the dataset. These records correspond to stops that function as the primary transfer hubs within the study area. These transfer hubs include a stop located at the bus station and a stop functioning as a main transfer point between regional and city routes. Therefore, the number of boardings at these stops cannot be fully related to the size of the surrounding population, as it is influenced by passengers arriving at this stop by other public transport routes. Consequently, the passenger demand observed at these locations cannot be meaningfully associated with the residential population in their surrounding catchment areas. To ensure the validity and reliability of the results, these stops were excluded from further analysis. Following this adjustment, the study was conducted on a database comprising 210 stop groups (Appendix).

In low-density territories (suburban and rural areas), residents' use of public transport is influenced by the distance to the nearest stop, but this distance–usage relationship is substantially more sensitive and structurally complex than in high-density urban environments. The pairwise correlation between (i) the average weekday number of boardings at groups of stops and (ii) the number of residents living within a 500 m radius of these stops demonstrates a strong statistical correlation $\left(r = 0.67\right)$ (Table 1). This finding suggests that stops accessible within approximately 5...7 min of walking are perceived as attractive by residents and are frequently used as the primary access points to the public transport system for everyday trips. The paired *t*-test shows a statistically significant difference between the variables $\left(t = -8.18,\ p < 0.001\right)$, as the calculated *t*-statistics exceeds the critical value $\left(|t| > 1.97\right)$ and the *p*-value is far below the 0.05 significance level. This confirms that the observed relationship is not due to random variation. These findings indicate that the 500 m distance represents a primary catchment area, where population density has a strong influence on stop usage.

The pairwise correlation coefficient between the average weekday boarding volume at groups of stops and the number of residents living within 1 km of these stops approaches the threshold typically interpreted as strong dependence (Table 2). For the 1 km distance band, the correlation weakens, comparing with the 500 m distance, to $r = 0.579$, indicating a moderate positive relationship. This indicates that in areas with lower levels of public transport provision, residents are willing to walk longer distances to access public transport compared with those in urban areas characterized by higher service levels. Consequently, a public transport facility located approximately 1 km from a place of residence can still generate substantial demand and thus constitutes a significant competitor to private passenger cars. Although still statistically significant $\left(t = -7.84,\ p < 0.001\right)$, the decrease in correlation strength suggests that population located further from the stop has a reduced influence on passenger flows. This result reflects the distance decay effect, where the likelihood of using public transport decreases as the distance to the stop increases. The 1 km zone can therefore be interpreted as an extended catchment area, contributing to demand but less intensively than the immediate vicinity.

A statistically significant correlation persists between the mean weekday boarding volumes at groups of stops and the number of residents living within a 1.5 km radius of those stops (Table 3). At this distance, the strength of the correlation is reduced compared to shorter radius $\left(r = 0.44\right)$, but remains meaningful, suggesting that public transport stops retain a degree of spatial attractiveness up to approximately 1.5 km, particularly in non-urban or regional areas. Despite remaining statistically significant $\left(t = -8.87,\ p < 0.001\right)$, the lower correlation coefficient suggests that the population within this distance contributes less consistently to passenger flows. Residents in such regions appear willing to walk up to 1.5 km to access public transport services. Beyond this threshold, the relationship between boarding activity and residential population density diminishes and effectively disappears, with the observed variation in boarding's becoming largely random rather than systematically associated with population within greater distances.

Based on the conducted analysis, it cannot be concluded that residents living more than 1.6 km from a public transport stop perceive public transport as a viable alternative for their regular trips (e.g., Figure 4). Individuals in these areas are more likely to use public transport only when strictly necessary and in the absence of other feasible options.

Consequently, the provision of public transport services to regions where stops are located at distances greater than 1.6 km from places of residence primarily constitutes a social service that ensures the basic possibility of making a trip. Under such service conditions, it is unrealistic to expect a significant modal shift towards more environmentally sustainable transport modes, to stimulate substantial regional economic growth, or to meaningfully reduce spatial disparities between urban and rural areas.

Table 1. Correlation analysis between passengers' average on working day and population (POP) in 500 m distance from stop

Pearson correlation	0.675418517
t-statistic	–8.175314752
p-value	$1.41001 \cdot 10^{-14}$

Table 2. Correlation analysis between passengers' average on working day and population (POP) in 1 km distance from stop

Pearson correlation	0.579140549
t-statistic	–7.839635478
p-value	$1.13729 \cdot 10^{-13}$

Table 3. Correlation analysis between passengers' average on working day and population (POP) in 1.5 km distance from stop

Pearson correlation	0.443688476
t-statistic	–8.869464521
p-value	$1.65109 \cdot 10^{-16}$

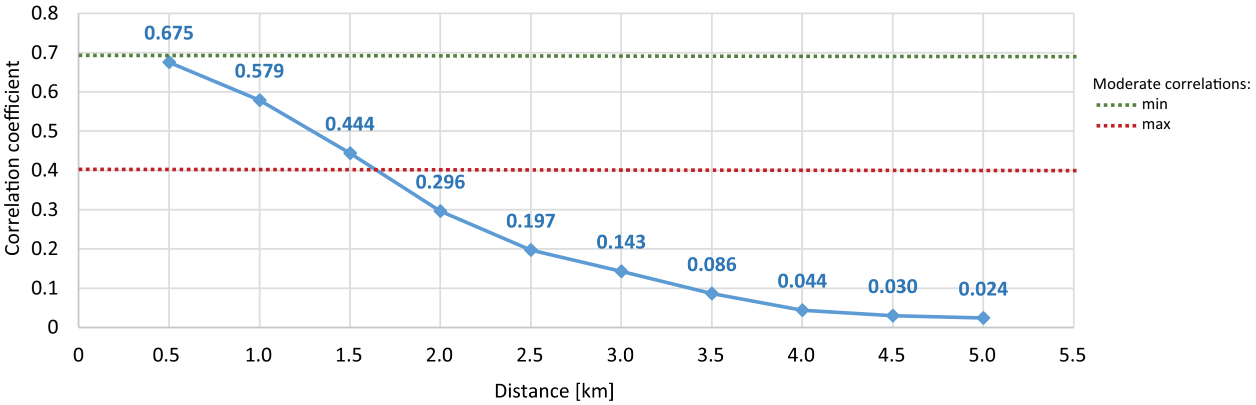

Figure 4. Variation of Pearson correlation coefficients depending on distance when calculating population size

4. Discussion and conclusions

Transport planning studies emphasize that in order to effectively plan public transport infrastructure, it is important to determine the maximum distance that residents are willing to walk to a stop. In low-density regions, such as suburban and rural areas, the distance to the nearest public transport stop exerts an even stronger influence on public transport usage than in urban environments. This is attributable to a higher degree of car dependency and less frequent public transport services. Individuals who can be classified as regular public transport users are more inclined to regard public transport as a viable alternative to private car use. Nevertheless, these user groups generally evaluate the accessibility of public transport more negatively, as evidenced by Dutch research (Pot *et al.* 2025). This maximum distance is usually determined by analysing the relationship between the intensity of use of stops and the distance of residents from the stop. Studies show that the number of passengers decreases unevenly with increasing distance from the stop – a clear dependence is usually observed, when after a certain distance the use of public transport decreases significantly (El-Geneidy *et al.* 2014). Analysis of such a dependence allows us to determine a threshold distance value that can be used when planning stop locations. This value defines the maximum distance that most residents still consider acceptable, so stops are planned in such a way that as many residents as possible fall within this accessibility zone. Scientific studies emphasize that such accessibility models help optimize the transport network and avoid situations where stops are too far from potential passengers (Murray *et al.* 1998).

The quality of the infrastructure between the place of residence and the public transport stop, as well as the service frequency, also exerts a significant influence. Because infrastructure (e.g., sidewalks, street lighting) is often of lower quality in low-density areas, pedestrians can be expected to exhibit a lower distance tolerance than in high-density urban centres. Consequently, the distance to the stop constitutes an even more critical factor in sparsely populated regions than in cities, where both service frequency and infrastructure tend to be more favourable. At the same time, residents in rural or peripheral regions generally exhibit lower expectations regarding public transport services than urban residents and therefore are more inclined to accept longer walking distances to reach a stop. In regions with low population density, it is not always possible to install many stops for economic and operational reasons. Therefore, it is necessary to determine a distance that would allow maintaining a balance between the efficiency of the transport system and the accessibility of residents. Research shows that accessibility analysis allows identifying optimal stop locations that maximize residential coverage without increasing travel time due to too frequent stops (Currie 2010). A simple increase in the number of stops does not necessarily resolve the problem; it may reduce commercial speed, raise operating costs and will extend travel time. Consequently, it is crucial to identify the optimal distance between stops and residential areas that preserves the competitiveness and attractiveness of public transport services. The study demonstrated that the strongest relationship between public transport demand and population is observed within a catchment radius of 500 m to 1 km. Accordingly, it is recommended that the number of residents within this distance be explicitly considered when determining the spatial allocation of public transport stops.

Having found that the highest correlation coefficient occurs at the smallest distance previously analysed, the question arose whether an even higher correlation could be obtained by further reducing this distance. Therefore, an additional distance threshold of 300 m was included in the analysis. The correlation between the demand for public transport stops and the number of residents living within a 300 m radius of the stops turned out to be statistically insignificant, with a Pearson correlation coefficient of 0.126. This result suggests that, in low-density areas – even in places characterised by relatively higher population or traffic density – it may not be advisable to locate public transport stops at distances smaller than 500 m.

Rather than assuming a linear relationship between passenger flow and population distribution, this study empirically assesses demand across incremental distance bands. We identify 1.5 km as a critical threshold, beyond which demand significantly declines. These finding grounds the "distance decay" concept in real-world transit planning, particularly for low-density areas where stop placement must balance accessibility with operational efficiency. These results can inform decision support systems to optimize stop locations; where traditional spacing is unfeasible, demand-responsive services or micromobility solutions should be considered to bridge the 1st- and last-mile gap. Future research should expand the explanatory variables to include access infrastructure quality and service frequency. Applying a multinomial regression model would then quantify the impact of these indicators on demand, allowing for more precise inferences regarding how distance influences mode and route choice.

Declaration on the use of Artificial Intelligence (AI)

During the preparation of this manuscript, the authors did not use generative AI or AI-assisted technologies.

The authors take full responsibility for the content of this manuscript.

Appendix

Table A. Collected database for the research

No	Stop name	Passenger flow average*	POP										
			300	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
1	Ermitažas; Promo	3.2	2	38	186	930	2508	5383	14314	30109	52179	80505	117217
2	Gėlių	4.6	56	127	285	401	476	543	883	1365	1452	1527	1636
3	Lelijų	8.4	59	128	257	406	483	538	787	1137	1452	1570	1714
4	Sniegenų	17.8	55	100	255	418	468	508	576	690	1065	1573	1720
5	Linų	3.9	50	79	267	408	469	529	784	1200	1470	1549	1577
6	Plikių	11.0	122	226	454	552	611	697	740	880	1160	1414	1754
7	Radailių	47.0	67	77	208	388	695	918	1567	2204	3515	5793	8599
8	Šimkų	0.3	18	34	52	75	229	379	487	884	1679	2757	3598
9	Gindulių	37.2	126	430	1919	3374	5089	6611	10332	18214	29471	50007	65702
10	Slengių	13.5	239	526	1845	3114	5008	6980	9295	11257	15707	21929	33545
11	Trušelių	29.6	194	487	868	1326	2699	4003	5474	7347	8685	10513	13274
12	Baukštininkų	1.8	27	36	125	241	497	867	1412	1958	3179	4709	6746
13	Žemgrindžių	1.1	36	72	112	164	349	624	911	1153	1856	2661	3420
14	Mokyklos	17.8	86	203	489	555	595	641	760	877	1083	1300	1553
15	Vytaučių	0.0	27	31	235	463	563	674	715	844	944	1355	1774
16	Pageidavimų	0.2	4	9	80	144	198	422	706	967	1165	1359	1783
17	Žvaigždžių	4.2	59	68	80	88	153	277	619	937	1155	1427	1696
18	Pakrantės	17.2	264	580	1702	3325	5358	8143	11022	16320	21191	31733	43983
19	Mazūriškių	10.6	142	481	1688	3088	4934	7470	10855	12747	17640	24241	28157
20	Lenkviečių	5.6	81	181	1139	2180	3371	5405	8039	11194	13615	17162	23403
21	Beržyno	20.1	50	121	322	627	1109	1860	2695	4410	6576	9400	13288
22	Žibintų	176.4	81	239	521	848	1028	1182	1412	1644	2153	2479	2846
23	Eketės	26.5	33	73	139	227	506	819	1040	1310	2051	4666	6892
24	Ketvergių	33.5	108	228	531	662	774	884	1265	1785	2339	2865	3275
25	Šernų	9.3	25	43	257	637	1161	1524	1860	2048	2199	2523	3051
26	Rokų	16.3	56	158	504	970	1396	1718	1899	2057	2396	2720	2935
27	Žvejų	12.4	152	319	667	1016	1243	1576	1849	2129	2401	2601	2889
28	Pastotės	17.8	159	351	869	991	1107	1394	1767	2187	2424	2520	2811
29	Pastogės	4.8	130	362	754	970	1231	1549	1830	2047	2373	2535	2812
30	Lakštingalų	7.6	121	369	850	940	1065	1293	1581	1922	2349	2495	2627
31	Bokštų	1.7	164	370	820	951	1051	1259	1556	1978	2349	2498	2674
32	Gandrų	1.6	133	364	865	946	1119	1406	1737	1990	2372	2499	2659
33	Sudmantai	1.9	128	159	531	931	1484	3216	12718	28966	60754	94317	125244
34	Baltojo akmens	5.9	187	335	693	945	1039	1215	1488	1862	2258	2502	2728

Continue of Table A

No	Stop name	Passenger flow average*	POP										
			300	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
35	Stonės	7.4	8	69	342	1230	2329	3477	5473	8215	11925	13919	17502
36	Jakų	13.4	203	439	1036	1310	1449	2599	14840	39664	71553	106996	119462
37	Dujų stoties	0.8	2	57	451	676	1078	1561	2083	2581	3379	14296	33801
38	Aisės	0.1	3	26	52	73	338	472	516	566	591	658	841
39	Lieknos	0.0	6	28	254	326	354	412	569	722	834	880	1013
40	Kiškėnų	0.2	11	56	77	301	460	781	1115	1535	2387	3946	5823
41	Galčių	0.2	12	16	53	128	306	975	1689	1992	2818	4775	8382
42	Dovilų	8.5	377	687	1033	1240	1723	2305	2920	3859	8616	13395	16249
43	Jurjonų	0.5	25	53	155	223	238	281	343	888	1414	2440	3523
44	Laisvės	0.4	33	89	193	221	242	301	667	1151	2444	3809	5142
45	Šnaukštų karjerų	1.3	6	15	98	204	376	676	1342	2324	3267	4398	6346
46	Agluonos	3.6	64	99	198	217	244	325	769	1441	2706	4168	5519
47	Beržų	0.0	38	47	72	83	132	379	509	538	578	613	765
48	Valdybos	6.4	17	29	73	76	80	114	394	513	546	619	796
49	Ąžuolyno	10.3	161	297	503	901	1333	1841	2303	2854	15292	36050	59286
50	Lankiškės	1.2	45	210	775	1078	1261	1829	2316	3076	5013	10365	14966
51	Medsėdžių	3.3	5	13	39	116	217	461	657	727	904	1181	1595
52	Kisinių	3.2	30	65	97	207	619	1167	1675	1920	2242	2479	3248
53	Stučių	1.7	2	10	24	54	217	392	618	1381	2104	3170	4413
54	Baičių	1.5	18	123	270	798	1281	1859	2411	3052	3886	5927	11230
55	Zylių	5.5	139	375	867	956	1063	1291	1570	2042	2381	2498	2684
56	Kalvių	18.2	124	340	630	709	831	1149	1657	2047	2408	2599	2973
57	Kisiniai	2.0	11	40	87	308	814	1238	1699	1950	2156	2442	3018
58	Grobštai	0.3	15	27	68	100	142	224	458	1271	1754	2040	2333
59	Poškai	0.0	12	25	117	449	652	740	813	925	1038	1251	1619
60	Agluonėnai	5.5	69	329	559	616	670	738	828	937	1052	1145	1500
61	Dumpiai	9.7	3	3	22	228	411	479	890	1471	3580	14585	24333
62	Spengiai	4.4	3	15	34	195	339	525	974	2242	3250	4217	5001
63	Mickai	5.6	47	68	102	133	255	784	1619	2906	4471	5454	6047
64	Dituva	23.3	54	171	222	306	1008	2270	3719	4278	4885	5655	6710
65	Dercekliai	0.9	30	97	447	1058	2192	3172	3894	4620	5474	5971	6588
66	Gubojų	12.1	67	148	559	1256	2557	3435	3948	4546	5404	5882	6409
67	Dituvos darželio	24.2	100	298	995	2038	2873	3530	3933	4474	5443	5842	6100
68	Gintaro	7.4	125	325	1036	1755	2372	3219	4064	5140	5661	5978	6229
69	Karvaičių	19.1	149	354	1070	1685	2352	3014	3936	5124	5687	5940	6208
70	Žemuogių	25.0	115	337	910	1568	2332	2994	3697	4828	5528	5872	6087
71	Pervalkos gatvė	21.1	198	458	1473	2216	2880	3435	3711	3885	4037	4419	5046
72	Nidos gatvė	20.3	132	353	1185	2254	2929	3344	3700	4140	4632	5530	5963
73	Preilos gatvė	14.1	142	424	1383	2269	3109	3438	3776	3915	4269	4779	5635
74	Pienių	22.5	180	438	1360	2136	2570	3092	3606	3884	3987	4182	4750
75	Dituvos bibliotekos	19.4	115	341	1100	1690	2171	2553	3242	3750	4047	4346	4537
76	Alyvų st.	0.7	30	85	322	449	468	494	579	862	1438	1561	1608
77	Tolupis	12.1	41	118	240	297	419	823	1597	2237	2975	3845	4884
78	Dituvos turgaus	31.9	66	289	989	2140	3029	3607	3952	4347	5216	5737	6074
79	Žaibų	0.1	89	209	1024	2231	3319	3806	3884	4118	4457	5182	5845
80	Pavasario	0.5	97	297	1042	2194	3154	3699	3927	4032	4213	4627	5536
81	Laivų	2.2	130	312	1020	1779	2377	3098	3587	3963	4202	4528	4735
82	Karpių	0.5	138	286	915	1457	1969	2634	3202	3751	4252	4443	4601
83	Ievų	10.6	127	345	872	1384	1884	2422	3045	3612	4193	4388	4513
84	Vaiteliai	1.0	28	53	144	238	419	527	588	634	793	1157	1717

Continue of Table A

No	Stop name	Passenger flow average*	POP										
			300	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
85	Kvietinių sankryža	1.7	3	7	41	107	399	576	1070	1777	3048	5124	11266
86	Gribžiniai	0.0	6	9	42	75	97	155	354	786	1222	1458	1723
87	Saulažolių 2-oji	0.1	6	17	174	596	1429	3367	6298	12889	14896	16042	17184
88	Eglynai	2.4	13	25	69	171	230	345	549	709	1164	1515	2045
89	Smilgynai	9.4	50	95	153	194	237	262	405	590	1083	1401	1744
90	Didieji Leliai	4.8	67	123	204	273	897	1417	1909	3415	5568	7197	9112
91	2-ieji Leliai	1.1	0	3	94	620	1427	2921	4668	5982	7692	10170	11870
92	1-ieji Leliai	4.8	30	124	312	963	1989	3400	5634	7517	9065	14377	26742
93	Gulbės sodai	8.7	65	135	343	1135	2212	3575	6140	7431	10541	19674	39280
94	1-oji Klemiškė	4.3	173	372	1011	2189	3614	5176	6747	10598	18436	41485	69169
95	Žiedų	6.4	354	825	1611	3180	4836	5687	7862	13155	25589	50019	70686
96	Gumbinės	0.0	12	17	100	181	371	542	758	1391	2191	3332	5246
97	Aitvarų	8.4	265	649	1895	3291	4981	6277	9023	16757	28911	49156	67161
98	Jazminų	14.8	337	670	1267	2339	4390	5369	7178	11542	22711	48841	71560
99	Urbikių	2.2	3	25	149	248	437	740	846	1162	2129	3143	5489
100	Gastos	3.4	19	24	131	617	2004	3717	4941	6823	9326	10998	14011
101	Veiviržėnai	29.2	156	327	694	774	793	873	920	963	1022	1226	1578
102	Bobės	1.0	8	21	31	54	101	287	828	1186	1286	1328	1521
103	Pėžaičiai	2.0	83	138	309	352	377	406	419	452	475	641	853
104	Aisėnai	0.1	0	0	0	12	51	75	232	418	489	540	589
105	Juodupis	1.1	0	2	22	32	39	79	321	783	1062	1248	1443
106	Santaros	0.0	20	49	163	331	397	416	438	465	592	733	1198
107	Spengių sodai	13.8	61	77	160	307	329	344	462	792	1142	4591	16863
108	Ulonų	1.5	6	27	175	301	364	479	528	1081	1896	11404	22549
109	Gručeikių sodai	3.5	71	156	286	322	336	378	621	840	1549	2632	11178
110	Vėžaičiai	42.0	411	568	1315	1557	1622	1692	1821	2085	2308	2764	4822
111	Gargždų AS	253.9	266	4242	10724	13262	14662	15306	16268	16970	17406	18756	19779
112	Endriejavas	7.0	108	441	635	698	762	854	889	927	961	1018	1062
113	Žadeikiai	8.6	57	216	240	244	247	247	261	295	331	376	413
114	Kalniškė	0.0	184	116	225	1721	7150	13632	15533	16942	17926	18671	19536
115	Lapiai	1.1	56	292	333	349	377	453	595	680	1038	1215	1488
116	Medsėdžiai	0.0	23	70	74	102	105	120	248	633	1053	1272	1481
117	Utriai	0.2	235	29	54	77	92	116	203	578	816	1090	1395
118	Kvietiniai	14.8	84	332	438	486	524	901	1919	3498	5419	10506	15346
119	Jakai	1.9	351	326	747	1173	1438	2836	10970	30490	64704	102834	123454
120	Dovilai	7.7	17	704	1040	1261	1780	2352	2999	4205	9303	13882	16623
121	Gerduvėnai	0.2	3	37	67	158	828	3279	7454	13095	16544	17672	18487
122	Rudaičiai	0.5	221	7	80	221	450	810	1737	4321	7989	12126	16639
123	Laugaliai	10.6	6	392	647	3298	9138	14431	15753	16705	18292	19269	19933
124	Šakiniai	0.3	0	29	81	143	210	363	1058	1679	2071	3189	4388
125	Gargždų kapinės	1.6	88	31	527	923	3283	9140	14687	16835	17971	19232	19754
126	Šlapšilė	8.5	170	188	405	585	1171	1734	2562	8461	14125	17834	18838
127	Dauparai	20.6	54	378	745	1032	1310	1444	1754	2120	2608	3431	9873
128	Jonušai	10.7	175	145	504	854	993	1197	1485	1795	2247	3042	4579
129	Užuovėjos	0.0	5	394	1143	3107	7570	12960	14671	15737	16551	17371	18391
130	Stragnai	0.3	8	116	443	1493	1842	2058	2296	2493	2832	3552	4151
131	Šaukliai	0.0	3	9	105	138	267	622	1466	2060	2558	3302	4013
132	Kalviškiai	0.2	232	8	65	216	323	390	554	717	833	1469	1945
133	Priekulė	27.7	44	699	1313	1642	2049	2208	2453	3049	3503	4121	4756
134	Lietuvininkų g.	0.3	66	66	603	1540	2110	3022	6898	11884	14823	17245	18880

Continue of Table A

No	Stop name	Passenger flow average*	POP										
			300	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
135	Skaidrioji g.	4.8	0	171	202	430	4903	10932	14305	16676	18333	19172	19669
136	Kuršlaukio g.	0.4	37	15	236	1304	6388	11668	15638	17338	18676	19255	19696
137	Gamyklų	0.6	3	40	580	2768	8087	13057	15881	17741	18825	19306	19744
138	Balkalnis	0.0	1572	3	3	6	107	136	149	172	348	694	1055
139	Mataičiai	1.5	44	77	87	100	105	125	170	262	273	287	344
140	Lelėnai	0.0	6	6	16	20	24	37	67	78	116	183	376
141	Auksoras	1.3	3	3	3	9	27	85	239	658	792	854	935
142	Valučiai	0.0	0	8	46	98	172	559	1104	1229	1339	1415	1577
143	Landžiai	0.0	0	6	17	32	80	218	250	302	416	515	661
144	Samališkė	0.0	49	92	112	142	233	983	1837	2135	2191	2433	2918
145	Sodas	0.0	10	14	24	75	264	372	494	572	744	1017	1519
146	Mėželiai	0.4	22	44	56	184	525	941	1384	2178	2632	3171	3578
147	Pempiai	0.2	20	32	119	247	390	1369	2434	3557	4649	5357	6005
148	Mokinių	0.0	0	0	191	825	1466	1813	3284	7389	13544	17207	18231
149	1-ieji Žvelsėnai	0.4	3	6	20	148	483	938	1072	1168	1597	3074	6156
150	Šalpėnai	8.5	44	122	189	241	274	298	322	403	646	751	859
151	Būdviečiai	0.2	3	5	31	77	186	676	900	1093	1883	2777	3247
152	Griežiai	0.1	27	32	40	114	169	285	784	2059	2793	3014	3449
153	Dreverna	3.0	142	343	419	422	436	447	512	600	704	879	1155
154	Šiūpariai	1.1	59	222	299	341	352	404	499	604	760	911	1051
155	Pjauliai	0.0	10	18	46	61	102	379	720	1255	2000	3665	5030
156	Daukšaičiai	9.9	119	206	275	314	371	409	491	572	774	1049	1762
157	Laigiai	0.0	8	16	47	204	622	813	903	957	968	1009	1215
158	Mokinių	4.4	340	729	1253	1516	1594	1665	1981	2366	3251	7131	13431
159	Antkoptis	0.9	1	48	111	123	129	136	164	185	193	196	391
160	Šukaičiai	2.1	46	85	179	213	223	234	277	460	806	1174	1358
161	Senosios mokyklos	0.0	1	13	54	98	303	674	777	922	1158	1578	1793
162	Balsėnai	0.0	40	102	133	143	147	155	207	278	312	467	1316
163	Maciuičiai	0.1	58	187	373	854	3209	8573	13738	15163	17278	18908	19797
164	Trepkalniai	0.0	5	5	11	22	61	134	272	449	797	1170	1276
165	Brožiai	0.1	54	86	129	157	181	210	238	261	338	609	901
166	Ryto g.	0.0	25	52	331	580	1969	4192	10613	14249	16661	18417	19446
167	Stirbiai	0.0	3	5	35	113	166	202	392	550	658	695	842
168	Girininkai	0.0	68	152	320	352	378	460	544	609	731	847	1708
169	Lankupiai	0.4	10	15	111	239	327	351	489	630	871	1393	1760
170	Misgiriai	0.0	0	11	11	11	14	26	147	395	622	768	865
171	Šilėnai	0.0	1	9	14	34	43	71	137	280	749	1147	1403
172	Bareikos	0.0	3	6	27	43	83	192	430	811	1519	2143	2368
173	Judrėnai	1.6	132	261	384	406	435	455	505	505	505	517	528
174	Girininkai	0.1	3	6	39	358	451	461	484	487	507	523	550
175	Pangesai	1.1	78	112	327	1135	1790	2234	2719	3398	4015	4653	5569
176	Lingiai	0.9	65	128	415	965	1619	2650	4086	5099	5698	6217	6514
177	Tiltas	0.0	3	5	68	399	468	513	607	775	879	1594	2863
178	Pakalniškiai	1.7	24	24	51	86	114	137	199	253	320	717	1562
179	Priekulės geležinkelio stotis	2.4	37	97	455	1232	2061	2795	3391	4043	4892	5562	6113
180	Genių	0.0	6	7	13	117	553	788	943	1045	1142	1306	1602
181	Tickinai	0.0	6	9	13	25	74	227	588	822	1026	1280	1391
182	Šilininkai	0.0	8	10	52	75	148	581	1017	1567	2639	3353	3716
183	Šakėnai	0.0	9	11	12	22	58	349	443	493	506	529	565

End of Table A

No	Stop name	Passenger flow average*	POP										
			300	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
184	Svencelė	3.3	57	69	80	86	92	102	163	486	557	568	768
185	Stančaičiai	0.0	14	18	32	40	44	47	60	73	89	132	257
186	Upitėnai	0.5	11	16	26	27	91	554	920	1038	1308	1518	1591
187	Venckai	1.6	123	186	198	233	333	429	563	857	1211	2065	3518
188	Žemguliai	1.0	14	20	27	37	46	148	189	225	347	579	620
189	Kryžkelė	0.0	18	20	52	169	405	442	526	698	1092	1692	2241
190	Vainotiškė	0.8	17	27	37	86	169	324	400	442	490	677	839
191	Žvelsėnai	0.1	16	17	26	122	373	648	1042	1128	1214	1298	1826
192	Gervių	0.0	4	8	296	497	636	706	851	977	1153	1279	1551
193	Rožių	0.3	9	41	76	76	88	327	454	533	569	608	772
194	Pašto	0.2	267	498	1044	1267	1438	1924	8147	26054	58947	95818	119745
195	Sudmantų žiedo	0.1	102	235	693	1144	1405	3735	12419	32732	67920	105001	124532
196	Stadiono	0.0	491	1479	5436	10744	13765	15024	15553	16240	17769	18629	19699
197	Vilnelės	0.1	607	1492	6751	11067	13955	15624	16378	17280	18045	18634	19452
198	Kulių dvaro	0.0	233	570	1607	4075	10309	13425	16069	17169	18077	18603	18919
199	Dobilas	0.0	158	466	1123	2105	5542	11885	14460	16468	17587	18596	18870
200	Obelėlė	0.0	150	417	974	1908	4467	10194	13987	16071	17423	18398	18875
201	Vandens	0.0	39	150	709	1856	2989	4599	9571	13930	16139	17552	18602
202	Žalgirių	0.7	9	20	292	953	2517	4504	5615	7283	9318	10734	13256
203	Ylavos	1.6	57	123	584	1710	3774	4837	6863	8733	9992	12114	17688
204	A. Bruožio	6.8	94	263	1129	2877	4113	5730	8228	9653	11149	16674	24521
205	Smalupės	4.0	178	476	1843	3120	4547	6659	9001	10380	14890	22156	37533
206	Šukaičiai 2	1.4	41	57	168	193	214	237	248	287	420	891	1266
207	Šalpėnai 2	0.6	0	11	30	89	211	246	289	326	353	414	729
208	Pavandenės	9.1	115	234	1745	3289	5641	8372	10949	15133	20472	27007	34120
209	Treniotos	0.9	228	671	2610	4758	10867	13808	15165	15978	16785	17619	18716
210	Vasario 16-osios	0.0	289	765	3156	6368	11270	14037	15342	16083	16785	18075	19121

Note: * – dimension: [passengers' number per working day].

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