



WP.T3 - D.T3.2.3

State of the Art Report about mobility problems
and policy challenges within ETP follower
regions

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Introduction

Remote regions in central Europe share the same risks and issues related to the fact that they are located at the periphery of main transport networks. Inadequate and under-used services, excessive costs, lack of last-mile services and proper intermodality, poor communication and information to users and car commuting are some of the challenges that many central European regions face.

The SMACKER project addresses these disparities and promotes public transport and mobility services that are demand-responsive and that connect local and regional systems to main corridors and transport nodes.

Within SMACKER mobility issues related to peripheral and rural areas, main barriers are assessed and addressed and solutions drawn on the best international know-how are provided. SMACKER promotes demand-responsive transport services to connect local and regional systems to the main transport corridors and nodes. Soft measures (e.g. behaviour change campaigns) and hard measures (e.g. mobility service pilots) are used to identify and promote eco-friendly solutions for public transport in rural and peripheral areas, with the aim of achieving more liveable and sustainable environments and better integration of population to the main corridors. SMACKER helps local communities to re-design their transport services according to user needs, through a coordinated co-design process between local/regional partners and stakeholders; SMACKER also encourages the use of new transport services through motivating and incentivizing campaigns. The direct beneficiaries of the actions are residents, commuters and tourists.

Participation reflects the overall integration of citizens and groups in planning processes and policy decision-making and consequently the sharing of power. In particular, transport planning and transport relevant measures are often the subject of controversial discussions within the urban community. The concept of Sustainable Urban Mobility Planning has established the principle that the public should be included from the very beginning of the transport planning process and not only when the plans are largely completed and only minor amendments can be carried out. For that reason, public authorities need to open-up debate on this highly specialised and complex subject area and make participation a part of the planning process. In order to ensure participation throughout the process, the development of an engagement strategy would be necessary.

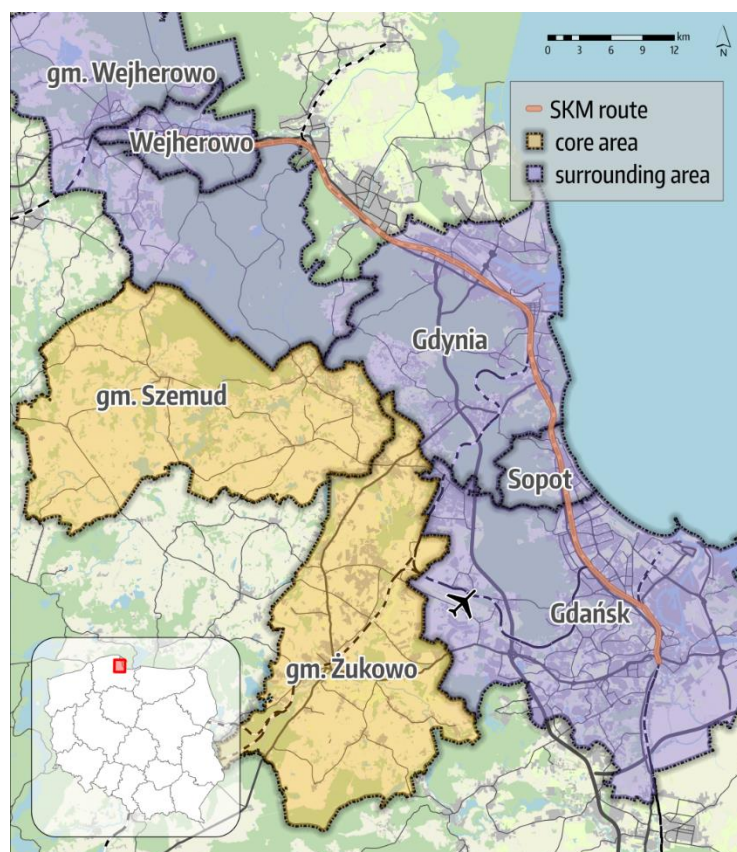
This report addresses the issue of mobility in gminas¹ of Żukowo (urban-rural) and Szemud (rural) in northern Poland, located adjacent to the Tricity consisting of Gdańsk, Gdynia and Sopot, which are lately being subjects of intensive urbanization. The document regards elements such as current urban conditions and issues of concern, while later describing potential solutions to the area's existing issues by means of modern transport services and sustainable mobility.

¹ In the Polish framework a “gmina” represents the unit of the administrative division corresponding to a municipality. It corresponds to the LAU (Local Administrative Units) level the EUROSTAT classification.



1. Project's area description

Gmina (municipality) Żukowo and gmina Szemud, which make up the core area for the present analysis, are located in northern Poland in Pomeranian Voivodeship, nearby the Baltic Sea, and are adjacent to the western boundary of Tricity - polycentric urban agglomeration consisting of three cities: Gdańsk, Sopot and Gdynia, with population of ca. 750,000 people, which is treated together with gmina Wejherowo (borders Tricity to the north) as the surrounding area (for the purposes of the present analysis). The Tricity is one of the most developed urban centres of Poland and important tourist destination, with numerous top-class universities, workplaces, headquarters of companies, shopping centres, transport nodes (with Gdynia Główna - seventh largest railway station serving 40,000 passengers every day) and institutions - all of them mostly concentrated along railway line no. 202, served by Rapid Urban Rail (Szybka Kolej Miejska, SKM). Both of the core's gminas are rapidly developing as they are under heavy influence by Tricity's suburbanisation processes and are strongly connected with the Tricity as it's the place condensing most services. Wejherowo as a part of Tricity's continuous urban area is also an important part of the surrounding area for gminas Szemud and Żukowo as a developing town with numerous services.



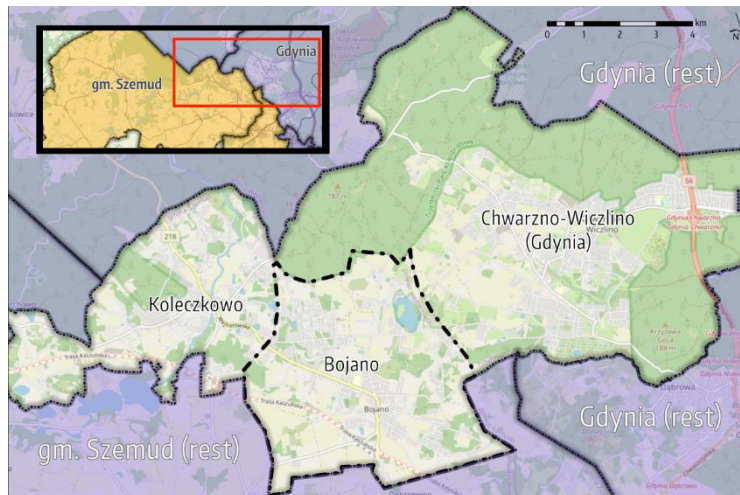
Map 1. Core area (gminas Szemud and Żukowo) and the surrounding area, important as destinations for core area's inhabitants

Rural gmina Szemud lies to the south of the Tricity Landscape Park, which also partly lies within the boundaries of the gmina, while the western and southern boundaries border with mostly rural areas, including ones in area of gmina Żukowo. To the east, gmina



Szemud lies adjacent to Chwarzno-Wiczlino, an urbanizing district of Gdynia, second most populated city of the Tricity. Chwarzno-Wiczlino is covered by the SMACKER program as a district of high car dependency, low population density and insufficient public transport offer, while rapidly developing (population growth estimated to be more than 400%) and being isolated from the rest of the city. The district shares similar conditions and issues with suburbanizing rural gminas Szemud and Żukowo and a Sustainable Urban Mobility Plan for Chwarzno-Wiczlino has been produced in 2020.

Population of gmina Szemud is estimated to ca. 18,000, which has grown twice in comparison to ca. 9,900 people in 1995. Despite its mostly rural character, the easternmost part of the gmina, especially villages of Bojano (pop. 3,500) and Koleczkowo (pop. 1,700), are becoming ones of typically suburban character, as they are a very popular place to settle for people working in the Tricity.



Map 2. Area of Bojano and Koleczkowo in gmina Szemud and adjacent district of Chwarzno-Wiczlino in Gdynia

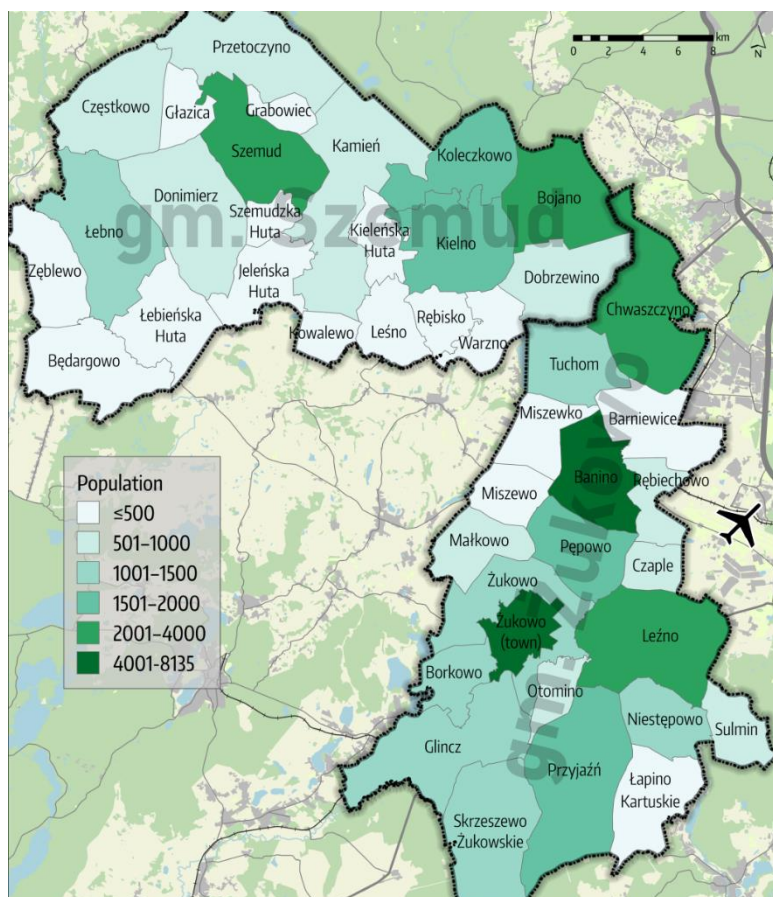
The rest of the gmina's area is typical for an extensive rural gmina, with some villages located near roads of higher class (such as Łebno, Kielno and Szemud - seat of the gmina, pop. 2,200; see Map 3), while the rest of villages consist mainly of buildings scattered around numerous lower-class roads.

Urban-rural gmina Żukowo lies south of gmina Szemud, adjacent to the western part of the most populated city of the Tricity, Gdańsk, and its outer low-rise and industrial districts of Osowa, Matarnia (with Lech Walesa Airport) and Kokoszki, being separated from the main urban part of Gdańsk by forests. It is also adjacent to the southern part of Gdynia and its residential district of Dąbrowa, and to gmina Kartuzy with the town of Kartuzy, populated by ca. 15,000 inhabitants, while on south it borders mostly rural areas.

The population of gmina Żukowo is estimated to be ca. 41,000 inhabitants (twice the population of gmina Szemud), with Żukowo being the seat of the gmina and its service centre, being inhabited by ca. 7,000 inhabitants. In overall, in the last 25 years number of inhabitants of the rural part of the gmina has boosted hugely - from 14,000 in 1995 to 34,000 (83% of the gmina) in 2019. It is the effect of heavy influence of Gdańsk and its suburbanisation - Banino and Pępowo (pop. 8,500), located in the central part of the gmina are the best examples, forming the second most populated place in gmina Żukowo and



their landscape having changed from a small village to a typical sprawled suburban village, with housing estates built rapidly on former fields. Banino is one of the most recognized examples of urban sprawl in Poland, with numerous sociological researches carried out about social conflicts and connections with Tricity. The rest of the gmina is of dispersed rural character, though new low-rise housing estates and individual houses are also being built in the whole area of the gmina, especially in the south.



Map 3. Population of the core area (gminas Szemud and Żukowo)

Both gminas are inhabited by population of relatively low age - most populated age group in gmina Szemud is 5-9 years old (7.8%), while for Żukowo 30-34 years old (8.4%). In gmina Szemud, 26.8% of population belongs to the pre-working age (less than 17 years old), 60.8% to the working age and 12.4% to the pension age (more than 65 years for men and 60 years of women). In gmina Żukowo the same age groups apply to, sequentially, 26.2%, 61.1% and 12.7% of the population.



Tab. 1. Demographical statistics of the core area, surrounding area in comparison with national and regional averages

	Population	Population density [people/km ²]	% of population		
			Pre-working age	Working age	Pension age
Gmina Szemud	18,240	103	26.8%	60.8%	12.4%
Gmina Żukowo	40,837	249	26.2%	61.1%	12.7%
Chwarzno-Wiczlino (Gdynia)	12,563	492	26.6%	59.0%	14.4%
Gdynia	246,348	1823	16.4%	57.6%	26.0%
Gdańsk	470,907	1798	17.8%	58.0%	24.2%
Wejherowo county	217,846	169	22.7%	60.6%	16.7%
Kartuzy county	139,397	124	26.1%	59.7%	14.2%
Pomeranian voivodeship	2,343,928	128	19.7%	59.8%	20.5%
Poland	38,382,576	123	18.1%	60.0%	21.9%

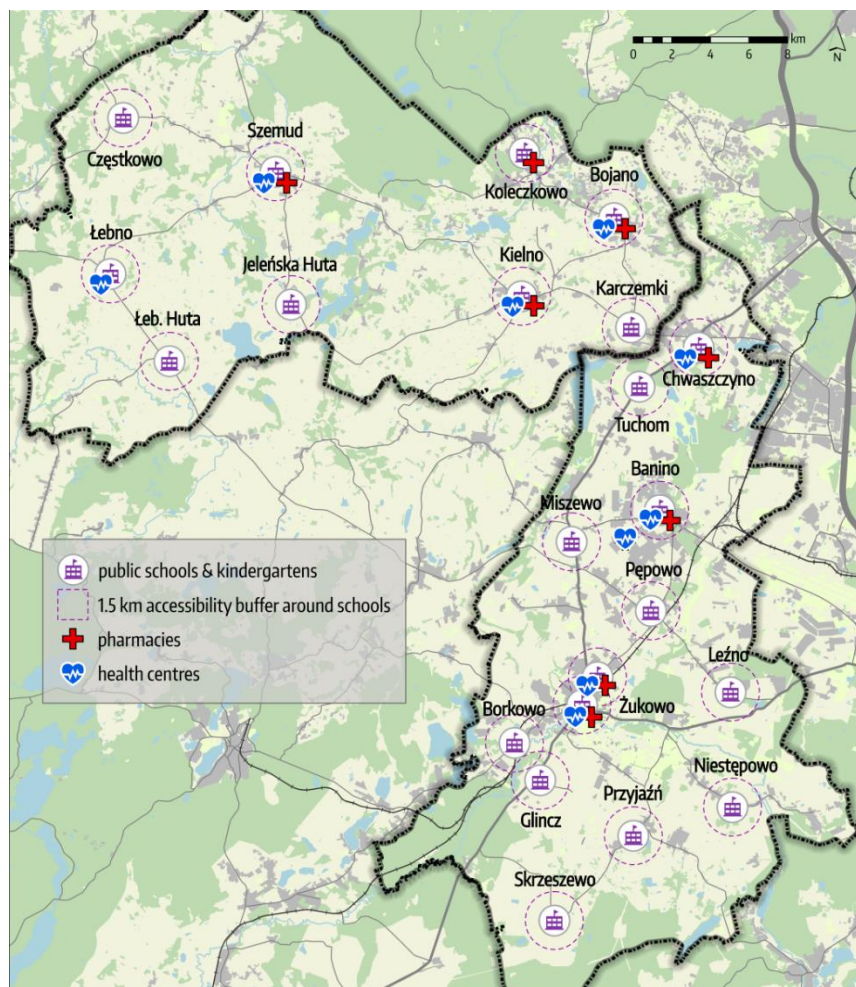
The most important POIs for the inhabitants of both gminas, located in the core area, are services. Primarily, schools and kindergartens are important destinations within the gminas. Considering the public ones, 9 of them are located in gmina Szemud and 15 in gmina Żukowo, with ca. 30 private-owned kindergartens in total. Educational facilities in gmina Szemud are located in most populated villages of the gmina, but still a large number of pupils have to face a distance of up to 3 kilometres to their schools or even twice that distance for people living in the central and northern part of the gmina. The problem not only applies to the dispersed smaller villages, but also to the rapidly urbanising eastern part of the gmina.

The density of schools in gmina Żukowo is higher, but the issue is also present in a high extent - inhabitants of the rapidly sprawling village of Banino and its vicinities and the area between Pępowo and Chwaszczyno cannot access schools within in a suitable distance buffer. Meanwhile, the problem of dispersed villages on a complicated road network, present in the central part of gmina Szemud, also exists in the southern part of gmina Żukowo.

Inhabitants of the southern part of gmina Żukowo also tend to travel to the centre of Żukowo town, located around train station, as it has the function of a local services centre. For the northern part, rapidly sprawling part of the gmina, centre of Banino with culture and health centres, and a high density of shops, is a prevalent attraction. In gmina Szemud, no typical attracting centres can be found - some services can be found in Szemud, while new services slowly appear in the eastern part of the gmina, but in a



dispersed form. Thus, in both gminas only inhabitants of central parts of seats of gminas (Żukowo and Szemud) and central parts of urbanising villages have convenient access to most important public services, while the rest usually has to be car-dependent or has to use public transport, which is of relatively low quality regarding frequency and accessibility.



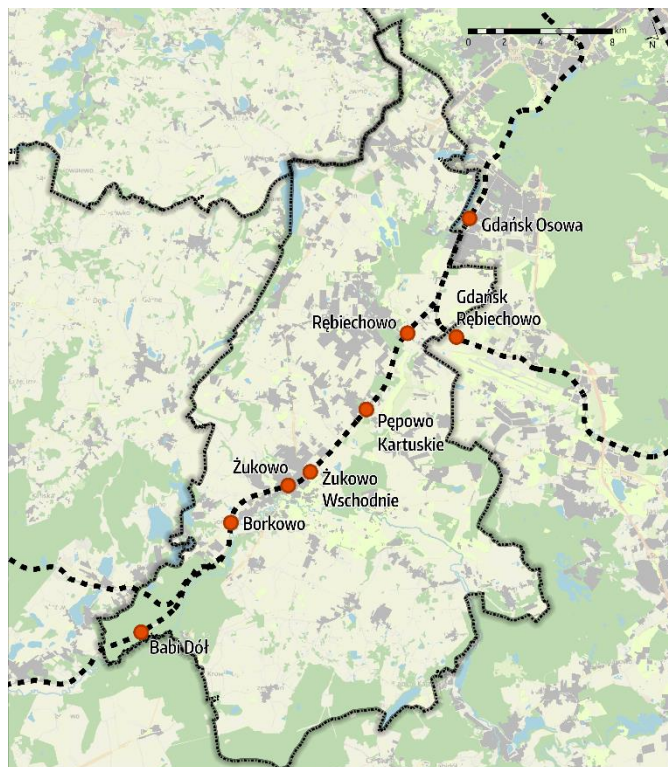
Map 4. Points of interests (educational & health services) within the core area

2. Description of the mobility demand and needs (relations and attractors poles)

As written in the paragraph above, the mobility demand within the core area mainly regards access to workplaces and basic services, such as schools, shops, sports and health facilities, which are located in more populated villages and towns or in the centres of sprawled villages. In gmina Żukowo, the town of Żukowo with its centre with numerous services is the most important travel destination inside the gmina (see Map 4). Most of the mobility demand regarding needs of higher level (such as higher education, workplaces, shopping centres, entertainment, long-distance public transport hubs) concerns access to



the Tricity. In both gminas, inhabitants seek a possibility to get to a transfer hub offering a connection to the Tricity or, most preferably, a direct connection to the Tricity. In gmina Żukowo, transfer hubs to trains running on the Pomeranian Metropolitan Railway (PKM) are an important intermediary travel destination. New inhabitants of the sprawling villages (Koleczkowo, Bojano, Banino) and of Żukowo tend to travel more to the Tricity for services, while the “old” residents of the villages of rural character tend to travel around their nearest surroundings.



Map 5. Train stations served by SKM/Polregio within boundaries of gmina Żukowo and near its boundaries

Mobility research has been carried for the both gminas - in gmina Żukowo in autumn 2017 and in gmina Szemud in spring 2019, providing standardised gmina-specific and accurate data on mobility. A research has also been carried for the Tricity Metropolitan Area in 2020, with results divided at county level (one division level higher than gmina).

Both gminas are typical car-dependent suburban municipalities. 92% of inhabitants of gmina Szemud declare having a car in their household and 86% of inhabitants of gmina Żukowo declare so. A typical household in gmina Szemud has 1.8 cars and in gmina Żukowo - 1.4, meanwhile, when taking into account only household with at least one car, gmina Szemud’s “motorised” households have on average 1.9 cars, and gmina Żukowo’s - 1.6 cars.

78% of inhabitants of gmina Szemud use cars for everyday travelling, with 20% using public transport and 4% using bicycles, while 74% of inhabitants of gmina Żukowo use their cars every day, with a greater share of usage of public transport (33% - especially buses,



passengers of which make up 72% of public transport passengers), and with bicycles having share of 3%.

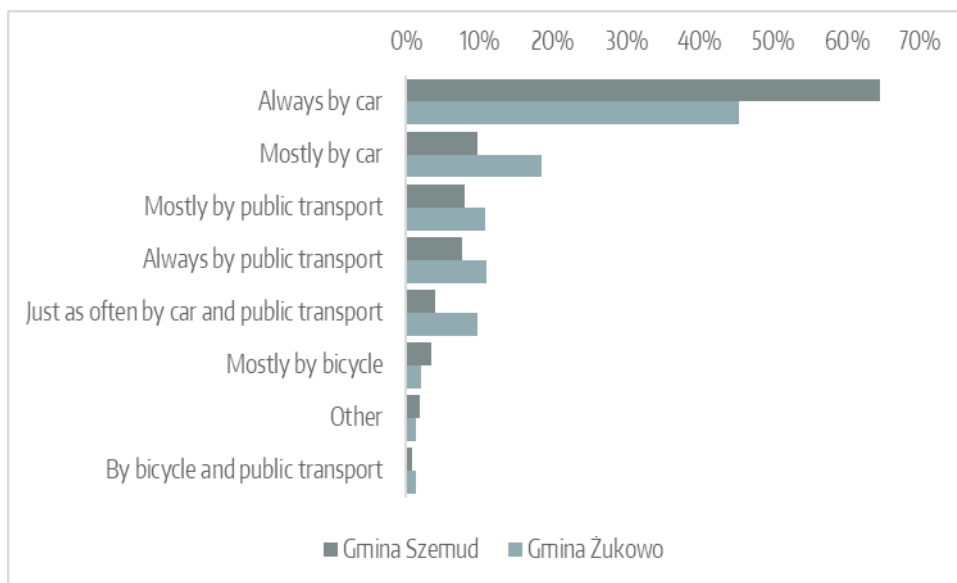


Chart 1. Declared transport modes used in everyday travelling

Inhabitants of gminas Szemud and Żukowo who have cars in their households, but use public transport, declared the most important reasons they do so are: lower cost of transport, other person using the car, road congestion, parking fees and problems with finding free parking spaces. This means that public transport is not used because of its high quality, but mainly because people cannot afford another car or because of infrastructural issues.

Inhabitants of both gminas declare having on average 1.5 bicycles per household and 2.2 bicycles per household equipped with bicycle. 5% of inhabitants of gmina Szemud use a bicycle frequently to get to workplace or place of education (1% in gmina Żukowo), 7% use it occasionally (8% in gmina Żukowo), 31% of inhabitants of both gminas use it frequently or occasionally for shopping and 32% (gmina Szemud) or 29% (gmina Żukowo) use it frequently or occasionally for other, non-recreational use.

Destinations of most travels in both gminas are workplaces, places of education, home or shopping locations. In gmina Szemud, 7% of all travels are for giving somebody a lift, while it consists of 3% of all travels in gmina Żukowo. 32% of school-age children in gmina Szemud are driven to school by car - the most important reason given by the respondents (33%) was no convenient public transport connection or no connection at all.

Respondents asked for the most important reason why they use car as their main way to travel pointed: shorter time of travelling, higher comfort, no need to, possibility to take more luggage and no need to transfer.

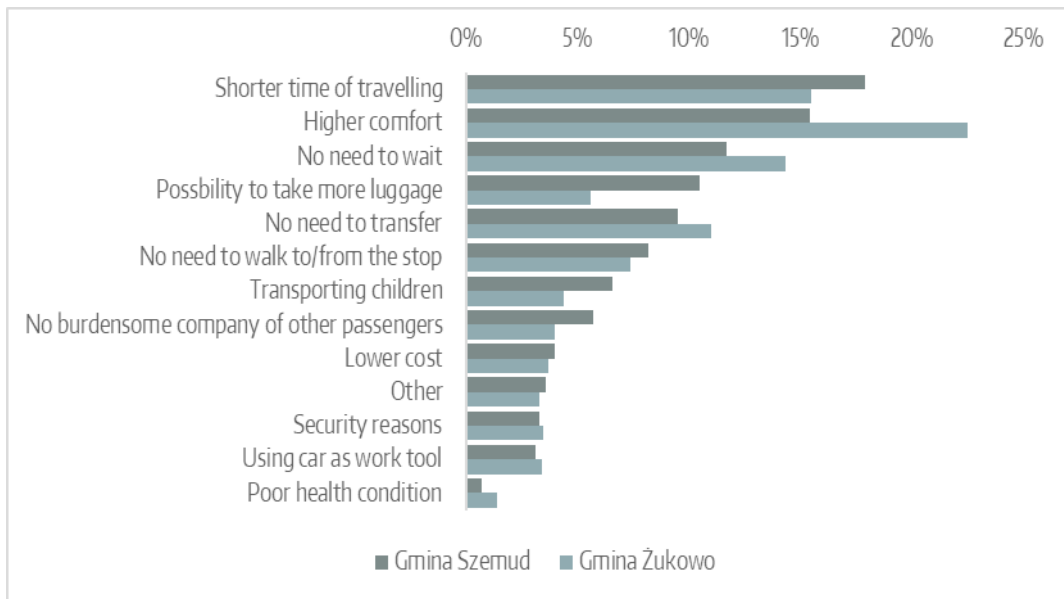
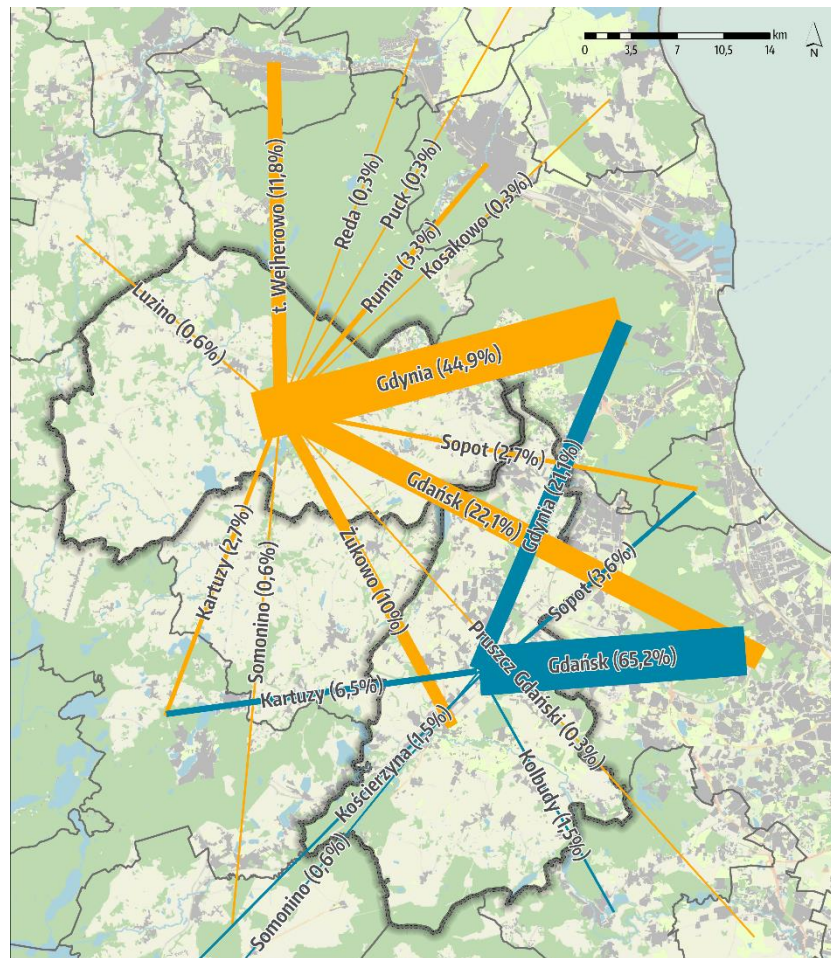


Chart 2. Reasons for using car in everyday travelling

Research of mobility carried in the gminas also involved main relations concerning travels of gmina’s inhabitants. 77% of working population of gmina Szemud and 85% of working population of gmina Żukowo have to travel for more than 1 kilometre to their workplace.

31% of gmina Szemud working population travel to their workplace to Gdynia, 26% inside gmina, 18% travel to Gdańsk, 9% to gmina Żukowo and 6% to the town of Wejherowo. Meanwhile, 36% of gmina Żukowo working population travel to their workplace to Gdynia, 30% inside gmina (53% of them to town of Żukowo and 12% to either Banino or Chwaszczyno), 13% to Gdynia and 4% to Kartuzy. According to the study, gmina Szemud has ties to gmina Żukowo, but not likewise in the other direction.

94% of pupils or students of both gminas have to travel to their place of education. In gmina Szemud, 42% of them travel for this purpose to Gdynia, 23% to the inside the gmina, 20% to the town of Wejherowo and 8% to Gdańsk. In gmina Żukowo, 52% of pupils or students travel to Gdańsk, 22% to the inside the gmina, 11% to Gdynia, 7% to Sopot and 4% to Kartuzy. This proves that the ties with the surrounding area, especially Gdynia and Gdańsk, are very strong.



Map 6. Travel relations concerning work and education of inhabitants of gmina Szemud (yellow) and Żukowo (blue)

Inhabitants of gmina Szemud, when asked what type of public transport connection would they desire, 50% pointed the need for a direct (with fewer transfers) connection with their place of living, 45% - need for a new connection with Gdynia, 13% - with Wejherowo, 12% - with Gdańsk and 11% with the town of Szemud. For the same question, 49% of inhabitants of gmina Żukowo expressed their need for a new connection with Gdańsk, 24% with their place of living, 18% with Gdynia and 11% with Kartuzy. When asked about what worries them most about indirect services, 24% said it is the risk of missing the transfer, 20% said it is the need to wait for the transfer and 13% said it is either the need to walk to another stop or exposure to weather conditions.

The average travel time for inhabitants of gmina Szemud was calculated to be 26 minutes (for work) and 25 minutes (for education) by car and 61 minutes (for work) and 55 minutes (for education) by public transport. Inhabitants of gmina Szemud have to travel by car on average 27 minutes (for work) and 33 minutes (for education) and by public transport on average 52 minutes (for work) and 51 minutes (for education).

Public transport in gmina Szemud in rating scale from 2 to 5 was given rate 3.03, and in gmina Żukowo - 3.50. In gmina Szemud most respondents said low frequency is the main issue considering public transport (35%), with other issues with less than 6% of answers,



while in gmina Żukowo punctuality and reliability were given as the main issues, with low price, accessibility and directness seen as best elements of the public transport system.

According to the respondents, for the whole Metropolitan Area, the most important changes that would encourage them to use public transport would be: higher service journey frequency (58%), coordination of transfers (51%), shorter travel time (50%), fewer transfers (40%), lower cost (37%) and better accessibility of stops (29%).

3. Description of the public transport services and related multimodal accessibility

3.1. PT transport supply

Collective transport services in gminas Szemud and Żukowo are provided by both public and private entities. In both gminas, public bus transport is provided by organisers united in Metropolitan Union of Communication of the Gulf of Gdańsk (MZKZG) - Gdańsk and Gdynia-based Public Transport Authorities (ZTM and ZKM). Both carriers issue their own tickets, but they also provide a possibility to buy a metropolitan ticket, which lets the passenger - depending on ticket type - ride on both ZTM and ZKM buses, or on the latter and also regional trains. All lines served by MZKZG organisers are served by relatively new, low-floor buses available for persons with reduced mobility. Public transport is also provided by rail - gmina Żukowo is served by trains running through Pomeranian Metropolitan Railway (PKM).

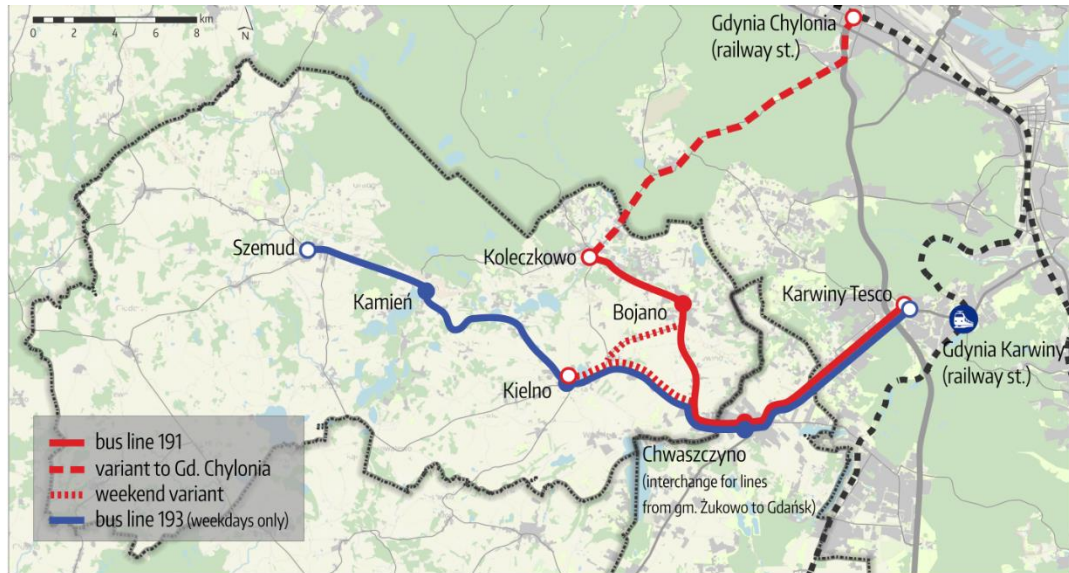
In gmina Szemud, MZKZG organisers provide service to highly populated villages in the eastern developing part of the gmina (Bojano and Koleczkowo). Line 191 has 14 pairs of bus service journeys each working day (every hour or two hours), 8 pairs on Saturdays and 6 pairs on Sundays, which is a relatively low number of service journeys taking into account ca. 6,000 inhabitants living in Bojano and Koleczkowo. The bus line makes it possible to travel to a terminus located in the external part of Gdynia (Karwiny Tesco), where passengers can transfer to buses and trolleybuses driving further to the city. It is also possible to transfer to another bus in one of bus stops in Chwaszczyno (in gmina Żukowo), taking the route to external part of Gdańsk.

None of those services provide a possible interchange with rail, even though it would be possible with an extension of a line, as Gdynia terminus of line 191 is located only four stops from train station Gdynia Karwiny. The 191 line however has two service journeys which do not end in Koleczkowo, but provide an extended service leading to Gdynia on the other end of the line too, where passengers can transfer to a train at Gdynia Chylonia station.

MZKZG organisers also provide bus line 193 to Kielno and Szemud (second and fourth most populated villages in the gmina, ca. 3,500 inhabitants), which runs on workdays only and has 5 pairs of service journeys, having the second terminus also in Karwiny Tesco (same as line 191). On weekends, the line is replaced by four variant service journeys of line

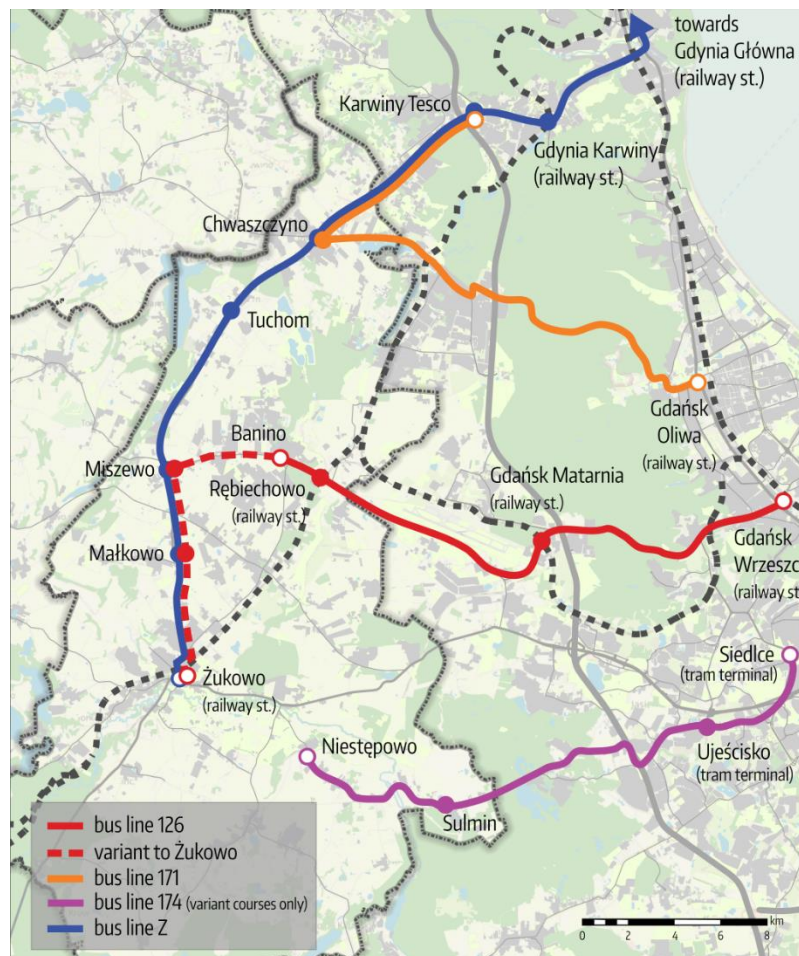


191, which at that time has a modified route running through Kielno (Szemud is not served). The remaining part: 15 of 23 villages in gmina Szemud (with ca. 7,000 inhabitants, i.e. 40% of the gmina's population) is not served by MZKZG organisers.



Map 7. Public bus routes running towards and through gmina Szemud

Gmina Żukowo is served by MZKZG organisers with lines 126, Z and extended service journeys of line 174, with Chwaszczyno also served by lines en route to gmina Szemud (forementioned lines 191 and 193) and city bus line 171. Line 126 provides a service (once an hour, twice an hour in workday morning rush hours) from Gdańsk Wrzeszcz train station to Banino (ca. 6,500 inhabitants, second most populated in the gmina) via Rębiechowo train station, with several service journeys extended to Żukowo (ca. 8,000 inhabitants). Żukowo is mainly served by Z bus line, running every hour (20 pairs of service journeys, reduced to 10 on Saturdays and 6 on Sundays), route of which leads from Gdynia main railway station via Chwaszczyno, Tuchom and Małkowo to Żukowo. Chwaszczyno is the best served area in the gmina as city bus line 171 (from southern Gdynia to Karwiny Tesco) provides a service every 30 minutes, but it does not drive further into the gmina. The southeastern part of the gmina (Niestępowo and Sulmin) is served by extended service journeys of bus line 174 with 7 pairs of service journeys on weekdays and 2 pairs of service journeys on weekend, route of which ends west to the centre of Gdańsk next to a tram terminal.



Map 8. Public bus routes running towards and through gmina Żukowo, excluding lines 191 and 193 (see Map 7)

Gmina Żukowo is also served by train running through Pomeranian Metropolitan Railway (PKM), on route from Kościerzyna or from Kartuzy, passing the core area through Glinicz, Borkowo, Żukowo, Pępowo and Rębiechowo, connecting those to Gdańsk, Gdynia and Lech Walesa International Airport (see Map 5). 28 regional trains (17 from Kartuzy and 11 from Kościerzyna) pass through gmina Żukowo on their way to Tricity daily on working days, with part of them not stopping at Pępowo Kartuskie. 126, 174 and Z bus lines provide a possibility for convenient change to PKM trains at Żukowo and Rębiechowo stops.

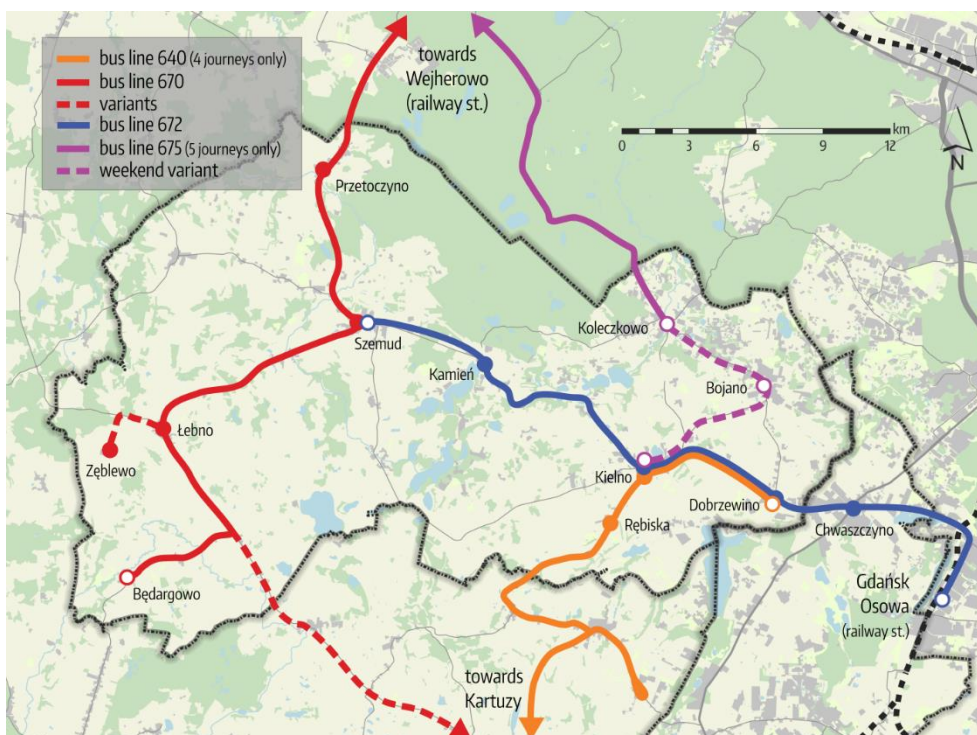
The area not covered by public transport services is partially covered by private bus companies. In gmina Szemud, the collective transport network is supplemented by bus routes of PKS Gdynia company, while in gmina Żukowo the network is supplemented by Przewozy Autobusowe Gryf (PA Gryf) and Przewozy Albatros. They are served by different types of vehicles; some of them are accessible to PRM passengers (e.g. most of PKS Gdynia vehicles), while some are not. Each of companies print their own tickets which are not valid in any other public means of transport.

In gmina Szemud, PKS Gdynia runs 13 bus lines, of which 4 are regular bus lines and the remaining are supplementary lines functioning mainly for transporting pupils to schools. One line ran by PKS Gdynia, 670, has a relatively high frequency of a service journey every



hour on workdays (with service journeys every half an hour in morning rush hours, 17 service journeys in total), with 11 service journeys on Saturdays and during holidays, and 7 service journeys on Sundays. It connects the western part of the gmina with Łebno, a village of higher population with health centre, and Szemud, the seat of the gmina. It also connects the gmina to Wejherowo, one of destinations popular for inhabitants of gmina Szemud and location of railway station. The schedule is complicated and may be unintelligible for passengers, with some service journeys running also through Zęblewo, some extended to Kartuzy, Pomieczyno or Przodkowo, with some even skipping Będargowo.

The second line, 672, runs from Gdańsk Osowa railway station via Chwaszczyno, Dobrzewino, Kielno, Kamień to Szemud, creating a latitudinal connection between most populated places in the gmina (except northeastern rapidly sprawling Koleczkowo and Bojano) and connecting them to one of the most important external destinations - Gdańsk (where interchange for trains is possible). The line runs 9 times a day, every two hours on working, and 8 times on Saturdays (no service journeys on Sundays). The third line, 675 connects Wejherowo to northern part of Koleczkowo 5 times a day on working days (3 times a day on Saturdays with route extended to Kielno via Bojano), while the fourth regular line, 640 runs from Kartuzy via Rębiska to Dobrzewino with 4 service journeys only on working days.



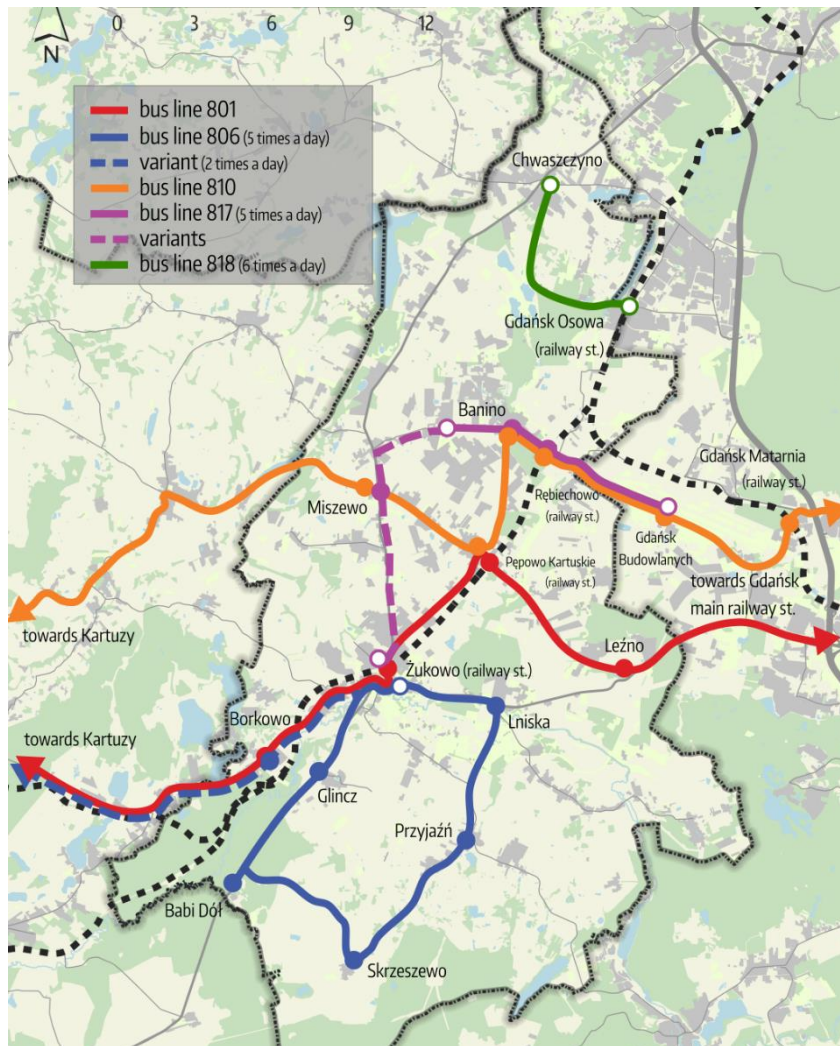
Map 9. PKS Gdynia bus routes running towards and through gmina Szemud

The ‘school’ lines (630-638 and 673) have their route only inside the gmina, and even though they make the bus routes network in gmina Szemud quite dense, they cannot be treated as a regular bus transport useful for inhabitants for reasons other than travelling to educational facilities. The reason is that they have no more than four pairs of service



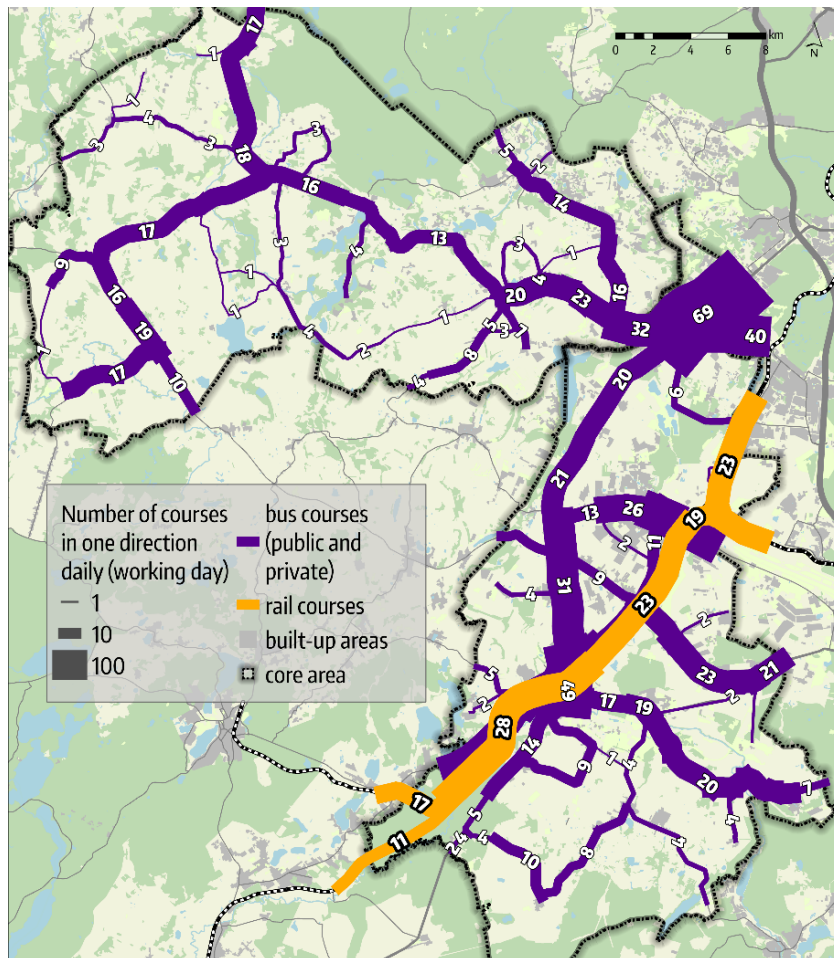
journeys each on every day (some of them even one or two service journeys) and their time of arrival/departure is set strictly to beginnings and ends of school lessons (e.g. morning service journey before 8 AM and then two service journeys at 1 PM and 3 PM). They only run on school days, so there are no service journeys at weekends and during holiday breaks - it is impossible to get to any destination e.g. during summer months. In fact these lines do not create an offer convenient for potential passengers.

In gmina Żukowo, three regular lines are provided by PA Gryf. Line 801 runs from central Gdańsk via Leźno, Pępowo and Żukowo to Kartuzy, offering a number of 21 service journeys a workday (18 during holidays, 16 on Saturdays and 12 on Sundays) with frequency of half an hour during peak hours and of an hour during rest of the day. Line 806 runs five times a day, on weekdays only, on a circular route ending in Żukowo, running via Glinicz, Babi Dół, Skrzyszewo, Przyjaźń and Lniska, with two service journeys extended to Kartuzy. The third line, 810, runs from central Gdańsk via Banino, Pępowo and Miszewo to Kartuzy, providing 9 service journeys a workday (7 during holidays and 3 on Sundays). Apart from that, Przewozy Albatros provides two regular lines, connecting the area of gmina Żukowo to the railway and Gdańsk. Line 817 runs five times a day on route from Banino to Gdańsk (Budowlanych bus stop, where transfer to city lines is possible) via Miszewo and Rębiechowo, where transfer to trains is possible, with two service journeys extended to Żukowo, and line 818 connects inhabitants of Chwaszczyno to the nearby Gdańsk Osowa railway station 6 times a day on workdays. Przewozy Albatros also offers 10 school lines (1-8, 19, 816), connecting different parts of the gmina to Żukowo and local schools, with from 2 to 9 service journeys a day.



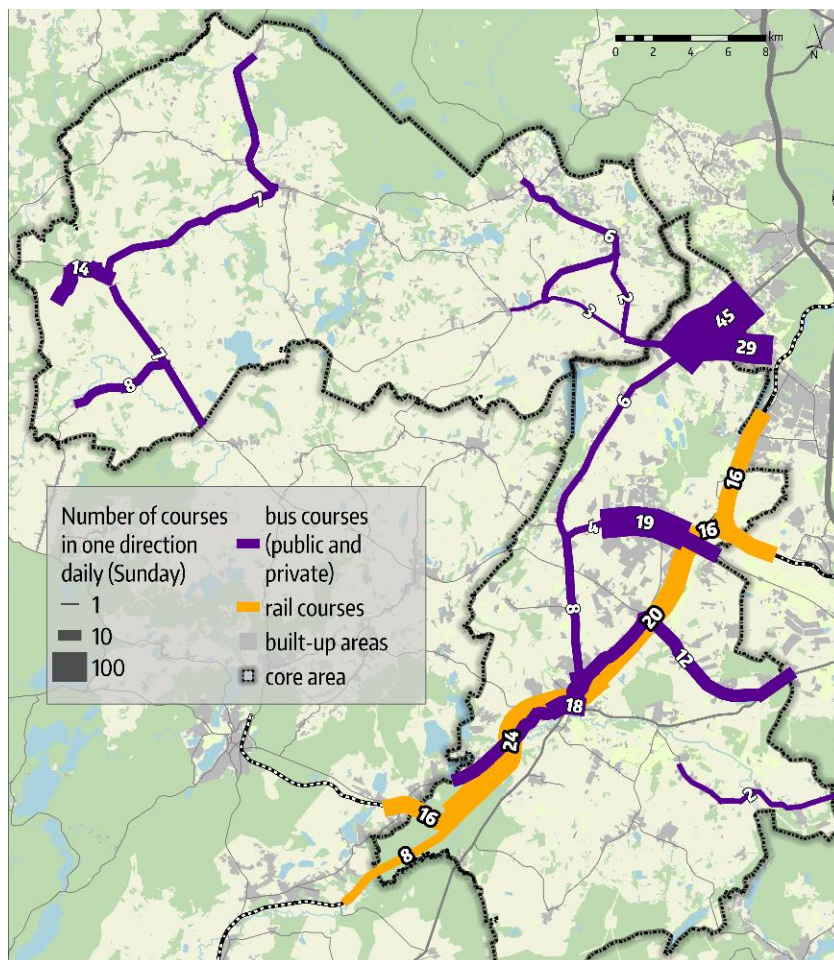
Map 10. PA Gryf and Przewozy Albatros bus routes running towards and through gmina Żukowo

Number of service journeys provided by different bus and rail carriers on workdays and Sundays can be seen on the maps below. Transport network in gmina Żukowo during workdays functions quite well, providing access to Żukowo and the railway, and only the southern part of the gmina, sprawled fragments of Banino and villages lying far from main roads have access to a low number of service journeys or none of them. Meanwhile, in gmina Szemud, except for bus stops located on the main roads, all other stops have a very low number of service journeys, which does not serve as a real public transport network for inhabitants, except for pupils. The gmina also does not have any rapid transport available, such as rail in gmina Żukowo, and no real multimodal hubs are available except for possibility to transfer to another bus while in the area of Chwaszczyno or to bus or tram while in the area of Gdynia or Gdańsk already.



Map 11. Public transport service journeys in one direction daily on a working day in core area

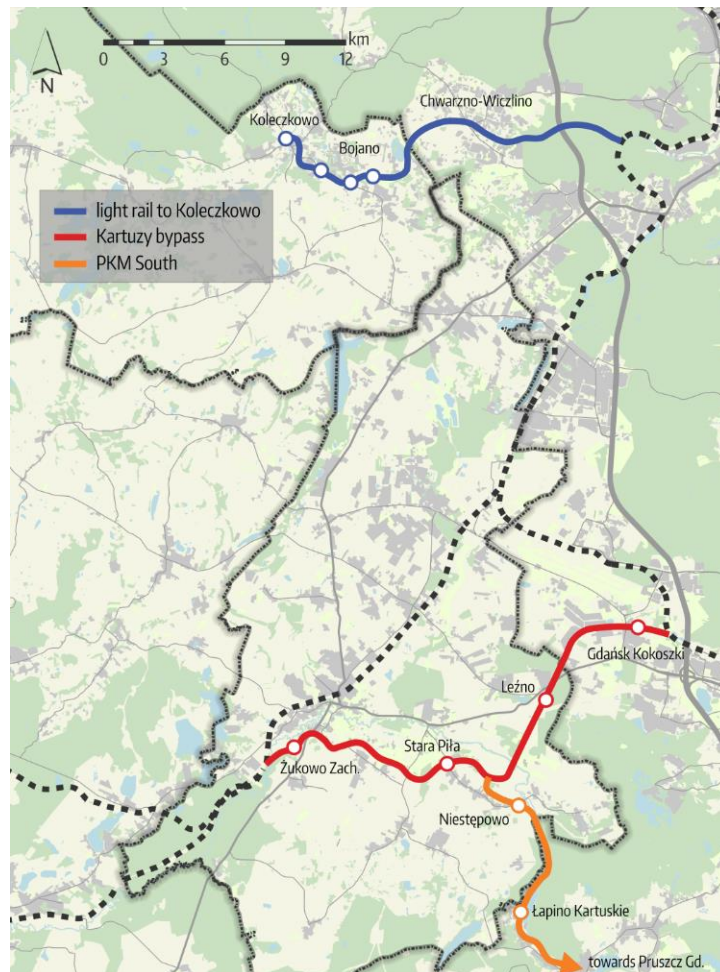
Meanwhile, during holidays or weekends, especially on Sundays, the network is severely weakened. Except for the eastern part of gmina Szemud, where Bojano and Koleczkowo are served by just 6 service journeys a day by the city line, and the western part served because it is lying en route from Kartuzy to Wejherowo, the gmina is not under any service of public transport. This precludes inhabitants from getting to fulfil any basic needs or travelling to the Tricity, and so the gmina is absolutely car-dependent. The situation looks somewhat better in gmina Żukowo, where rail functions all year, supported by city bus lines from Gdańsk to Żukowo via Kartuzy and from Gdynia to Żukowo (still, 6 service journeys a day only). The southern part of the gmina is completely not taken under service of public transport on Sundays.



Map 12. Public transport service journeys in one direction daily on a Sunday in core area

Railway in the area can also be accessed within the *park and ride* formula - parking lots are located next to railway stations: Gdańsk Rębiechowo (near core area's border), providing access to inhabitants of Banino, and Gdańsk Osowa, offering convenient transfer for inhabitants of Chwaszczyno. Concerning future plans, a railway is also planned to be the way to service Bojano and Koleczkowo in gmina Szemud, as a new light railway line is planned to be built from Gdynia via its Chwarzno-Wiczlino district to Bojano and Koleczkowo, with possible extension to Szemud and Luzino. The investment is included in development plans of both Gdynia and gmina Szemud and is set to be included in the investment plans for the 2021-2027 EU financial framework of PKP Polskie Linie Kolejowe (PKP PLK, national railway infrastructure manager).

New lines are planned to function also in the southern part of gmina Żukowo - the "Kartuzy bypass" is planned to be brought to life again by 2023, running from Gdańsk via Leżno, Niestępowo and Otomino to Żukowo, as a substitution for the existing railway from the Tricity to Kartuzy/Kościerzyna which is planned to be renovated (and later planned to be integrated into the network as regular connection), and a South PKM line is planned to be constructed on route from the south of Gdańsk to Niestępowo via Łapino Kartuskie (currently at the stage of conducting a technical, economic and environmental study).



Map 13. Planned railway lines in core area

The core area is also partly covered by some car-sharing services: small fragments of Banino and Chwaszczyno of gmina Żukowo are covered by Panek CarSharing service. There is no existing demand responsive transport service in the core area or in its vicinity. Public transport data is available digitally in GTFS format for all MZKZG-associated bus lines and regional train lines of the PKM; it is not available for private bus lines, though they provide line schedules online (not real-time).

3.2. Accessibility

The overall accessibility of stop points in both gminas is at a satisfactory level. Bus stops are located in such places and with such space between stops that most inhabitants have rather convenient access to a bus stop in the closest area of where they live, except for inhabitants of small, dispersed villages, usually located in a larger distance from a road accessible by bus. According to the survey, 73% of inhabitants of gmina Szemud and 76% of inhabitants of gmina Żukowo have to walk up to 10 minutes to get to a public transport stop, with 15% of inhabitants of gmina Szemud and 9% of inhabitants of gmina Żukowo being dissatisfied with the time accessibility to public transport stops.

There is also an exception to the satisfactory accessibility in the eastern part of gmina Szemud (Bojano and Koleczkowo) and northern (Chwaszczyno) and central part of gmina



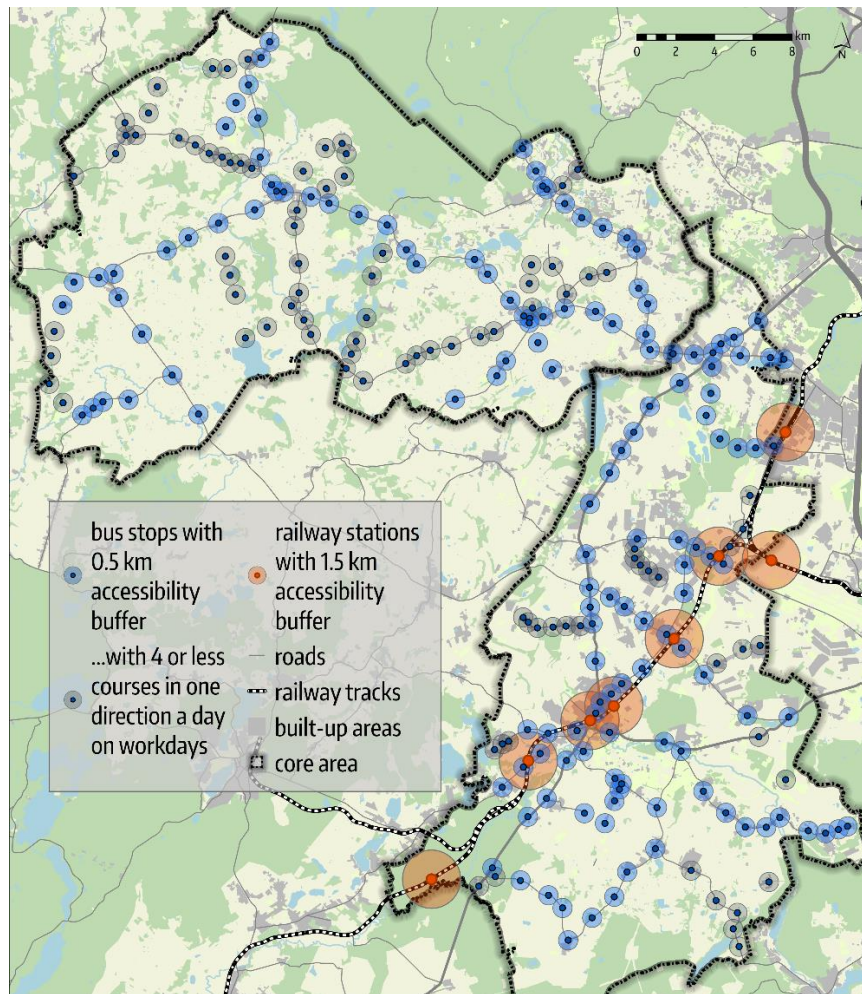
Żukowo (Banino and Pępowo), being affected by intensive urban sprawl, have developed a road network unfriendly to providing service with traditional public transport and so, many newly-built houses are located up to 2 kilometres from the nearest bus stop. Even though zoning plans for the areas have been adopted, they lack road solutions favourable for public transport, and the planned roads haven't been mostly built yet. For this reason the newly-built settlements are served by narrow roads typically ending with a turning circle, not creating an effective network of roads connected with each other, and the settlements are still separated by strips of crops or wastelands, with limited possibility to walk through them; the newly-built housing estates are also often gated and the roads - with no public access.



Map 14. Typical structure of newly-built houses and housing estates in Banino, gmina Żukowo

An important issue of bus stop accessibility in the core area, especially in gmina Szemud, is the fact that even though the accessibility buffer covers most of the inhabitants - so infrastructure is organised quite well - 39% of the bus stops have fewer than 5 bus service journeys a day in one direction. In gmina Szemud half (49%) of bus stops have fewer than 5 service journeys a day, so only people with access to bus stops on main roads (especially on route Gdańsk-Wejherowo and Wejherowo-Kartuzy going through the gmina's area) and in the eastern area of the gmina have a sufficient accessibility to bus service journeys.

Also, the whole core area is affected by an issue of physical inaccessibility - roads with pavements occur only mainly in Żukowo and most populated villages, so pedestrians are obligated to walk on the roadside, which causes issues about safety of getting to the stops; the roads are also lacking appropriate lighting.



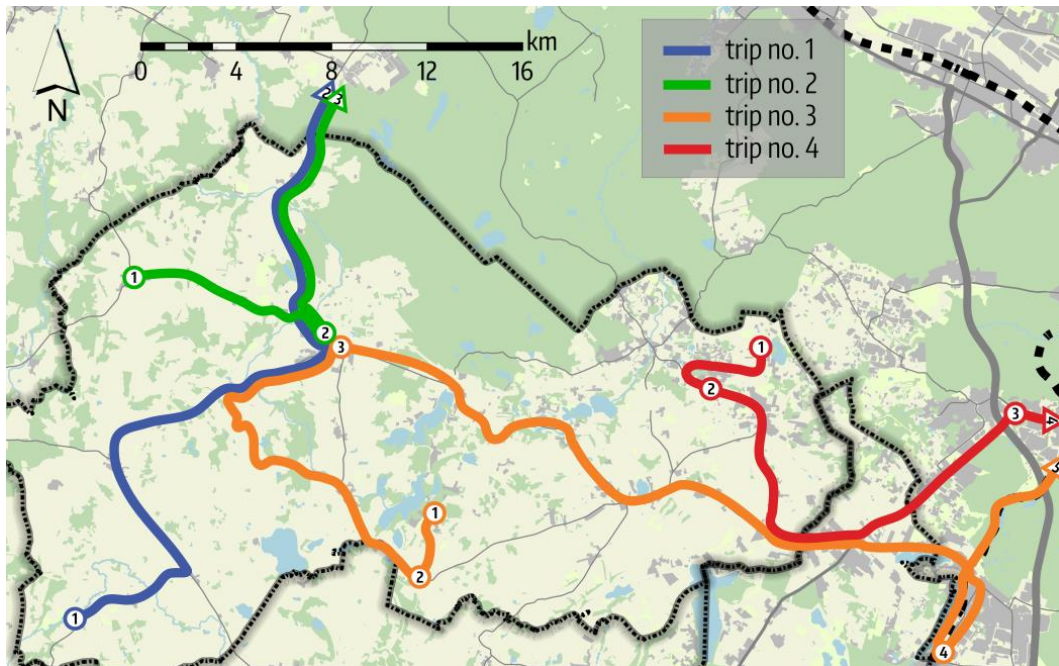
Map 15. Public transport accessibility in the core area

Comparison of different ways to get from locations in the core area to locations of POIs (working days):

- From Będargowo [1] to Wejherowo [2] railway station (trip no. 1):
 - by car: 28 min
 - by public transport: bus 670 [1-2] (42 min)
- From Czestkowo [1] to Wejherowo [3] railway station (trip no. 2):
 - by car: 18 min
 - by public transport: bus 632 [1-2] (26 min, runs 3 times a day) + 25 min interchange + bus 670 (22 min) [2-3] = 73 min
- From Kowalewo (Niedzwiedzia St) [1] to Gdynia Główna railway station [5] in the morning rush hours (trip no. 3):
 - by car: 35 min
 - by public transport: 14 min on foot [1-2] + bus 633 (11 min, runs 2 times a day only) [2-3] + interchange 9 min + bus 672 (30 min) [3-4] + SKM (18 min) [4-5] = 82 min
- From Bojano (Srebrna St, newly built low-rise housing estate) [1] to Gdynia Główna railway station [4] (trip no. 4):
 - by car: 27 min



- by public transport: 26 min on foot [1-2] + bus 191 [2-3] (26 min) + 2 min interchange + bus 23 [3-4] (40 min) = 68 min

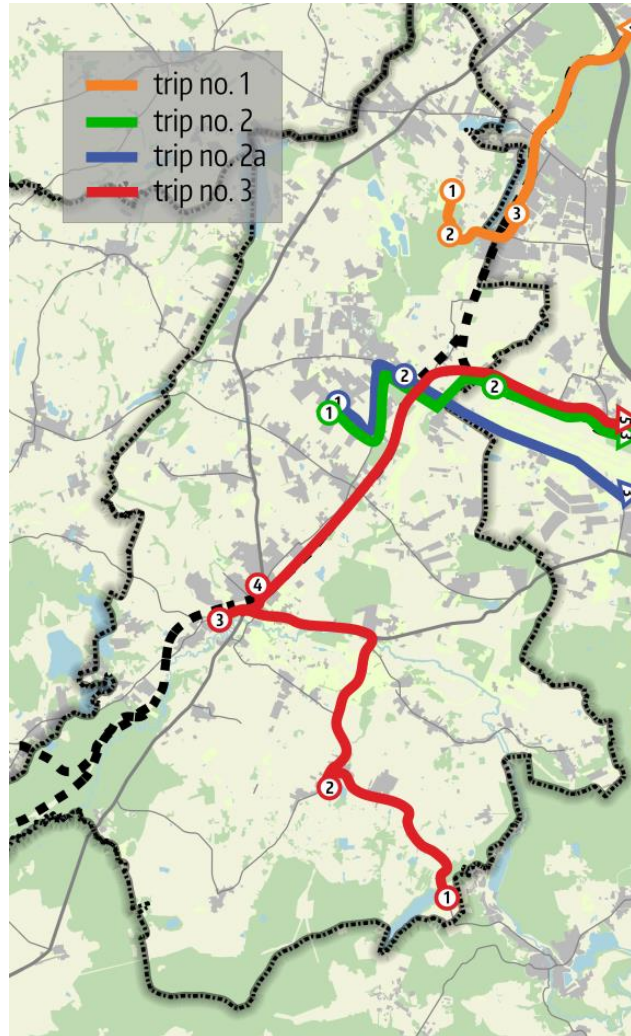


Map 16. Example trips from gmina Szemud by public transport

- From Chwaszczyno (Akacyjowa St, new built low-rise buildings) [1] to Gdynia Główna railway station [4]:
 - by car: 26 min
 - by public transport:
 - 29 min on foot + 3 min interchange + SKM (18 min) = 50 min
 - 12 min on foot [1-2] + 5 min bus 818 [2-3] + 3 min interchange + SKM (18 min) [3-4] = 38 min (trip no. 1)
 - by bicycle + public transport: 9 min by bicycle + 3 min interchange + SKM (18 min) = 30 min
- From Banino (Imbirowa St, new low-rise housing estate) [1] to Gdańsk Wrzeszcz railway station [3]:
 - by car: 25 min
 - by car + rail (Gdańsk Rębiechowo station): 9 min by car [1-2] + 3 min interchange + 28 min by rail [2-3] = 40 min (trip. no 2)
 - by public transport:
 - 22 min on foot + bus 126 (34 min) = 56 min
 - bus 816 [1-2] (7 min, 3 service journeys one way a day) + bus 126 [2-3] (34 min) = 41 min (trip no. 2a)
 - by bicycle + public transport: 14 min (Gdańsk Rębiechowo) by bicycle [1-2] + 3 min interchange + 28 min by rail [2-3] = 45 min (trip no. 2)
- From Łapino Kartuskie [1] to Gdańsk Wrzeszcz railway station [5]:
 - by car: 31 min



- by public transport: bus 3 [1-2] (17 min, runs 4 times a day) + interchange 15 min + bus 806 [2-3] (11 min) + 12 min on foot [3-4] + 22 min interchange + SKM (33 min) [4-5] = 110 min



Map 17. Example trips from gmina Żukowo by public transport

There are also problems with accessibility and intelligibility of information about the available public transport, as well as about the overall organisation of public transport:

- The routes provided by private carriers are very often complicated, with numerous U-turns (especially the ‘school’ courses), making it difficult to understand which way does the bus go; complicated routes also decrease attractiveness of using public transport,
- There are multiple variants (routes) under one bus line - some lines have up to six different variants, which are going different ways, skip some villages or stops, start or end at other stops (especially in Żukowo), etc., which makes the network extremely difficult to understand,
- There is no combined system for finding timetables, routes etc. for all carriers; PKS Gdynia does not provide any route-finding system or locations of bus stops except their names,



- Passenger information is of very poor quality, some carriers do not even provide maps or schemas of the routes or a timetable in a comprehensible way,
- There are many one-way routes (not circular) which let the passenger travel from place A to B, but not the other way round,
- Bus stops are not well-marked, they lack the stop name on the infrastructure, and the stop names are frequently inaccurate - it is not possible to comprehend where exactly the stop is (especially when there is no map provided) or the same bus stops have different names between carriers,
- Some lines skip some stops and some do not, with no clear reason, causing confusion and possibly causing passengers to leave the bus too late,
- Every private carrier has his own ticket tariff, not possible to use in other carriers' vehicles,
- Schedule is maladjusted to real needs of inhabitants and there are not enough service journeys,
- Interchange between bus and rail is not convenient, bus stops are quite far from rail platforms,
- There is not enough bus stop infrastructure such as stop shelters,
- There is hardly any coordination between different bus lines or railway lines, forcing passengers for a long wait, discouraging them from public transport.

4. Mapping the governance framework and relevant actors

4.1. Planning and regulatory framework

The planning framework that could impact the project consists of several important documents. First, any actions taken in terms of public transport should correspond with the Strategy of Sustainable Transport Development for Poland (Strategia rozwoju transportu), containing general diagnosis of the state of transport in Poland and the directions it should follow. As regards public transport, the document puts stress on five key aspects:

- increasing the efficiency of passenger transport
- ensuring that all residents have access to jobs and services
- making urban transport comfortable and safe
- increasing the attractiveness and quality of the urban environment
- reducing environmental pollution, the greenhouse effect and the level of energy consumption by passenger transport.

The document emphasizes the need to create conditions for the development of public transport throughout the country, including ensuring the transport accessibility of non-urban areas, including areas at risk of permanent marginalization (characterized by low time and space accessibility), including organizing a system of financing in non-urban areas. An important aspect the document focuses on is creating conditions for the integration of various modes of transport through the implementation of



multimodal systems (transfer nodes, "park and ride" systems, city bike and bicycle parking stations, creation of high-quality bicycle infrastructure, development of new forms of shared mobility etc.), common timetables enabling efficient and time-consuming change of means of transport, common tariff system and passenger information systems, and also creating integrated transport systems based on rail.

It is also stated it is important to promote mechanisms for management and improvement of public transport in urban agglomerations and review necessary actions (legal, organizational and investment) favoring the improvement of the functioning of public transport. Another indicated aspect is to promote and properly implement new, innovative solutions that allow the best use of available transport options, including, in particular, public transport, bicycle and pedestrian traffic, as well as modern forms of movement (personal transport devices, systems based on shared use), use of digital technologies and intelligent transport systems.

The next document any changes in the core area should correspond with is the Plan for Sustainable Development of Public Transport (Plan zrównoważonego rozwoju publicznego transportu zbiorowego) of Pomeranian Voivodeship, which is an obligatory document containing guidelines for organisation of public services in the field of public transport. Analyses and plans included in the document contain information on how public transport should be organised to fulfil needs of population, including all social groups, be as accessible as much as possible (spatially and functionally), have a high standard of quality, correspond with transport planning on all levels, reduce negative environmental impact, while maintaining economic effectiveness. Its aims include:

- increasing the share of collective transport in travel, resulting in a reduction in the share of individual car transport in the areas of the greatest congestion
- improvement of accessibility to important regional centers
- improvement of accessibility to important transport nodes (airports, seaports, railway stations) as important integration nodes, enabling the implementation of inter-powiat travel chains
- improvement of accessibility between neighboring regions enabling economic, educational and public benefit cooperation between neighboring regions.

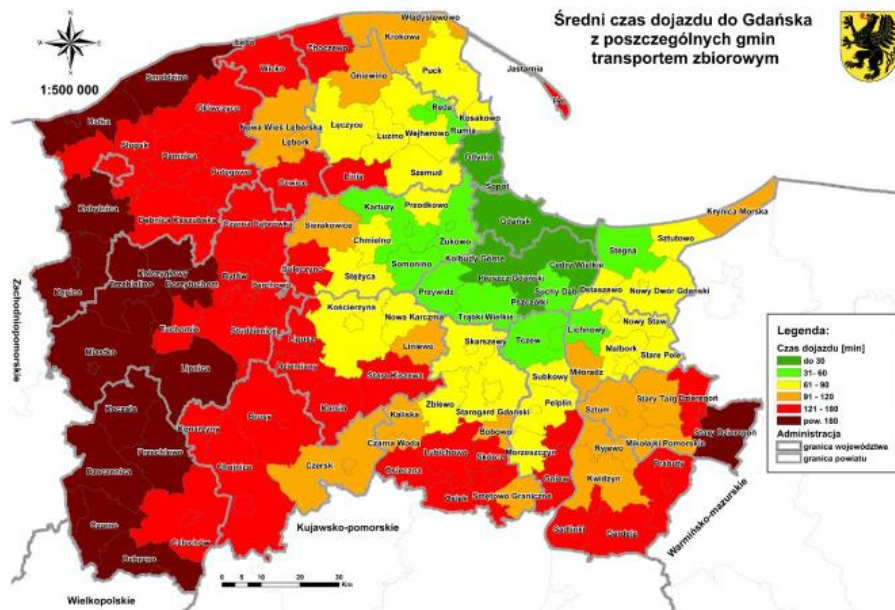
These are planned to be achieved by, inter alia:

- full integration of tariff systems within the agglomeration
- ensuring adequate frequency and capacity of public transport, adjusted to the demand - through the use of various means of transport, including - to a greater extent than before - rail transport
- promoting solutions in the field of spatial and functional integration of transport subsystems; common timetables and tariff systems; rail transport; technical, organizational and preventive actions to improve road safety; solutions reducing the nuisance of heavy traffic; innovative technical solutions, including ITS solutions; mobility management, including encouraging people to resign from



unnecessary car journeys and performing them with "environmentally friendly" means of travel or traveling outside of peak traffic hours; mobility culture

The document addresses the analysed core area within the question of transport accessibility to the Tricity by public transport, which for gmina Szemud is at a level of more than 60 minutes on average, which is an unacceptable level according to the authors, while for gmina Żukowo the accessibility is assessed within the time of 31-60 minutes.



Map 18. Transport accessibility of the Tricity within the Pomeranian Voivodeship (source: Plan for Sustainable Development of Public Transport of Pomeranian Voivodeship)

The plans also mentions the problem of insufficient integration of public and individual transport subsystems in regional, metropolitan and local scale, including technical, tariff, ticketing and informational aspects. The SWOT analysis indicates a high number of non-functioning railway lines, legal system maladjusted to current needs of public transport, making it impossible to carry out short and long-term financing policies and insufficient budget, while at the same time drawing attention to functioning of the urban rail systems and opportunities within priorities of public transport's development in EU's, country's and voivodeship's policies, integrated development planning within the region and allocation of funds for integrated transport nodes (including Operational Programme Infrastructure and Environment).

The plan considers such a transport node next to Rębiechowo and Żukowo Wschodnie railway stations. In the voivodeship's strategy of development, it is suggested to consider creating a regional bus station next to one of the nodes. The voivodeship's plan also states that bus lines connecting Wejherowo via Szemud and Żukowo to Kartuzy and connecting Kartuzy via Żukowo to Gdynia are crucial for voivodeship's functioning with high number of passengers and should have a number of 4-10 pairs of service journeys a day.



It is stated that areas within the radius of 30 kilometres from the Tricity should have connections to the Tricity with the frequency of 20 minutes during peak hours, of 30 minutes in the remaining part of working days and on Saturdays and of 60 minutes on Sundays and holidays, and that the time to travel to the Tricity should be 40 minutes and the time to travel by public transport between neighboring powiats should be 15 minutes for 10 km of journey, 25 minutes for 20 km and 35 minutes for 30 km (distance between Szemud and Żukowo is 23 km). It is also stated that journeys that the number of interchanges should be minimised, with a maximum number of two interchanges (which should be no more than 10% of journeys within the radius of 30 kilometres).

The document addresses the issue of stop infrastructure, which should have a comprehensible schedule unified for all carriers, plate with stop name legible from large distance, a shelter for stops of higher use, paved surface, lighting and public transport schemes. When it comes to most important directions of development of the area, the document also puts emphasis on constructing and reconstructing of nodes and infrastructure integrating the subsystems of collective and individual transport (e.g. railway stations and stops along with station facilities for passenger service, stations and stops of other public transport subsystems with accompanying infrastructure) and on the development of the Pomeranian Metropolitan Railway. Standards for transport nodes are stated, pointing out the minimum numbers of P+R, B+R and K+R places, seats for the passengers, maximum distance between stops, possibility to buy tickets, having shelter and visual and voice information systems.

It is also stated that when estimating voivodeship's population growth by 23% by 2025 and assuming no change in the state of public transport, inhabitants would be encouraged to use individual transport; use of individual transport, currently at the level of 73% is estimated to become 78% by 2025, with decline of utilisation of public transport from 27% to 22% if there are no actions taken.

According to the Polish legact acts hierarchy, all the lower-level documents and strategies have to be consistent with the higher-level acts. As the documents on national and voivodeship level are already relatively modern and accurate, the lower-level acts usually repeat their objectives with an expansion considering local conditions, though some documents also included new diagnoses and objectives.

On the regional level of planning, the urban development plan of the Gdańsk-Gdynia-Sopot Metropolitan Area (Obszar Metropolitalny Gdańsk-Gdynia-Sopot) should be taken into account when planning to introduce new solutions. Its thematic objectives include 'improving internal transport accessibility and streamlining the public transport network' and 'improving the management and prioritization of metropolitan public and multimodal transport as well as active mobility'. The diagnosis also contains the statement that "there is no full integration of the organization of public transport systems at the regional and agglomeration level, despite the existence of MZKZG as an institution managing and coordinating public transport at the metropolitan area level [...] and the consequence is the lack of uniform tariff solutions for rail and bus transport. As a result, we are dealing with an unfavorable trend of a decline in the



share of public transport in total transport. The reasons for this decline are complex and, in addition to organizational shortcomings, include, among others, an increase in the level of motorization, an increase in the availability of individual transport, a reduction in congestion in Gdańsk, outdated rolling stock used in voivodeship transport or the lack of privileging of public transport vehicles in traffic”.

Also, it is needed to be checked whether any proposed operations are not contradictory to the Study of Land Use Conditions and Directions (Studium uwarunkowań i kierunków zagospodarowania przestrzennego) of both gminas, which is one of the most important documents regarding planning framework on the municipality level and also containing instructions on how to provide convenient transport solutions for inhabitants. The Pomeranian Voivodeship, Powiat and Gmina Development Strategies (Strategie rozwoju gmin; Strategie rozwoju powiatów; Strategia rozwoju województwa pomorskiego) and Plans for Sustainable Development of Public Transport of Wejherowo and Kartuzy powiatów (Plany zrównoważonego rozwoju publicznego transport zbiorowego dla powiatów wejherowskiego i kartuskiego) are also important considering public transport, but considering gminas Szemud and Żukowo they do not contain much more than what was mentioned in higher-level documents. They mostly contain information already found in this document - e.g. both documents contain information considering insufficient network, accessibility and frequency of public transport and insufficient number of pavements and cycle paths.

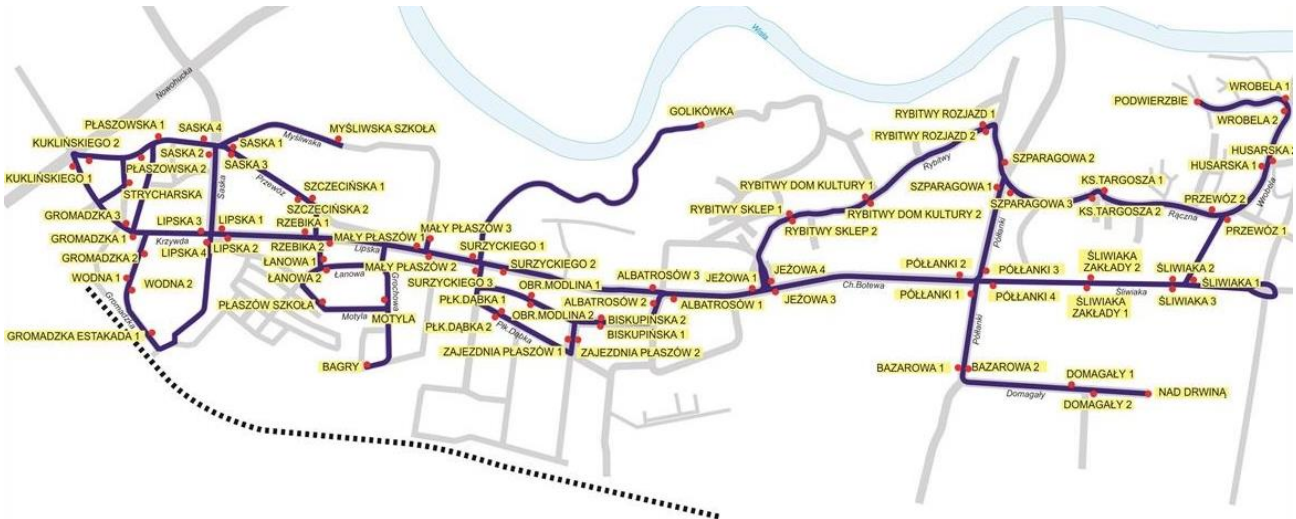
The voivodeship’s strategy contains information that public bus transport in the voivodeship, except for large cities, operates on commercial terms, and as a result is lacking comprehensive information for travelers on connections, timetables or ticket prices. Another noted problem is the insufficient and shrinking network of connections and poor adaptation of the rolling stock to the needs of people with disabilities and the elderly, which as a consequence leads to exclusion from social and professional life.

The Kartuzy powiat strategy also contains innovative goals of supporting the development of infrastructure in the vicinity of integration nodes and railway stations (Transit-Oriented Development). It also mentions actions considering uniform naming and marking of all stops with introduction of standards for creating and placing in-vehicle information, launching coordinated passenger information throughout the area, including on the Internet, covering all organizers and carriers, with particular emphasis on interchanges and transfer stops, ensuring an adequate number of connections and frequency adjusted to the demand, and systematic monitoring of public transport and periodic testing of residents’ transport preferences and behavior

When it comes to Sustainable Urban Mobility Plans, the core areas themselves do not have a SUMP, but both Gdańsk and Gdynia have their own SUMPs, adopted in 2016 (Gdańsk) and 2018 (Gdynia). SUMP for the whole Metropolitan Area, including both gminas, is under development since 2019 and planned to be enacted by the first quarter of 2022.



There are no regulations regarding Demand Responsive Transport in Poland as it is a relatively new public transport solution although all actions need to be compatible with the Public Transport Act (Ustawa z dnia 16 grudnia 2010 r. o publicznym transporcie zbiorowym). The first city to introduce DRT was Kraków in southern Poland having introduced it in 2007 under the Civitas Caravel project. Kraków has been carrying out the service with two vehicles along partly dynamic routes within an area which has been extended four times since creation of the system.



Map 19. Area of functioning of Kraków's DRT system (source: Municipal Transport Company in Kraków)

Kraków has been followed by Szczecin in 2017 on similar conditions as Kraków's network, offering DRT service in the much greater area of district of Podjuchy with six vehicles. In 2018, 40,000 passengers used the DRT service in Kraków and 252,000 in Szczecin. Several municipalities in West Pomeranian voivodeship are planning to introduce DRT on behalf of the World Bank's Catching-Up Regions 3 program which will have ended by 2023, with Jaworzno (in Silesia) also planning to create a DRT service. There also was a pilot project in Wilkowice (thanks to the MAMBA program), thanks to which a DRT service made it possible for residents until March 2020 to travel to local centre, Bielsko-Biała, after private bus carrier stopped services.

The slow expansion of DRT services is mainly caused by insufficient budgeting of public transport in Poland. This is mostly caused by the forementioned Public Transport Act, which is obsolete and has been tried to be amended several times since 2010, when it was passed and still hasn't been changed. The act causes public transport in Poland, especially outside the urban functional areas, to have scarce budget, not allowing for any innovations. The second aspect is the vague division of competences between different levels of self-government considering organisation of public transport and so, it is often treated as a "hot potato" of which nobody wants to take care of, because the act does not clearly indicate what level of administration is responsible for which type of public transport.



Another act which limits the usefulness of DRT in Poland is the 2001 Road Transport Act (Ustawa z dnia 6 września 2001 r. o transporcie drogowym) which does not allow providing regular public transport services by a vehicle which is not a bus - this limits the possibilities of creating a economically effective DRT service within an area of lower population density. The Road Transport Act also forces the bus driver to stop on every bus stop in the schedule on the way, even if there are no passengers with the need for that stop, making the journey slower, less comfortable for passenger and more expensive. This forces the DRT to be treated by law not by “regular services”, but “occasional transport”, which allows no need to develop regular timetables, allows for the use of "dynamic stops", does not require drivers to have special licenses and the only requirement applies to the vehicle category and it allows the use of vehicles with a capacity of less than 9 people. The problematic issue concerns no possibility to benefit from reimbursement for statutory discounts. A solution to this situation may be the application of commercial discounts, however, it is associated with higher costs of operating the service.

The above-mentioned implementations functioning in Poland are not, however, based on the provisions on "occasional transport". Both Kraków and Szczecin comply with the legislative conditions for "regular public transport". In order to meet these requirements, cities, on the basis of archived data on journeys and orders, prepare a preliminary timetable, which may be modified depending on the market demand. In addition to the implementation of statutory provisions, such a plan allows the organizer to predict the demand for the fleet and prepare properly. However, it should be borne in mind that the legal form of "regular public transport" limits flexibility and imposes additional requirements to be met by carriers. In some situations, implementing on-demand transport that meets the requirements of this act simply misses the point. According to the World Bank experts, authors of the report "Poland: Catching Up Regions 3 - Transport in rural areas in the West Pomeranian Voivodeship", it is recommended for non-urban areas to apply for the provisions on "occasional transport". Each implementation should, however, be preceded by an appropriate legislative analysis for a specific case, because the provisions are not clear and it is advisable to amend the act on public transport.

4.2. Identification of Stakeholders and key target groups

The Stakeholders for the project would be, first, administration of the area:

- Ministry of Infrastructure, responsible for transport in Poland,
- Pomorski Urząd Wojewódzki w Gdańsku (Pomeranian Voivodeship Office in Gdańsk), administration at regional level, office of the voivode (the executive)
- Urząd Marszałkowski Województwa Pomorskiego (Pomeranian Voivodeship Marshal Office), administration at regional level, office of the marshall (the legislative)



- Starostwo Powiatowe w Kartuzach (Kartuzy Powiat Council), responsible for gmina Żukowo and Starostwo Powiatowe w Wejherowie (Wejherowo Powiat Council), responsible for gmina Szemud
- Urząd Gminy Żukowo (Żukowo Commune Office) and Urząd Gminy Szemud (Szemud Commune Office)
- Urząd Miasta Gdyni (Gdynia City Council) with its Samodzielny Referat Projektów Unijnych i Zarządzania Mobilnością (Independent Department of EU Projects and Mobility Management) and Wydział Strategii (Department of Strategy), responsible for the SMACKER project
- Rada Dzielnicy Chwarzno-Wiczlino (Chwarzno-Wiczlino District Council), as the district is covered by the SMACKER project
- Urząd Miejski w Gdańsku (Gdańsk City Council) as Gdańsk is an important destination of the core area's inhabitants
- Urząd Miejski w Wejherowie (Wejherowo City Council) as Wejherowo is an important destination of the core area's inhabitants

Infrastructure and service providers:

- Metropolitalny Związek Komunikacyjny Zatoki Gdańskiej (Metropolitan Union of Communication of the Gulf of Gdańsk)
- Zarząd Transportu Miejskiego w Gdańsku (Gdańsk City Transport Authority)
- Zarząd Komunikacji Miejskiej w Gdyni (Gdynia City Transport Authority)
- Pomorska Kolej Metropolitalna (Pomeranian Metropolitan Railway)
- PKP Polskie Linie Kolejowe (PKP Polish Railways)

Transport operators:

- PKP Szybka Kolej Miejska w Trójmieście (PKP Rapid Urban Rail in Tricity)
- Polregio
- PKS Gdynia
- Przewozy Autobusowe „Gryf”
- Przewozy Albatros

Schools and universities:

- Gdańsk University - Faculty of Economy
- Gdańsk University of Technology - Faculty of Civil and Environmental Engineering
- Gdynia Maritime University - Faculty of Navigation

Other associations that might be interested in the project:

- Obszar Metropolitalny Gdańsk-Gdynia-Sopot (Gdańsk-Gdynia-Sopot Metropolitan Area), association of communes and counties aimed at strengthening cooperation and leading to the harmonious development of the entire metropolitan area around the Tricity, through the best use of the potential of cities, municipalities and member counties, respecting their distinctiveness and specificity



- Zrzeszenie Kaszubsko-Pomorskie (Kashubian-Pomeranian Association), socio-cultural organization, associating Pomeranians and all people who identify with its statutory goals, primarily the comprehensive development of Pomerania
- Związek Gmin Pomorskich (Association of Pomeranian Gminas) - association for inter-gmina cooperation and partnership
- Gdańska Fundacja Innowacji Społecznej (Gdańsk Foundation for Social Innovation), foundation concentrating i.a on supporting the development of local communities in the metropolitan area of the Tricity
- Forum Rozwoju Aglomeracji Gdańskiej (Gdańsk Agglomeration Development Forum), association supporting and initiating activities aimed at the broadly understood development of the Gdańsk agglomeration, primarily spatial issues (urban renewal, social participation) and sustainable development
- Agencja Rozwoju Pomorza (Agency of Development of Pomerania), supporting Pomeranian entrepreneurship and local self-governments, as well as initiating and supporting economic undertakings of regional importance
- Metropolitalne Forum Wójtów, Burmistrzów i Prezydentów NORDA (NORDA Metropolitan Forum of Mayors and Presidents), association of heads of gminas in the region of northern Pomerania (includes gmina Szemud)
- Lokalna Grupa Działania "Kaszubska Droga" (Local Action Group Kashubian Way)
- Local citizens' organizations:
 - Stowarzyszenie Inicjatywa Mieszkańców Dla Banina
 - Stowarzyszenie Społeczno-Kulturalne Mieszkańcy dla Tuchomia
 - Stowarzyszenie Otwarte Kaszuby
 - Stowarzyszenie Mieszkańcy Bojana i Okolic
 - Stowarzyszenie Mieszkańców Osiedla Królewskiego w Baninie
 - Stowarzyszenie Mieszkańców Osiedla Familijnego w Baninie
 - Razem dla Pępowa
 - Kaszubskie Stowarzyszenie Racjonalnego Rozwoju VIS VITALIS
 - Stowarzyszenie Rozwoju Regionalnego Radunia

Further description of categories of stakeholders and their target groups typology can be found in Annex 1.

As the DRT would affect people living in the core area rather than coming to the area (it is not a popular destination), the key target groups are the inhabitants of the core area. Dividing them into groups, we can mention:

- primary school-age children,
- young inhabitants, under education in high school,
- university students,
- current public transport passengers,
- people living in areas not serviced by public transport,
- car drivers,
- people travelling inside the core area to their workplace,



- people travelling outside the core area to their workplace,
- the elderly,
- persons with reduced mobility.

5. SWOT analysis

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Persistent population increase • Pomeranian Metropolitan Railway running through the area of gmina Żukowo • Strong cooperation between different administrative levels and between gminas 	<ul style="list-style-type: none"> • Low population density except for the eastern part of gmina Szemud, town of Żukowo and the newly urbanising areas • High level of car-dependency • Sustainable mobility being underbudgeted • Uneven development of residential areas - creation of new housing estates without sufficient access to sustainable means of transport • Bad condition of local roads and lack of roadside infrastructure • Lack of bus connections in areas of low population density • Lack of convenient transport connections inside gminas and connecting gminas with the Tricity area • Lack of bus connections during holidays, weekends and off-peak hours • No coordination and integration of transport systems • No integrated transport nodes • High share of residents' travel destinations located outside the core area • Low quality of passenger information and complicated public transport routes



OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Introduction of on-demand transport or flexible transport to bring people from remote residential areas to public transport nodes, development of new mobility services Increase of spatial chaos and urban sprawl • Increase of motorization and road traffic with simultaneous decline in use of public transport • Increase in traffic pollution • Construction of the Kashubian Route (S6) highway as an incentive to switch to cars and a way for further degradation of spatial cohesion • Possible cooperation between gminas and Chwarzno-Wiczlino • Unfavorable legal conditions • Underbudgeted public transport system - reduction of funds allocated to the development of public transport with a simultaneous increase in demand, maintenance costs and expansion of the transport network • Permanent reduction in the attractiveness of public transport as a result of the ongoing pandemic • Lack of social acceptance for changes; transport habits of the inhabitants • Low awareness of residents about the negative impact of car traffic on the environment • Lack of a shared vision of residents, officials and politicians in the area of transport development 	<ul style="list-style-type: none"> • Economic development of the voivodeship • Beneficial location in the vicinity of main region's cities, strong connection with them providing services, workplaces, places of education • Utilization of EU programs and external funds • High quality of public transport's rolling stock • Restoration of passenger traffic on railway line 229 (gmina Żukowo), • Construction of railway line from Gdynia to Koleczkowo via Bojano • Construction of the Kashubian Route (S6) highway as a way to reduce transit traffic • Increasing the awareness of residents and entrepreneurs about sustainable mobility • Full integration of public transport in the metropolis • Integrated planning of the transport and mobility system at the metropolitan level

6. Policy challenges

Any new solutions to the existing problems core area should:

- provide access to local centres (Żukowo), services (schools, culture and sport facilities, workplaces, leisure) and transport hubs (Żukowo, Chwaszczyno, railway stations) making access to cities in the surrounding area possible,



- serve as many inhabited locations as possible
- be comprehensible to the inhabitants,
- provide convenient timetables and frequency for all types of passengers,
- consist of routes which would not be too complicated (but still flexible),
- provide convenient transfer to other means of transport, both in terms of distance between stops and coordination of timetables,
- provide a high-quality passenger information, including unified timetables and bus stop names, understandable maps/schemes,
- provide unified routing system for passengers to find the fastest/most convenient way to travel,
- provide bus stop infrastructure and high stop accessibility,
- provide vehicles accessible to PRM persons and ageing members of communities,
- provide a ticket tariff which would be matched with other existing ticket tariffs,
- improve the cost of running fixed-route services, e.g. replace the school service journeys,
- use vehicles adjusted to possible number of users,
- provide access to booking (if applies) both using traditional methods of reservation (phone calls), as well as internet and mobile apps (with e.g. vehicle locating),
- be known and visible to the inhabitants of the core area thanks to a fitted marketing and information strategy.

7. Conclusions and addresses for the Action Plan development

The core area, consisting of gminas Żukowo and Szemud lies adjacent to one of the most important urban centres of Poland - the Tricity. The proximity is both a blessing, thanks to all the opportunities given by the Tricity - and a curse of unplanned suburban development and transition into a quasi-urban area. Lately, Poland has been encountering the problem of insufficient public transport service in rural areas, but within the core area the issue is more serious as it gathers a growing number of population with no increase to quality of transport services. The existing services are not only inadequate to the new conditions and induce a forced car ownership, but are also not able to handle the areas of "old urbanisation".

Both the population of densely populated villages, such as Banino (7,300), Bojano (3,000 inhabitants), Koleczkowo (1,300) and Kielno (1,200), or even Szemud, the seat of gmina (1,800), and of the low-population villages scattered all around numerous roads of the core area, cannot expect a properly designed transport solution tailored to their needs. The existing public transport network makes it difficult for inhabitants to fulfill their essential needs considering health or education as frequently there is no useful connection



to villages with such services. It also blocks their possibility for development or achieving higher goals by not enabling them to get to the urban centre, essentially bringing their basic need to one element - a private car, which has been proven by carried out surveys.

Assessing the existing public transport system, there is hardly any coordination and integration, the system is complicated and confusing, with different route variants, ticketing systems and improper information - but the most important problem comes with the schedules, which are maladjusted to real demand - in some areas, there are only single service journeys available. The system does not fulfill any requirements indicated in the strategic documents considering public transport, with inadequate frequency or accessibility to the Tricity. This especially applies to gmina Szemud, where it is problematic to find any positive sides of public transport outside of the main corridors (Wejherowo-Kartuzy, Wejherowo-Tricity). The same issue applies to the southern part of gmina Żukowo, though the number of service journeys is still higher than the on the outskirts of gmina Szemud. During weekends, situation in both gminas of the core area seems really tragic, with only the railway saving the Żukowo's situation on the central transport corridor; meanwhile gmina Szemud is nearly completely abandoned by public transport.

The planned investments might solve the problem partially, providing access to railway services for the inhabitants of the southern part of gmina Żukowo, but without proper integration with feeder lines won't solve the problem. For the time being, light rail in gmina Szemud will take time to be built, and the problem of sudden urbanisation with no proper public transport service is pressing. The minimal solution for the main corridors - towards Szemud and Koleczkowo - is to strengthen (as far as the available budget) the existing lines with more buses as buildings are mostly condensed around the main roads except for the external parts of villages. At the same time, around half of the gmina's population live in villages scattered around a network of many roads of different types. Such road network is hard to service efficiently by a regular bus line - which is proven by the high number of school lines needed for the pupils to be transported to schools and back home. Because of this, even though there is enough bus stops and their accessibility is at a satisfying level, nearly no bus service journeys stop there.

Considering the thorough research, public transport system of gmina Żukowo requires a scrupulous reconstruction according to all the guidelines indicated in the documents of the powiat, voivodeship and the country, but does not require any atypical solutions. Meanwhile, a Demand Responsive Transport service might be a useful solution for the area of gmina Szemud, its mobility problems and a way for increasing the level of sustainable mobility by improving public transport accessibility and - as a result - reducing car-dependency. The described type of transport is an irregular form of organizing passenger transport, and the irregularity may concern both the time and route of the service. Thanks to specialized software, routes and hours of service journeys can be created on an ongoing basis, in response to the needs reported at a given moment in the area covered by the service.



Transport on demand is usually carried out by vehicles with a smaller passenger capacity than normally used for regular passenger services in public transport. These vehicles may run at assumed times on a specific route or cover a separate area with the service - without being limited to routes. In each case, the automated booking system for the service enables the declaration of an intention to travel on a specific route at a given time, and on this basis, this system then arranges the route and sets the time of a given course.

Transport-on-demand services are mainly implemented in areas where, for various reasons, traditional, regular public transport services do not function or are functioning to a small extent. This applies in particular to areas characterized by a low, irregular level of demand for public transport services. This usually relates to areas characterized by a low population density, large area, complicated road network or demographic structure of residents with predominating number of the elderly. Transport on demand may provide the ability to overcome the so-called the first and last mile of travel by public transport, thus reducing the differences between the convenience of door-to-door travel, public transport and passenger cars. Moreover, transport on demand allows to limit the phenomenon of transport exclusion, which, as a result of the lack of means of transport, low availability of public transport or improper of timetables, restricts the access of the inhabitants of a given area to goods, services, life opportunities or the social network. This phenomenon affects in particular: the elderly, children and adolescents, single parents, people with disabilities, people without access to a car, and the poor. This can relate to the given situation of gmina Szemud with its low population density, road network difficult to include into traditional bus services, its scattered villages and nearly non-existent public transport, therefore it should be considered justified to consider introducing transport on demand, with necessary modifications which would allow the DRT to be a full-fledged element of the public transport services network.

The next steps for a full implementation of a DRT service require further research on demand for DRT services, including surveys with residents and talks with and between stakeholders. They should allow to obtain information on the issues of:

- methods of journey booking (via telephone calls, the Internet)
- time of booking (on the day/when required, in advance, repeated booking)
- frequency of running the service (only when requested or set number of journeys per day)
- flexibility (full, within a corridor)
- area covered (after surveying needs of inhabitants and confronting it with economic situation; only several villages and connecting them to a transport node, larger area, area of gmina, area of more than one gmina - e.g. both gminas Szemud and Żukowo and Gdynia/Gdańsk etc.)
- main users of the service (all public, disadvantaged groups etc.)
- size of vehicle
- price and ticket integration
- financing



- competition with other transport solutions
- ways of integration into other modes of transportation.

8. References

- Local Data Bank of the Polish Central Statistical Office (<https://bdl.stat.gov.pl/BDLS/pages/Home.aspx>),
- Websites of gminas Szemud (<http://szemud.pl>) and Żukowo (<https://www.zukowo.pl>)
- Websites of transport services, infrastructure providers and transport: MZKZG (<https://mzkzg.org/>), ZTM Gdańsk (<https://ztm.gda.pl/>), ZKM Gdynia (<https://zkmgdynia.pl/>), PA GRYF (<http://gryf.trasownik.net/>), Przewozy Albatros (<http://przewozyalbatros.pl/>), PKM (<https://www.pkm-sa.pl/>),
- GTFS.pl (<http://gtfs.pl>),
- Panek CarSharing (<http://panekcs.pl>),
- Sustainable Urban Mobility Plans of Gdańsk and Gdynia,
- Strategy of Sustainable Transport Development for Poland,
- Plan for Sustainable Development of Public Transport of Pomeranian Voivodeship,
- Urban development plan of the Gdańsk-Gdynia-Sopot Metropolitan Area,
- Pomeranian Voivodeship, Powiat and Gmina Development Strategies
- Plans for Sustainable Development of Public Transport of Wejherowo and Kartuszy powiats
- Study of Land Use Conditions and Directions of gminas Szemud and Żukowo,
- Public Transport Act
- Road Transport Act
- OpenStreetMap.