

Assessment of Rail Transport Conditions and of the Possibility to Increase the Role of Rail Transport in the Public Transport System of the Urban Functional Area of Olsztyn

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Summary

This article is an introduction to the issue of integrating rail transport with the local public transport system in the Urban Functional Area of Olsztyn. It presents the definition of the said area and the current information on the possibilities of rail transport within it, derived from strategic documents and public debate. This is followed by a detailed description of the technical conditions of the railway infrastructure in the Urban Functional Area of Olsztyn, taking into account investments carried out in recent years, those in progress and those planned, as well as a description of the rail transport services provided. The final part of the article presents the principles of operation of public transport in Poland and some Polish examples of organisational integration. The authors intend to continue the discussion in a further publication.

Keywords: railway infrastructure, Olsztyn, public transport, integrated transport system

1. Introduction

Inspiration for this article was drawn from the public consultation on the project of Strategia Rozwoju Miasta – Olsztyn 2030+ (Development Strategy for the City – Olsztyn 2030+), and in particular from the debate held on 14 October 2021 entitled “Olsztyn mobilny” (“A mobile Olsztyn” [1]). It pointed out the need to include in this Strategy measures that could increase the role of rail transport in the public transport system of the Urban Functional Area of Olsztyn. The implementation of an integrated ticket fare, enabling passengers to use regional trains without restrictions in the Urban Functional Area of Olsztyn, as well as an increase in the number of trains of this category operating in Olsztyn, should be considered the most important measures. The investments carried out in recent years, as well as the ongoing and planned investments in railway infrastructure in Warmia and Mazury, particularly in the Urban Functional Area of Olsztyn, provide opportunities to organise rail transport more attractively than is currently the case. However, achieving this requires the cooperation of relevant stakeholders. This article is intended

as a description of the current conditions of the railway infrastructure and rail transport in the Urban Functional Area of Olsztyn, as well as a presentation of selected examples of the integration of rail transport with public transport in the agglomeration and conurbation, as well as in smaller towns. It will serve as a starting point for the next publication, in which proposals will be put forward for organisational and infrastructural measures which, in the opinion of the authors, represent a rational approach to making better use of the advantages of regional passenger rail transport in the Urban Functional Area of Olsztyn.

2. General considerations and initial assumptions

2.1. Defining the analysed area

The analysis presented in this article covers the area referred to as the Urban Functional Area of Olsztyn (Figure 1), which consists of the city of Olsztyn as its core and the neighbouring communes of Barczewo, Dywity, Gietrzwałd, Jonkowo, Purda and Stawiguda.

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Due to the technical, organisational and economic aspects of the organisation of rail transport, which works as a system serving different transport segments, selected elements of the analysis should be carried out in a broader scope, i.e. at least in relation to the area of the Olsztyn district and its neighbouring districts and even – the area of the entire province. This is especially relevant for planning the timetable and operational work of the rolling stock, which are significantly associated with the layout of the railway infrastructure.

In terms of infrastructure, the scope of the analysis covered the sections of railway routes which lie within the boundaries of the Urban Functional Area of Olsztyn and that lead from the border of the Urban Functional Area of Olsztyn to the nearest junction or intermediate station located in a town with a population of over 3,500. Thus, the railway infrastructure is described for the geographical area bordered by Ostróda, Olsztynek, Szczytno, Biskupiec Reszelski, Korsze, Dobrze Miasto and Morąg stations.

2.2. Strategic documents

Among the strategic documents defining the plans for the development of public transport in the Urban Functional Area of Olsztyn, in particular the 2019 update of „Plan zrównoważonego rozwoju publicznego transportu zbiorowego dla Miasta Olsztyna na lata 2012–2027” („Plan for sustainable development of public transport for the City of Olsztyn for 2012–2027”) [3], „Strategia rozwoju publicznego transportu zbiorowego w Olsztynie do 2027 r.” („Strategy for the development of public transport in Olsztyn until 2027”) [4] developed in 2015 and „Plan mobilności Miejskiego Obszaru Funkcjonalnego Olsztyna” („Mobility Plan of

the Urban Functional Area of Olsztyn”) [5] developed in 2017. All the above-mentioned documents assume the possibility of including regional rail transport in the public transport network of the Urban Functional Area of Olsztyn, however, making it conditional on the implementation of certain infrastructural measures (especially in terms of building passenger checkpoints and improving the capacity of railway routes) as well as organisational measures (especially the introduction of an integrated ticket fare and increasing the number of passenger services by rail, which is important in the context of popularising rail transport in intraurban and suburban movements). Some of these assumptions have already been realised, especially with regard to the railway infrastructure, which has been significantly modernised in recent years thanks to investments by PKP PLK S.A. In Olsztyn alone, five new check-in points have been added (the Olsztyn Likusy passing point and the Olsztyn Śródmieście, Olsztyn Jezioro Ukiel, Olsztyn Redykajny and Olsztyn Dajtki passenger stops), and the capacity of the critical section of line No 220 connecting Olsztyn Główny and Olsztyn Gutkowo has been increased as a result of adding the already mentioned Olsztyn Likusy passing point.

Outside Olsztyn, the locations of passenger stops in Klewki, Stawiguda and Gryżliny, among others, have been adjusted. Despite some deficiencies in the aforementioned modernisation, the current potential of the railway infrastructure in the Urban Functional Area of Olsztyn is undoubtedly greater than at the time the documents were prepared [3, 4, 5]. Moreover, this potential will be further increased with investments currently underway or in preparation (e.g. in connection with the ongoing construction of a new passenger stop in Nikielkowo).

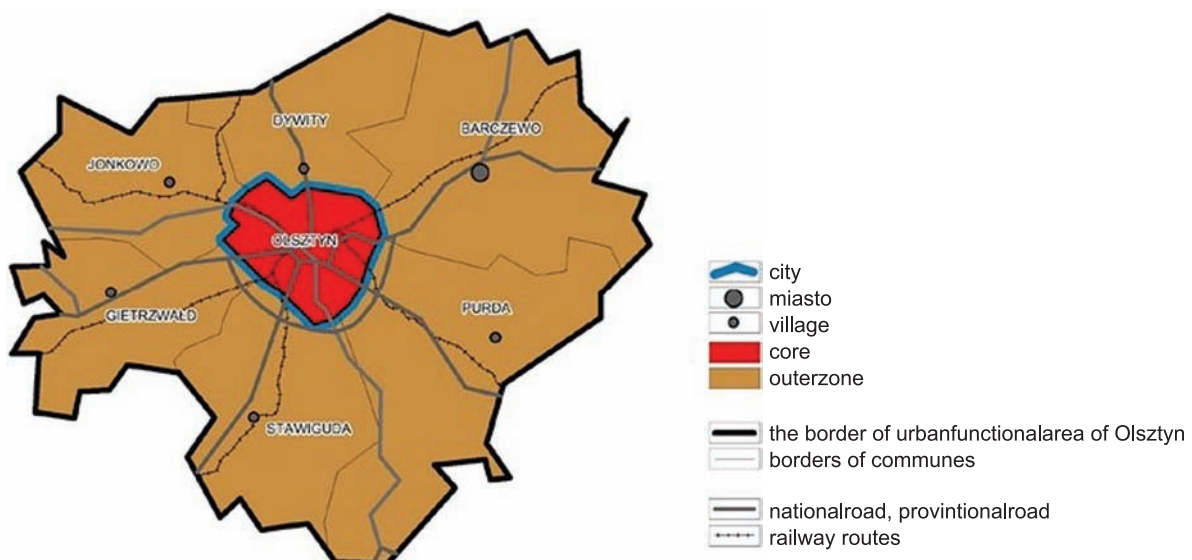


Fig. 1. Urban Functional Area of Olsztyn; own study based on [2]

2.3. Public debate on the so-called Olsztyn Municipal Railway

The public debate on the so-called Olsztyn Municipal Railway System or Olsztyn Agglomeration Railway System has been continuing for many years. Numerous proposals have been put forward, including the construction of a railway route leading to the Pieczewo housing estate, as well as a southern bypass line passing through the Jaroty and Pieczewo housing estates, connecting railway lines No 216 Działdowo – Olsztyn Główny and No 219 Olsztyn Główny – Elk (through Szczytno). In favour of the rail service for Jaroty and Pieczewo was the fact that these are the largest housing estates in Olsztyn and thus passenger traffic is concentrated on the routes connecting them with the city centre and the main railway station. However, the disadvantage of the concepts presented was the circuitous routing of the planned railway routes, which would probably not allow satisfactory journey times to be achieved and thus would not allow sufficient competitive advantages of rail transport over other modes of public and private transport. Consequently, the City of Olsztyn has decided to serve the largest settlements using tram transport and has consistently pursued this policy, as evidenced by the ongoing expansion of the tram network.

In addition to the proposals described above, ideas of using the existing railway infrastructure to operate urban (agglomeration) transport have also been in the public debate for many years. This concerns not only railway line No 220 between Olsztyn Główny and Olsztyn Gutkowo, routed through the estates of Likusy and Redykajny, but also other lines. These discussions have had the positive effect of including the potential option of integrating rail transport into the public transport system of the Urban Functional Area of Olsztyn in, among other things, strategic documents [3, 4, 5], as indicated in point 1.2. What remains to be decided is the organisational model for such transport.

2.4. Agglomeration railway system or regional railway system?

In the context of the organisation of rail transport, agglomeration (urban) traffic is defined as the service of large agglomerations which comprises cyclical train services with a minimum intensity of about 30 pairs of trains per day [6]. Poland's oldest and best-known agglomeration railway system operates in the Tricity, connecting Gdańsk Śródmieście with Wejherowo (most of the route is on railway line No 250 Gdańsk Śródmieście – Rumia) and – on days when there are football matches or concerts – with the Gdańsk Stadion Expo stop located near the football stadium. In 2015, the system was supplemented by services provided on

the new Pomeranian Metropolitan Railway (PKM) line, leading from Gdańsk Wrzeszcz through Gdańsk Airport towards Gdańsk Osowa and Żukowo Wschodnie (electrification of the PKM line is currently underway). According to the provided description, agglomeration trains in the Tricity and its surroundings mainly operate on dedicated track systems, which makes it possible to achieve high frequency of agglomeration traffic and the transport routes they constitute the “backbone” of the public transport network in the area. It is similar in the Warsaw agglomeration, in which several sections of railway routes are completely separate for agglomeration or regional traffic and long-distance traffic, while freight traffic is diverted to perimeter lines.

Regional traffic (sometimes referred to as local traffic) involves the carriage of passengers on medium and short distances, for example between neighbouring junction stations [6]. This also includes rail transport organised by the Marshal of the Warmia-Masuria Province, currently carried out by POLREGIO S.A. (Regio trains).

The concept presented by the authors for rail transport with the public transport system in the Urban Functional Area of Olsztyn assumes a scenario in which more than 30 pairs of regional trains per day will operate between Olsztyn Główny station and Olsztyn Zachodni passenger stop. In the remaining sections, this number will be higher than at present, but lower than specified in the presented definition of agglomeration traffic. It can therefore be emphasised as early as at this point that the idea presented in the articles does not concern the construction of a new agglomeration railway system in and around Olsztyn, as has been discussed in the public debate. The idea is rather to intensify (for the benefit of the entire Urban Functional Area of Olsztyn and even for the region) and to integrate regional rail transport into the public transport system in the Urban Functional Area of Olsztyn, making maximum use of the possibilities offered by the new and modernised railway infrastructure. Importantly, such a model of integrating railways into the public transport system of the Urban Functional Area of Olsztyn can be implemented gradually, involving organisational, informational and – if appropriate – further infrastructural measures, taking into account the financial and organisational capabilities of the stakeholders involved.

3. Railway infrastructure conditions

3.1. Basic technical and operating data

Basic technical and operating data of the railway infrastructure in the analysed area defined in point 1.1 is presented in Table 1.

Table 1

Basic technical and operating data of the railway infrastructure [7]

Line No.	Section of railway route			Length [km]			Tracks	Electrification	
	Start	Km	End	Km	Total	Urban Functional Area			Olsztyn
216	Olsztynek	52.968	Olsztyn Główny	83.283	30.315	25.323	4.573	1	Y
219	Olsztyn Główny	0.000	Szczytno	44.946	44.946	16.691	0.000	1	N
220	Olsztyn Główny	0.000	Morąg	45.302	45.302	27.486	8.049	1	Y
221	Olsztyn Gutkowo	0.000	Dobre Miasto	22.966	22.966	9.222	0.000	1	N
223	Czerwonka	0.000	Biskupiec Reszelski	7.527	7.527	0.000	0.000	1	N
353	Ostróda	259.103	Korsze	366.371	107.268	45.884	4.565	2	Y
					258.324	124.606	17.187	–	–

Number of tracks

Of the railway routes analysed, only railway line No 353 is double-track; the other lines are single-track. In addition, the commissioning in 2018 of the Olsztyn Kortowo junction signal box at the point where lines No 216 (from Działdowo) and No 353 (from Poznań) meet has made the entire Olsztyn Dajtki – Olsztyn Główny section operationally capable of being treated as a three-track section (trains can alternate – according to traffic needs – between two tracks of line No 353 and one track of line No 216).

Traction power supply

Railway lines No 216, 220 and 353 are electrified (3 kV direct current), while railway lines No 219, 221 and 223 are non-electrified.

Line speed

The maximum speeds for multiple units and railbuses on the analysed railway sections are shown in Table 2.

According to data from Table 2, already more than 75% of the railway sections in the analysed area allow passenger trains (made up of multiple units and

Table 2

The maximum speeds for multiple units and railbuses [8]

Line No.	From km	To km	Length [km]	Speed [km/h]	Notes
216	52.968	63.559	10.591	120	–
216	63.559	67.797	4.238	100	–
216	67.797	80.733	12.936	120	–
216	80.733	83.283	2.550	100	–
219	0.000	44.934	44.934	100	–
219	44.934	44.946	0.012	120	–
220	0.000	8.640	8.640	80	Target speed 100 km/h
220	8.640	21.200	12.560	100	–
220	21.200	45.302	24.102	80	–
221	0.000	22.966	22.966	50	Line No 221 is being upgraded. Target speed 100 km/h
223	0.000	0.333	0.333	40	–
223	0.333	7.527	7.194	70	–
353	259.103	259.892	0.789	100	–
353	259.892	298.269	38.377	120	–
353	298.269	365.633	67.364	100	–
353	365.633	366.371	0.738	80	–

railbuses) to operate at speeds of at least 100 km/h. The completion of the ongoing modernisation of the Olsztyn Gutkowo – Dobre Miasto section of line No 221 and, in addition, the upgrading of the Olsztyn Główny – Olsztyn Gutkowo section of line No 220, which is currently being implemented by the infrastructure manager, will increase the proportion of lines suitable for this speed of traffic by a further 31 km (to 87%).

Operational points

There are 19 railway stations, 3 passing points with passenger stops, 23 passenger stops and 1 junction signal box in the analysed area. In addition, two passenger stops are under construction (Nikielkowo, Kolno). A schematic drawing of the railway network and the listed operational points is shown in Fig. 2.

3.2. Investments completed in recent years, ongoing and planned³

Railway line No 216 between Olsztynek and Olsztyn Główny

By the time of preparation of this article, a significant part of the scope of works included in the

investment entitled “Prace na linii kolejowej nr 216 na odcinku Działdowo – Olsztyn” (“Works on railway line No 216 on the Działdowo – Olsztyn section”), subsidised under the Operational Programme Eastern Poland (2014–2020 perspective), has been completed [9]. As a result, on the Olsztynek – Olsztyn Główny section, the maximum speed of passenger trains has been increased to 100–120 km/h. The Olsztyn Kortowo junction signal box was built, together with the adjacent Olsztyn Dajtki passenger stop (Fig. 3), as well as platform No 1 of the Olsztyn Śródmieście passenger stop. The track systems and platforms at Olsztynek and Gągławki stations and at the Gryżliny, Stawiguda (location adjustment), Bartąg and Olsztyn Zachodni passenger stops (single side platform No 1 only) were rebuilt. In addition, the investment includes station investments: the completed construction of Olsztyn Zachodni station, the ongoing refurbishment of Olsztynek station and the construction of Olsztyn Główny station, which is starting – for formal and organisational reasons – with a delay.

The modernisation of the track and platform system and railway infrastructure of Olsztyn Główny station also carried out as part of this project, is described separately.

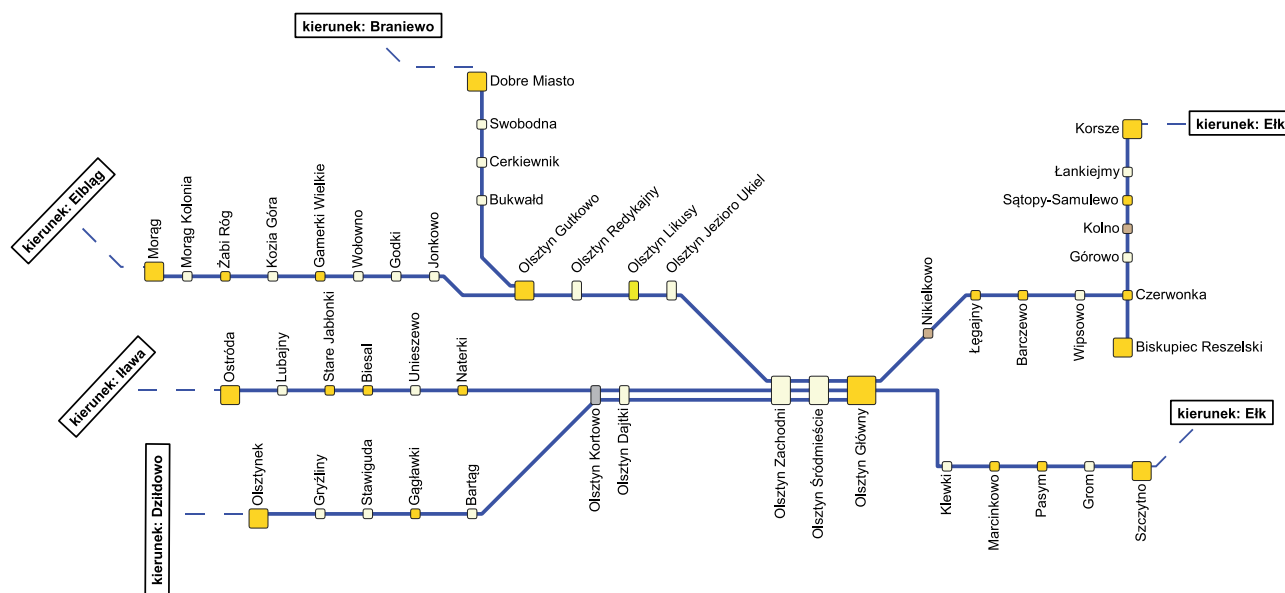


Fig. 2. A schematic layout of the railway network in the analysed area [own study]

³ The described scope of work for investments that are either underway or planned at the time of the publication of this article is subject to change. In particular, this applies to the described coverage areas of the individual Local Control Centres which, according to the information available to the authors, are currently being reviewed by the infrastructure manager and are likely to be corrected.



Fig. 3. Olsztyn Dajtki passenger stop (left) and Olsztyn Kortowo junction signal box (right) [photo: A. Dąbrowski]

Railway line No 219 between Olsztyn Główny and Szczytno

In 2013, the investment entitled “Rewitalizacja i modernizacja linii kolejowych Olsztyn – Szczytno – Szymany (odcinek Olsztyn – Szczytno – linia kolejowa nr 219 i odcinek Szymany – Szczytno – linia kolejowa nr 35), jako kolejowe połączenie modernizowanego lotniska w Szymanach z Olsztynem” (“Revitalisation and modernisation of the Olsztyn – Szczytno – Szymany railway route (Olsztyn – Szczytno section – railway line No 219 and Szymany – Szczytno section – railway line No 35), as a railway connection between the modernised airport in Szymanach and Olsztyn”), co-financed under the Warmińsko-Mazurskie Regional Operational Programme for the years 2007–2013, was completed [10]. As a result of the works carried out on the Olsztyn Główny – Szczytno section, the maximum speed of passenger trains was increased to 100 km/h, a Local Control Centre was launched in Szczytno, including remote control of Marcinkowo and Pasym stations, and the location of the Klewki stop (Fig. 4), previously located far from the existing settlement network, was changed.



Fig. 4. Klewki passenger stop in new location [photo: A. Dąbrowski]

Railway line No 220 between Olsztyn Główny and Olsztyn Gutkowo

In 2021, part of the scope of works included in the investment entitled “Prace na liniach kolejowych nr 220 i 221 na odcinku Olsztyn – Gutkowo – Dobre Miasto” (“Works on railway lines No 220 and 221 on the section Olsztyn – Gutkowo – Dobre Miasto”), co-financed under the Warmińsko-Mazurskie Regional Operational Programme for the years 2014–2020, was completed [11]. The work completed on the Olsztyn Główny – Olsztyn Gutkowo section of the line allows passenger trains to travel at a maximum speed of 80 km/h. A passing point was built with the Olsztyn Likusy passenger stop (Figure 5; it will eventually be operated from the Olsztyn Gutkowo Local Control Centre), increasing the capacity of the Olsztyn Główny – Olsztyn Gutkowo section. Olsztyn Jezioro Ukiel and Olsztyn Redykajny (Fig. 6) stops were built, as well as platform 2 of the Olsztyn Śródmieście stop. In addition, single side platform No. 3 at the Olsztyn Zachodni stop was rebuilt.



Fig. 5. Passenger stops: a) Jezioro Olsztyn Ukiel, b) Olsztyn Redykajny [photo: A. Dąbrowski]



Fig. 6. Lay-by at the Olsztyn Likusy passenger stop [photo: A. Dąbrowski]

Railway line No 220 between Olsztyn Gutkowo and Morąg

In recent years, this section has mainly been subjected to maintenance work and minor repairs associated with the replacement of mechanical signals with traffic lights at Żabi Róg and Morąg stations. The document prepared by PKP Polskie Linie Kolejowe S.A. entitled „Zamierzenia inwestycyjne na lata 2021–2030 z perspektywą do 2040 roku” („Investment objectives for 2021–2030 with an outlook until 2040”) provides for a regional project entitled „Prace na linii kolejowej nr 220 na odcinku Gutkowo – Jonkowo” („Works on railway line No 220 on the Gutkowo–Jonkowo section”) [12]. In addition, the investment „Prace na liniach kolejowych nr 220 i 221 na odcinku Olsztyn – Gutkowo – Dobre Miasto” („Works on railway lines No 220 and 221 on the section Olsztyn – Gutkowo – Dobre Miasto”) provides for the possibility of including the planned Jonkowo station and the rebuilt Gamerki Wielkie station in the control area of the Olsztyn Gutkowo Local Control Centre in the future.

Railway line No 221 between Olsztyn Gutkowo and Dobre Miasto

In 2021, another part of the scope of works included in the investment entitled „Prace na liniach kolejowych nr 220 i 221 na odcinku Olsztyn – Gutkowo – Dobre Miasto” („Works on railway lines No 220 and 221 on the section Olsztyn – Gutkowo – Dobre Miasto”) was started. As a result of the investment, the maximum speed of passenger trains is planned to be increased to 100 km/h for the Olsztyn Gutkowo – Dobre Miasto section. The track systems and platforms at Olsztyn Gutkowo and Dobre Miasto stations, as well as at the Bukwałd, Cerkiewnik and Swobodna passenger stops, will be rebuilt. This stage of work also includes the construction of the Olsztyn

Gutkowo Local Control Centre, from which, among other things, Dobre Miasto station will be controlled.

Railway line No 223 between Czerwonka and Biskupiec Reszelski

In 2019–2020, this section of the line was renovated to enable regular freight services to the Egger Biskupiec Sp. z o.o. chipboard factory (in addition, regular low-volume freight traffic is also routed to Mrągowo station). As a result of the works completed for the line, the permitted speed for passenger trains is now 70 km/h. This section has also been included in the scope of the „Wstępne Studium Planistyczno-Prognostyczne w ramach II etapu naboru do Programu Uzupełniania Lokalnej i Regionalnej Infrastruktury Kolejowej – Kolej+ do 2028 r. dla projektu: Modernizacja linii kolejowej nr 223 Czerwonka – Biskupiec – Mrągowo – Mikołajki – Orzysz” („Preliminary Planning and Forecasting Study within the 2nd stage of the call for proposals for the Local and Regional Railway Infrastructure Completion Programme – Rail+ until 2028 for the project: Modernisation of railway line No 223 Czerwonka – Biskupiec – Mrągowo – Mikołajki – Orzysz”), in which the cost of its modernisation was estimated at PLN 851 million [13]. Ultimately, however, the project did not qualify for implementation under the programme in question. The assumptions for the emerging Olsztyn Główny Local Control Centre provide for the possibility of including the Czerwonka – Mikołajki section signal boxes in its control area.

Railway line No 353 between Ostróda and Olsztyn Główny

Works on the said section have been carried out systematically since 2016 as part of the task entitled „Prace na linii nr 353 na odcinku Jabłonowo Pomorskie – Iława – Olsztyn – Korsze” („Works on line No 353 on the section Jabłonowo Pomorskie

– Iława – Olsztyn – Korsze”), financed from the budget. So far, two stages have been completed, resulting in an increase in the maximum speed of passenger trains on the Ostróda – Olsztyn Główny section to 120 km/h. As part of the work carried out, the track systems and platforms at Stare Jabłonki, Biesal and Naterki stations, at Lubajny and Unieszewo passenger stops, and double side platform No 2 at Olsztyn Zachodni passenger stop were also rebuilt [14, 15].

In February 2022, a tender was issued for the task entitled „Modernizacja stacji Ostróda wraz z pozostałymi pracami w branży sterowania ruchem kolejowym na odcinku Iława Główna – Olsztyn Główny wraz z przeniesieniem budynku sterowania stacjami Rudzienice Suskie, Stare Jabłonki, Samborowo, Biesal i Naterki do st. Ostróda” (“Modernisation of Ostróda station along with other works concerning railway traffic control on the section Iława Główna – Olsztyn Główny along with the transfer of the control building of Rudzienice Suskie, Stare Jabłonki, Samborowo, Biesal and Naterki stations to Ostróda station”). Consequently, the original assumption that the signal boxes on the Rudzienice Suskie – Olsztyn Główny section were to be controlled from the Olsztyn Główny Local Control Centre was changed [16].

Railway line No 353 between Olsztyn Główny and Korsze

In recent years, this section has mainly been subject to maintenance and minor repairs, but is scheduled for modernisation as part of the task entitled “Prace na linii nr 353 na odcinku Jabłonowo Pomorskie – Iława – Olsztyn – Korsze” (“Works on line No 353 on the Jabłonowo Pomorskie – Iława – Olsztyn – Korsze section”), financed from budget. Pre-design documentation is currently being developed for this investment [17].

In addition, as part of the Government’s Programme for the Construction or Modernisation of Railway Stops for 2021–2025, separate tenders have been issued for the design and construction of two passenger stops in Nikielków and Kolno and for the modernisation of the existing stop in Łankiejmy [18, 19, 20]. The assumptions for the constructed Olsztyn Główny Local Control Centre provide for the possibility of including the signal boxes on the Olsztyn Główny – Czerwonka section within its control area.

Modernisation of Olsztyn Główny station

In November 2021, a contract was signed for the task entitled „Modernizacja układu torowo-peronowego i infrastruktury kolejowej na stacji Olsztyn Główny” („Modernisation of the track and platform system and railway infrastructure at Olsztyn Główny station”) carried out as part of the project entitled „Prace na linii kolejowej nr 216 na odcinku Działdowo – Olsztyn” („Works on railway line No 216 on the Działdowo

– Olsztyn section”). This comprehensive investment involves a thorough rebuilding of the entire station infrastructure. From the perspective of the issues addressed in this article, particularly important is the reconstruction of the track system, the scope of which provides for an additional connection between track 4a of railway line No 220 and track 2a of railway line No 353 between the Olsztyn Śródmieście and Olsztyn Zachodni passenger stops. As a result, Platform 2 of the first of the above-mentioned stops will not only be used by trains operated on line No 220 but also on Track 2 of line No 353. The design of the rebuilt station also includes an additional shorter edge at Platform 1 and a front track for trains either departing for or arriving from the east. In terms of railway traffic control, the construction of a Local Control Centre is planned, from which the entire station (constituting one signalling control circuit) and also the stations on railway line No 216 Olsztynek – Olsztyn Główny, railway line No 353 Olsztyn Główny – Czerwonka and railway line No 223 Czerwonka – Mikołajki will be controlled [21].

Construction of the station building at Olsztyn Główny railway station

In January 2022, a contract was signed for the task entitled “Budowa dworca kolejowego Olsztyn Główny” (“Construction of the Olsztyn Główny railway station”), carried out as part of the project entitled “Prace na linii kolejowej nr 216 na odcinku Działdowo – Olsztyn” („Works on railway line No 216 on the Działdowo–Olsztyn section”). As it has been planned, the new station will have a modern design with a sail-like appearance, as well as a comfortable interior adapted to the needs of people with disabilities [22]. The accessibility of the structure will also be improved by the construction of a subway to connect the station building with the Zatorze housing estate (Figure 7). However, there is a risk that the integrity and functionality of the entire station complex (which until now has been a single building for both rail and bus services) will not be properly ensured due to a lack of coordination of the works between PKP S.A. and the owners of the bus service part of the station and the adjacent office building [23].

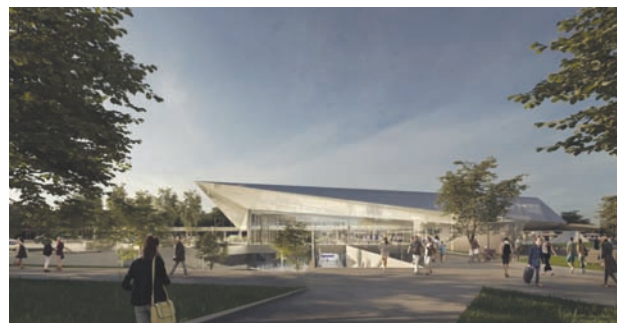


Fig. 7. Visualisation of the new Olsztyn Główny railway station [22]

Construction of the Olsztyn Śródmieście transport interchange

In June 2021, a contract was signed for the task entitled “Węzeł przesiadkowy Olsztyn-Śródmieście” (“Olsztyn-Śródmieście transport interchange”) as part of the project entitled “Rozwój transportu zbiorowego w Olsztynie – łańcuchy ekomobilności” (“Development of public transport in Olsztyn – eco-mobility chains”). As a result of the planned works, the surroundings of the Olsztyn Śródmieście passenger stop are to assume the shape of a memorial park with elements of small architecture and a city bike station (Fig. 8). There will also be short-term parking areas for cars [24].



Fig. 8. Visualisation of the Olsztyn-Śródmieście transport interchange [24]

4. Current situation of passenger transport in the analysed area

4.1. Number of train services

The Olsztyn railway junction converges railway lines from 6 directions. There is regular passenger traffic on all of them. Railway line No 221 Olsztyn Gutkowo–Braniewo has been undergoing modernisation since 2021⁴, which is why passenger services have been temporarily suspended on this line (it should be added that the replacement bus service introduced at the beginning has also been suspended). Passenger services are also not provided on the section of railway line No 223 Czerwonka – Biskupiec Reszelski, where scheduled passenger traffic was suspended on 31 August 2009.

The daily numbers of passenger services on each line, determined on the basis of the train timetable in

force on 5, 6 and 7 March 2022 (Saturday, Sunday and Monday), are shown in Table 3.

Summarising the timetable analysis and the synthetic data in Table 3, it should be stated that the current regional railway services in the analysed area mainly serve the transport needs of residents of the Olsztyn area for the morning commute to work and school in Olsztyn and the afternoon return to their place of residence. The intensification of railway services during peak hours, with at the same time a small daily number of passenger trains results in very long interruptions on many lines during the working day. For example, after the departure of a passenger train from Szczytno at 7:20 a.m., the next train of this category does not leave for Olsztyn until 2:28 p.m. Similarly, following the departure of the 8:38 a.m. train from Morąg, the next train to Olsztyn departs at 12:48 p.m. Such an unbalanced timetable reduces or excludes the possibility of using rail transport for other needs, such as official errands, shopping, medical appointments or private meetings. This is even worse on non-working days, when there is a further reduction in the number of services (e.g. on Sundays, only two pairs of trains run between Olsztyn and Olsztynek). As a consequence, regional rail transport remains unattractive, the possibility of its integration into the public transport system of the Urban Functional Area of Olsztyn is limited, and the new or very expensively modernised rail infrastructure, in particular the new passenger stops, is used only to a negligible extent.

At this point, it should also be added that, for example, in the analysis of the “Allianz pro Schiene” alliance, which brings together 24 non-profit organisations and more than 170 companies from the entire railway industry in Germany, it is assumed that a condition for treating a railway line as a tool for eliminating transport exclusion is that at least 10 pairs of trains per day must be operated on it [25]. Only this kind of offer is the minimum needed to meet the basic transport needs of the public and, as a result, to construct a rational timetable enabling the use of the railways even during off-peak hours.

Measures to increase the number of regional passenger railway services serving the Olsztyn transport interchange should also take into account the need to maintain suitable conditions for freight traffic. However, based on data from previous years, it can be concluded that the higher freight and maintenance and repair traffic (with 15–20 trains per day) only takes place on double-track railway line No 353 (i.e. Ostróda – Olsztyn Główny – Korsze), while on the single-track lines included in the scope of this analysis, the average daily number of such trains ranges from

⁴ The project, with a net value of PLN 147 million, is co-financed by EU funds under the Warmińsko-Mazurskie Regional Operational Programme. The works are scheduled to continue until 2023.

1 to 3. As some trains are operated at night, it can be assumed that the existing capacity of the railway infrastructure of the Olsztyn transport interchange will

enable the development of the passenger service network while retaining adequate capacity reserves for freight and maintenance and repair trains.

Table 3

Daily number of railway passenger services in the analysed area – as at 5 March 2022 (Saturday), 6 March 2022 (Sunday) and 7 March 2022 (Monday)

Data for the analysed section		Train services operating on the section			
Section (lines included)	Length [km]	From	To	Number of trains on Mon (Sat/Sun) ⁵	
Olsztyn Gł. – Ostróda (Line No 353)	39.790	Olsztyn Gł.	Toruń Gł.	4 (4/4)	10 (8/9)
		Olsztyn Gł.	Jabłonowo Pom.	2 (0/1)	
		Olsztyn Gł.	Gdynia Gł./Chyl.	2 (2/2)	
		Olsztyn Gł.	Iława Gł.	2 (2/2)	
		10 (7/7)	Toruń Gł.	Olsztyn Gł.	4 (4/4)
			Jabłonowo Pom.	Olsztyn Gł.	2 (1/0)
			Gdynia Gł./Chyl.	Olsztyn Gł.	2 (2/2)
			Iława Gł.	Olsztyn Gł.	2 (0/1)
Olsztyn Gł. – Szczytno ⁶ (Line No 219)	44.946	Olsztyn Gł.	Ełk	4 (3/3)	7 (3/4)
		Olsztyn Gł.	Szczytno	3 (0/1)	7 (4/3)
		Ełk	Olsztyn Gł.	4 (3/3)	
		Szczytno	Olsztyn Gł.	3 (1/0)	
Olsztyn Gł. – Morąg (Line No 220)	45.302	Olsztyn Gł.	Elbląg	5 (3/3)	7 (4/5)
		Olsztyn Gł.	Malbork	1 (1/1)	
		Olsztyn Gł.	Morąg	1 (0/1)	7 (5/4)
		Elbląg	Olsztyn Gł.	5 (3/3)	
		Malbork	Olsztyn Gł.	1 (1/1)	
		Morąg	Olsztyn Gł.	1 (1/0)	
Olsztyn Gł. – Korsze (Line No 353)	67.478	Olsztyn Gł.	Ełk	4 (3/4)	6 (5/6)
		Olsztyn Gł.	Korsze	2 (2/2)	6 (6/5)
		Ełk	Olsztyn Gł.	4 (4/3)	
		Korsze	Olsztyn Gł.	2 (2/2)	
Olsztyn Gł. – Olsztynek (Line No 216)	30.315	Olsztyn Gł.	Działdowo	5 (4/2)	5 (4/2)
		Działdowo	Olsztyn Gł.	5 (4/2)	5 (4/2)
Olsztyn Gł. – Dobrze Miasto (Line No 220, Line No 221)	31.015	Olsztyn Gł.	Braniewo	5 (2/3) ⁷	5 (2/3)
		Braniewo	Olsztyn Gł.	5 (2/3) ⁷	5 (2/3)
Olsztyn Gł. – Biskupiec Resz. (Line No 353, Line No 223)	38.052	Railway traffic on the Czerwonka–Biskupiec Reszelski section of line No 223 has been suspended		0	0

⁵ Number of trains on Mondays (Mon), Saturdays (Sat) and Sundays (Sun).

⁶ On selected days, passenger trains to and from Olsztyn-Mazury Airport (Szymany Lotnisko passenger stop) coordinated with flight times also operate on a section of line No 219 Olsztyn Gł.–Szczytno. These trains serve all stations and passenger stops along their route, but due to their irregular and variable timetable, they cannot be considered part of a regular daily transport offer. No trains were in operation on this route from 5 to 7 March.

⁷ The Marshal of the Warmia-Masuria Province has declared that after the completion of the modernisation of railway line No 221, five pairs of trains per day will be operated on that line. This figure was assumed to be for working days, and for non-working days a layout corresponding to rail line No 216 was assumed.

4.2. Train operation and cost of railway services

Train operation is expressed as the number of kilometres travelled by the rolling stock operating the specified services, and thus its unit is the train-kilometre. Daily train operation, calculated from the data in Table 3 (and therefore related to the analysed area only), is approximately:

- 3,482 train-kilometres for a working day,
- 2,552 train-kilometres for Saturdays,
- 2,347 train-kilometres for Sundays.

Assuming (according to the 2022 calendar) 251 working days, 53 Saturdays and 61 Sundays and other public holidays, this yields an annual train operation of approximately 1,152,460 train-kilometres. Further estimates assume that this is approximately 91% of the annual train operation that would be obtained for 365 working days.

Assuming the cost of train operation borne in 2020 by the transport organiser (Marshal of the Warmia-Masuria Province) on account of providing public services in the scope of provincial rail passenger transport, i.e. PLN 18.10 per 1 train-kilometre [26], it can be calculated that the implementation of the train operation indicated in Table 3 (i.e. only in the analysed area), should result in an annual commitment of approximately PLN 20,859,526. For comparison, it should be pointed out that according to [26], in 2020 in the entire Warmia-Masuria Province, train operation amounted to 3,000,378 train-kilometres, with a total commitment of PLN 54,299,557.

It is to be expected that any increase in train operation for regional railway services, which will be considered in the next publication as one of the key measures, should result in economies of scale and consequently a slight reduction in the unit cost per train-kilometre.

4.3. Other means of transport

In the Urban Functional Area of Olsztyn, public transport services are also operated by trams and buses. Particularly noteworthy is the fact that, with the introduction of the Bus Transport Development Fund, district and commune transport in the analysed area is developing intensively, and most of it is operated with new vehicles of a satisfactory technical standard and a consistent visual identification scheme (lime and grey colour). The systems in operation are outlined below.

City of Olsztyn [27]

Olsztyn has an urban public transport system operated by the Road, Greenery and Transport Authority in Olsztyn. Services are operated on 3 tram lines, 34 day-service bus lines and 2 night-service bus lines. Selected

transport routes provide connections to neighbouring communities, i.e. Barczewo (114, 124, 304), Dywity (108, 110, 112, 117), Olsztynek (line 129), Purda (line 105) and Stawiguda (121, 129, 136).

Olsztyn district [28]

Since 1 September 2020, District Public Transport (PKZ) has been operated in the Olsztyn district. It primarily serves the communes of Dobre Miasto (7 lines) and Purda (5 lines), but the routes of selected lines also travel through the communes of Biskupiec, Dywity, Jeziorany, Stawiguda and the city of Olsztyn. Some PKZ connections complement the network of commune connections (e.g. in the communes of Biskupiec and Dywity) or even operate as a joint offer (e.g. line No 509 from Dobre Miasto through Jeziorany to Biskupiec, on which both Olsztyn District and Biskupiec commune courses are operated).

Barczewo commune [29]

Commune public transport services have been in operation in the commune since 4 April 2022. Bus services are offered on 5 lines which provide access from various parts of the commune to the centre of Barczewo, and there also connect with suburban buses (114, 124) organised by the Road, Greenery and Transport Authority in Olsztyn.

Biskupiec commune [30]

Within the commune, Biskupiec Public Transport organised by the commune has been in operation since 1 September 2021. Bus services are operated for 12 lines. Particularly noteworthy is line No 510 between Biskupiec and Olsztyn, which provides an attractive, by Polish standards, transport offer of 16 pairs of services on school working days and between 7 and 10 pairs of services on other days.

Dywity commune [31]

Commune Public Transport services have been in operation in the commune since 1 October 2019. Bus services are operated for 6 lines which meet transport needs within the commune and also provide transport to the neighbouring communes of Dobre Miasto, Jeziorany and the outskirts of Olsztyn (i.e. the Olsztyn – Jagiellońska Ogrody bus terminus). Direct transport to the centre of Olsztyn is provided by suburban lines organised by the Road, Greenery and Transport Authority in Olsztyn (lines No 108, 110, 112 and 117).

Gietrzwałd commune [32]

Commune public transport services have been in operation in the area since 1 February 2021. Bus services are operated for five lines. Line 534 provides a connection to the peripheral Dajtki bus terminus in Olsztyn.

Jonkowo commune [33]

Commune public transport services have been in operation in the commune since 30 January 2020. Bus services are provided for 5 lines, with lines J-1 and J-2 operating in opposite directions along an identical circuitous route from Jonkowo to the peripheral Sokola terminus in Olsztyn's Gutkowo (in addition, on weekdays selected courses are provided to Roosevelt Square in the centre of Olsztyn).

Stawiguda commune [34]

Commune public transport services have been in operation in the commune since 18 November 2019. Bus services are provided for 4 lines, none of which provide direct access to the centre of Olsztyn.

Further development and cooperation of the above-mentioned systems is expected, with a tendency for the Olsztyn district and the District Public Transport (PKZ) organised by it to take over the integrating function. In the context of the article, the possibility of integrating these local systems with the regional rail transport of the Urban Functional Area of Olsztyn should be given special attention. An example of this is the model used in Środa Śląska, described later in this article.

5. Organisation of public transport

5.1. Legal basis for the organisation of public transport

The principles of organisation and operation of regular passenger transport in Poland in public transport, as well as the principles of financing regular passenger transport in public transport in terms of public utility transport, are regulated by the Act of 16 December 2010 on public transport (Dz.U. /Journal of Laws/ of 2011, No. 5, item 13, as amended). According to this act, depending on the area and type of transport, the organiser may be a commune, an association of communes, a district, an association of districts, a district-commune association, a metropolitan association, a province or the minister responsible for transport. The organiser's tasks include planning the development of transport, organising public transport and managing public transport. With regard to rail transport, the applicable model is one in which the organiser of interregional rail transport is the minister responsible for transport, while the organisers of regional rail transport - with a few exceptions - are the individual provinces represented by their marshals.

One of the key elements of increasing the role of rail transport in the public transport system of the Urban Functional Area of Olsztyn, which will be discussed in the next publication, should be to increase

the number of regional rail connections serving the Olsztyn transport interchange. This can be achieved in cooperation with the current transport organiser (i.e. the Marshal of the Province), as well as by appointing a second transport organiser, which could be an association of communes, a district, association of districts, district-commune association or metropolitan association. More on the possibilities in this respect can be found in the overview article [35], but there is no doubt that any of these solutions will require good cooperation and advanced coordination between all the local authorities involved in the process.

5.2. The essence and aspects of public transport system integration

One of the critical elements in the planning and organisation of public transport is the integration of its different modes. As a result of each system complementing the functions of the others, the combined efficiency of these systems becomes higher than if each were to operate independently. The main objective of an integrated urban public transport offer is to increase transport accessibility and ensure that journeys are made in the shortest possible time on a „door-to-door” basis [36]. The integration of different modes of transport can be considered in terms of infrastructure, organisation (fares, timetables) and information.

Infrastructure integration involves shaping the infrastructure in such a way as to make it easier for passengers to change between different modes of transport. A fundamental prerequisite for infrastructural integration is the location of passenger service points for the different modes of transport in close proximity to each other and their connection by pedestrian walkways enabling a comfortable change from one mode of transport to another. In this respect, in the analysed part of the Urban Functional Area of Olsztyn, including Olsztyn itself, the existing solutions are unsatisfactory, which unfortunately also applies to the modernised railway infrastructure. At the same time, it should be borne in mind that infrastructure integration measures should be preceded by the development of a comprehensive public transport operation plan in order to avoid incurring costs for investments that will not yield the expected results later (e.g. making it physically easier to change from train to bus should only be considered if such a change makes sense from the passenger's point of view). Therefore, at the initial stage of the process of integrating public transport systems, the organisational and legal aspects of coordinating timetables and setting uniform fares are more important.

Organisational integration in the area of timetabling is about planning the arrival and departure times of the various modes of transport in such a way

as to minimise the time lost through interchange. This Integration should also involve ensuring that the continuation of the rest of the journey is possible in the event of a disruption to railway traffic. It should be emphasised at this point that the opposite, i.e. adapting rail transport operations to possible disruptions to road traffic, is either impracticable or practicable only to a very limited extent.

Organisational integration in the area of fare solutions relies on ensuring that journeys can be made with combining services within a single ticket. This solution can be implemented by modifying existing fares and introducing a new, uniform fare for the entire integrated transport system, or as an additional solution to complement the existing solutions. The essence of the integrated fare is, besides the extremely important advantage of the convenience of use, the discount the user receives in relation to the cost of tickets purchased separately for the individual modes of transport. Examples of fare integration operating in Poland, which are one of the starting points for further considerations on increasing the role of rail transport in the Urban Functional Area of Olsztyn, are indicated in point 4.3.

Integration in terms of information systems, given the increasing use of modern IT and geolocation solutions, should be based on the operation of a single IT system providing passenger information and ticket

distribution services for the entire integrated transport system, supervised by the transport organiser(s) in the area where the system operates. As a result, electronic boards with dynamic timetables should display information about all public transport modes serving the interchange, and the passenger should be able to find all the information needed and carry out all the necessary operations (e.g. ticket purchase) within a single web portal or mobile application.

5.3. Examples of organisational integration of public transport in terms of fare solutions

Fare integration between urban transport and rail transport already operates in several Polish cities or metropolitan centres (Warsaw, Łódź, Tricity, Bydgoszcz, Toruń and the Metropolis GZM). In Poland, combined fare solutions are no longer new and can successfully operate, although the extent of integration and the solutions adopted vary from case to case.

The oldest tariff system in Poland is the Warsaw “ZTM-KM-WKD integrated ticket system (Figure 9), covering Warsaw (defined as Zone 1) and selected municipalities of the Warsaw agglomeration (defined as Zone 2). A holder of a valid short-term (daily, three-day) or long-term (30 or 90-day) ticket can use all means of public transport organised by Zarząd Transportu Miejskiego w Warszawie (including SKM trains),

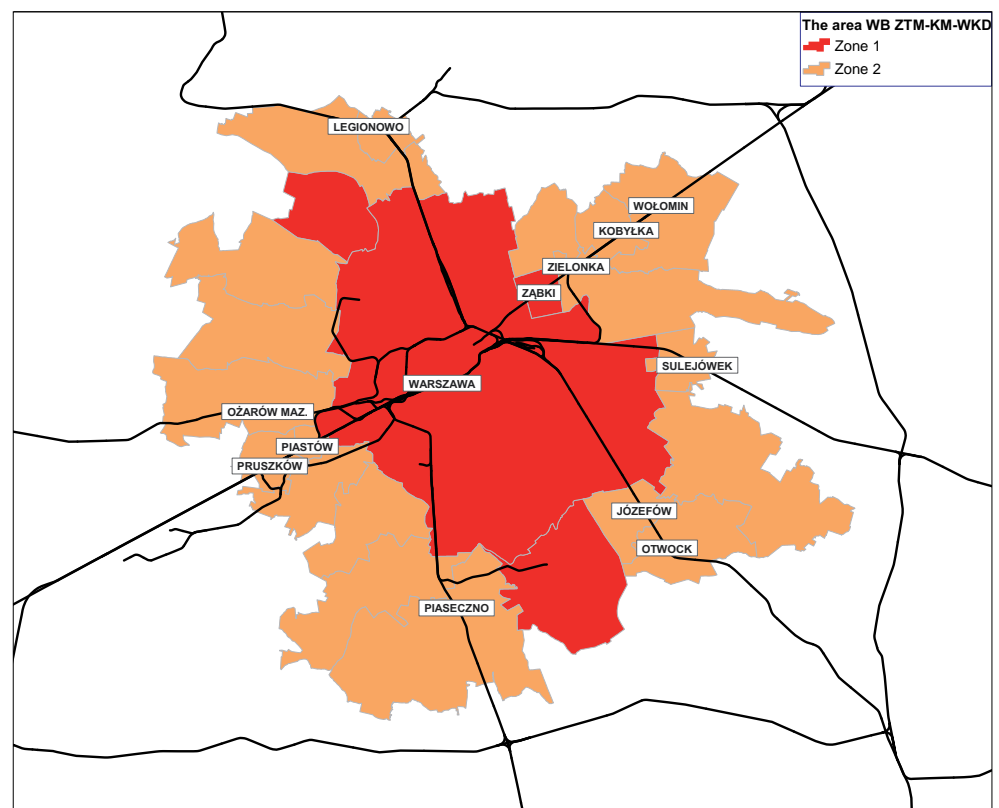


Fig. 9. Area of the ZTM-KM-WKD integrated ticket system [own study]

Mazovian Railways and Warsaw Commuter Railway within the period and area of its validity. By concluding agreements with ZTM, individual communes entrust it with the organisation of transport within a specified budget and operational work, and ZTM, as the organiser of transport, in addition to financing urban transport and SKM, pays compensation to rail transport operators (KM and WKD) for accepting the integrated ticket on the basis of relevant agreements. Individual commune governments can regulate season ticket prices by increasing the level of participation in the costs of operating transport. Three discount thresholds have been defined as the „Metropolitan Ticket” offer (as at 1 December 2021, out of 26 communes that have become part of this programme, as many as 19 have chosen the highest level of season ticket subsidies). In municipalities in fare Zone 2 which have not become part of the „Metropolitan Ticket” offer, the basic ticket price applies. Season tickets are encoded as an electronic ticket either on a dedicated card or on other media (e.g. student cards).

Extensive fare integration is taking place in the Łódź agglomeration under the so-called Combined Agglomeration Ticket (WBA). The area covered by the scheme is divided into 4 zones: A (Łódź, Pabianice, Zgierz), B, C and D (Fig. 10). The offer includes 30-day tickets allowing travel on public transport in Łódź and on trains within the zone as specified for the ticket. Additionally, versions of the ticket designated as A+,

B+, C+ and D+ are available, which also cover public transport services in cities other than Łódź, within the areas specified as the respective zones. The WBA agreement implies that individual organisers determine price discounts within the WBA offer in relation to the original ticket price, and the final ticket price is the sum of the individual ticket prices including the discounts, which makes the solution practical from a formal point of view (no need for complex mutual settlements). Similar to the Warsaw solution, the ticket is encoded on a dedicated card.

In addition, as a result of an agreement between Łódź and the rail carriers operating regional services within the city (Łódź Agglomeration Railway and Polregio), selected types of train tickets have been recognised (i.e. single-use zone tickets and season tickets) in public transport vehicles and all types of public transport tickets (including single-use tickets) have been recognised on trains in Łódź.

Although a number of fare solutions integrating rail and public transport are currently in place in Poland, there is still no integrated fare system that would cover the entire province and the existing rail and bus connections (also tram or trolleybus connections, if applicable) within its area. Integrated public transport systems of this type are common in the Czech Republic, Germany and Slovakia, i.e. countries neighbouring Poland. Admittedly, also in Poland, the current legal

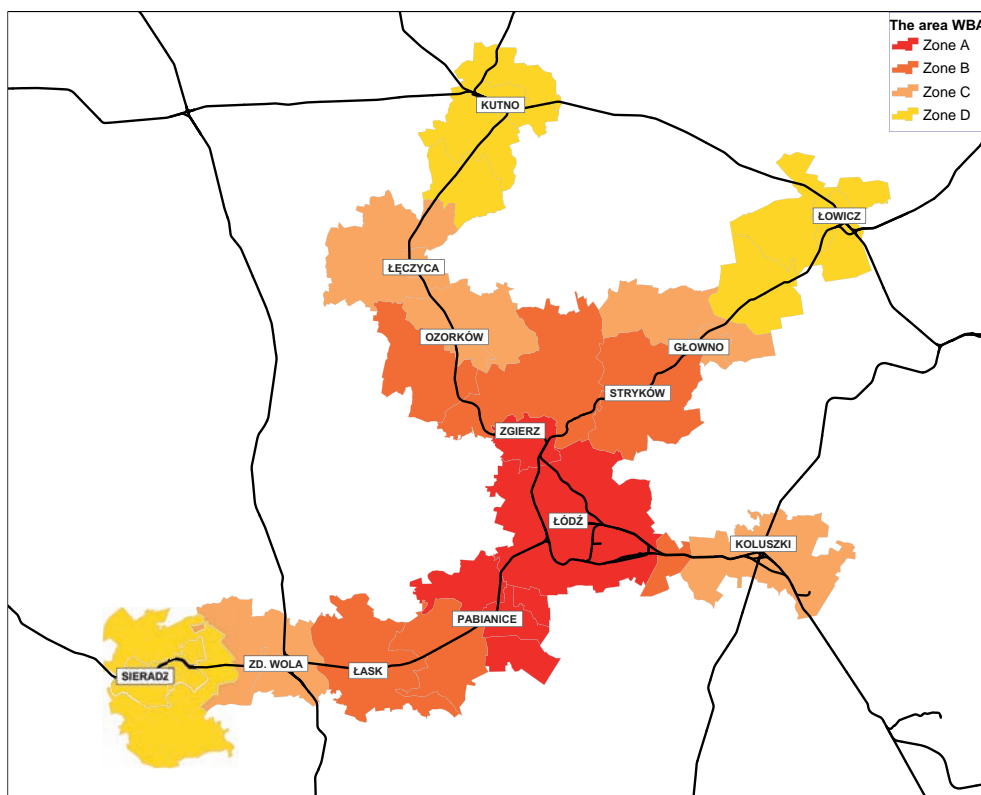


Fig. 10. Area of the Combined Agglomeration Ticket in the Łódź Province [own work]





conditions already allow for the implementation of integrated tariff solutions, but this requires the willingness of the involved stakeholders to cooperate [35].

5.4. Examples of timetable integration

So far, the practice of coordinating public transport timetables with rail transport is very limited in Poland. The solutions in place are more of an exception than the rule but their existence indicates that they are possible to implement both for connections organised by a single transport organiser and for those organised by different organisers.

The first example is that of typical feeder lines to rail transport organised by the same transport organiser who is responsible for rail services, as is the case with the feeder bus lines operating under the Koleje Małopolskie label. As at 17 February 2022, the following bus lines are operated (the rail-bus junction is shown in bold): **Bochnia** – Limanowa, **Bochnia** – Szczurowa, **Brzesko** – Radłów, **Wieliczka** – Łapanów, **Wieliczka** – Myślenice and **Wieliczka** – Dobczyce [37]. The timetables of the bus lines mentioned above allow approximately 5 minutes to change from train to bus and approximately 10 minutes to change from bus to train. With the operation of these lines, the range of rail services has been indirectly increased to include towns and cities that do not have direct access to rail

connections (including Myślenice with a population of around 18,000 and Limanowa with around 15,000 residents) Another example of the integration of a public transport system with rail transport is the town of Środa Śląska where the railway station is located on the edge of the town, 3 km straight line from its centre. The integration is intended to make it easier to travel by public transport from the provincial capital (Wrocław) to a destination within the city without having to unnecessarily waste time while transferring. It is noteworthy that information on bus-train connectivity is included in the timetables of the individual lines made available to the public. The city bus timetables include the arrival or departure times of trains travelling to/from Wrocław. For some bus services, an annotation of the guaranteed waiting time for a delayed train is included (Figure 11), allowing passengers to react more effectively in the event of travel difficulties. An aggregated timetable of bus services linked to rail connections has also been developed so that the passenger does not have to search for connections in the timetables of individual lines. The example of Środa Śląska can be inspiring for those communes within the Urban Functional Area of Olsztyn which organise their own public transport. Some bus lines have stops near stations and passenger stops serving regional rail connections, and thus the Środa solution might be used there.

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www.srodaslaska.pl/komunikacja		DNI ROBOCZE *		OBOWIĄZUJE OD 13.06.2022					
nr przystanku	przystanek	05:09	05:33	06:31	07:16	09:24	10:14	18:11	21:07
(99)	1 Szczepanów Jaśkowice Pętla	05:09	05:33	06:31	07:16	09:24	10:14	18:11	21:07
(100)	2 Szczepanów Jaśkowice	05:10	05:34	06:32	07:17	09:25	10:15	18:12	21:08
(98)	3 Szczepanów Długa II	05:11	05:35	06:33	07:18	09:26	10:16	18:13	21:09
(212)	4 Szczepanów Długa NŻ	05:11	05:35	06:33	07:18	09:26	10:16	18:13	21:09
(95)	5 Szczepanów Długa I	05:12	05:36	06:34	07:19	09:27	10:17	18:14	21:10
(247)	6 Szczepanów Mały Kościół NŻ	05:13	05:37	06:35	07:20	09:28	10:18	18:15	21:11
(101)	7 Szczepanów Kościół	05:14	05:38	06:36	07:21	09:29	10:19	18:16	21:12
(114)	8 Szczepanów Szkoła	>	>	>	>	>	>	>	22:28
przejazdy pociągów z Wrocławia		05:07	06:32	07:17	09:24	10:14	14:42	18:18	22:29
(77)	9 Środa Śl. Dworzec Kolejowy	05:16	05:40	06:38	07:23	09:31	10:21	18:18	22:29
(206)	10 Środa Śl. Kolejowa VII/Jarzębinowa	05:17	05:41	06:39	07:24	09:32	10:22	18:19	22:30
(132)	11 Środa Śl. Kolejowa VI/Akacyjowa	05:18	05:42	06:40	07:25	09:33	10:23	18:20	22:31
(74)	12 Środa Śl. Kolejowa V/Traugutta	05:19	05:43	06:41	07:26	09:34	10:24	18:21	22:32
(67)	13 Środa Śl. Malczycka I	05:20	05:44	06:42	07:27	09:35	10:25	18:22	22:33
(71)	14 Środa Śl. Malczycka III/ Targ	05:21	05:45	06:43	07:28	09:36	10:26	18:23	22:34
(1)	15 Środa Śl. Legnicka/ Dworzec A.	05:22	05:46	06:44	07:29	09:37	10:27	18:24	22:35
(12)	16 Środa Śl. Rynek	↺	↺	06:47	07:32	09:40	10:30	18:27	22:38
(13)	17 Środa Śl. Wrocławską PUP			06:48	07:33			↺	↺
(25)	18 Środa Śl. Górna SP			>	07:34			↺	↺
(26)	19 Środa Śl. Górna/ Strzelecka			>	07:35				
(27)	20 Środa Śl. Średzki Park Wodny			>	07:36				
(210)	21 Środa Śl. Willowa				06:49				
(14)	22 Środa Śl. Wrocławską			06:50					

Objaśnienia: ♣/✱ - kursuje tylko w dni nauki szkolnej/wolne od nauki szkolnej; ♿ - pojazd przystosowany do przewozu osób niepełnosprawnych; > - kursuje inną trasą; † - autobus oczekuje do 10 min. na pociąg; ↺ - kurs powrotny tą samą linią; ↻ - po zakończeniu kursu na wskazanej linii

Fig. 11. Timetable of a Środa Public Transport bus line with an indication of the possibility to change from Lower Silesian Railway trains and information on waiting times for those changing from a bus to a train [https://komunikacja.srodaslaska.pl/]

While in large cities, public transport serves the vicinity of the main railway stations with a relatively high frequency, allowing the choice of connection according to the time of departure or arrival of the train, in the case of small and medium-sized towns, the organisation of public transport connections requires the bus timetable to be arranged in such a way that it is both tailored to local transport needs and, as far as possible, ensures that the feeder function to the railway line is realised.

6. Conclusions

The aim of this article was to introduce the topic of integrating rail transport with local public transport system in the Urban Functional Area of Olsztyn and to lay the foundations for presenting the assumptions for such a system in a subsequent publication. The issue described is not new and has been raised in various forums of public debate in Olsztyn for at least a dozen years, and has been emphasised in several existing strategic documents. Nevertheless, the topic should be regarded as not systematised and the occasional slogans about launching the Olsztyn Municipal Railway or the Olsztyn Agglomeration Railway go too far into the future, overlooking the earlier stage, which should be a common-sense increase of the importance of regional rail transport in Olsztyn and its area using a series of organisational, informational and infrastructural measures. For this reason, the article outlines the basic differences between regional and agglomeration rail transport and indicates that it is rather the former that should now realistically be considered for the Urban Functional Area of Olsztyn.

In recent years, large investments have been made in the modernisation of railway lines, including increasing the permissible speed of trains, the capacity of the infrastructure (construction of signal boxes), as well as its accessibility (construction of new passenger stops and correction of those that were previously unfavourably located in relation to the settlement network). Further tasks are, or will soon be, underway. The increasing potential of the new and upgraded railway infrastructure (still insufficiently present in the public awareness) should be used as one of the key elements in creating a new, more attractive image of rail transport in the Urban Functional Area of Olsztyn.

Unfortunately, the development of rail infrastructure has not been kept up with the organisation of rail transport. The daily number of regional services on lines converging in Olsztyn on weekdays ranges from 10 pairs of trains on the Ostróda – Olsztyn section to just five pairs of trains on the Olsztynek – Olsztyn or Dobrze Miasto – Olsztyn sections (after modernisation). With a timetable designed primarily to serve

the morning and afternoon rush hours, most lines have very long interruptions during the day (up to about seven hours!), preventing or limiting the possibility of satisfying non-work and study-related transport needs. The problem is more evident on school and work holidays, when the number of services is further reduced. The consequence is a lack of opportunities for greater use of rail transport for travel in the Urban Functional Area of Olsztyn, including intra-urban travel in Olsztyn itself, as well as image problems resulting from insufficient use of the newly built or modernised railway infrastructure for which considerable money has been spent.

Therefore, the aim to increase the role of rail transport in the public transport system of the Urban Functional Area of Olsztyn requires the implementation of organisational, informational and infrastructural measures. In addition to the need to increase the number of regional rail services on lines converging on the Olsztyn interchange, the integration of the various modes of transport is particularly important and should be implemented simultaneously in the area of fares and timetable coordination, the latter aspect determining the existence of the service as a functional whole. Examples of organisational and information activities are described in this article for selected larger and smaller cities in Poland, with the idea that this may be a contribution to consider in a subsequent publication.

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