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Bright ideas.
Sustainable change.

Riga node operation optimization study

Strategic timetabling as success factor for future growth in the railway network

Source: https://info.railbaltica.org/en/infrastructure/

Agenda

01 **Presentation** of Ramboll

02 **Introduction,**
Target and **Scope** of the Riga node study

03 **Methodology** and
Approach

04 Master Timetable as a result for a
Successful strategic infrastructure development

05 **Discussion** and
Questions

Presentation of Ramboll

Jonathan Witte

Senior Consultant (Service and infrastructure development)

Mobility & Rail

Berlin, Germany

Background

6 years of work experience including a master in transportation with focus on railway planning and operations (TU Berlin). He has extensive knowledge of railway operations due to his work as operations specialist in the business development for railway companies, project engineer and expert for duty scheduling for software companies and specialist for strategic service and infrastructure development for the network operator DB Netz AG.

Functional experience

2019 – today **Ramboll** **Senior Consultant**	Operations, development and optimization of public railway networks and development of railway infrastructure
2017 – 2019 **DB Netz AG** **Project engineer**	Development and optimization of timetable concepts and railway infrastructure for the transformed new digital central railway station S21.
2016 – 2017 **IVU** **Project engineer**	Introduction of the software IVU.rail.plan in railway companies. Specialist for duty scheduling
2013 – 2016 **NETINERA** **Business development**	Development of operational plans for tenders for local und commuter rail transport throughout Germany

Sector experience

2019 – today **Ramboll** **Senior Consultant**	Consultant in railway sector: Processing and management of projects on behalf of the public sector and the private sector.
2017 – 2019 **DB Netz AG** **Project engineer**	Railway infrastructure operator (EIU): Service and infrastructure development, Stakeholder management.
2016 – 2017 **IVU, Berlin** **Project engineer**	Railway operations software developer(railway supplier): Expert for duty scheduling, introduction of software into Railway operator processes.
2013 – 2016 **NETINERA** **Business development**	Railway company (EVU): Business development, vehicle, timetable operational concepts for tenders in Germany

Selected references

- Market launch Management for Stuttgart 21
- Kaunas node operation expertise services
- Riga node operation expertise services
- Implementation of ETCS in Schleswig-Holstein
- Service and infrastructure concept development for the Stuttgart-Nuremberg corridor.

Ramboll Key Expert Team

Project manager, Timetabling and infrastructure

Ralf Jugelt

Timetabling and infrastructure, Deputy project manager

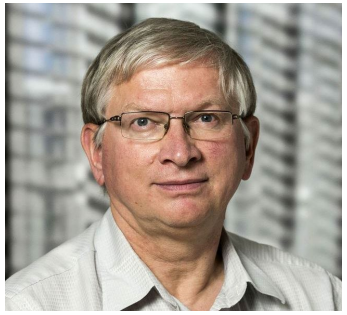
Jonathan Witte

Infrastructure modelling and simulation

Tove Møller

Timetabling and service development

Dr. Hauke Juranek



1435 mm Infrastructure Development

Svend Tantholdt

Other Experts involved (local presence)

1520 mm Infrastructure Development

Aleksandr Bulatov

Local Management Support

Ilze Ragovska-Bērziņa

Riga node operation optimization study

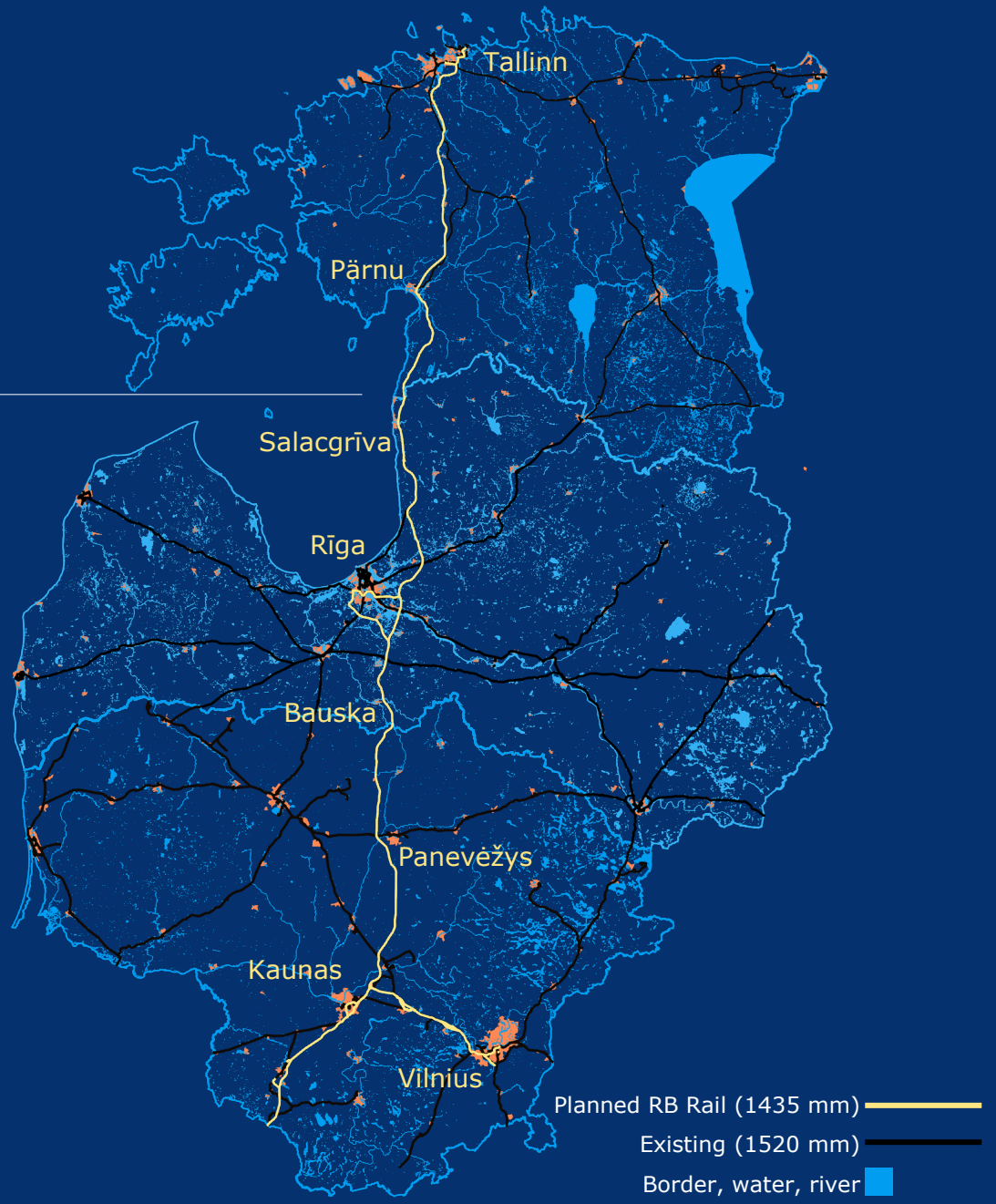
Target and Scope of the study

Background

Estonia

Latvia

Lithuania



Rail Baltica key figures and targets:

870 km greenfield railway infrastructure

1435 mm
Double track

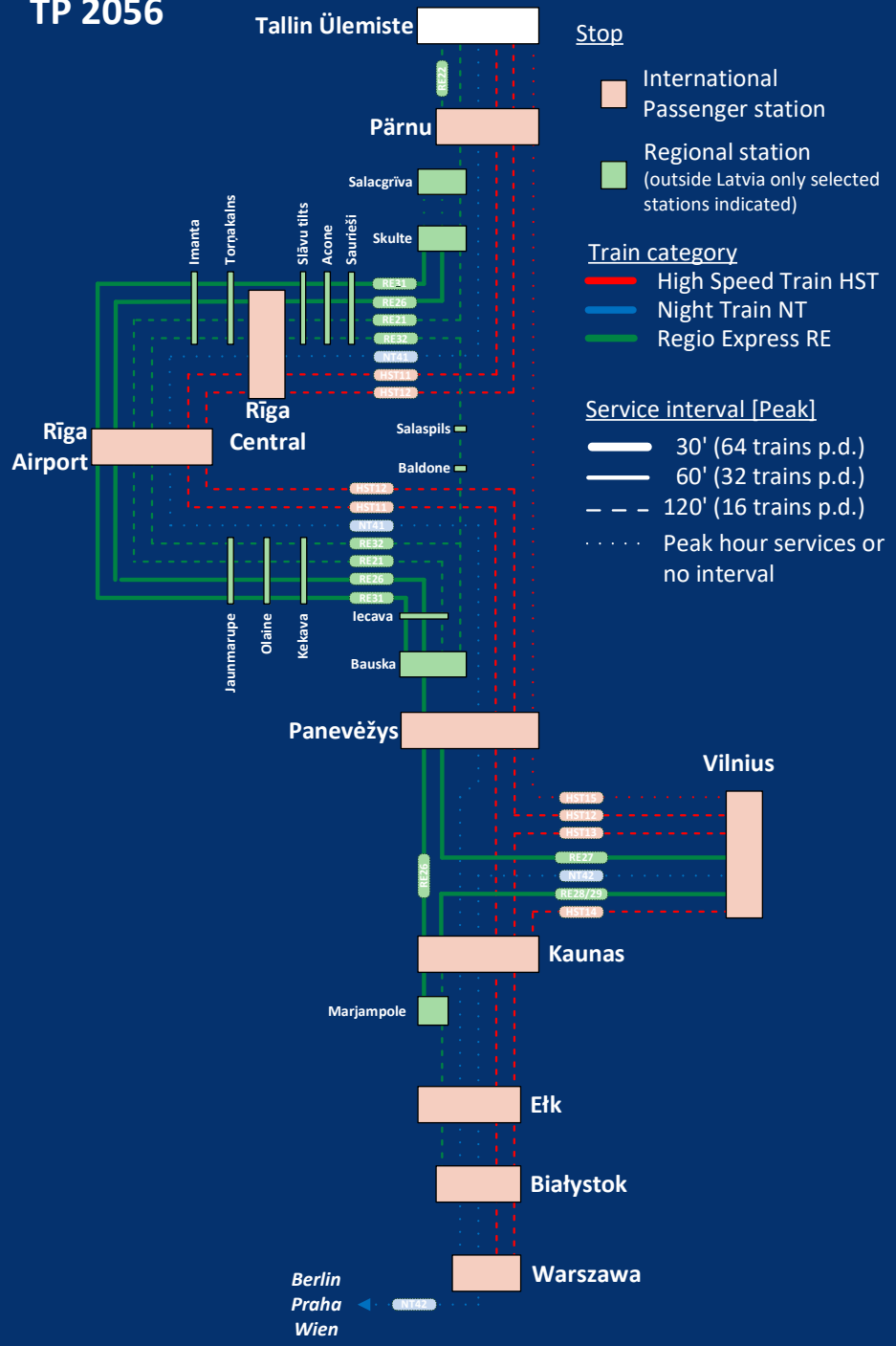
ERTMS Level 2

Electrified
2x25kV AC

Maximum length of freight trains: 1050m
Axle load 25t

Design speed:
249 km/h for passenger trains and 120 km/h for freight trains

Background



With the participation of Ramboll employees the

Baltica Operational Plan (RB OP) concept was issued in 2018.

- **Analysis** of future transportation demand (based on RB global project CBA)
- **Elaboration** of operational requirements and related parameters for passenger and freight services
- **Definition** of the future train service pattern for Rail Baltica
- **Elaboration** of infrastructure requirements (track layout and general parameters)

Why the Rīga node study?

Provision of future proof passenger services

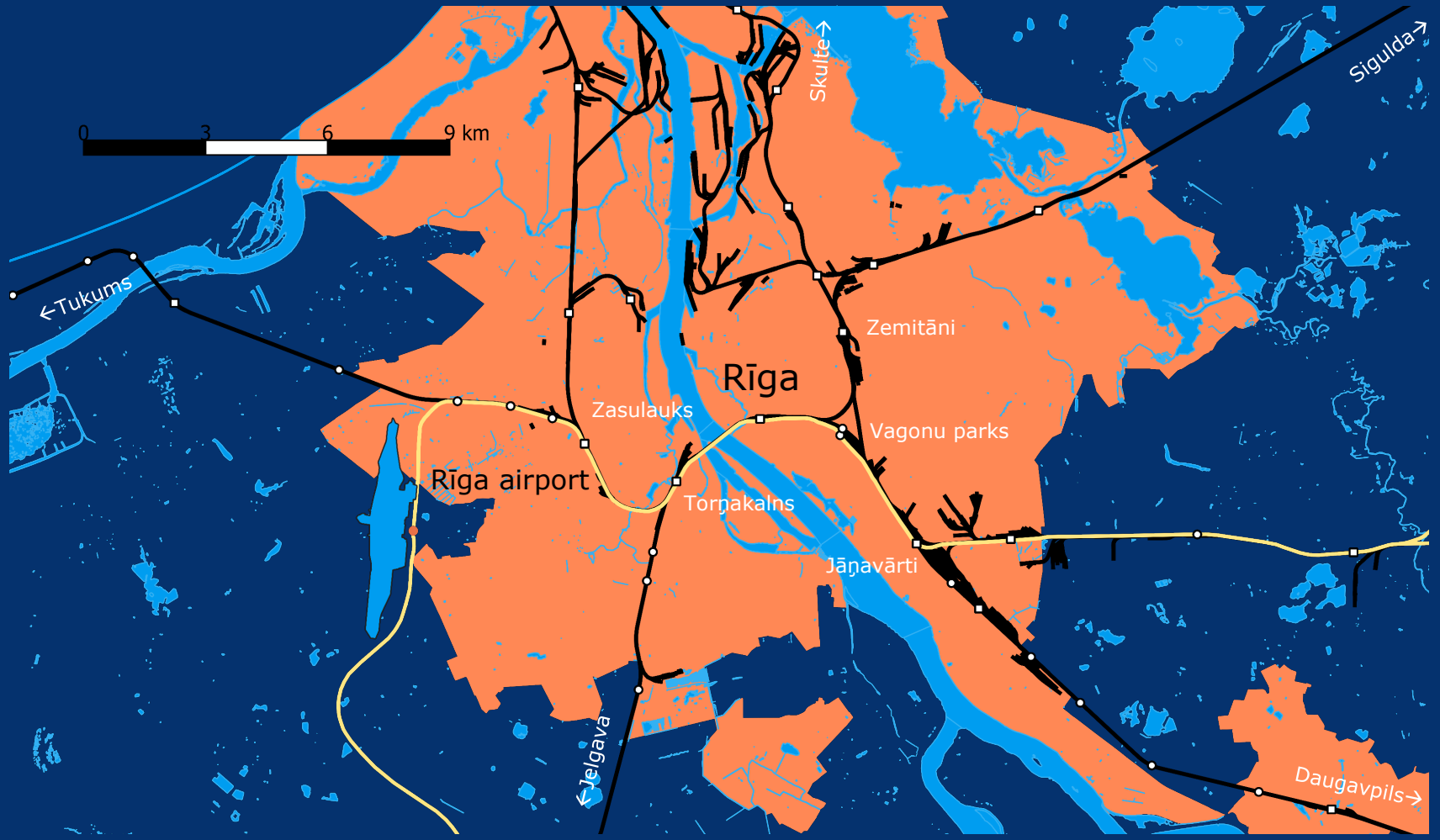
Need to connect the Rail Baltica corridor with the national 1520 mm infrastructure.

Need for more attractive 1520 mm passenger services (frequency, interconnectivity, travel times).

To achieve a seamless integrated 1435/1520 mm network.

➔ Maximation of the socio-economic benefit of Rail Baltica in Latvia

Why the Rīga node study?

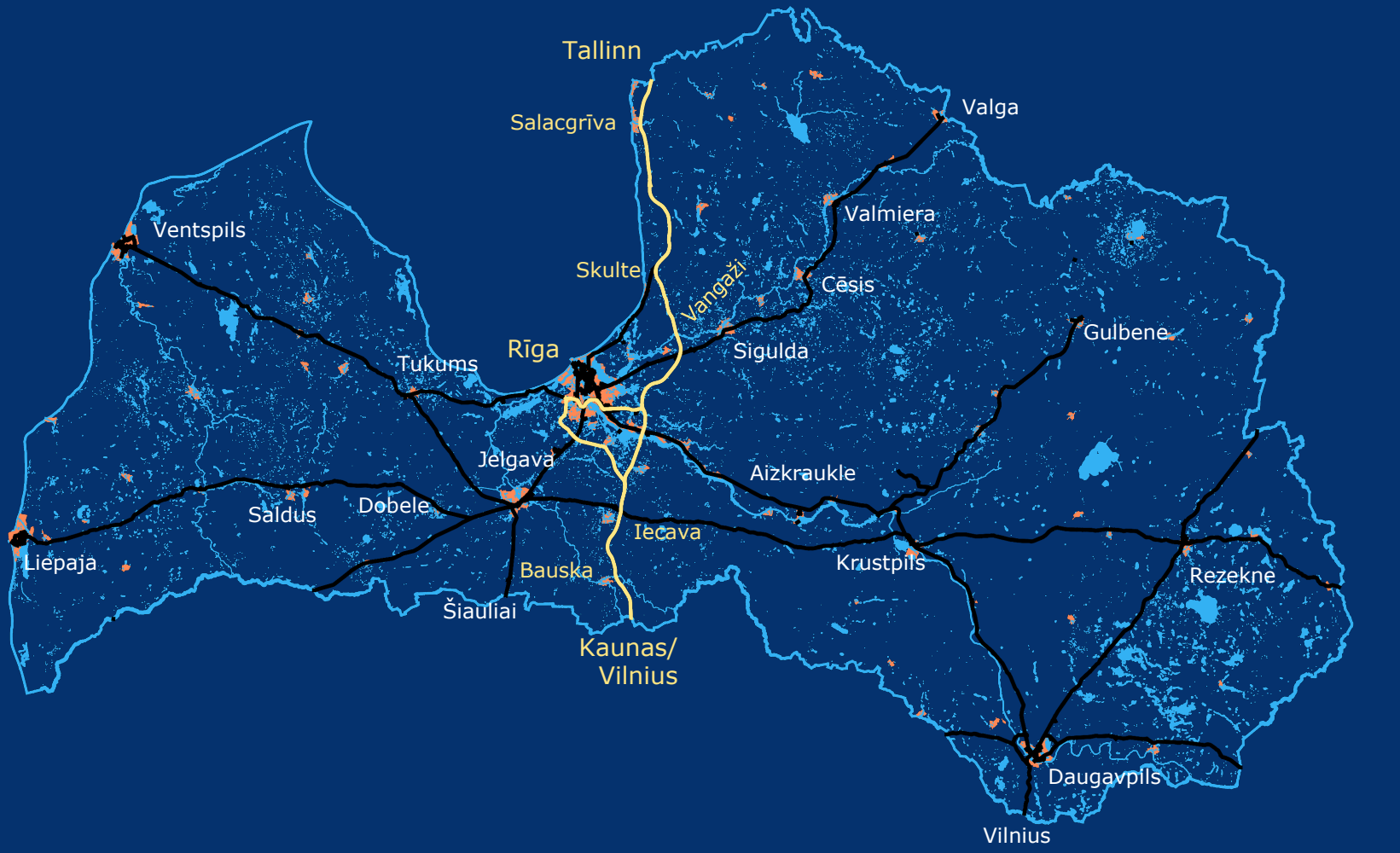


Infrastructure development in the Rīga area

- Large scale reconstruction of the 1520 mm infrastructure together with 1435 mm implementation of Rail Baltica
- Spatial restraints in an urban area challenging for infrastructure design
- Requirement to deliver seamless interconnectivity of both gauges

➔ Chance and challenge at the same time!

Key targets of the Rīga node study



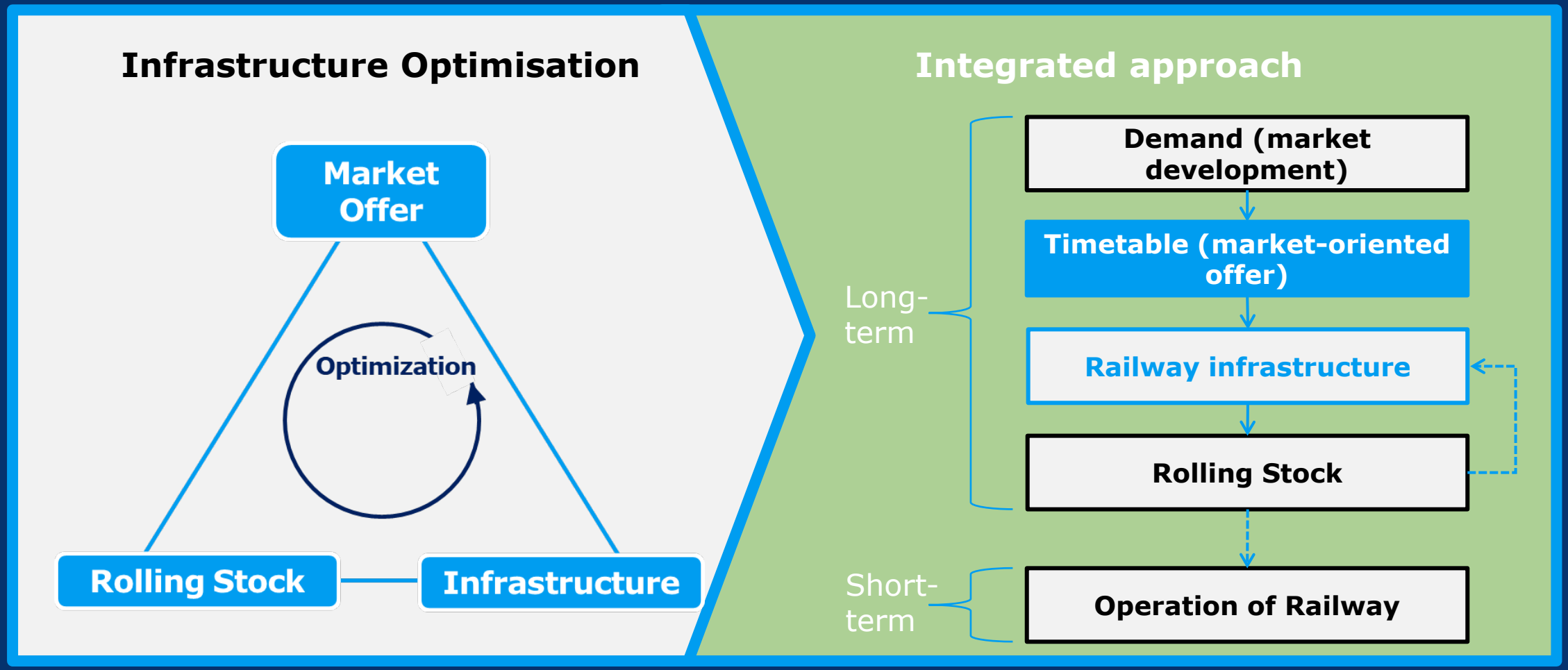
01 **Increase** benefits for end users of a single fully integrated railway transport system 1435/1520 mm.

02 **Identify** limiting factors and propose optimisation measures for the railway infrastructures in Rīga node area to maximise efficiency of investments

Methodology and **Approach**

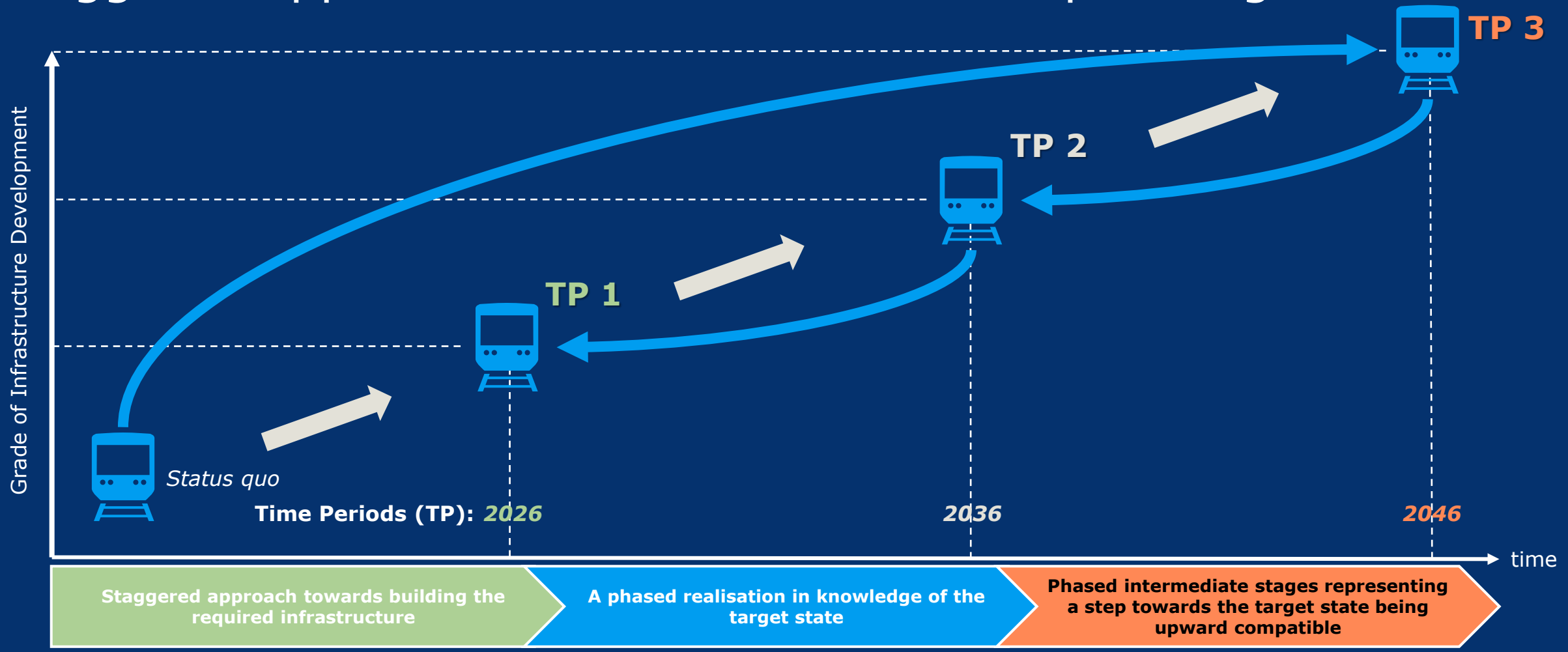
The integrated “swiss approach”

Integrated Approach (the 🇨🇭 "Swiss approach")
for market-orientated infrastructure and timetable optimization



Source: BAV

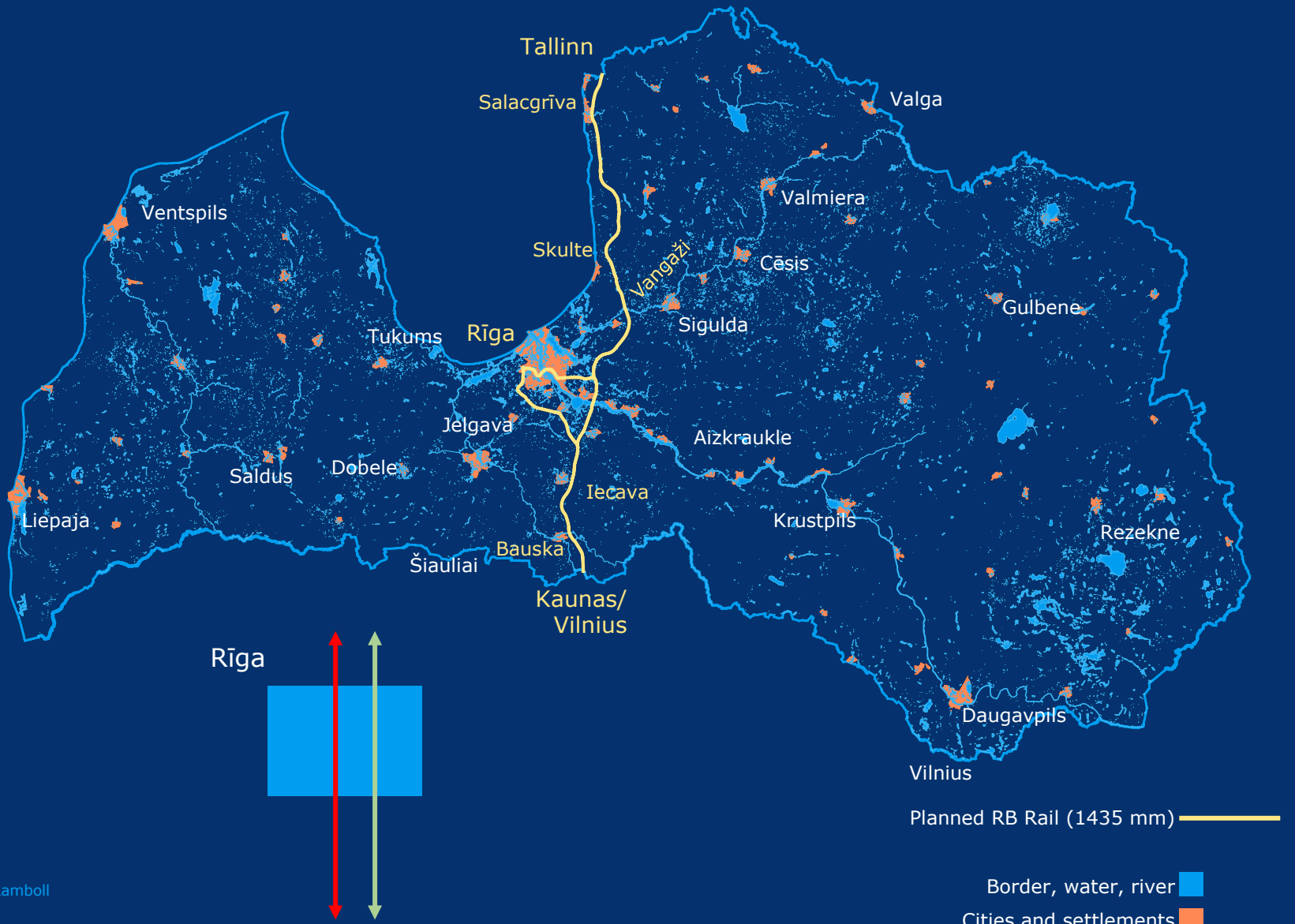
Methodology
staggered approach towards infrastructure planning



Resulting integrated Master Timetable

For both gauges (1520/1435 mm) as a result of the study

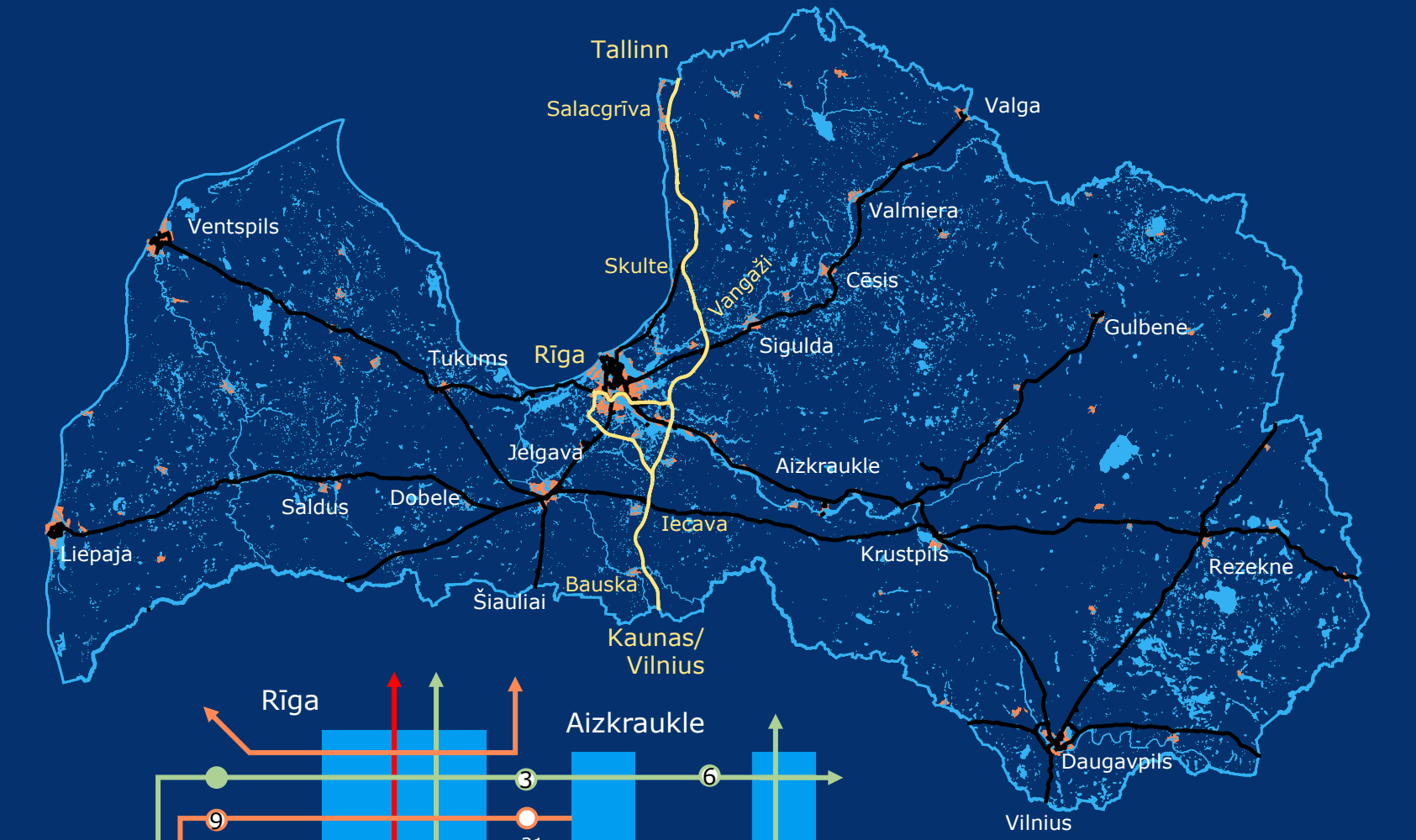
Connecting the Rail Baltica service…



Clock-face scheduling Master timetable allows to form a modern passenger line network as backbone for the (local) transport service offer

- **International train services:** direct, fast connections between international centres via the **1435 mm RB main line**.

… to the 1520 mm passenger network…

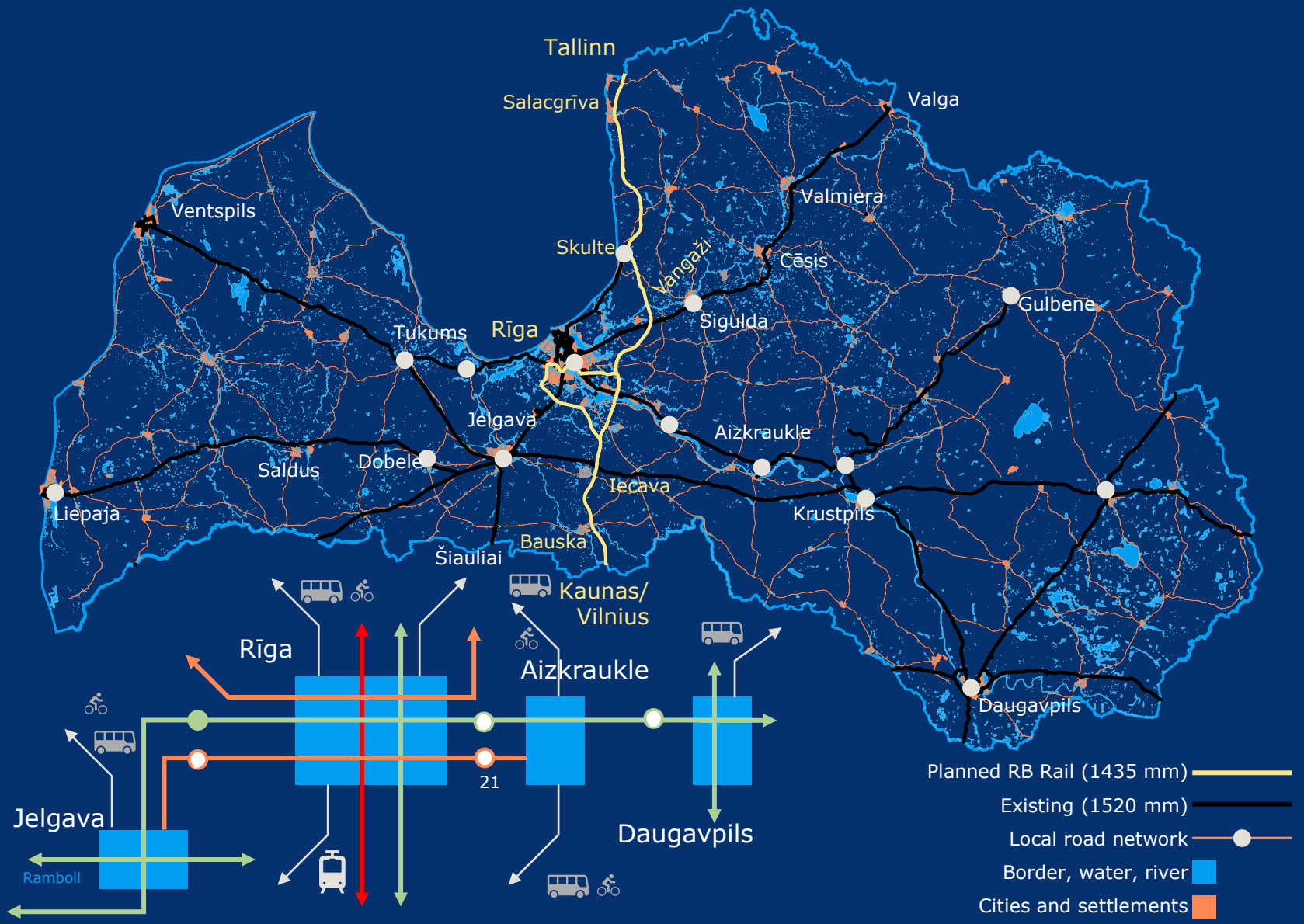


Planned RB Rail (1435 mm)
Existing (1520 mm)
Border, water, river
Cities and settlements

Clock-face scheduling Master timetable allows to form a modern passenger line network as backbone for the (local) transport service offer

- **International train services:** direct, fast connections between international centres via the **1435 mm RB main line**.
- **Regional express services:** direct and fast connections between international and regional centres via **1435 and 1520 mm infrastructure**.
- **Local passenger services:** serving all stops on the line, providing interconnectivity to local, regional and even international centres and services via **existing 1520 mm infrastructure**

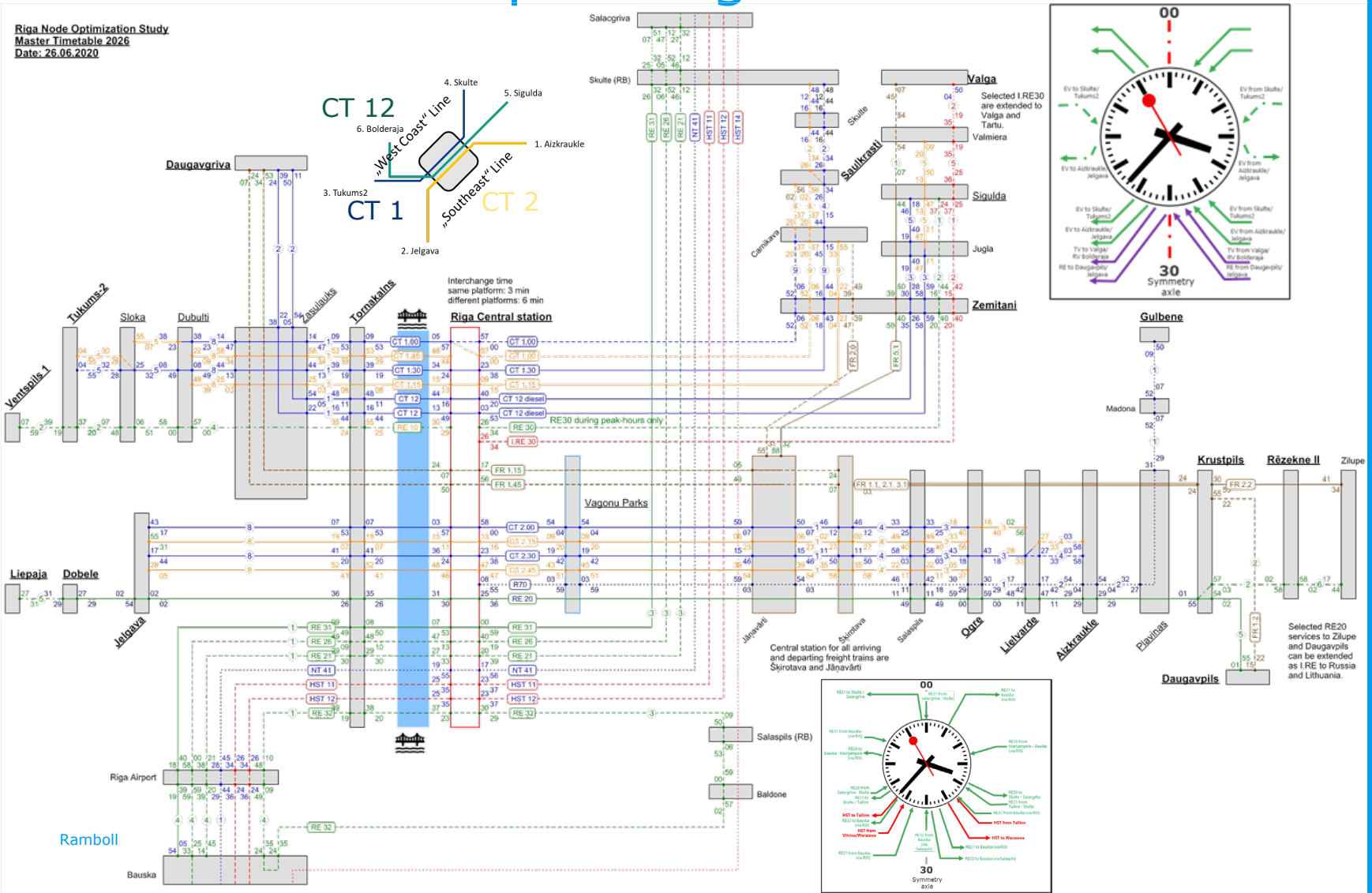
…and the local transport hubs



Clock-face scheduling Master timetable allows to form a modern passenger line network as backbone for the (local) transport service offer

- **International train services:** direct, fast connections between international centres via the **1435 mm RB main line**.
- **Regional express services:** direct and fast connections between international and regional centres via **1435 and 1520 mm infrastructure**.
- **Local passenger services:** serving all stops on the line, providing interconnectivity to local, regional and even international centres and services via **existing 1520 mm infrastructure**
- **Local transport:** rail services are optimized to allow fast and efficient interchange to **local Bus, B+R** … in international, regional and local centres.

Significantly increased quantity structure on the Latvian passenger network

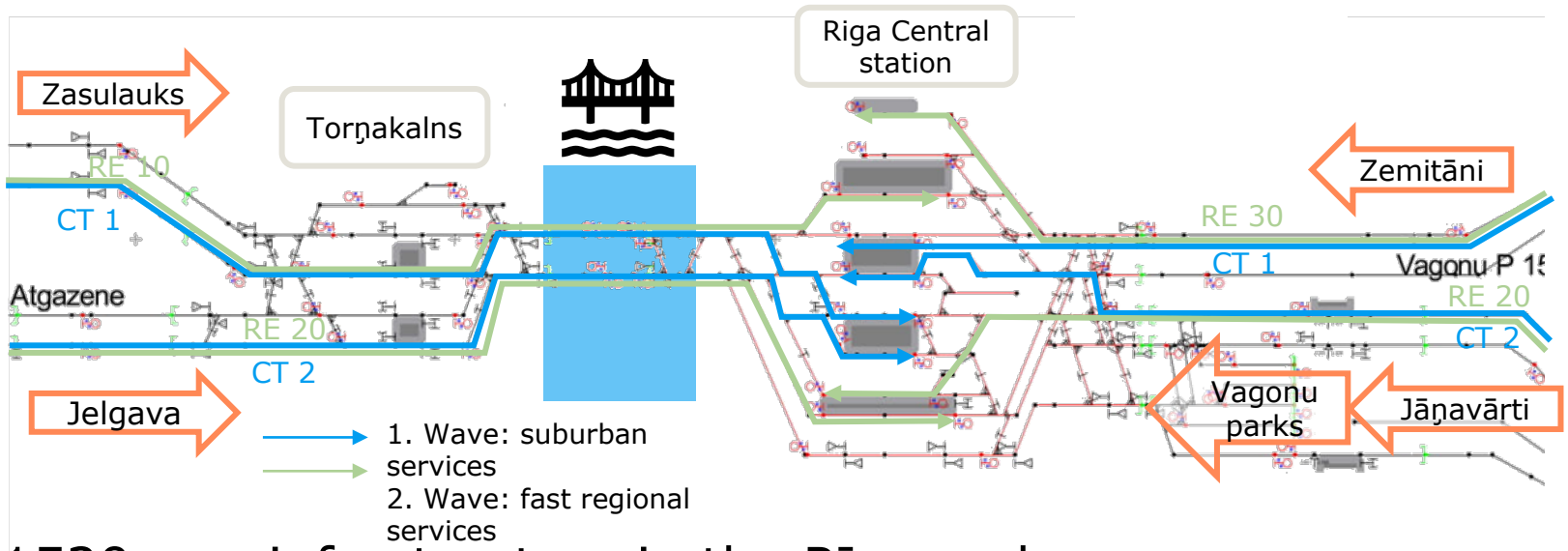


Ramboll

01 **Increase** benefits for end users of a single fully integrated railway transport system 1435/1520 mm.

- Fixed interval and fixed stopping pattern
- New suburban services (CT) (15 min interval during peak-hours)
- Creation of regional express through services (RE) through Riga central station
- Overall ramp up of the quantity structure passenger services
- Interconnectivity of all services and lines in international, regional and local nodes
- Further work to improve accessibility and attractiveness of stations
- …

Identified bottlenecks and developed solutions



1520 mm infrastructure in the Rīga node area

02 **Identify** limiting factors and propose optimisation measures for the railway infrastructures in Rīga node area to maximise efficiency of investments

- 1435 mm service pattern is feasible on the proposed infrastructure
- Crucial bottleneck is the existing 1520 mm Daugava river bridge
- Bottlenecks in core area could be fixed with the integrated clock-face scheduled service pattern
- Small scale improvements on the track layout proposed:

➔All service improvements can be supported by proposed/existing infrastructure

In the meantime

What happened since 2020?

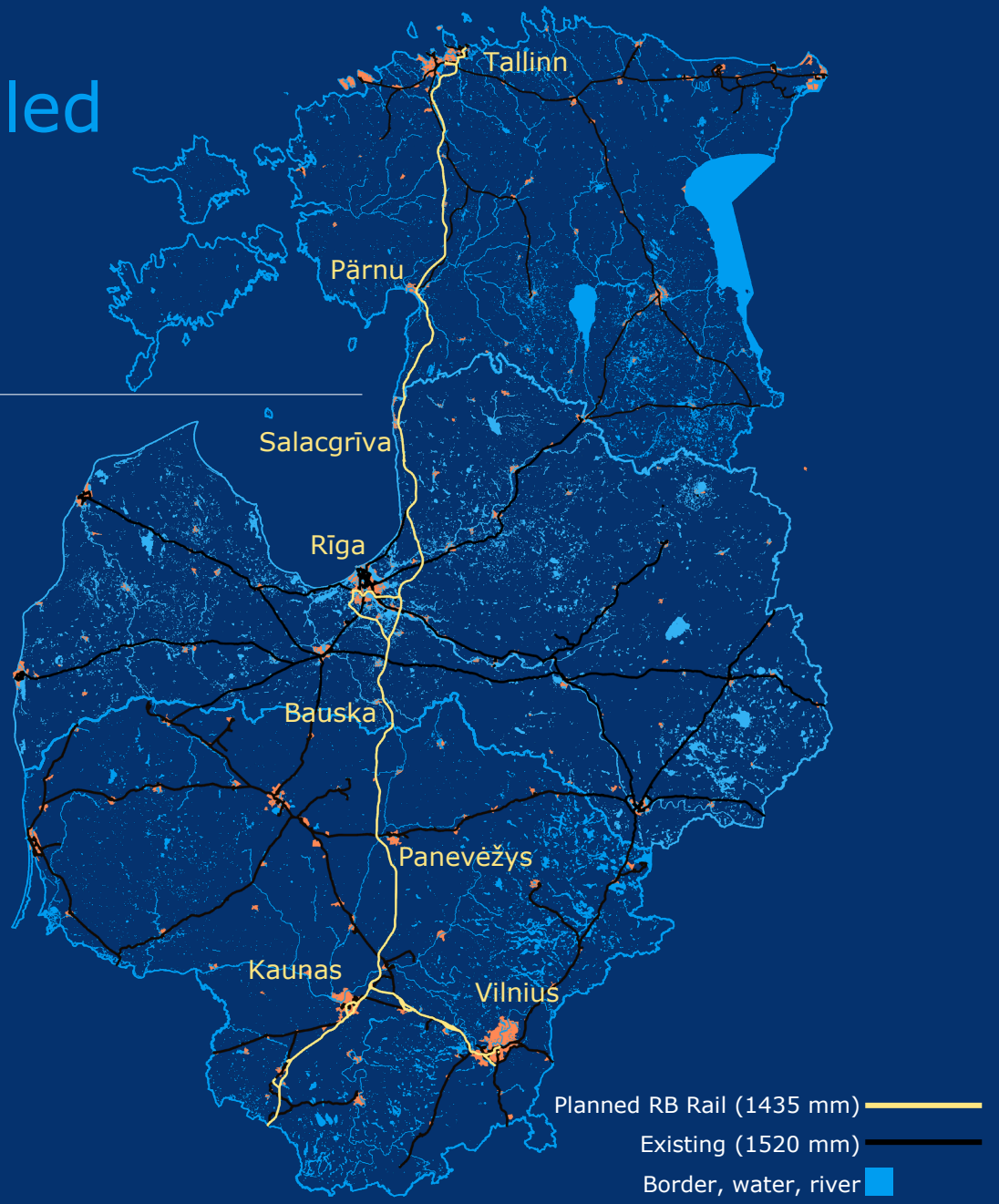
Further progress in the Rail Baltica project.

Following detailed studies

Estonia

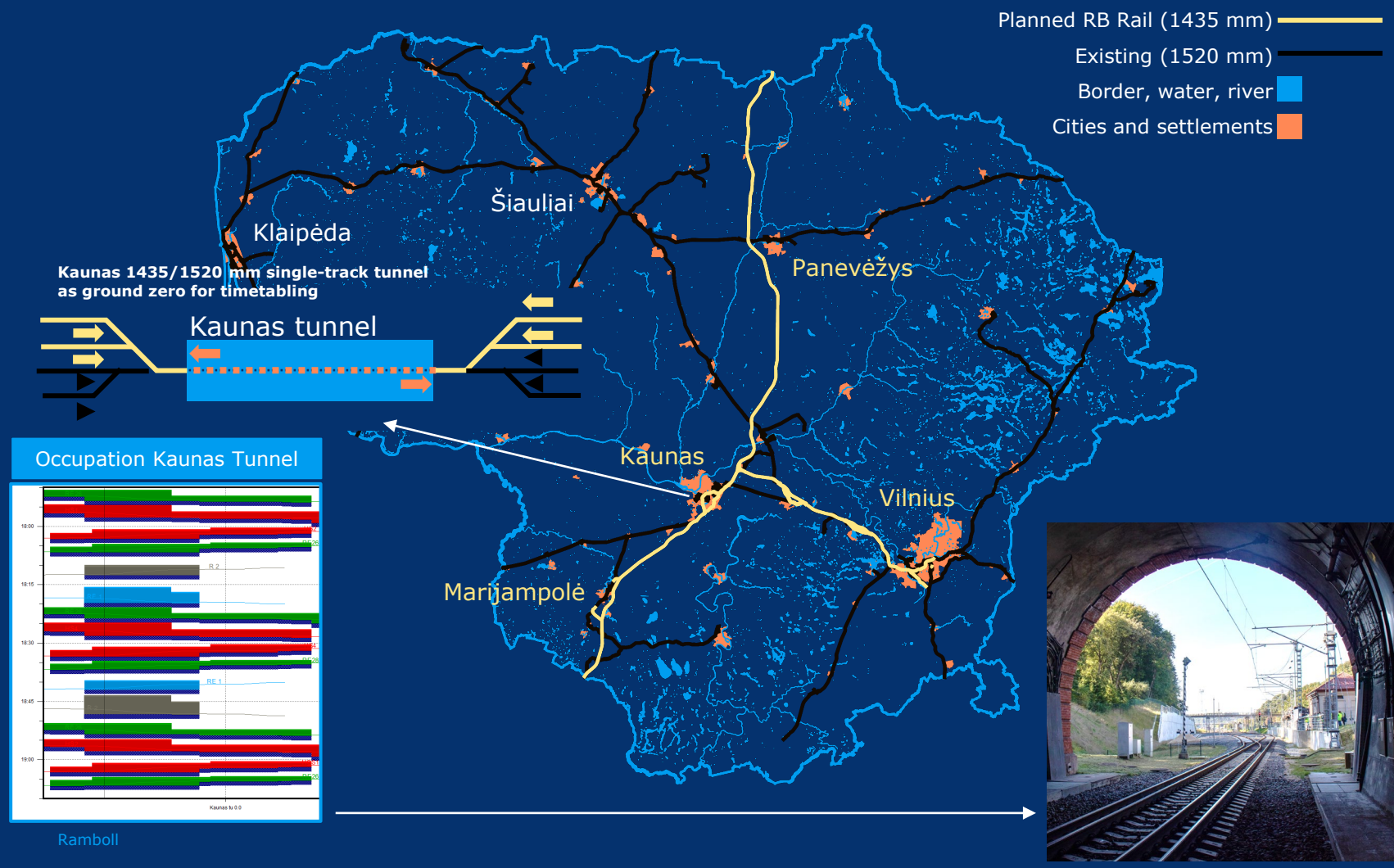
Latvia

Lithuania



- Rīga node study completed in February 2021
- Kaunas node study completion in January 2023

Scope and results of the Kaunas node study for Lithuania



Scope

- Similar approach on service development in Lithuania
- Focus on infrastructure 1435/1520 mm bottlenecks in Kaunas area
- Support of ongoing special planning process for Rail Baltica infrastructure
- Parallel operational assessment of proposed infrastructure

Results:

- Future oriented service approach confirmed
- Recommendations to avoid bottlenecks delivered
- Significantly improvements visible in planning documents

Discussion and Questions

Any questions?

Thank You!

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Source: https://trainspo.com/photo/134815/

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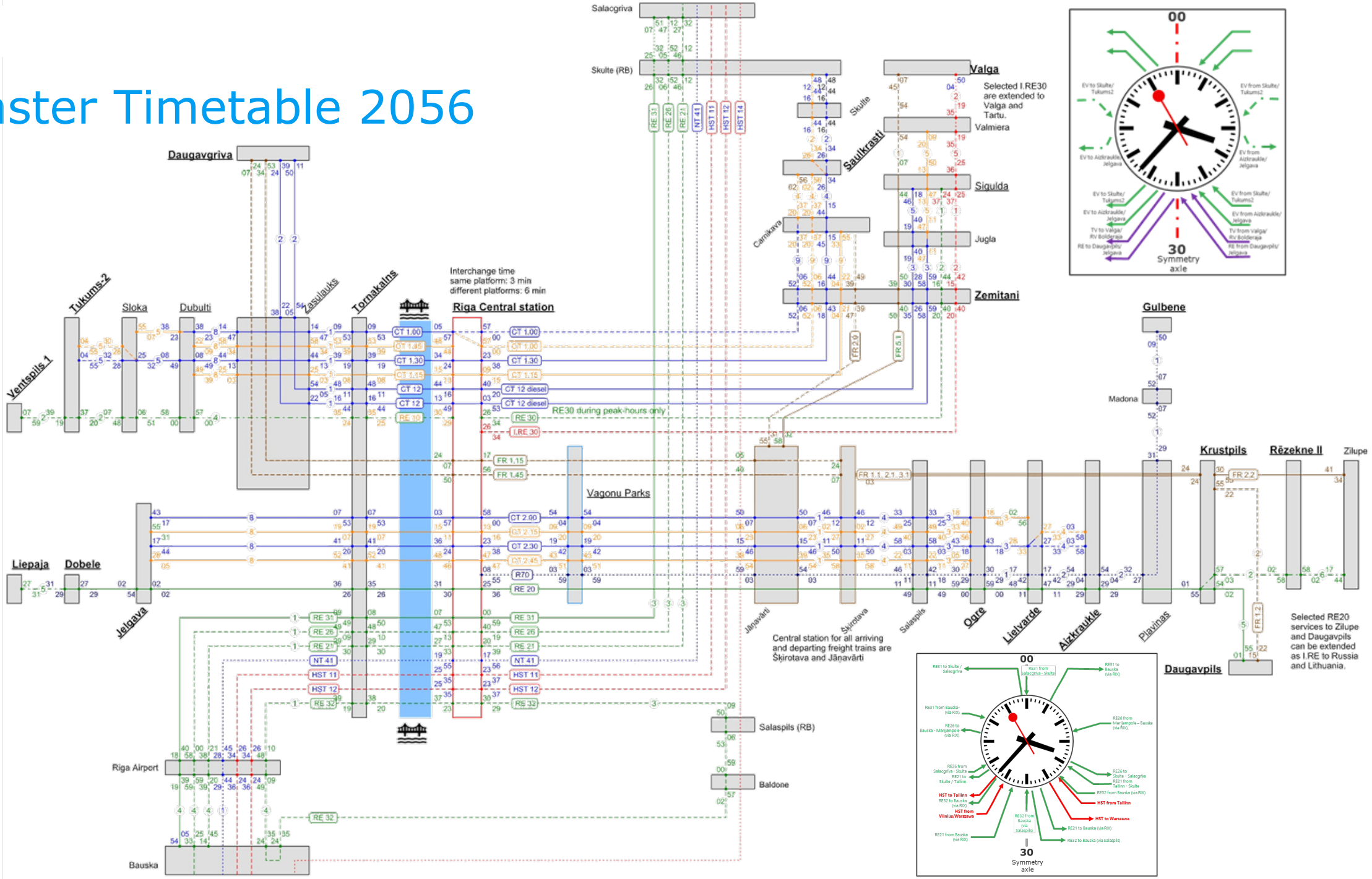
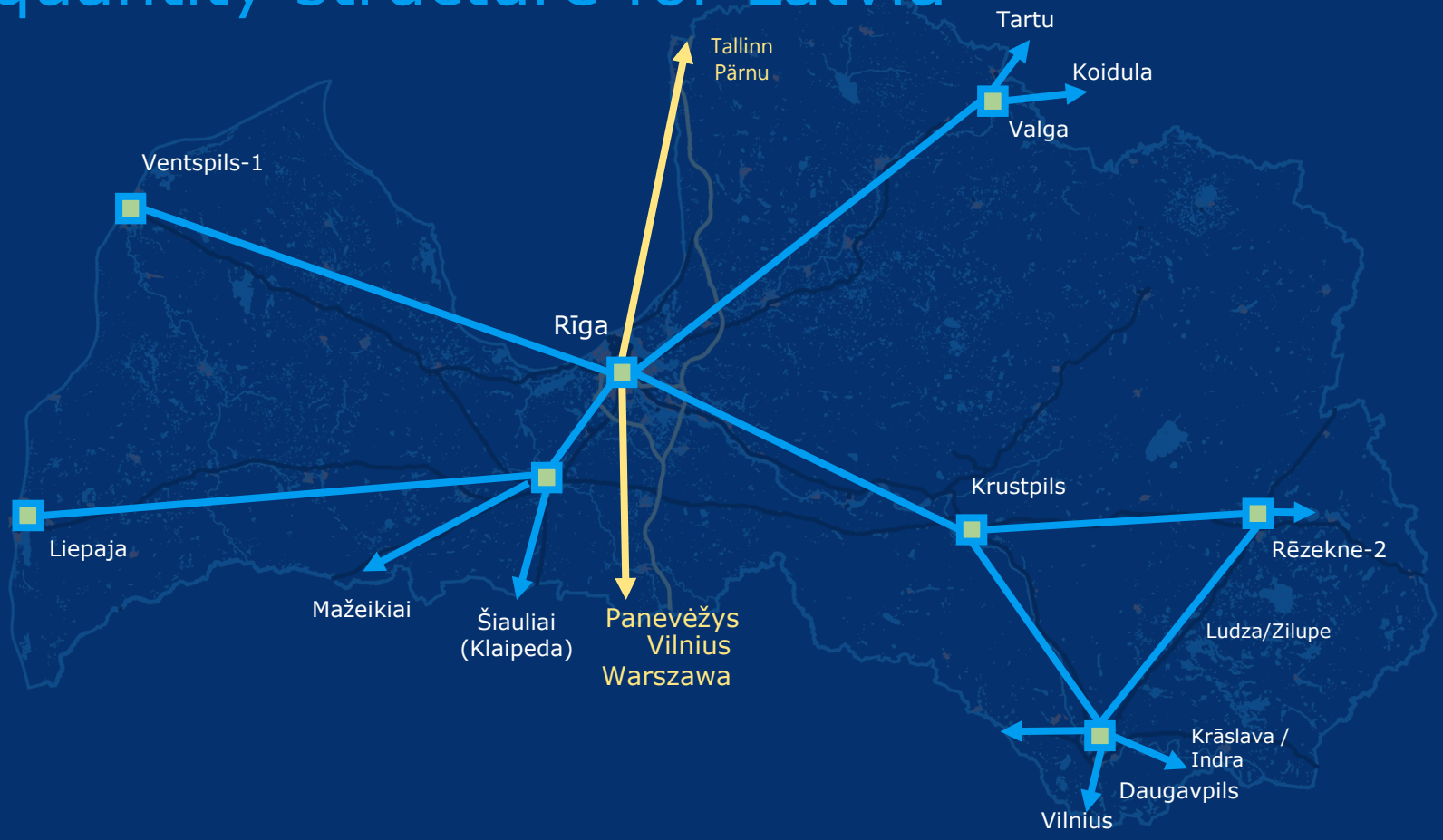
Backup

Master Timetable 2056



Foreseen services and quantity structure for Latvia



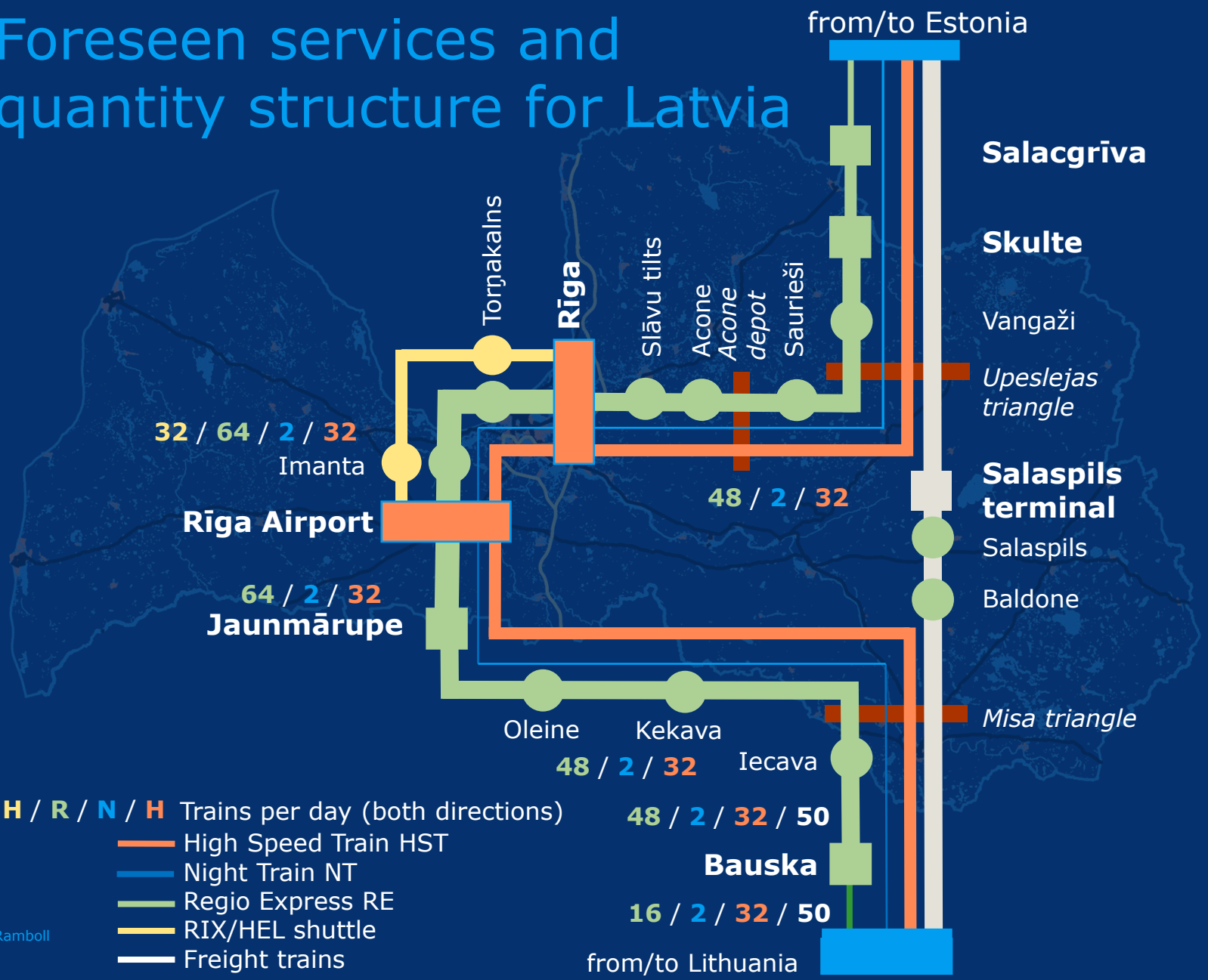
Why the Rīga node study?

- Large scale reconstruction of the 1520 mm together with 1435 mm implementation of Rail Baltica
- Spatial restraints in an urban area challenging for infrastructure design
- Requirement to deliver seamless interconnectivity of both gauges

Chance and **challenge** at the same time.

→ Recommendation to perform a more detailed Riga node study

Foreseen services and quantity structure for Latvia



Why the Rīga node study?

Recommendation

of the **RB OP** was to perform a more detailed analysis for

the **Rīga node area**.

This includes:

- Detailed capacity analysis
- Detailed timetable stability analysis
- Detaille assessment of the required track layout for 1435 mm and 1520 mm services.

Transformation of the Latvian 1520 mm passenger network

Transforming the existing **"line based"**
1520 mm passenger and freight service…

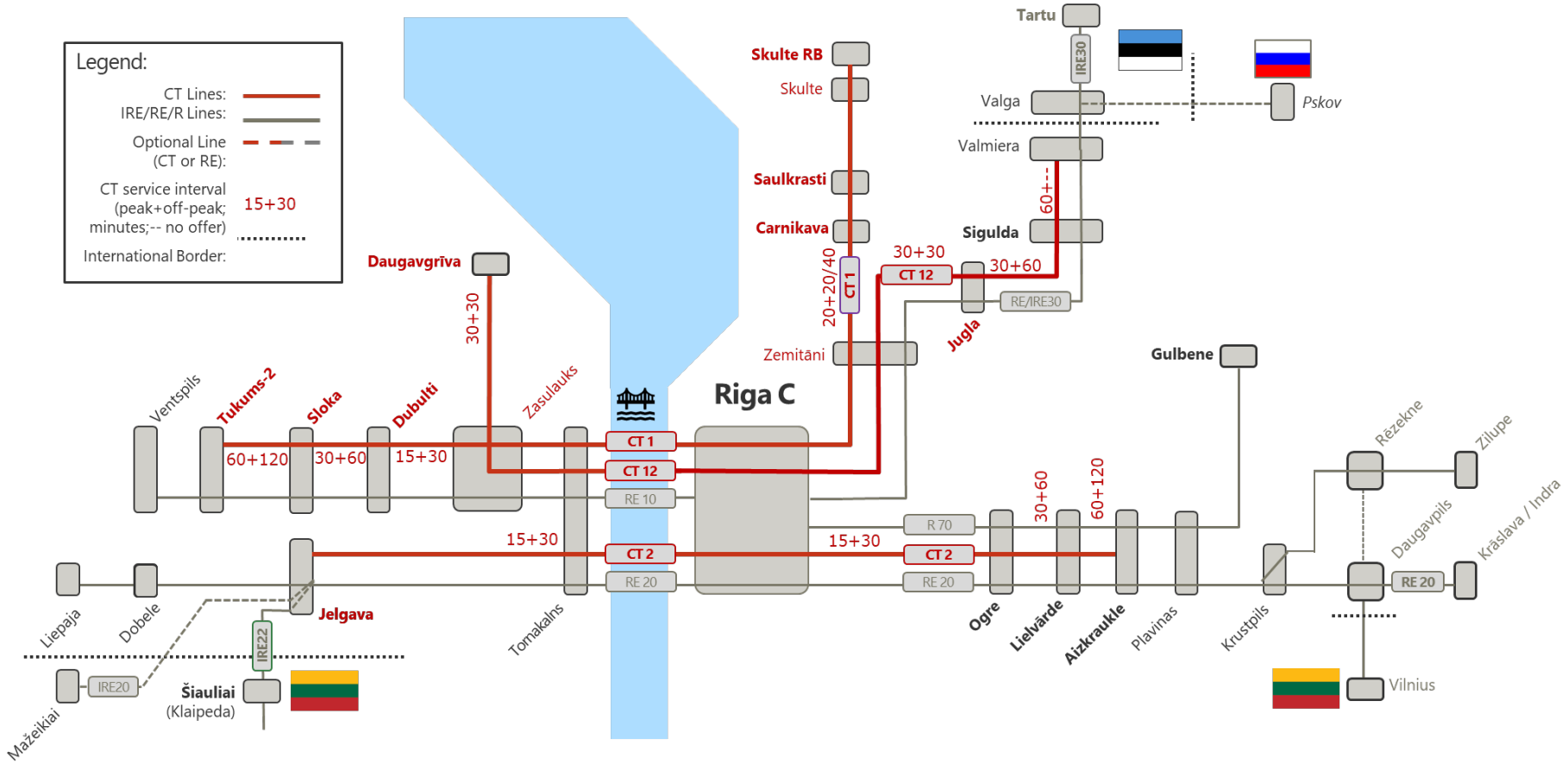
…into a long-term **"Network based" 1520/1435 mm Clock-face scheduled** integrated service pattern with additional features

- Fast direct services along existing lines
- No connections between different lines (long interchange times)
- No stable service over the whole day
- No understandable service pattern visible for passengers
- General overall low number of services
- Nonstop flexible freight train path






- Keep existing 1520 mm fast services on the corridor but focus on local passenger services
- Optimal connected passenger lines for minimum travel time from everywhere to everywhere
- Fixed interval and fixed stopping pattern (stable services)
- Understandable services, products and operating hours with communicated interchanges
- Up to hourly services possible to cope with passenger requirements
- Nonstop flexible, hourly freight train paths


Legend:
CT Lines:
IRE/RE/R Lines:
Optional Line (CT or RE):
CT service interval (peak+off-peak; minutes;-- no offer)
15+30
International Border:
Riga C
Skulte RB
Skulte
Saulkrasti
Carnikava
Zemitāni
Daugavgrīva
30+30
20+20/40
CT 1
30+30
CT 12
30+60
RE/IRE30
Jugla
Tartu
IRE30
Valga
Pskov
Valmiera
60+--
Sigulda
Gulbene
Ventspils
Tukums-2
Sloka
Dubulti
Zasulauks
60+120
30+60
15+30
CT 1
CT 12
RE 10
15+30
CT 2
RE 20
R 70
15+30
CT 2
RE 20
30+60
60+120
Ogre
Lielvārde
Aizkraukle
Plavinas
Krustpils
Rēzekne
Zilupe
Daugavpils
RE 20
Krāslava / Indra
Vilnius
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IRE22
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Mažeikiai
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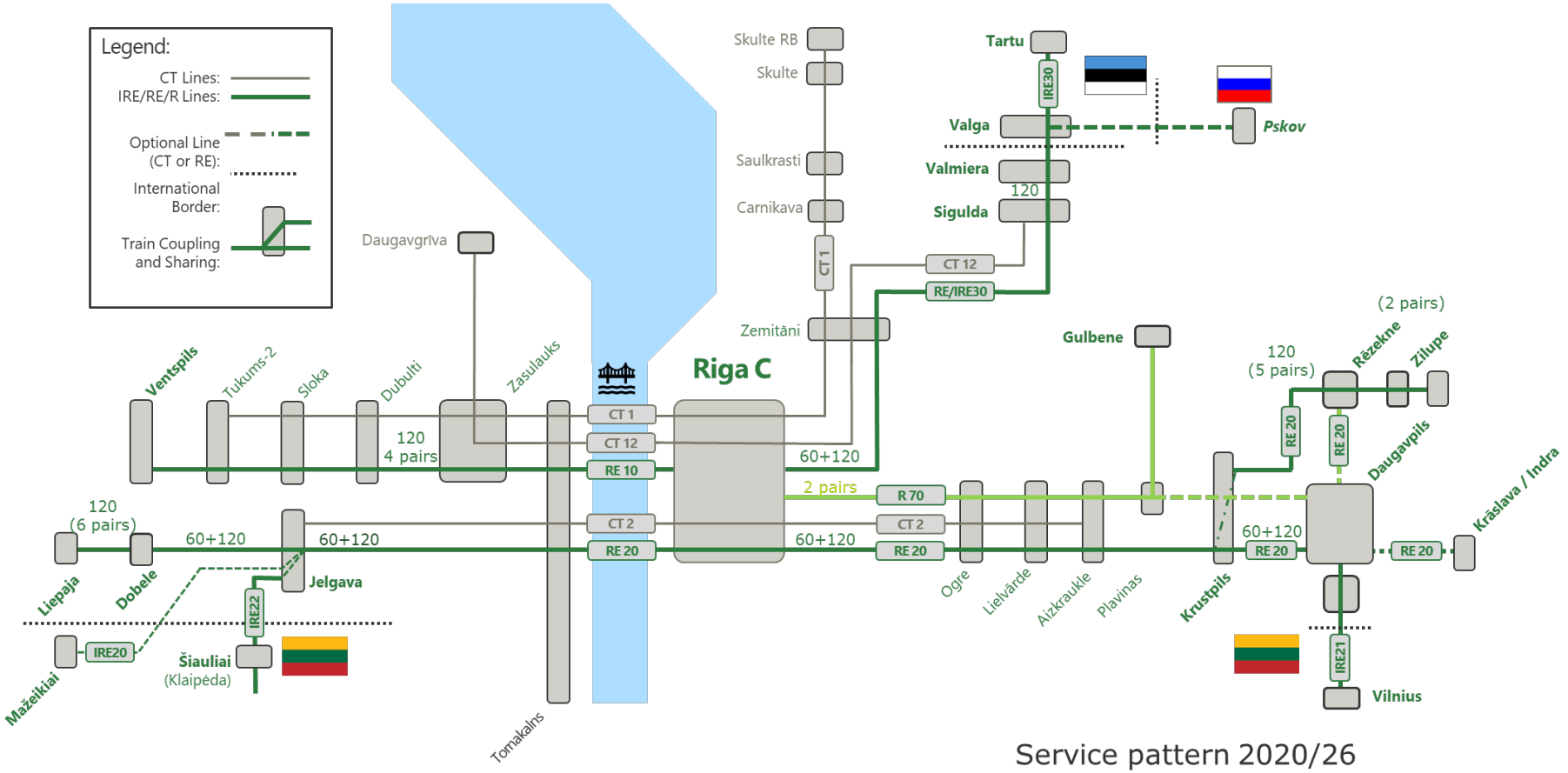
(Klaipeda)



Service pattern 2020/26