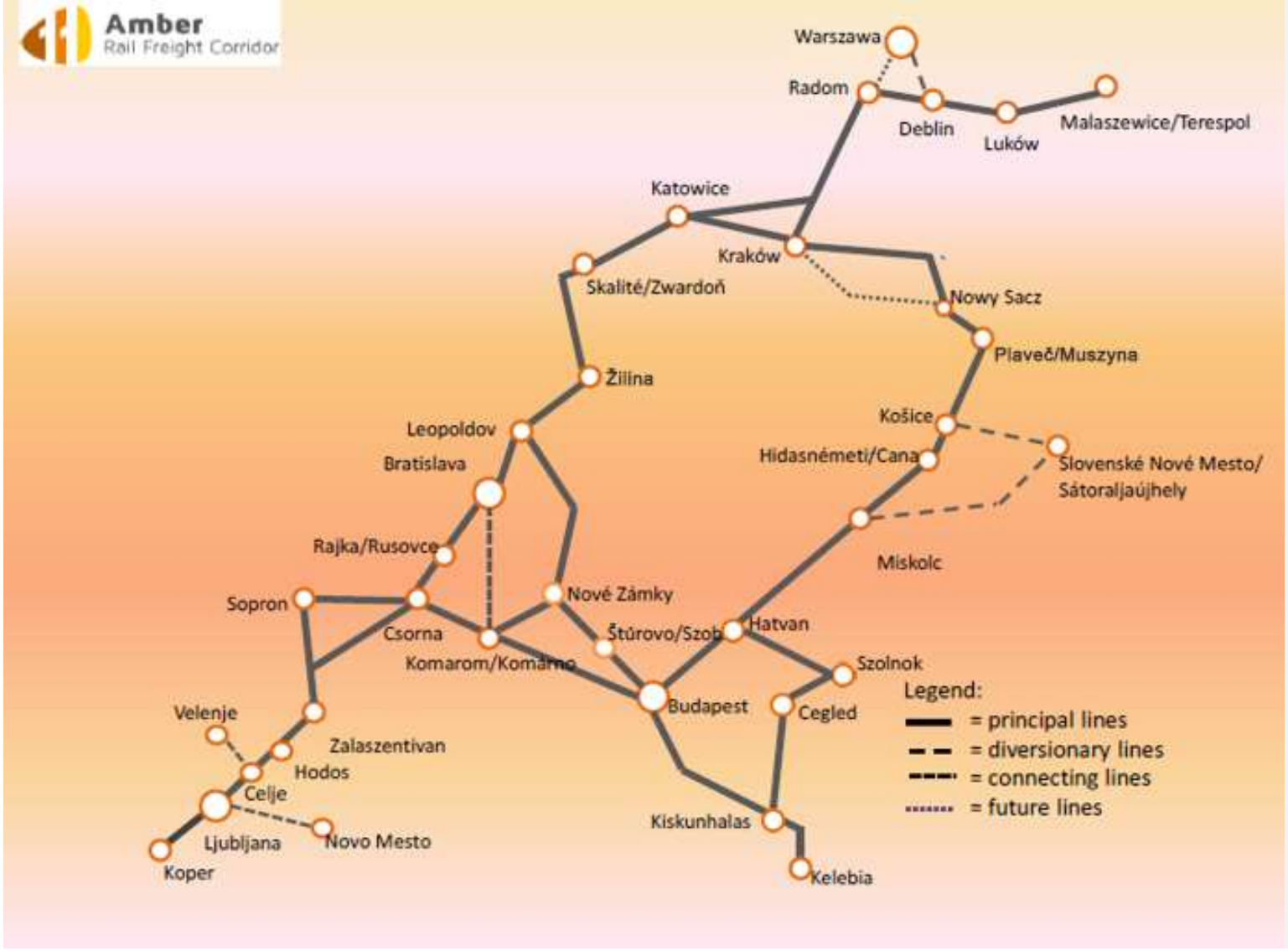


Contracting Authority:

GYSEV Raaberbahn

Contractor:

KONTÚR CSOPORT

Subcontractor:

TRENECON

STUDY ON BOTTLENECKS ALONG RFC AMBER

FINAL PRESENTATION

Dec. 2020

Co-financed by the European Union
Connecting Europe Facility

OUTLINE

1) Implementation framework
2) Phases and timeline of implementation
3) Brief presentation of the Bottleneck Study
   - State of play – topology, infrastructure parameters
   - Traffic demand (current and future)
   - Analysis of bottlenecks along RFC Amber
     – infrastructure, capacity, operational and administrative
   - Improvement measures – evaluation (methodology, priorities)
4) Summary and main conclusions

Co-financed by the European Union
Connecting Europe Facility

1. Implementation framework

Co-financed by the European Union
Connecting Europe Facility

1. IMPLEMENTATION FRAMEWORK

- PSA – Activity 4 – Bottleneck Study – sets objectives
- Contract signed by Contracting Authority of RFC11, GYSEV Zrt. with Kontúr Csoport Kft., March 2019
- Subcontractor: TRENECON Consulting and Planning Ltd.
- Co-operation:
  Ad-hoc Working Group to manage implementation
- Regular presentations to MB, meetings with Ad-hoc WG members

Co-financed by the European Union
Connecting Europe Facility

1. IMPLEMENTATION FRAMEWORK

Stakeholders directly involved:

- IMs/AB as members of Ad-hoc Working Group
  - SŽ-I Slovenske Železnice Infrastruktura d.o.o
  - MÁV Magyar Államvasutak Zrt.
  - GYSEV Győr-Sopron-Ebenfurti Vasút Zrt.
  - VPE Vasúti Pályakapacitás-elosztó Kft.
  - ŽSR Železnice Slovenskej Republiky
  - PKP Polskie Linie Kolejowe S.A.
- Number of RUs were addressed – substantive cooperation with Rail Cargo Carrier Kft. (spokesperson/ representative of RAG/TAG) invited to Ad-hoc WG
- Additionally: the C-OSS, MaBo and ExBo of RFC Amber

Co-financed by the European Union
Connecting Europe Facility

2. Phases and timeline of implementation

Co-financed by the European Union
Connecting Europe Facility

2. PHASES OF IMPLEMENTATION

Timeline of Implementation: *March 2019 – December 2020*

Project implementation phases	Milestones	Start date	Completion date
Inception phase	Inception Report	04.01.2019	02.04.2019
Data collection phase	Summary Report	01.03.2019	30.11.2019
Analysis phase	Discussion Note	24.11.2019	30.04.2020
Elaboration phase	Draft Bottleneck Study	30.04.2020	30.09.2020
Finalisation of the Study	Final Study	15.09.2020	18.12.2020

Co-financed by the European Union
Connecting Europe Facility

2. PHASES OF IMPLEMENTATION: COLLABORATION

Coordination – meetings, discussions:

Inception phase:

- With the Contracting Authority GYSEV - 23 January 2019
- With the Hungarian partners - 12 February 2019
- With the corridor stakeholders - ad-hoc WG - 12 March 2019

Data collection and analysis phases:

- With the ad-hoc WG - 12 September 2019 – presentation and discussion of preliminary findings, missing data
- With the Contracting Authority GYSEV - 05 July 2019 – progress of implementation
- With RAG/TAG spokesperson – 23 July 2019 – RFC Amber experience, RU needs

Co-financed by the European Union
Connecting Europe Facility

2. PHASES OF IMPLEMENTATION: COLLABORATION

Coordination – meetings, discussions:

Elaboration phase:

- With the ad-hoc WG - 23 July 2020 – status, main findings of the analysis, agreeing on the evaluation methodology
- With the ad-hoc WG - 21 September 2020 – presentation of the draft study, comments and approval of ad-hoc WG members

Finalisation phase:

- One-on-one discussions with stakeholders to come to a common understanding, to integrate comments to the satisfaction of national stakeholders
- E-mail discussion with RCC Kft. – 13 November 2019 - information exchange on operational and administrative issues
- On-line consultation with the Contracting Authority, MÁV, VPE – 13 November 2019 - on traffic management, performance management issues

Co-financed by the European Union
Connecting Europe Facility

2. PHASES OF IMPLEMENTATION

Data collection

- Extensive desktop research – during the project
- Input from IMs/AB – 3 rounds of excel data request:
  - 1st: data request was compiled in excel sheets for line sections and sent out to IMs/AB in April 2019
  - 2nd: data request (a) on traffic flows, (b) operational and administrative issues in excel sheets/questionnaire in May 2019
  - 3rd: request for missing data on projects, O/D traffic in Oct. 2019
- Direct input from RUs – revised questionnaire on operational and administrative issues, February 2020
- Interviews, discussions – with RAG/TAG (RCC), IMs/AB C-OSS representatives – on the phone/on-line during implementation as required for clarification

Co-financed by the European Union
Connecting Europe Facility

3. Presentation of the Bottleneck Study

Co-financed by the European Union
Connecting Europe Facility

Bottleneck Study

General introduction

Co-financed by the European Union
Connecting Europe Facility

3.1 OBJECTIVES OF THE STUDY

According to the ToR the Bottleneck Study is prepared to:

- identify and describe bottlenecks of administrative operational and infrastructural nature with a focus on cross-border areas, capacity, TEN-T minimum requirements

- propose appropriate improvement measures to eliminate, reduce bottlenecks, to allow for more efficient rail freight operation

Eventually the Study is to support (substantiate) future investments to improve functioning of RFC Amber

Co-financed by the European Union
Connecting Europe Facility

3.2 STRUCTURE OF THE STUDY

1. Executive Summary
2. Background and preliminaries
3. Objectives
4. Brief introduction of RFC Amber
5. Current infrastructure parameters
6. Current and future traffic demand and economic trends
7. Infrastructure and capacity bottlenecks
8. Operational and administrative bottlenecks
9. Measures for improvement

Co-financed by the European Union
Connecting Europe Facility

3.3 INTRODUCTION OF THE CORRIDOR

- Topology – RFC and TEN-T line categories on RFC Amber
- National and operational borders, ports and landbridges
- Nodes (urban nodes, marshalling yards, junctions)
- Common sections with other RFCs
- Identification of line sections as the units of assessment (homogenous technical parameters or capacity and traffic)

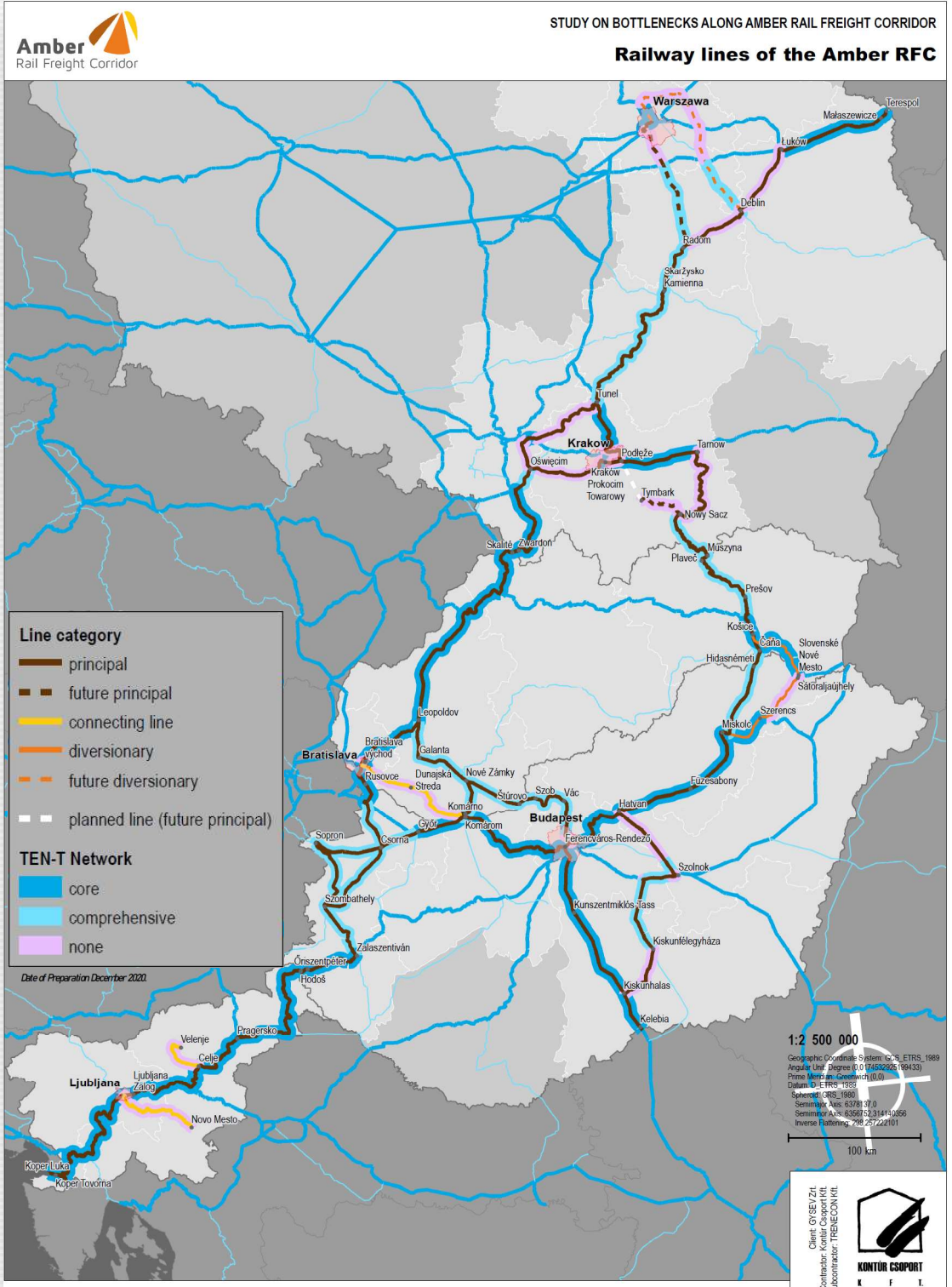
► *Graphic presentation of all important information on maps, using GIS software*

Co-financed by the European Union
Connecting Europe Facility

3.3 INTRODUCTION OF THE CORRIDOR: RFC & TEN-T LINES

	principal	future principal	diversionary	future diversionary	connecting line	TOTAL
Length (line km)	3076	164	142	152	206	3740

	TEN-T core	TEN-T comp.	Non TEN-T	TOTAL
Length (line km)	1580	1194	966	3740



3.3 INTRODUCTION OF THE CORRIDOR: NODES

Urban nodes (as defined by TEN-T regulation):

- Slovenia: Ljubljana
- Hungary: Budapest
- Slovakia: Bratislava
- Poland: Katowice (not on the corridor lines), Krakow, Warszawa

Operational nodes along the RFC: marshalling and shunting yards, border crossings (pairs of stations), functional nodes, major junctions

Terminals: rail-road mainly, some IWW and sea ports

Co-financed by the European Union
Connecting Europe Facility

3.3 INTRODUCTION OF THE CORRIDOR: BORDER CROSSINGS

Port of Koper in Slovenia

EU (Schengen area) internal borders:

Hungarian-Slovenian border:

- Őriszentpéter (HU) – Hodoš (SL)

Slovak-Hungarian border

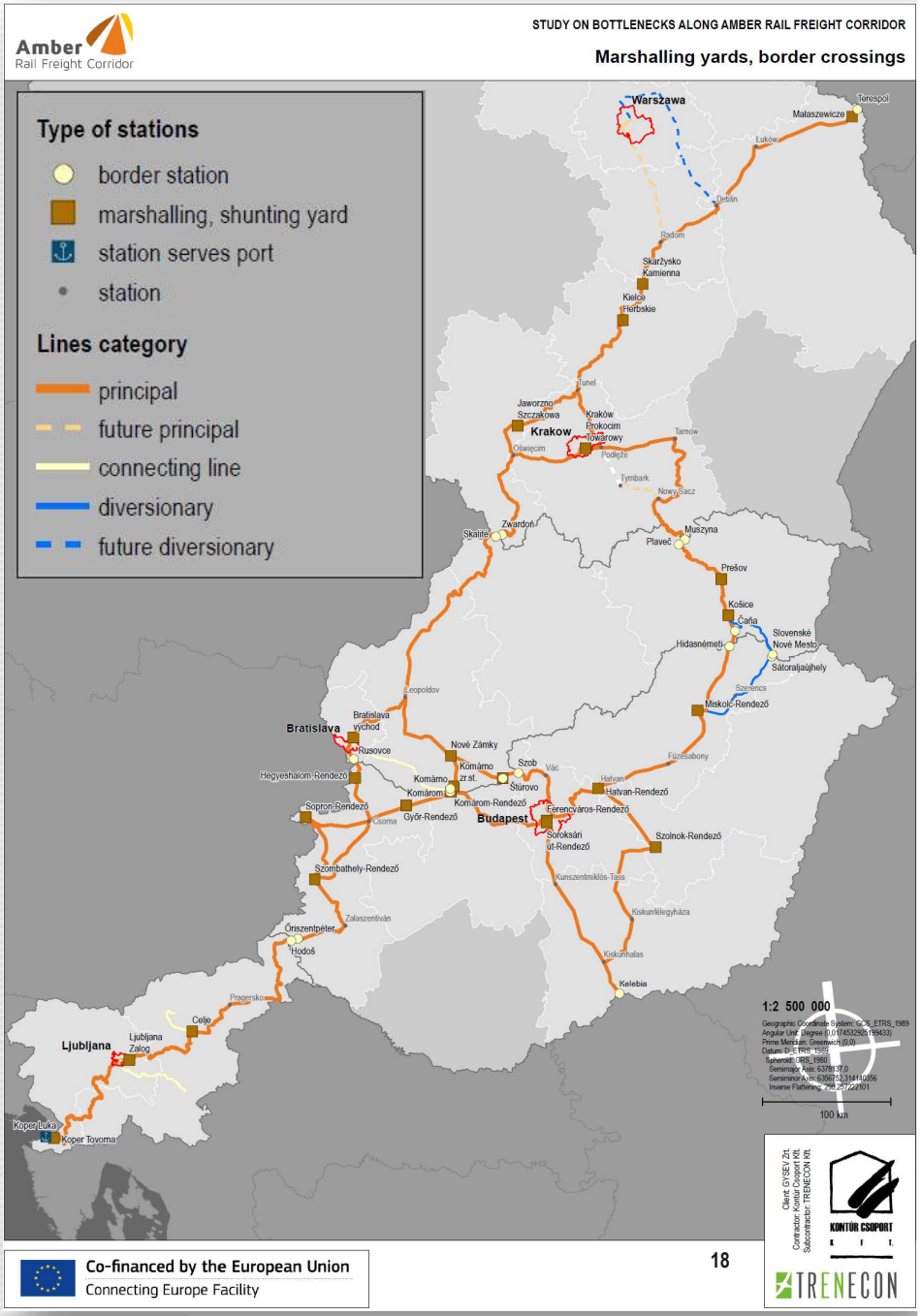
- Rusovce (SK) – Rajka (HU)
- Komárno (SK) – Komárom (HU)
- Štúrovo (SK) – Szob (HU)
- Čaňa (SK) – Hidasnémeti (HU)
- Slovenské Nové Mesto (SK) – Sátoraljaújhely (HU)

Polish-Slovak border

- Zwardon (PL) – Skalité (SK)
- Muszyna (PL) – Plaveč (SK)

Landbridges (external borders outside the EU and Schengen area):

- Terespol in Poland (border with Belarus)
- Kelebia in Hungary (border with Serbia)



3.3 INTRODUCTION OF THE CORRIDOR: OVERLAPPING SECTIONS

RFC5 - Baltic-Adriatic Corridor

RFC6 - Mediterranean Corridor

RFC7 - Orient/East-Med Corridor

RFC8 - North Sea-Baltic Corridor

RFC9 - Rhine-Danube Corridor

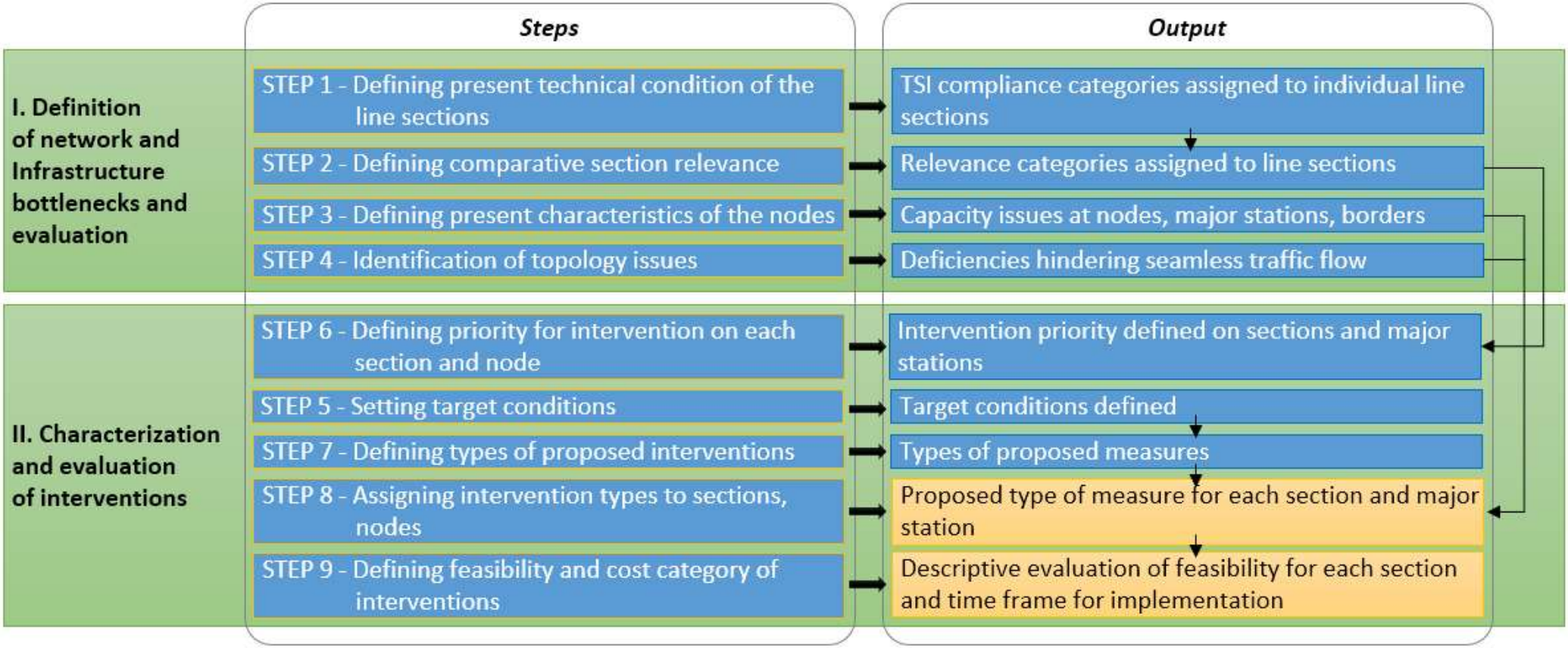
RFC10 - Alpine - Western Balkan Corridor

Bottleneck Study

Identification of infrastructure bottlenecks

Co-financed by the European Union
Connecting Europe Facility

3.4 EVALUATION METHODOLOGY – INFRASTRUCTURE, CAPACITY BOTTLENECKS AND INTERVENTIONS



Co-financed by the European Union
Connecting Europe Facility

3.5 INFRASTRUCTURE ASSESSMENT: STATE OF PLAY

Graphic presentation of the following parameters, compliance with TEN-T parameters and RU needs – in detailed maps included in the Bottleneck Study:

- Lines, line sections
  - Traction, power supply
  - Number of tracks
  - Train load, axle load
  - Gradient, maximum train length
  - Train/line speed for freight and actual restrictions
  - Train control and ERTMS
  - Loading gauge
  - Traffic characteristics and capacity issues
- Stations, marshalling yards and border crossings (focusing on 740m freight train handling infrastructure and capacity issues)
- Terminals

Co-financed by the European Union
Connecting Europe Facility

3.5 INFRASTRUCTURE - STATE OF PLAY - HIGHLIGHTS

Electrification is a core requirement

- Non-electrified sections: connecting lines in Slovenia (Celje – Velenje and Ljubljana – Novo mesto) and in Slovakia (Komárno – Dunajská Streda – Bratislava Nové Mesto), border crossing section in Slovakia and Hungary at Slovenské Nové Mesto-Sátoraljaújhely
- Both 3kV DC and 25kV AC are present – bi-traction locomotives or loco change is needed

Topology issues hindering seamless flow:

- meandering alignment of corridor (slow section in Slovenia-Western-Hungary – Slovakia, Southern Poland)
- changing direction: Zalaszentiván, Komárom (HU), Komárno, Bratislava (SK), Tunel (PL) and Celje, Ljubljana (SL)

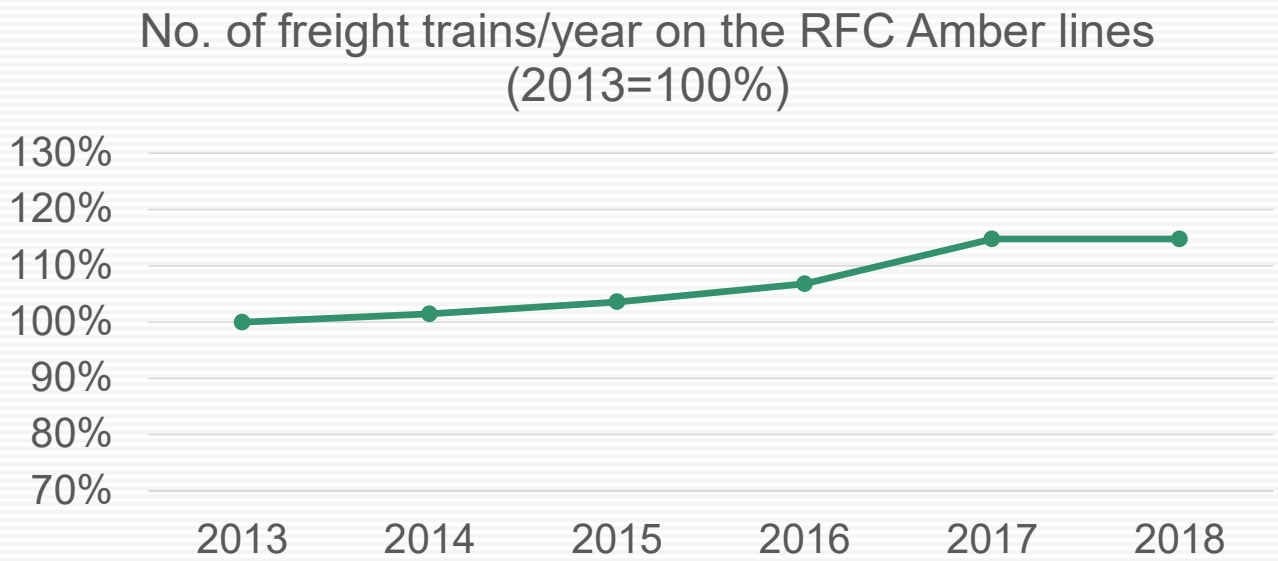
Train length and train load/weight capacity is low on almost 50% of the network

Line speed is inadequate on almost 40% of the network and frequent speed **restrictions** (causing rerouting, delays, uncertain ETA)

Co-financed by the European Union
Connecting Europe Facility

3.6 CURRENT TRAFFIC DEMAND

- Total train traffic on the sections of the RFC Amber slightly increased (by 20% from 2013 to 2018)
- Considerably higher traffic on the western branch of the Corridor
- Highest traffic lines are in and around Warsaw, Bratislava, Budapest and Ljubljana due to suburban passenger train traffic
- International origin/destination type traffic data is not available, not registered

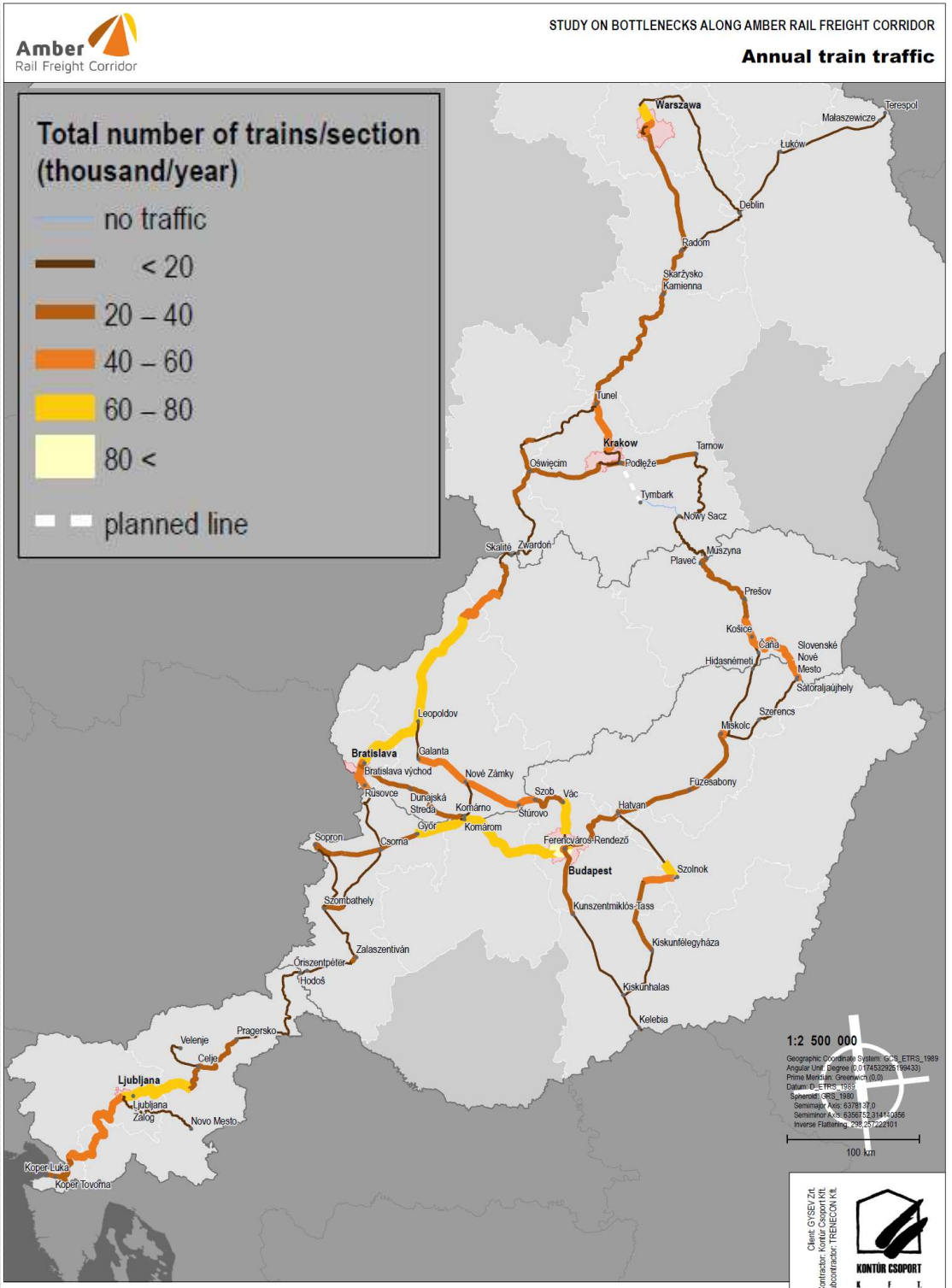


3.6 CURRENT TRAFFIC DEMAND

Overall train traffic by line sections

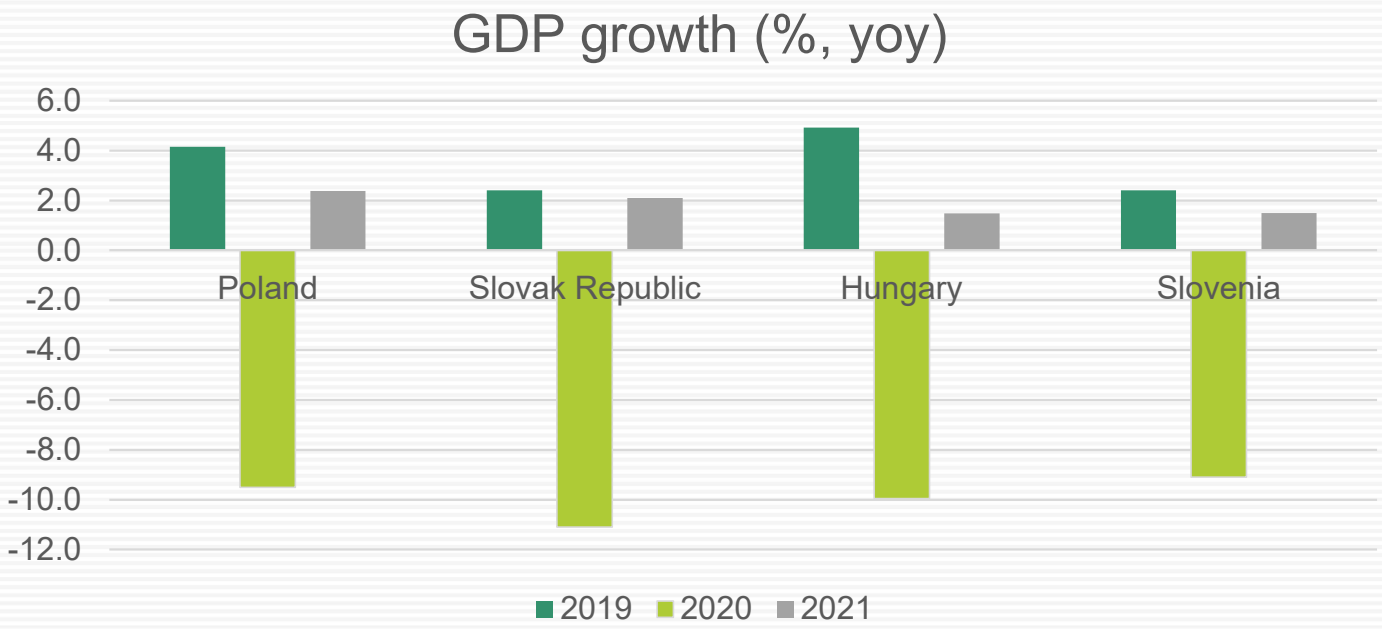
Other traffic maps are also available in the Study showing:

- Proportion of freight trains
- Freight traffic change over time
- Forwarded cargo volumes



3.7 FUTURE TRAFFIC DEMAND

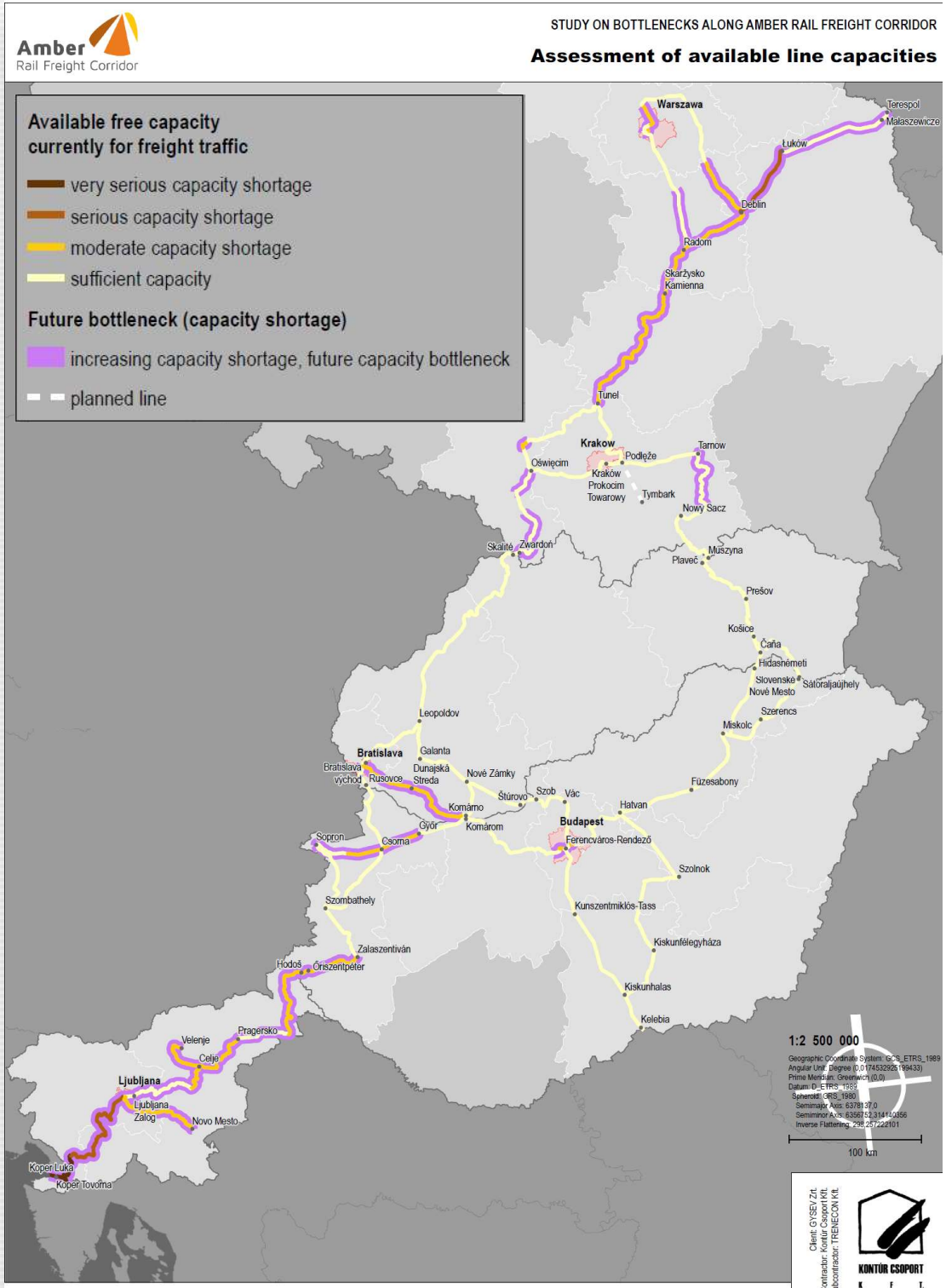
- Forecast based on Transport Market Study of RFC Amber (TMS) for the short term; correlation with GDP forecast and population projections
- Impact of COVID19 pandemic is considered (based on OECD data)



- EU Reference Scenario (2016) – to 2030 and 2050
- Growth in China and in the world based on long-term EUROSTAT/PWC data not considering COVID-19
- Forecast assumes that EU policy objectives for TEN-T network will be accomplished as planned

3.8 CAPACITY UTILIZATION

- Calculation methodology of capacity utilisation differs by country – only descriptive categories from ‘sufficient capacity’ (means no capacity problem) to ‘very serious capacity shortage’ are mapped
- With the exception for the Koper – Divača and Luków-Deblin line sections, capacity shortage is not crucial
- Moderate capacity shortage is present on some sections, mainly overlapping with other RFCs and in urban areas
- Node bottlenecks are also present (marshalling yards, border stations and junctions)



3.9 INFRASTRUCTURE AND CAPACITY BOTTLENECKS

Methodology of identification and evaluation:

Infrastructure bottlenecks: defined by the complexity of parameters of the main infrastructure elements that fail to ensure interoperability and TEN-T requirements for core network, considering sections and also nodes where capacity is found inadequate to manage future freight volumes efficiently.

Classification of line sections by their relevance considering:

- Definition of **section relevance** (RFC, TEN-T designation and traffic), where:
- Traffic category is based on current and forecasted freight train traffic

Additionally: the respective **compound index** of TEN-T compliance (infrastructure parameters) and **capacity availability**

The outcome: prioritisation of line sections for improvement

3.9 INFRASTRUCTURE AND CAPACITY BOTTLENECKS

Overall compliance of TEN-T requirements and further RU needs: the **Compound Index** – weighting of parameters

Parameter	Weight	Parameter values and their score in compound index					
max. train length	25%	≥740m	600-739m	400-599m	<400m		
		5	**4**	**2**	**1**		
axle load and linear load	25%	D4 22.5 t/axle 8 t/m	D3 and D2 22.5 t/axle, 7.2 and 6.4 t/m	C4 and C3 20 t/axle 8 and 7.2 t/m		C2 20 t/axle 6.4 t/m	A- <16 t/axle <5 t/m
		5	**4**	**3**		**2**	**1**
line speed	10%	≥100 km/h	80-99 km/h	50-79 km/h	<50 km/h		
		5	**4**	**2**	**1**		
restrictions	10%	No or not significant permanent restriction	Justifiable speed limit (geometry, station etc.)	Moderate or only local speed limit (track, structure condition, crossing)		Serious speed limitation (on significant length)	
		5	**4**	**3**		**2**	
max gradient	10%	≤4.5‰	4.5-9.0‰	9.0-12.5‰	>12,5‰		
		5	**4**	**2**	**1**		
loading gauge	10%	≥P/C400	≥P/C400 but administrative restriction		<P/C400		
		5	**4**		**3**		
ERTMS	10%	GSM-R & ETCS L2	GSM-R & ETCS L1	GSM-R	no		
		5	**4**	**3**	**1**		

3.9 INFRASTRUCTURE AND CAPACITY BOTTLENECKS

The **Compound Index** is primarily a relative number, representing how much the section meets the TEN-T/TSI requirements and allowing to compare the sections to each other and rank them

Categorisation of RFC Amber sections by compound index:

Section quality compared to TEN-T requirements	Acceptable > 4.0	Fair 3.51 – 4.00	Poor 3.01 – 3.50	Very poor ≤ 3.0	Total
Poland	269km	317km	354km	300km	**1240km**
Slovak Republic	474km	189km	53km	-	**716km**
Hungary	289km	755km	212km	16km	**1272km**
Slovenia	110km	241km	-	162km	**512km**
Total	**1142km**	**1501km**	**619km**	**478km**	**3740km**

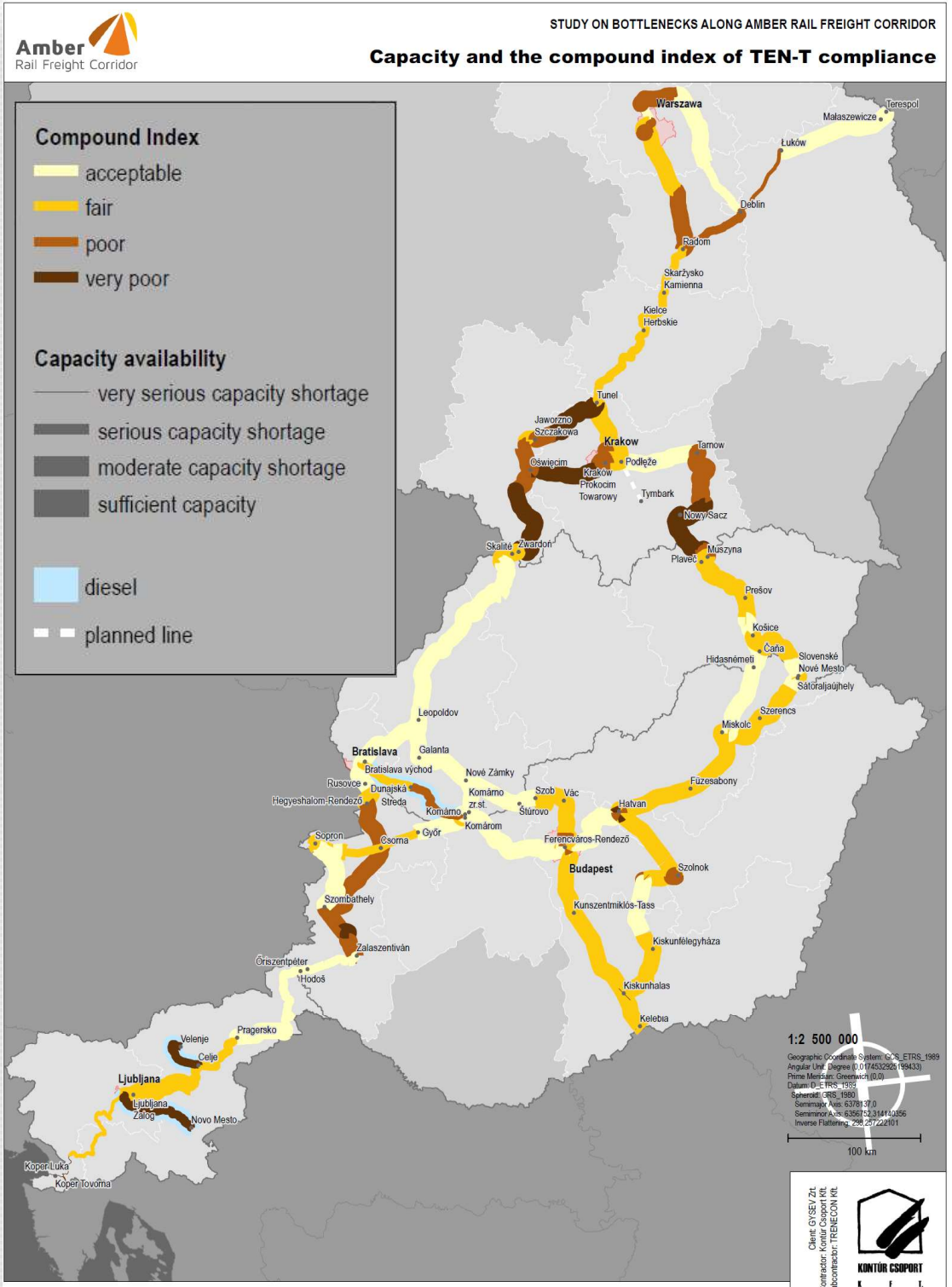
See next map for territorial distribution of sections with lowest and highest index.

Co-financed by the European Union
Connecting Europe Facility

3.9 INFRASTRUCTURE AND CAPACITY BOTTLENECKS

Capacity utilisation and the comparative categories of compound index by section

Sections having the worst Compound Index are far from fulfilling the infrastructure requirements



3.9 INFRASTRUCTURE AND CAPACITY BOTTLENECKS

Section Relevance – criteria for classification:

Criteria		
TEN-T	**RFC category**	**Traffic in % of RFC average**
core	principal	High: over 125%
comprehensive	future principal	Average: 125% - 75%
none	diversionary	Low: below 75%
	future diversionary	
	connecting line	

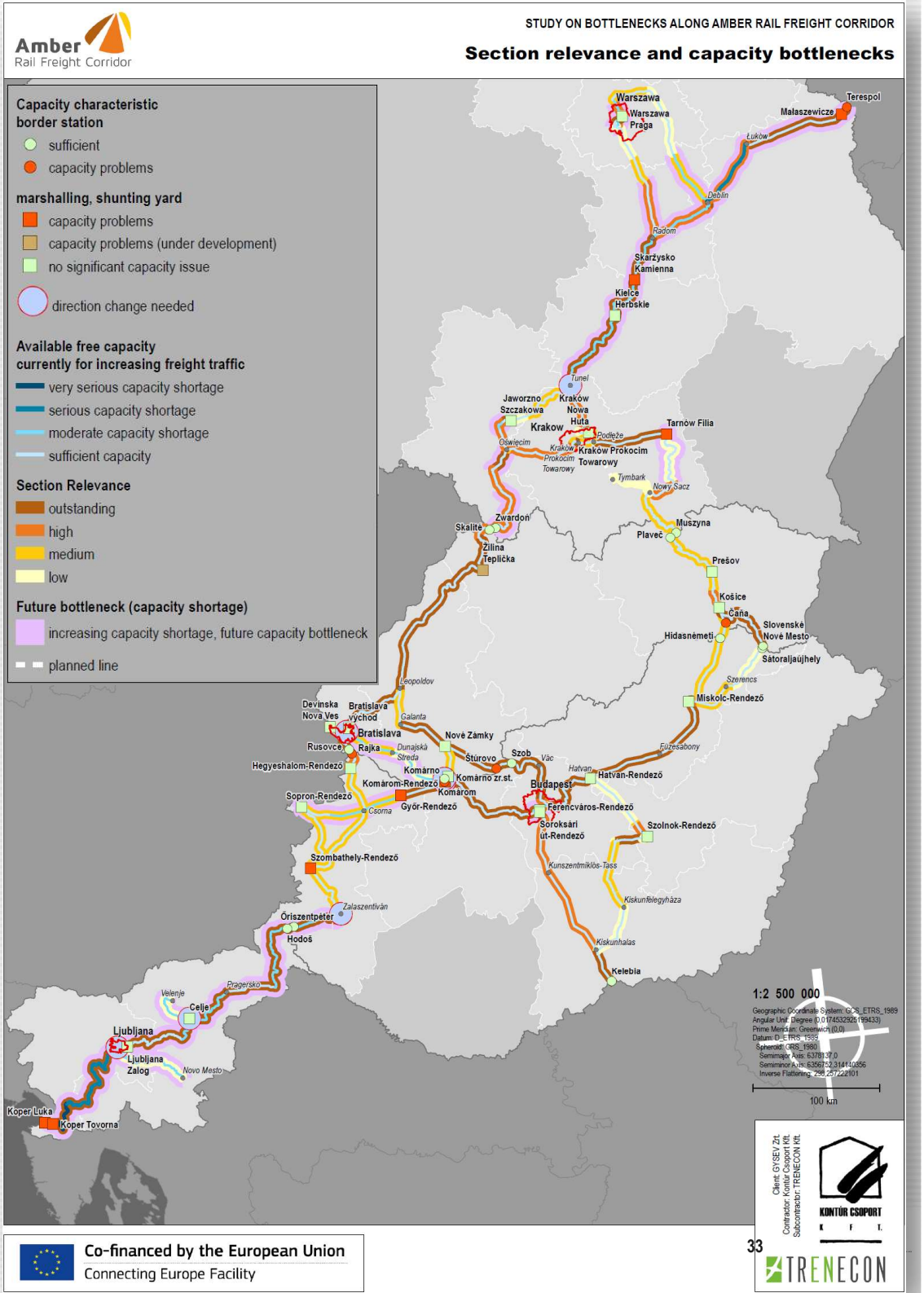
Section relevance is a combination of the above three criteria designating the particular section into one of the four relevance categories (see next map):

- outstanding
- high
- medium
- low

Co-financed by the European Union
Connecting Europe Facility

3.9 INFRASTRUCTURE AND CAPACITY BOTTLENECKS

Section relevance (combining traffic volume and TEN-T/RFC network role) and capacity issues, missing links at lines and nodes

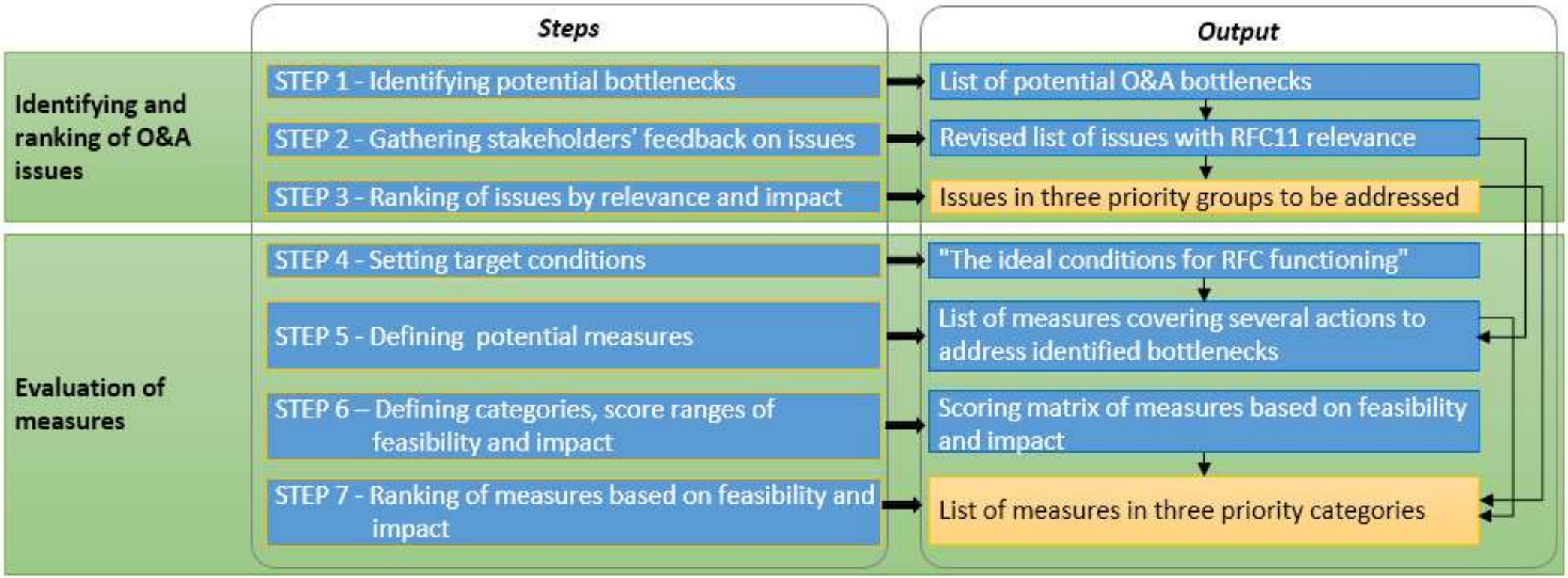


Bottleneck Study

Identification of operational-administrative bottlenecks

Co-financed by the European Union
Connecting Europe Facility

3.10 EVALUATION METHODOLOGY – OPERATIONAL, ADMINISTRATIVE ISSUES AND MEASURES



Co-financed by the European Union
Connecting Europe Facility

3.10 OPERATIONAL AND ADMINISTRATIVE BOTTLENECKS

Background:

- Limited direct input from RUs, generic RFC issues
- Limited experience RFC Amber in operation since 2019
- Bilateral agreements concerning international rail freight are in place
- Co-operation, harmonization efforts are underway
- Sector policy objectives (Sector Statement)
- IT tools, guidelines, handbooks (RNE activity)

Co-financed by the European Union
Connecting Europe Facility

3.10 OPERATIONAL AND ADMINISTRATIVE BOTTLENECKS

Methodology of identifying and evaluating O&A issues:

- Desktop research – assumed bottlenecks identified
- Questionnaire survey – IMs, RUs
- General ranking by relevance, impact based on feedback
- Understanding causes of issues

Co-financed by the European Union
Connecting Europe Facility

3.10 OPERATIONAL AND ADMINISTRATIVE BOTTLENECKS

Categorization of identified bottlenecks by relevance/impact

Bottleneck	Ranking: impact category
1. CAPACITY MANAGEMENT	
1A - Path allocation procedure via C-OSS is inadequate	medium
1B - PaP parameters and RC fail to meet market requirements	high
1C - Limited applicability of the PCS and reliability of data	low
2. COMMUNICATION	
2A - Communication difficulties at handover points, borders	high
2B – Poorly functioning interfaces between national IT tools and the RNE tools	medium
2C – Inadequate coordination and sharing information on capacity restrictions, disturbances	high
2D - Insufficient language skills of staff	medium
3. TRAFFIC MANAGEMENT	
3A - Ineffective arrangements, processes at border crossings	high
3B – Low reliability of RFC trains impacts competitiveness	medium
3C – Competitive re-routing, contingency measures for traffic disturbances/TCRs are not available	high*
3D – RFC traffic management staff is not properly prepared	low
4. ADMINISTRATIVE ISSUES	
4A - Cross-border interoperability difficulties due to lack of harmonisation of national rules	high
4B - Not transparent, calculable procedures and charging in case of multimodal transport	medium
4C - Long technological times of forwarding outside the EU	medium

Co-financed by the European Union
Connecting Europe Facility

Bottleneck Study

Measures to eliminate infrastructure bottlenecks

Co-financed by the European Union
Connecting Europe Facility

3.11 INFRASTRUCTURE – PROPOSED MEASURES

Definition of intervention priority of sections, main steps are:

a) Prioritizing, ranking the lines according to their TEN-T infrastructure compliance (compound index) and section relevance

b) Setting target conditions and corresponding types of interventions to reach the targets and consequently eliminate the bottleneck(s)

c) Definition of measures by line sections and nodes to support RFC Amber developments, assessment of feasibility and time frame

The intervention priority is based on the compound index value and the section relevance

Investment priority groups are:

1. improvement imperative
2. intervention proposed
3. desired for optimal RFC performance

Co-financed by the European Union
Connecting Europe Facility

3.11 INFRASTRUCTURE – PROPOSED MEASURES

Methodology:

Matrix for prioritisation of sections considering compound index and section relevance

Section relevance: / Compound index:	outstanding	high	medium	low
≤ 3.0 very poor	1	1	1	2
3.01 – 3.50 poor	1	1	2	3
3.51 – 4.00 fair	1	2	3	3
4.00 < good	2	3	3	3

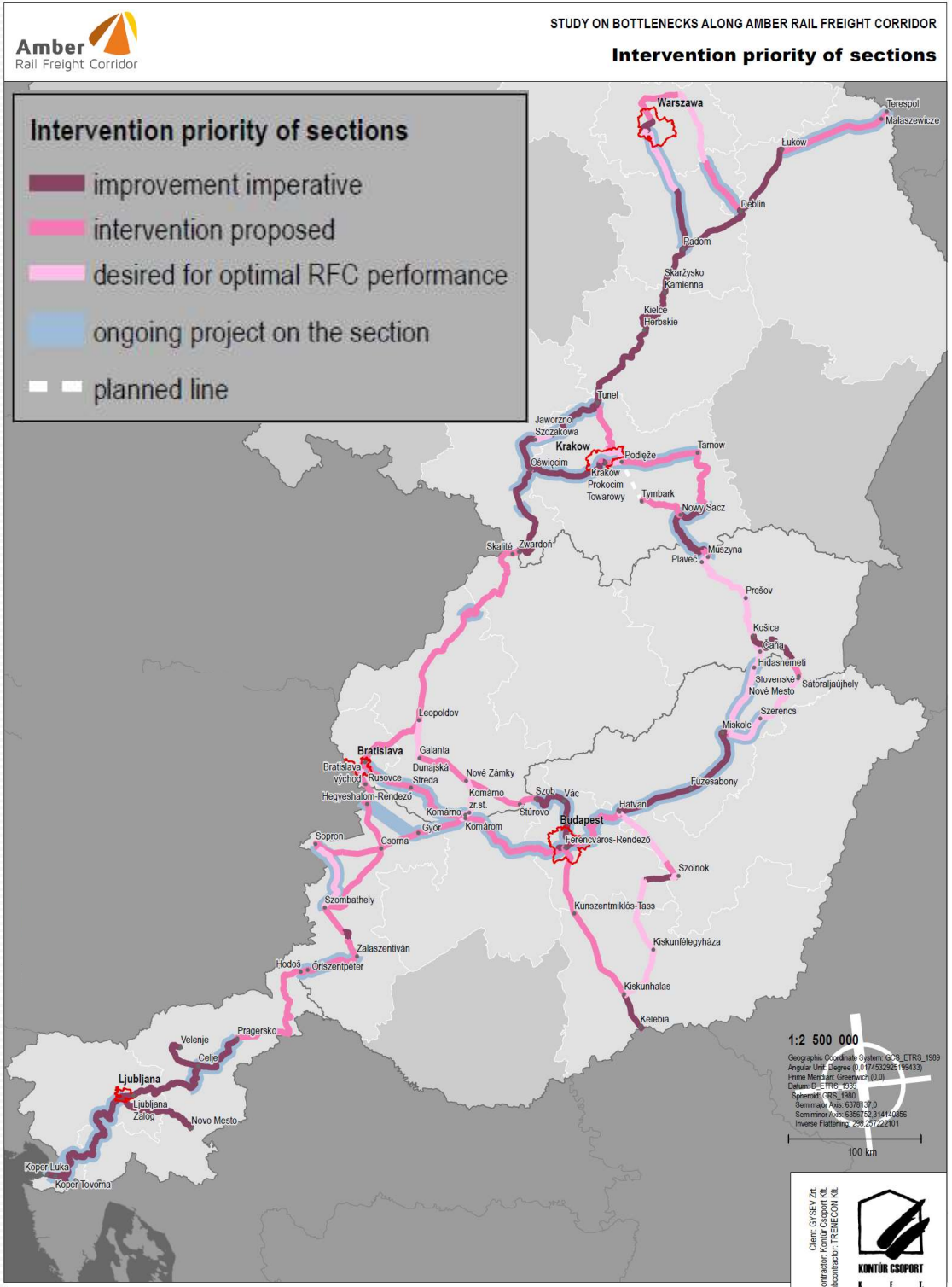
Target conditions: TEN-T Guideline requirements and further RU needs, sufficient infrastructure capacity for future traffic

Co-financed by the European Union
Connecting Europe Facility

3.11 INFRASTRUCTURE – PRIORITY OF LINE SECTIONS

Improvement priority groups of sections for overall functioning of RFC Amber

Not reflecting national preferences (passenger traffic, other corridors' freight flows etc.)



3.11 INFRASTRUCTURE – PROPOSED MEASURES

Types of measures/intervention categories

- New line/new section construction
- Upgrade to TSI requirements, by distinguishing where:
  - Full reconstruction/upgrade is needed (e.g. to increase axle load)
  - Partial upgrade is needed (ERTMS, train length, restrictions etc.)
- Capacity enhancement (combined with upgrade where needed)
  - of line sections
  - of sections being part of an urban node
  - of stations (marshalling yards, border stations, nodes, junctions)

Considering feasibility of interventions (complexity, cost, interdependencies)

Co-financed by the European Union
Connecting Europe Facility

3.11 INFRASTRUCTURE – PROPOSED INTERVENTIONS ON LINES

Proposed types of interventions for improvement and their time frame

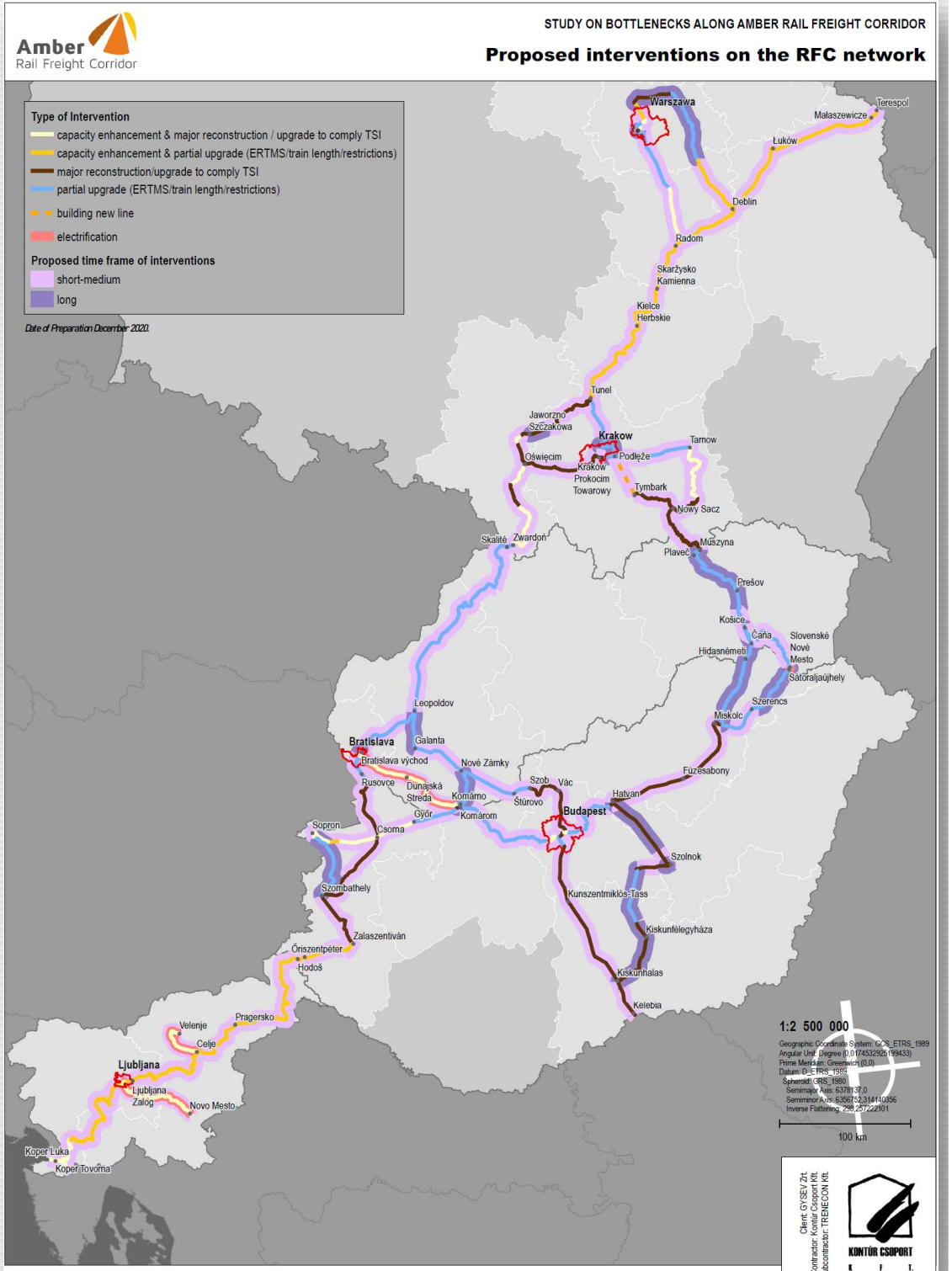
Time frame is defined by the intervention priority and also other obligations (e.g. TEN-T Core 2030)

Type of Intervention

- capacity enhancement & major reconstruction / upgrade to comply TSI
- capacity enhancement & partial upgrade (ERTMS/train length/restrictions)
- major reconstruction/upgrade to comply TSI
- partial upgrade (ERTMS/train length/restrictions)
- building new line
- electrification

Proposed time frame of interventions

- short-medium
- long

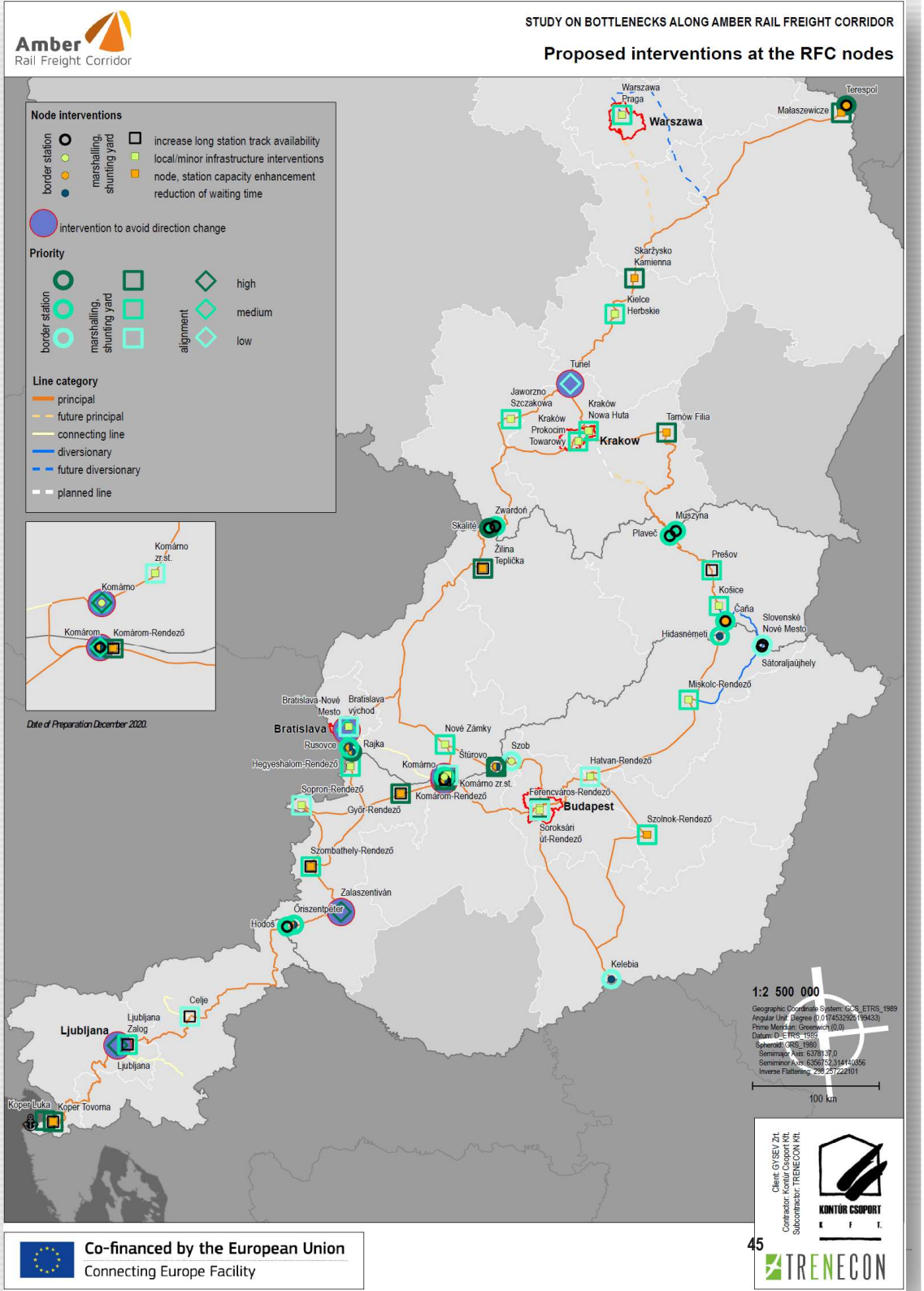


3.11 INFRASTRUCTURE – PROPOSED INTERVENTIONS AT NODES

Types of the station (or local) interventions and their priority

Station tracks of 740 m, marshalling yard and border station developments to increase capacity, upgrade infrastructure and reduce waiting time at borders

New triangle tracks for seamless traffic flow



3.11 INFRASTRUCTURE – PROJECTS IN THE PIPELINE

Ongoing developments, project proposals and plans by IMs

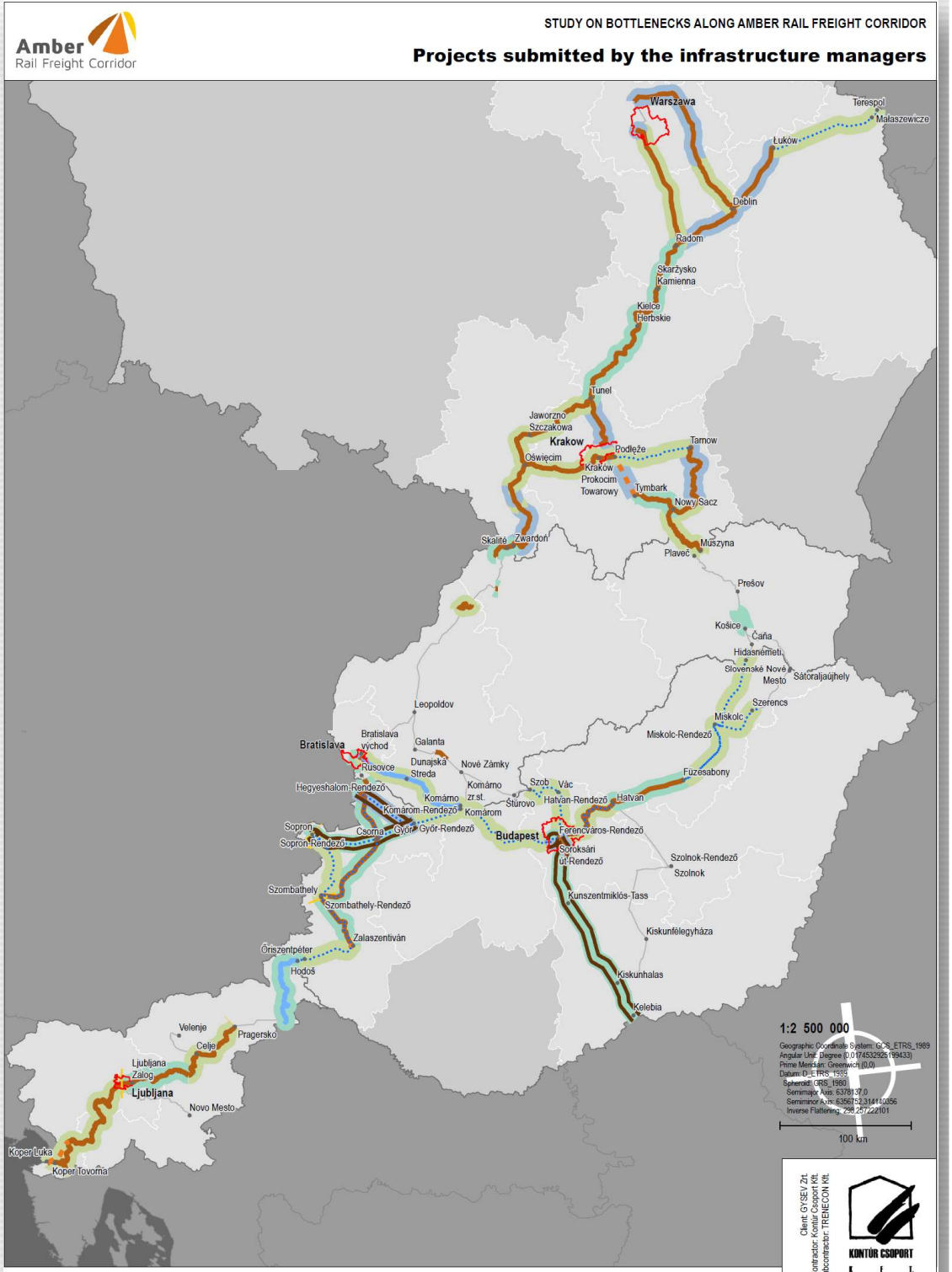
Supports the elimination of infrastructure and capacity bottlenecks

Project types

- upgrade to TSI requirements and 2nd track construction
- upgrade to TSI requirements
- ERTMS
- building new line
- station development
- other (capacity increase or partial reconstruction)

Time frame

- ongoing
- short term plan
- medium-long term plan



Bottleneck Study

Measures to improve operational-administrative bottlenecks

Co-financed by the European Union
Connecting Europe Facility

3.12 MEASURES TO IMPROVE O&A BOTTLENECKS
Methodology of evaluation

1. Setting target conditions for each bottleneck category
2. Definition of potential measures – based on main causes identified
3. Evaluation of measures based on feasibility and impact (interdependence) (MCA): Scoring of impact and feasibility of O&A interventions

Criteria category/score	1	3	5
impact	low	medium	high
feasibility	unrealistic	complex	feasible

4. Ranking of potential measures in three categories

Scoring categories to define O&A intervention priority groups

Ranges for priority group	4-9	10-14	15-20
Intervention priority group	desirable	to be considered	proposed

Co-financed by the European Union
Connecting Europe Facility

3.12 MEASURES TO IMPROVE O&A BOTTLENECKS

Ranking of O&A interventions by impact and feasibility score

Ref. no.*	Proposed measures	Issue impact	Total score	Priority category
1B	Enhance surveying and consideration of RU demand in PaP parameters and RC to offer competitive RFC capacity	high	18	proposed
2A	Actions to improve communication efficiency and transparency at national borders	high	18	proposed
2C	Interventions improving coordination in planning and sharing information on capacity restrictions, disturbances	high	16	proposed
3A	Harmonisation of processes and procedures at borders	high	16	proposed
3B	Interventions to ensure priority and increase punctuality of RFC trains	medium	16	proposed
3C	Develop efficient re-routing options, contingency for disturbances, restrictions	high	16	proposed
4A	Enhance cross-border interoperability by harmonisation of national rules, requirements and use of common IT platforms	high	16	proposed
2B	Improve functionality and reliability of RNE Tools for RFC Amber	medium	14	to be considered
1A	Ensure resources and increase role of a competent C-OSS for path allocation and capacity planning	medium	12	to be considered
2D	Improve language skills of staff and ease their communication by using standardized forms, messages with IT support	medium	12	to be considered
3D	Strengthen the role and capacity of RFC traffic management by preparing staff and exchange of experience	low	12	to be considered
4B	Simplify procedures in the multimodal transport chains and support freight forwarders in route planning, cost calculation and path reservation	medium	10	to be considered
1C	Improve applicability of the PCS and reliability of its data content	low	8	desirable
4C	Harmonisation of rules/legislation to ease administrative burden	medium	6	desirable

4. Summary, main conclusions

Co-financed by the European Union
Connecting Europe Facility

4 SUMMARY, MAIN CONCLUSIONS

- The evaluation is based on the data input of IMs/AB and RFC Amber documents like CID, TMS
- It is beyond the scope of the strategic-level Study to set an overall priority list of interventions and define project proposals
- National considerations, other network developments, availability of funding, etc. can affect implementation preferences, feasibility of individual actions
- However, the priority groups of interventions clearly indicate what sections (connecting stations or nodes) and at what level of development could mostly improve functioning, competitiveness of RFC Amber
- For more detailed definition of interventions (technical content, implementation framework), specific studies and designs have to be prepared
- Complex O&A issues require strong co-operation among Member States (IMs) concerned, often EU level harmonisation

Co-financed by the European Union
Connecting Europe Facility

4 SUMMARY, MAIN CONCLUSIONS

1. **Infrastructure and capacity bottlenecks, interventions**

   a. Most critical sections for the functionality of RFC Amber are those where current capacity is already insufficient.

   b. Infrastructure developments should focus on elimination of significant restrictions (axle load, speed, train length primarily) in sections

   c. Interventions at nodes should focus on capacity for long freight train handling and supporting seamless traffic flow along the lines

   d. Line bottlenecks are interlinked to problems at nodes and vice versa (e.g. punctuality, uncertain ETA at the border influences the unnecessary waiting time and RU efficiency, organisation)

   e. Relative priority of sections in each member states are set in the study to support decision making

Co-financed by the European Union
Connecting Europe Facility

4 SUMMARY, MAIN CONCLUSIONS

2. Operational and administrative issues, measures

a. Note the limited operational experience of RFC Amber

b. Theoretical order of measures – many have been long in the forefront of the sector (RNE)

c. Do not apply uniformly to procedures of all member states, IMs or handover points

d. Most of the identified issues have been addressed, efforts have been made for improvement at EU/RNE level or at other RFCs;

e. At EU/RNE level guidelines, IT support have been developed – they need to be adopted in RFC Amber management processes

Co-financed by the European Union
Connecting Europe Facility

Thank you for your attention!

Co-financed by the European Union
Connecting Europe Facility