

# Capacity Strategy 2026

Common document of

Infrabel, ProRail, ACF, SNCF Réseau, DB Netz AG, SBB Infrastruktur AG, BLS Netz AG, ÖBB Infrastruktur AG und RFI S.p.A

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## Disclaimer

With the present document, the participating Infrastructure Managers (IM) test an integrated approach for delivering future Capacity Strategies. In the spirit of TTR, the aim beyond the pilot is to reach an understanding of the expected content, which should be harmonized yet detailed enough to feed a single document that covers several, intricately connected networks. The step of a single, integrated Capacity Strategy among the participating IMs will be strived for Timetable 2027. Until then and in case of discrepancies (e.g., differences in scope of the information) between the present document and the national Capacity Strategies, the latter remain the reference documents.

## Introduction

TTR expects each IM to publish a Capacity Strategy until 3 years prior to timetable-change (X-36). General aim of the Capacity Strategy is to provide indication on key values of capacity planning, i.e., on changes in the availability of the infrastructure, Temporary Capacity Restrictions (TCRs or “negative capacity”) as well as on commercial capacity (“positive capacity”) for a given timetable.

The Capacity Strategy is the earliest TTR-planning instrument, based on which the Capacity Model (June 2023 for Timetable 2025) and, for some of the first implementing IMs, the Capacity Supply (January 2024 for Timetable 2025) will be developed.



Figure 1: Steps of the TTR process (Source: RNE)

## The present document

- aims at stressing the international character of TTR-end products by testing to which extent a common document can be pushed beyond borders to the benefit of consistency, coherence, and customer-friendliness,
- results from the MVP Capacity Strategy started 2021 among Infrabel, ProRail, ACF, DB Netz, SBB Infrastruktur, BLS Netz, ÖBB Infrastruktur and RFI,
- adds to but doesn't replace the national Capacity Strategy of each involved Infrastructure Manager,
- meets the requirements of RNE's Capacity Strategy Handbook, version 2.0<sup>1</sup>,
- focuses for Timetable 2026 on lines of international relevance,
- encloses four main chapters:
  - Description of the geographic scope
  - Expected permanent changes in infrastructure capacity,
  - Expected Temporary Capacity Restrictions (TCRs) with major impact,
  - Expected traffic flows, whereby the values displayed apply for Timetable 2026 to relevant border points within the geographical scope.

The Capacity Strategy targets applicants as well as their end customers, service facilities and terminals, policy decision makers as well as any other stakeholder of rail capacity planning and allocation.

The present document is non-binding. It applies to Timetable 2026 and is an updated version of the common Capacity Strategy 2025.

It is endorsed by the involved Infrastructure Managers.

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<sup>1</sup> [https://rne.eu/wp-content/uploads/2022/12/HB\\_Capacity\\_Strategy\\_2.0.pdf](https://rne.eu/wp-content/uploads/2022/12/HB_Capacity_Strategy_2.0.pdf)

## 0. Geographical scope

### 0.1 Relevant border points

The lines of international relevance were selected on basis of experience, starting from border points with the highest volume of international traffic, both passenger and freight. The relevant border points are listed in the following table:

	BDK	ProRail	InfraBel	DB Netz	PKP PLK	Správa železnic	SNCF Réseau	SBB Infra	RFI	ACF	ÖBB Infra
BDK				Flensburg Weiche/ Padborg							
ProRail			Roosendaal/ Essen, Meer/ Hazeldonk (HSL), Maastricht/ Visé	Kaldenkirchen / Venlo, Emmerich / Zevenaar, Bad Bentheim / Oldenzaal, Herzogenrath / Heerlen							
InfraBel		Roosendaal/ Essen, Meer/ Hazeldonk (HSL), Maastricht/ Visé		Aachen West / Montzen, Aachen Süd / Hergenrath			Aubange - Mont- St.Martin			Aubange/ Rodange, Kleinbettingen/Ster penich, Gouvy/ Troisvierges, Athus/Rodange	
DB Netz	Flensburg Weiche/ Padborg	Kaldenkirchen/ Venlo, Emmerich/ Zevenaar, Bad Bentheim/ Oldenzaal, Herzogenrath/ Heerlen	Aachen West / Montzen, Aachen Süd / Hergenrath		Frankfurt (Oder) Brücke/ Slubice/ Rzepin, Horka/ Wegliniec	Bad Schandau/ Decin, Schrinding/ Cheb, Furth im Wald/ Ceska Kubice	Perl/ Apach, Saarbrücken/ Forbach, Kehl/ Strasbourg, Müllheim/ Mulhouse, Wörth/ Lauterbourg	Basel Bad/Basel Bad Rbf / Basel SBB/Basel SBB RB		Trier/ Wasserbillig	Kiefersfelden/ Kufstein, Freilassing/ Salzburg, Passau/ Schärding, LindauReutin/Lochau - Hörbranz
PKP PLK				Frankfurt (Oder) Brücke/ Slubice/ Rzepin, Horka/ Wegliniec							

<b>Správa železnic</b>		Bad Schandau/ Decin, Schrinding/ Cheb, Furth im Wald/ Ceska Kubice		
<b>SNCF Réseau</b>	Aubange - Mont-St.Martin	Perl/ Apach, Saarbrücken/ Forbach, Kehl/ Strasbourg, Müllheim/ Mulhouse, Wörth/ Lauterbourg	St. Louis / Basel St. Johann	
<b>SBB Infra</b>		Basel Bad/Basel Bad Rbf / Basel SBB/Basel SBB RB	St. Louis / Basel St. Johann	Luino, Domodossola, Chiasso
<b>RFI</b>			Luino, Domodossola, Chiasso	Brennero, Tarvisio
<b>ACF</b>	Aubange/ Rodange, Kleinbettingen/St erpenich, Gouvy/ Troisvierges, Athus/Rodange	Trier/ Wasserbillig		
<b>ÖBB Infra</b>		Kiefersfelden/ Kufstein, Freilassing/ Salzburg, Passau/ Schärding, LindauReutin/ Lochau - Hörbranz		Brennero, Tarvisio

Table 1: Selected border crossings for MVP 2026

## 0.2 Geographic Scope

The above-mentioned border points connect in a network as shown in the following schematic map:

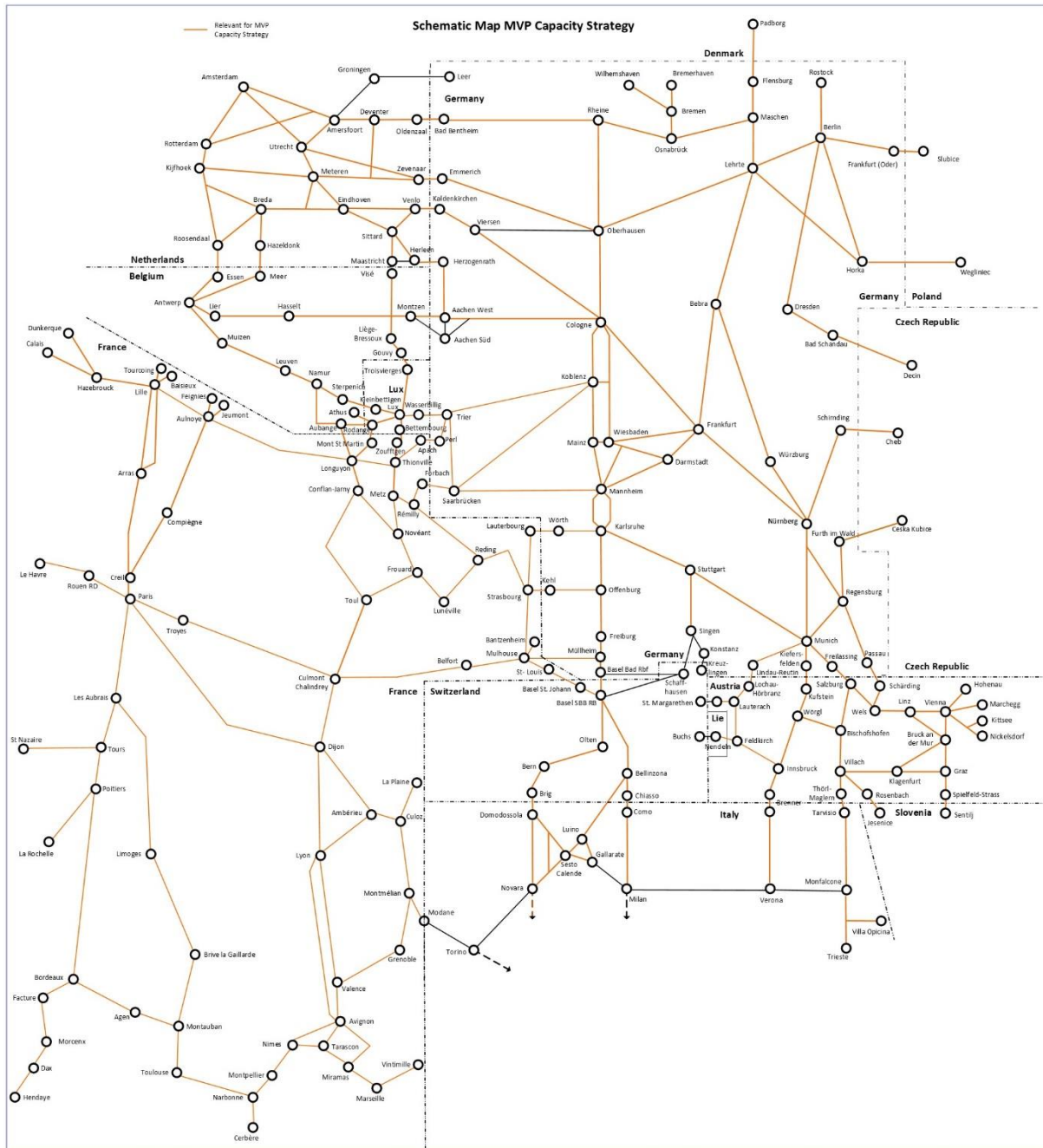


Figure 2: Schematic map MVP Capacity Strategy 2026

# **1. Expected Capacity of the Infrastructure**

## **1.1 General Principles**

The present chapter provides an overview of significant positive or negative changes to the available capacity for Timetable 2026.

The projects listed in this chapter fulfill the following criteria:

- Unlike TCRs which are mentioned in chapter 2, the project has a permanent impact on the available capacity,
- The project unfolds its effect on capacity for Timetable 2026. Subsequent Capacity Strategies will provide annual updates,
- The projects have a significant size and are located on network segments relevant for international traffic, whereby each Infrastructure Manager evaluates the fulfillment of this criteria on its own.



## 1.2 Additional Available Capacity

The following projects fulfill the above listed criteria:

Country	Network Segment	Description	Effect	Impact on capacity as of	Remark (e.g., to indicate status)
<b>2025</b>					
LU	Luxembourg Central Station	Track reorganization	Traffic segregation	12/2025	Risky
LU	L1 Luxembourg-Ettelbruck	Reorganization of the blocks	Increase of the capacity	12/2025	Risky
DE	Fulda	Extension track 258	Reduction of transport times in freight traffic, prevention of train path exclusion due to crossing of the tracks, use for overtaking of freight trains.	12/2025	Definitive
DE	Dresdner Bahn and ABS Berlin - Dresden	New double-track construction (incl. electrification) and removal of level crossings	Travel time reduction between Dresden and Berlin. Opening up the efficiency of rail corridor 7.	12/2025	Definitive
DE	Westheim (Schwaben) / Neusäß	Central passing track in the area of Westheim (Schwaben) / Neusäß. Electrification Bodenseegürtelbahn.	Increase in operating quality (higher flexibility in operation due to additional overtaking option), shortening of transport time.	12/2025	Definitive
DE	Subterranean rail station and redesign node Stuttgart	Stuttgart 21	Travel time reduction in regional and long-distance traffic. Prerequisite for the realisation of half-hourly intervals in long-distance traffic on the North-South corridor and Mannheim - Munich.	12/2025	Definitive

DE	Sulzbach	Simultaneous entries in Sulzbach.	Compliance with node times and self-turning in Schwäbisch-Hall Hesselental.	12/2025	Definitive
DE	POS North Ludwigshafen - Saarbrücken	ETCS POS North	Travel time reduction.	12/2025	Definitive
DE	Ulm	Optimised track plan.	Creation of required capacities for through connections on the southern line and to Neu-Ulm from NBS and Filstalbahn.	12/2025	Definitive
DE	Fulda Main Station	Electrification of stabling sidings 30 to 35.	Increase in operating quality and positive capacity effect through avoidance of empty runs to alternative parking locations; coverage of parking demand; relief of congested rail tracks	12/2025	Definitive
DE	Schlüchtern - Flieden	Block optimization in section Schlüchtern - Flieden.	Smoother operation and fewer capacity reducing braking processes.	12/2025	Definitive
CH	Liestal	<u>Liestal reversing track</u>	Prerequisites for the quarter-hourly S-Bahn service between Basel and Liestal.	12/2025	Definitive
CH	Basel SBB	<u>Basel SBB station upgrade</u>	Greater capacity due to adjustments to the track layout and to an additional platform on track 19/20.	12/2025	Definitive
CH	Basel - Ost - MuttENZ	<u>Basel-MuttENZ traffic segregation</u>	Prerequisite for increased services and punctuality.	12/2025	Definitive
CH	Basel SBB RB	Longer tracks D - Group	Performance enhancement for Basel SBB marshalling yard	12/2025	Definitive
CH	Liestal	<u>Liestal four track upgrade</u>	Traffic segregation thanks to 4 track upgrade.	12/2025	Definitive
AT	Western axis	Unterpurkersdorf, Tullnerbach-Pressbaum: Station refurbishments	Adapting infrastructure to local passenger traffic requirements and setting up a 760-m-track in Unterpurkersdorf	12/2025	Definitive

AT	Western axis	Seekirchen Süd; construction of new stop incl. transfer point and block post	Construction of a new stop, additional block post and transfer point	12/2025	Definitive
AT	Western axis	Gramatneusiedl, station refurbishment	Increasing switch speeds, erecting 760-m-tracks	12/2025	Definitive
AT	Western axis	Stadlau-national border near Marchegg; electrification and double-track upgrade	2-track upgrade, raise speed up to 200 km/h, station refurbishments	12/2025	Definitive
AT	Southern axis	Vienna Meidling-Altmannsdorf junction, 2-track upgrade	2-track upgrade	12/2025	Definitive
AT	Southern axis	Vienna Blumental-Wampersdorf, 2-track upgrade of Pottendorfer line	2-track upgrade, raise speed up to 200 km/h, station refurbishments	12/2025	Definitive
AT	Southern axis	Wampersdorf-Wiener Neustadt Hbf, raise attractiveness of line section	Raise speed up to 160 km/h, station refurbishments	12/2025	Definitive
AT	Southern axis	Graz-Weitendorf, needs-based upgrade (module 1)	4-track upgrade Graz-Feldkirchen, extension of track lengths at Puntigam station	12/2025	Definitive
AT	Southern axis	Graz-Klagenfurt; Koralm Railway	Construction of Graz-Klagenfurt high-capacity line	12/2025	Definitive
AT	Southern axis	Arnoldstein, station refurbishment	Construction of tracks for freight trains (760 m)	12/2025	Definitive
AT	Brenner axis	Construction of Vomp overtaking station	Construction of overtaking track (760 m) for freight trains	12/2025	Definitive
IT	Gorizia branch	Infrastructural	New single-track link to Slovenia	12/2025	Definitive
IT	Cressa-Fontaneto	750 m module	Adaptation to STI; Increased transportation capacity without changes in available train volumes	12/2025	Definitive
IT	Chiasso - Como - Bivio Rosales	Technological	Increase of capacity and regularity	12/2025	Probable

IT	Monza – Mi. Smist.	Technological and infrastructural	Increase of capacity and regularity	12/2025	Definitive
<b>2026</b>					
NL	Haanrade	Making switches operable for central control	Faster handling of freight trains from/to Haanrade possible. Shorter occupation times for the Heerlen - Herzogenrath section	05/2026	Risky
NL	Europoort	Electrification of 2 arrival and departure tracks	Freight trains with length of 740m can start/end at Europoort	2025/2026	Probable
NL	Venlo	Adjustments layout and longer platform tracks	Stopping with longer trains possible	2026	Risky
NL	Eindhoven Centraal	Adjustments layout east side	Shorter running times and more simultaneities	2026	Probable
NL	Maasvlakte	New railway yard Maasvlakte Zuid, construction of first set of 6 tracks for 740m long freight trains.	Capacity for more freight trains to/from Maasvlakte	Q4/2026	Probable
LU	Howald	Track reorganization and additional platform	Increase of the capacity, traffic segregation	2026	Definitive
LU	New line between Luxembourg and Bettembourg	Additional line	(Significant) increase of the capacity, traffic segregation	2026-2028	Definitive
FR	Hendaye / Irun	Y Basque	Capacity increase	2026/2027	Definitive
FR	TELT Saint Jean de Maurienne	Entry of Lyon-Torino Tunnel	Capacity increase	Q3/2026	Definitive
FR	Marseille	Racc de Moureplace	Re-open	2026	Definitive

DE	ABS/NBS Karlsruhe - Offenburg - Freiburg - Basel (1. & 2. construction stage)	ABS/NBS Karlsruhe - Offenburg - Freiburg - Basel (route section 9: Müllheim - Auggen; including four track expansion Weil am Rhein - Haltingen)	Capacity increase and travel time reductions as well as unmixing of long-distance and regional and freight traffic.	04/2026	Definitive
DE	Darmstadt-Eberstadt	Extension of existing passing loop to 740 m.	Drivability for 740 m trains.	06/2026	Definitive
DE	Baruth	Extension of existing passing loop to 740 m.	Drivability for 740 m trains.	07/2026	Definitive
DE	Wirtheim	Extension of platforms in Wirtheim.	Prerequisite for implementation for timetables from 2026 onwards. Avoidance of operational hindrances as well as excess holding times.	11/2026	Definitive
DE	Gardelegen	Creation of a new 740 m passing loop.	Drivability for 740 m trains.	11/2026	Definitive
CH	Maroggia	Track 2 lengthened for 750m trains	Elimination of stability risks.	11/2026	Definitive

Table 2: List of MVP-relevant infrastructure projects with positive capacity effects expected active by TT2026

### 1.3 Reduced Available Capacity

No permanent reductions in available capacity are planned for Timetable 2026.

## 2. Expected Temporary Capacity Restrictions with major impact

### 2.1 General Principles

Infrastructure Managers are required to plan TCRs following “Annex VII”<sup>2</sup>.

Annex VII sets the frame for TCR-planning, the aim of which is to promote early planning, international coordination among Infrastructure Managers, transparency towards Applicants and planning stability. Ultimately, it pursues the goal of increased performance and competitiveness of rail services.

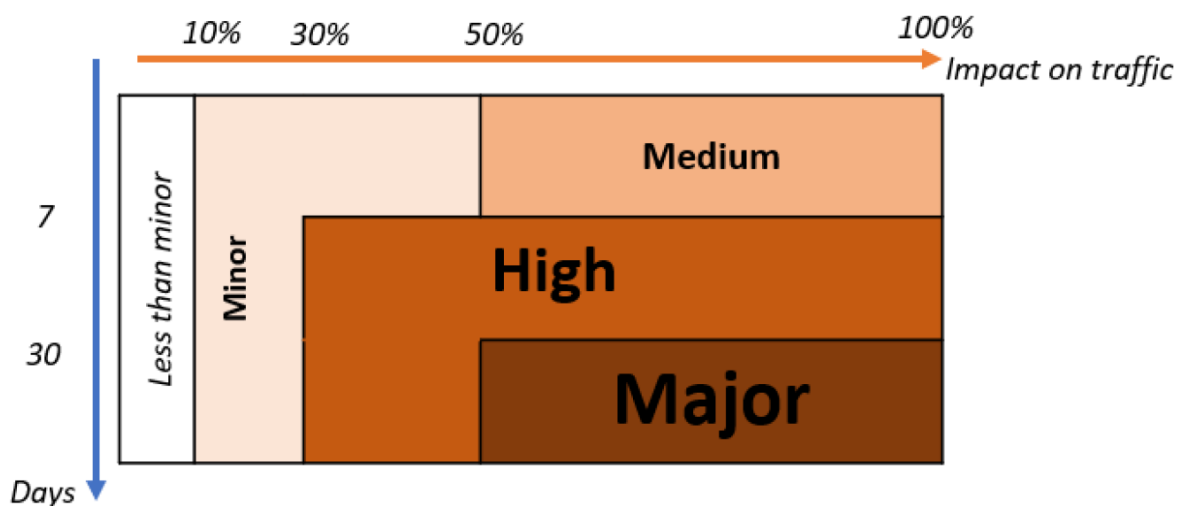


Figure 3: Overview of Annex VII-categories of TCRs (Source: RNE)

The TCRs listed in this Chapter fulfill the following criteria:

- The TCR falls in the category of major TCRs in Figure 3
- Within this category, the TCR is expected to have a significant impact on international traffic due to its duration, its volume and/or location. Each Infrastructure Manager evaluates the fulfillment of this criteria on its own
- The TCR will impact capacity of Timetable 2026, regardless of its start and completion date
- The TCR is financed

<sup>2</sup> COMMISSION DELEGATED DECISION (EU) 2017/ 2075 - of 4 September 2017 - replacing Annex VII to Directive 2012/ 34/ EU of the European Parliament and of the Council establishing a single European railway area (europa.eu)

## **2.2 National Specificities**

### **Infrabel**

The following chapter contains a summary of the TCR planning principles for Infrabel. The full version is available in the national Capacity Strategy document.

#### **TCR windows**

The maintenance of the infrastructure is repetitive in nature. Every asset must be maintained regularly with a frequency fixed by the regulation. Therefore, planning can be based on this regularity and does not have to start from scratch every time. By elaborating a regular planning, maintenance is facilitated, which will positively affect the availability of the infrastructure.

Tying the planning of maintenance to a recurring principle also means that less effort is required to create the planning. This will make the planning process more efficient. The rotation plan is part of the Capacity Strategy and the Capacity Based Planning (CBP) is developed to ensure that sufficient capacity is available to carry out the maintenance. At the same time, alternative routes for freight and long-distance passenger services are safeguarded.

The rotation plan is built out of a number of maps and a rotation schedule. The maps indicate how the trains will be rerouted in order to free up capacity for works. These maps apply on working days from Monday to Friday and consist of a grouping of multiple weeks where one rotation map applies. Every year, the rotation starts with a different map in order to ensure a fair spread of maintenance windows during winter and summer periods, and vacation periods. In 2022, the amplitudes of the maintenance windows are identified between the passage of the last commercial passenger train and the first commercial passenger train. From 2023, Infrabel will gradually extend the range of maintenance windows to 6 hours.

#### **Regular TCRs**

Long-term TCR-planning is based on:

- Infrabels multi-annual investment plan,
- Long-term programmes for major projects,
- Long-term programmes for renewal works (classic major works).

All available information relating to major construction projects announced in the long term that may have an impact on traffic (government projects, SNCB-Stations modernisation projects for stations and major private projects located near the railway lines, etc.).

Infrabel plans TCRs in different coordination phases, in order to align the planning of the different types of TCRs with the particularities of Infrabels network, with its needs in terms of resources and with the needs of applicants in terms of information, as well as in compliance with Annex VII of Directive 2012/34/EU.

### **Consultation Process**

As part of its task of providing information on the temporary capacity restrictions necessary to maintain, renew and extend its network, Infrabel draws up a schedule of works considering these TCRs and the routes or corridors that must remain free of any capacity constraints to ensure the continuity of traffic. To facilitate the planning of the works and to facilitate the consultation process, general recommendations are agreed between Infrabel and the applicants. Infrabel uses these general recommendations as a basis for determining which corridors should remain open and for coordinating the annual planning of the works. The TCRs and the routes left open are published annually in the form of a Corridor Book. This Corridor Book is made available to applicants on the Infrabel Business Corner.

### **ProRail**

For harmonization purposes this chapter is a slightly restructured and, on some points, summarized version of the TCR chapter in the ProRail national Capacity Strategy document. The principles in this chapter are based on the working method for the timetable year 2023. Known trends and developments that are important for the design, planning and allocation of TCRs are added.

The “Corridor Book” contains a more detailed elaboration of many of the planning rules for regular TCRs mentioned in this chapter, specified by line, section or location. The Corridor Book 2024 is available for applicants through the ProRail Logistics Portal<sup>3</sup> (currently in Dutch only). The Corridor Book describes:

- The standard deviation routes for freight and passenger traffic
- Sections which cannot hold planned TCRs simultaneously

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<sup>3</sup> <https://prorailbv.sharepoint.com/sites/LogistiekPortaal/SitePages/spelregels.aspx>



- Standard path alteration solutions in case of TCRs

## **TCR windows**

The capacity for maintenance is currently out of balance: contractors' working schedules do not fit well with the Maintenance Windows model. ProRail is investigating necessary adjustments of the model, including duration, day of the week, (non-)total closure and frequency, in the study "Maintenance Windows of the Future". Guiding principle is to limit the impact of the adjustments on traffic as much as possible. The results of the study can have consequences for the principles mentioned in this paragraph.

In addition, ProRail is looking for capacity to implement the results of the TWAS study concerning maintenance.

Maintenance Windows are allocated in the yearly timetable on all track sections in the Netherlands and facilitate TCRs for short-cycle maintenance as well as other minor TCRs.

In the Maintenance Windows, works can be planned without further consultation of RUs or coordination with neighboring IMs, both before and after the X-4 publication, provided that the works fit within a Maintenance Window in terms of duration, space and conditions.

The number of Maintenance Windows at a certain location depends on the historical and/or expected need for maintenance and projects. Also, additional Maintenance Windows can be planned on connecting track sections of the Maintenance Windows if no more traffic is possible there. In most locations, several Maintenance Windows are planned per week.

Maintenance Windows are planned throughout the network in such a way that (deviation) routes remain available on all days of traffic demand between the main origin and destination locations of freight trains and night trains, including border crossings with / locations in Germany and Belgium. The weekly recurring model of Maintenance Windows and the available routes for traffic is shown (at network level) in appendix E. This is the situation in 2023 and an indication of what the situation could be in 2026, taking into account the research referred to in the framed block at the beginning of this paragraph.

Maintenance Windows are mainly planned at night hours, are spread as much as possible over all nights of the week and are basically planned when there is as little traffic as possible.

In addition to Maintenance Windows at night, daytime windows are also scheduled, particularly at siding lines and yards.

Each Maintenance Window lasts at least 4 hours.

Each Maintenance Window is repetitive on a weekly basis, except:

- at locations where this is not possible due to traffic needs and the absence of diversion routes,
- if the demand for Maintenance Windows is so low that a bi-weekly or four-weekly schedule is also sufficient for performing works and reducing ad hoc impact to traffic as a result of ad hoc TCRs,
- if works require a TCR larger than the periodically scheduled windows, these are planned on a fixed date by means of a Low Frequency Maintenance Window or a Maintenance Window with Additional Conditions.

Maintenance Windows are designed on single-track and double-track sections so that work can be done safely. This often results in a total closure of a single-track or double-track section. Exceptions are made in order to keep large maintenance and service facilities accessible.

When changes are made to the infrastructure, the Maintenance Windows are redesigned. Maintainability is taken into account in the redesign of the infrastructure.

If there are any Maintenance Windows on a deviation route due to another TCR that has been planned earlier than the Maintenance Window, the Maintenance Windows will be cancelled. In the ad hoc phase, the cancellation of Maintenance Windows must be explicitly agreed.

Non-activated Maintenance Windows will be cancelled 12 days in advance.

Exceptions apply. This term will be harmonized at European level in the context of TTR to 14 days in advance.

When planning the Maintenance Windows simultaneously with the 7\*24-hour timetable of traffic (BasisDagen), conflicts between the Maintenance Windows and trains are being solved.

As a result of TTR, this procedure may be revised as Maintenance Windows will be part of the Capacity Supply from a timetable year to be determined.

### **Regular TCRs**

In this paragraph, “Regular TCRs” are referred to as “TCRs”.

The spatial extent of a TCR does not exceed the size needed for the safe execution of the planned works. This includes a safety zone. In addition, tracks whereas a result of the works no train traffic is possible will be included in the possession.

Works are planned in total closures on single-track and double-track sections. As many activities as possible from different projects are executed simultaneously (clustering).

On multi-track sections and transport nodes (yards), the principle is to plan no total closures. When designing a TCR and clustering with other projects, a trade-off is always made between more impact during a shorter period of time or a solution with less impact for during a longer time. The trade-off is made on total impact and costs.

On all track sections, the maximum size (distance) of a TCR does not exceed pre-defined “sub-corridor” for reasons of quality of alternative passenger transport, unless this is technically not possible otherwise.

Depending on the results of the “Single-track working on double-track sections” study, this way of planning TCRs may be applied in the future. Safety, technical possibilities and sufficient residual capacity are the most important aspects that are taken into account.

The duration of a TCR is depending on the planned works (no longer than necessary), taking into account a time buffer to prevent exceeding the planning. Usually, the duration of a Medium or High impact TCR consists, if there are no particular interest of applicants, of a full number of days and one adjacent night.

There is a shift to a more rational assessment between impact on traffic and costs. As a result of this, it can be expected that in 2026 TCRs are less often split up in 2-days TCRs planned during weekends. Additionally, see the last point mentioned in paragraph 4.3.1.3.

The duration of a TCR is typically chosen between the end of the passenger service in the evening and the start of the passenger service in the morning, taking into account the interests of freight traffic and long-distance passenger traffic.

The exact starting and ending times of a TCR is set 23 weeks in advance. The time setting of the TCR is optimized for the train service as much as possible, while the duration of the TCR remains unchanged. This process might be changed as a result of TTR.

The planning of TCRs takes into account:

- The availability of deviation capacity (one or more deviation routes)
- Works on border route sections / deviation routes abroad (in coordination with neighboring IMs, including the Aachen-Montzen border section between Belgium and Germany)
- Major public events
- Accessibility of large maintenance facilities for rolling stock
- Accessibility of service facilities
- Accessibility of terminals and shipping companies
- Road works and local railway works
  - causing extra train passengers
  - needed for alternative transport (“buses”)
  - accessibility for local traffic and emergency services (availability of level crossings)
- Avoiding peak deployment of scarce resources from contractors (mechanics), suppliers of switches and software suppliers
- Minimum intervals between TCRs of the same project due to their construction planning
- Avoiding simultaneous impact on multiple sides of a transport node
- Avoiding simultaneous impact in several sections of a main passenger flow
- Spreading the impact over time for passengers on the level of track sections and main passenger flows
- Minimum intervals between software changes at Rail Traffic Control Centers
- Impact on traffic (see paragraph Impact of TCRs)

To achieve a feasible planning of TCRs for contractors and an economically responsible deployment of resources, ProRail is committed to more equally spread works throughout the year and over the days of the week. To this end, more often than before, TCRs will be planned outside weekends and holiday periods. When choosing activities to be done outside weekends and holiday periods, impact for passengers,

costs for freight RUs, feasibility of the alternative transport, the use of critical resources and a spread of the extra impact across RUs and regions are the most important factors.

When determining the number, duration and execution time of TCRs, in addition to the aspects mentioned in the previous paragraphs, an impact indicator is taken into account.

The impact is expressed in ERM (Extra Experienced Passenger Minutes) based on (weighted) extra travel time of travelers as a result of deviation or alternative transport.

An impact indicator for freight transport is under development (EGU, Extra Goods Hours).

As a result of the foreseen increase in the amount of works by ProRail, an increase in the impact must be expected. The basic principle is that the impact increases less than the increase of turnover ("Less more impact").

On a national level, ProRail aims to spread the amount of works and TCRs evenly over the years with a view to impact for all traffic, travelers, available contractor capacity and budgets.

ProRail is optimizing the work packages per track section ('sub-corridor') for several years, taking into account traffic impact. As a result, on sub-corridor level the number of TCRs can vary significantly from year to year.

ProRail plans activities spread as much as possible over all quarters, between holidays and non-holidays and between working days and weekend days

Minor TCRs, including preparation works and post-processing works for projects, grinding, inspections and repairs, are planned in a Maintenance Window.

If technically necessary or economically justified, longer TCRs are used (up to approx. 9 hours). These TCRs are usually planned in the night of a scheduled Maintenance Window and during the evening before.

The path alteration process (in the planning systems) as a result of TCRs is done after the (annual) path allocation process.

Standard traffic handling rules are leading in this. These are part of the annual timetable publication. If no standards apply, a customized solution can be developed, also as a part of the annual timetable.

If stabling capacity is in a TCR and those tracks cannot be used for stabling rolling stock, replacement capacity will be offered elsewhere. From the last node on both sides of the TCR, the route to the nearest alternative stabling yard is kept available, if necessary, by canceling maintenance windows.

Adjustments to annual timetable trains as a result of TCRs prevail to trains requested ad hoc.

The path alteration process due to TCRs will change as a result of TTR. The effective year of the change has yet to be determined.

ProRail is taking into account an 80-weeks TCR, with alternating single-track availability and total closure for international train traffic, for the construction of a third track between Emmerich and Oberhausen by DB Netz from the beginning of November 2024 to the end of May 2026.

Specific principles for the planning of TCR and TCR Windows during this period can be found in the national Capacity Strategy.

### **Consultation Process**

For large, usually multi-annual projects with a complex construction phasing, a consultation with applicants is done in multiple meetings about the way the work will be done, preferably before X-30.

The result of this process step is a detailed plan that contains the available tracks during each construction phase and its duration, as well as constraints for the TCR planning. An alternative timetable could be agreed upon for one or more construction phases.

The phasing steps are fitted into the draft of the multi-year national TCR planning.

During the Masterplanning phase (X-29 to X-21), a first estimation is made of the capacity needs per project with an indication of the TCRs in terms of number, location, duration and the extent of the capacity restriction (total or partly closure). The cluster possibilities of TCRs on a line section are determined for the first time.

A first version of the national TCR planning is made and subject to a preliminary consultation with applicants and coordination with other infrastructure managers.

The result of this process step is a publication of Major and High TCRs at X-24 and a feasibility check on the planning possibilities of Medium TCRs on X-21. At the end of

this phase, the Masterplan is established, which sets out the projects that will be done in the primary focus year, with a view to the four subsequent years.

During the final planning phase (X-17 to X-12; for minor TCRs up to X-4), the exact size (at track level) and duration of the TCR is determined and consulted with applicants. Clustering of TCRs is finalized. The final national TCR planning is made, coordinated with neighbouring infrastructure managers, and consulted with applicants.

The TCRs with Minor impact are determined, incorporated into the planning of larger TCRs and consulted with applicants.

The result of this process step is the final publication at X-12 of all Medium, High and Major TCRs and at X-4 of all Minor TCRs.

### **Escalation process**

The dispute resolution procedure that applies to applications from applicants and the required capacity for TCRs is described in section 4.5.5 of the ProRail Network Statement.

### **ACF/CFL**

The infrastructure manager CFL is responsible of the maintenance of the rail network in Luxembourg, with the validation of operations by the entity ACF. All maintenance is validated in cooperation to ensure the availability of the network.

### **TCR windows**

CFL plans all the minor maintenance works in order to avoid disruption of the traffic.

The maintenance is divided in three categories:

- Small maintenance: planned when there is no circulation
- Maintenance during planned TCRs: some maintenance operations can be achieved during some TCRs areas. Train operators cannot use the areas, and this do not disturb the traffic.
- Planned maintenance: planned as defined in the TCRs guideline Annex VII deadlines. Enough windows are planned in order to ensure maintenance requirements.

The organization is planned with the respect of three steps:

- Clustering of TCRs to minimize gravity
- Areas where TCRs shall not be planned simultaneously
- Periods of punctual/regular TCRs (nights, weekends...)

On the other hand, all minor maintenance is integrated in the TCRs process. As the number of trains circulating during the night is rising, that this way of planning will have to change in the future.

For medium/major maintenance, the window can be considered during the summer period, between mid-July and mid-September, where the major changes can be operated.

### **Regular TCRs**

TCRs are collected in a tool communicated to all RUs licensed to operate on the Luxembourg rail network. Between X-42 and X-37, TCRs are collected and coordinated internally. At X-37, a first draw of TCRs is discussed between CFL and ACF to validate a basis for the discussion with other IMs and RUs. Mainly, the known TCRs at that point are major and high TCRs. Nevertheless, also medium TCRs are treated at this date if known.

At X-25, all the known TCRs are published. Major and high TCRs should stay fixed at this moment. In line with the publication requirement of Annex VII, at this stage meetings are organized between IM (one IM or also neighboring IMs) and RUs, and the TCR-List is distributed to the meeting participants (and all interested RUs) by E-Mail.

If any major or high TCR must be changed after this date, the process requires a validation of the changes from the RUs.

At X-13, the infrastructure manager proceeds to the second publication. At this stage, if known, the medium and minor TCRs are published.

### **Consultation process**

The IM prepares exchange meetings with the RU in order to correctly transmit the available information.

After agreement, the planning is validated by ACF. Once the TCR planning is agreed, it will be transmitted to the RUs by the IM, and the planning will be available on the ACF website for consultation.

### **SNCF Réseau**

SNCF-R offers two permanent alternatives, the first is a modify request outside the periods impacted by TCRs. The second is a modify request for alternative path: The



impact of TCRs is limited by using alternative routes when the infrastructure facilities allow it. The general principle is to keep always at least one of the paths open. The two courses can be not equal in time, it is then necessary to apply compensation.

### **TCR windows & regular TCRs**

The capacities allocated for works needs are the object of "works windows" defined on sections with windows. Several types are available:

- "Generic windows" ("correctives" and "surveillance") corresponding to capacity for the most common works carried out during periods of reduced commercial demand.
- "Distorted windows" applied to a limited number of weeks and likely to have a significant impact on train paths.

With regard to the station zones and railway hubs, these are not the object of windows, bearing in mind the wide variety of railway routes that may be shared to operate there. These zones are the subject of "works capacities" on sections/tracks without windows.

For such operations, SNCF Réseau will base its decisions case-by-case on efforts to strike the best possible technical and economic balance, which may result in the following operational measures:

- total stoppage of traffic for a given period on the track concerned or on both tracks, if necessary.
- temporary speed restrictions (TSR) on the track concerned and on adjacent tracks.

### **Consultation process**

SNCF Réseau communicates to candidates before November Y-3 the category 1 RTCs planned on the national railway network. At the request of the candidates, SNCF Réseau must provide a comparison of the conditions encountered, with at least two capacity restriction scenarios. SNCF Réseau draws up these alternative scenarios on the basis of the information provided by the candidates at the time of their requests and jointly with them. The comparison must, for each scenario, include the following elements at the very least:

- the duration of the capacity restriction,
- the indicative amount of infrastructure user fees,
- the available capacity on the diversion routes,
- the alternative routes available,

- the indicative journey times.

Before making a choice between alternative capacity restriction scenarios, SNCF Réseau consults with the candidates concerned and considers the impact of different scenarios on these candidates and on the users of services.

All candidates (including AOTs) may participate in the works consultation bodies (presentations of works portfolios, consultations on generic windows/exclusion days/alternative routes, reviews of macro axes and consultations of high capacity impact (FIC) work sites, preparatory meetings, work impacts consultation bodies (RPO, etc.), regional technical committees) according to the following conditions, while it should be remembered, in accordance with the law, that SNCF Réseau shall remain, in the final analysis, the sole party able to decide on the allocation of capacities and the planning of work:

- only candidates that have formulated expressions of needs of commercial capacities (or, as a minimum, have sent a prior letter of intent to SNCF Réseau for the order of capacities for the timetables concerned by such bodies) are able to speak at such meetings. In the event that several representatives (e.g., AOT and railway undertaking) express the same need, only one of them (to be appointed between them) will be authorized to take a final position, with the other nevertheless able to speak during discussions,
- the other candidates (i.e., those who have not formulated expressions of needs as indicated above) may attend discussions as observers.

SNCF Réseau shall remain the sole decision-maker with regard to capacity allocation and the planning of works.

The following table lists, based on what already exists at the date of publication of this Network Statement, these bodies, the pilot body within SNCF Réseau and the deadlines for holding the discussions. These bodies may change over time, with regard to developments in the associated processes.

If they wish to participate in these bodies, candidates are invited to contact their dedicated national or regional account manager or, if there is no identified contact person, the One Stop Shop to find out about the procedures for participation.

N°	Instance	Pilote	Période
1	<b>Présentation des portefeuilles de chantiers issus de la commande stratégique</b>	DGOP	Avril A - 3
2	<b>Concertations fenêtres génériques / jours d'exclusion / itinéraires alternatifs.</b> L'objet de la concertation est d'échanger sur les demandes d'évolution formulées par DGOP et par les EF.	DAC	Oct A-3
3	<b>Macro revues d'Axe / Concertation des chantiers FIC</b> Présentation aux EF des chantiers FIC avec les résultats des premières études capacitaires et présentation des macro-ordonnancements permettant de disposer de premières visions d'axe en termes d'interception et de LTV.	<u>DAC</u>	Nov. A-3
4	<b>Réunions de concertations Pré-RP0</b> Réunions de préparation des concertations relatives aux chantiers sur LGV et aux RVB/SR.	Infrapoles	Nov A-3 à Janvier A-2
5	<b>Réunions de concertations RP0</b> Réunions de concertations concernant les incidences des travaux sur les circulations	Infrapoles	Février à Juin A-2
11	<b>COTEC Régionaux</b> Suivi régional des instances capacitaires	Directions territoriales	Périodique

## DB Netz

DB Netz is currently revising its TCR planning processes according to Annex VII. A full implementation of Annex VII is expected to be achieved in calendar year 2027 for Timetable 2028. The processes of regular TCR-Planning, consultation and international coordination described in this Chapter are therefore subject to further adjustments that will be duly explained in the following Capacity Strategies.

### TCR windows

At DB Netz, a distinction is made between two instruments for considering maintenance work: maintenance corridors and timetable windows.

Maintenance corridors ('longer' closures, e.g., twice a year for one to two weeks at night, normally in track-changing operation) are planned during the medium-term capacity management phase, i.e., five to three years ahead, and processed up to X-26. Planning results are available as of X-26.

Timetable windows (regular – periodic – closures, e.g., one or two days a week for 6 hours for a longer period of up to one year) are planned two years ahead and processed by X-21. Planning results are available as of X-21.

### Regular TCRs

DB Netz is gradually introducing a TCR-planning process structured in three consultation phases. The first consultation phase aims at the publication of high and

major impact TCRs until X-24, whereas the second consultation phase aims at the publication of high and major impact TCRs as well as of medium impact TCRs until X-12. The third consultation phase is dedicated to minor impact TCRs to be published until X-4.

DB Netz further detailed the TCR fourfold typology of Annex VII into eight TCR-categories from the lowest impact TCRs in Category 1 (very low time impact, less than 10% impact on traffic volume) to the highest impact TCRs in Category 8 (time impact over 30 days and impact on traffic volume over 50%).

DB Netz-internal category	Number of TCR consecutive days	Share in % of the estimated impacted traffic volume	Impact on other networks
1	Irrelevant	Up to 10%	Irrelevant
2	Up to 7	More than 10%	Irrelevant
3	Up to 7	More than 10% and up to 50 %	Yes
4	Up to 7	More than 50%	Yes
5	More than 7	More than 10% and up to 30%	Irrelevant
6	More than 7	More than 30%	Partly
7	At least 30	More than 50%	Irrelevant
8	More than 30	More than 50%	Partly

*Table 3: Further TCR-categorization on basis of Annex VII*

The impact on traffic volume is evaluated following a method that puts nominal capacity in relation with the estimated volume of path allocations in the relevant Annual Timetable.

The first consultation phase concentrates on bundling TCR-windows in space (“TCR-corridors”) and time (weekdays, weekends, days and/or nights) considering the extent of the capacity restriction (total or one-track-closure). The objective is to reduce the impact on traffic to the largest extent possible. The first consultation phase starts approximately forty months ahead of timetable change with the first publication of intended TCR-windows, the final draft of which are published X-24.

The second consultation phase focuses on updating the TCR-planning and detailing the effect of a TCR on path concepts following such criteria as total train routing, train routing from the end of the TCR-stretch to its destination, travel time incl. extensions

because of TCRs, network effects of a cancellation or a deviation, potential for further delays and operational costs. Depending on the outcome of the evaluation, the TCRs will be taken in the Annual Timetable as capacity not available for commercial use and around which annual path requests will be planned. The second consultation phase may include smaller TCRs, not considered during the first consultation phase.

The third consultation phase addresses non-ATT relevant TCRs.

### **Impact of the Program “High-Performance-Network” (“Hochleistungsnetz” or “HLN”) on TCR-Planning principle**

The aging German Railway network is being renovated and developed by means of a record-high number of TCRs. Considered against a dynamic demand for rail services, that number sets the network under capacity pressure resulting in a dramatically deteriorating service quality, as made visible by a steadily worsening punctuality. In this environment, DB Netz was asked in July 2022 to plan TCRs differently, using TCR-bundles for significantly extended periods of time whenever relevant.

The aim is to deliver a “High-Performance Network” on the main lines by 2030.

Goals of the Program are:

- robust components for a reliable Infrastructure,
- high equipment and configuration standards for a performing Infrastructure able to handle an increasing number of trains,
- attractive railway stations and replacement transport services during TCRs for a better customer experience,
- long, TCR-free periods of time after general renovation TCRs for better planning.

The Program is planned to start with a five month-total closure of the segment Frankfurt – Mannheim (“Riedbahn”, s. below, TCR #1) in the second half of 2024.

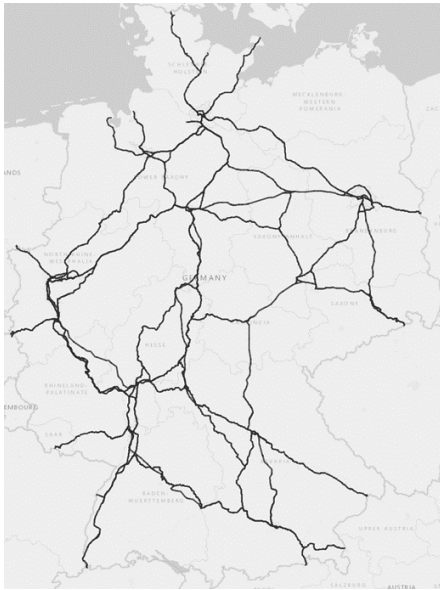


Figure 4: High-Performance Network 2030

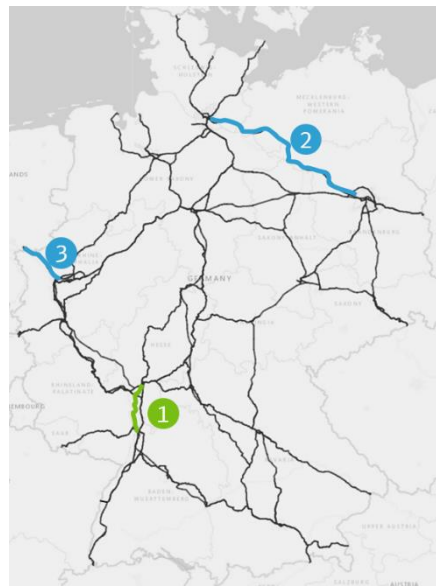


Figure 5: First three HLN-TCRs

Two TCRs are planned to follow in 2025, i.e., Hamburg – Berlin and the already known TCR Emmerich-Oberhausen.

HLN-TCRs for timetable 2026 will be communicated in March 2023. In addition, HLN-induced re-planning of already communicated TCRs cannot be excluded. DB Netz is currently reviewing possible changes for Timetable 2025 and 2026.

Notwithstanding communication using regular channels, an updated status will be added with the Capacity Strategy 2027 in December 2023.

Until then, the present Capacity Strategy displays by default the latest communicated TCR-planning status, as published on 19<sup>th</sup> of July 2022.

### **Planning of TCRs and diversionary lines**

DB Netz applies no “TCR-exclusion-zone” principle, following which a TCR on a line would automatically cause a TCR-exclusion on its diversionary line(s).

The multiplicity of routing options, that can reach for some TCR-corridors as much as three-hundred rerouting options for freight, the complexity of traffic flows on a network, the biggest share of which is used by several market segments, requires the highest possible flexibility to best conciliate TCR-implementation and the lowest possible impact on available capacity.

By means of an algorithm, such TCR-exclusion may however be decided when TCRs on two or more “TCR-corridors” cause capacity usage on diversionary lines to overstep their maximum capacity, i.e., 125% of the capacity providing for acceptable quality standards (“Nennleistung”).

As an example, TCRs may be planned at the time on the left- and the right-bank of the Rhine, as long as either through a remaining available track on each side in case of single-track closure and/or the 125%-threshold is not reached on other potential diversionary lines – in our case the Altenbeken-line.

The earliest overview of diversionary lines and their estimated capacity usage on a weekly basis is delivered each year with the publication of TCR-corridors, on 1<sup>st</sup> August of each year (X-40)<sup>4</sup>.

### **Consultation and coordination**

DB Netz consults applicants and service facilities at three levels:

- Regionally, in seven areas corresponding to the regional subdivisions of DB Netz (North, East, Southeast, South, Southwest, Center and West), currently in March and October of each year covering multiple time periods.
- Nationally, currently in July of each year, covering multiple time periods as well.

On regional and national levels, DB Netz starts this process at X-40. Nonetheless, this consultation process is under revision and will be adapted in the next few months to better match Annex VII-requirements.

- Internationally, in seven areas: from/to Belgium and The Netherlands, Scandinavia, Poland, the Czech Republic, the Brenner Corridor (Austria and Italy) Switzerland as well as France, Luxemburg and the South of Belgium. The mapping considers traffic flows and diversionary options in case of TCRs on a line of international relevance.

Regional and national consultations are organized around two instruments:

- meetings (“*Bau- und Informationsdialog*” or “TCR an Information Dialog”), during which DB Netz informs and Applicants may comment

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<sup>4</sup> S. Annex A for an overview on of capacity estimates on diversionary lines to TCR windows published on 16<sup>th</sup> July 2022 for Timetable 2026.

- online observation phases, following which Applicants are given the opportunity to deliver an opinion in written form

International consultations in the Annex VII-target picture are organized in meetings expected to take place in principle in early autumn (approx. X-39, X-27, and X-15) and in early spring (approx. X-31 and X-19). The exact month of consultation depends on how the milestones of all involved IMs can be coordinated to provide applicants with up-to-date information.

DB Netz considers the comments received to the extent possible.

DB Netz plans to coordinate internationally with neighboring IMs in meetings that precede the consultation of applicants by one or few days. These coordination meetings are planned equally in early autumn and in spring. Aim of the coordination is primarily to ensure bi- or trilaterally coherent bundling of TCRs as well as a coherent estimate of remaining capacity on diversionary lines.

### **Escalation process**

DB Netz has agreed with its neighbor-IMs on no pre-defined escalation process. Aim of starting with coordinating information at the earliest possible stage is to identify planning inconsistencies when they can be repaired. For Applicants, escalation takes place within the regular national processes.

### **SBB Infra & BLS Netz**

Although Annex VII of EU Directive 2012/34 is not directly applicable to Switzerland, in practice a procedure is used that is largely in line with the deadlines set out in Annex VII.

As regards Switzerland, the effect on the transit corridors is shown below:

	Major impact TCR	High impact TCR
<b>Definition according to Annex 7 (EU directive)</b>	>30 days, more than 50% of traffic affected	>7 consecutive days, more than 30% of traffic affected
<b>Definition according to RailNAO Art. 11b</b>	-	>7 consecutive days, more than one third of traffic affected
<b>Publication of line closure according to RailNAO Art. 11b</b>	24 months before timetable change, updated 12 months before timetable change	



In the MVP, it was agreed that on the North/South Axis (RFC RALP) a single-digit number of TCR announcements across all capacity strategies should be targeted as a guideline in terms of quantity. For the capacity strategy TTR@CH, this means that as a rule, only a few – so-called "crucial major" or "once-in-a-lifetime" – TCR are published. As part of the business processes, SBB Infrastruktur has developed the following admission criteria:

TCR >90 days and more than 50% capacity restrictions.

### **Maintenance windows**

Handling the requirement for maintenance possessions:

Essentially, no distinction is made between the requirement for maintenance possessions or for renewal possessions. The medium-term requirement for possessions will be registered with the central planning office. As regards new maintenance windows, a study will be commissioned, and a rough possessions plan will usually be drawn up in the first instance; the detailed plan will be adjusted as required over the following years.

#### **GSM-R<sup>5</sup> / RBC<sup>6</sup> maintenance windows**

On ETCS L2<sup>7</sup> routes, technical maintenance work needs to be carried out and software updated at regular intervals on the RBC and GSM-R systems. For this work to be carried out, the relevant routes need to be completely closed on six simultaneous occasions (Sun to Mon nights) each year. The dates will be laid down for several years.

Two of these nights will be subject to total closures of around 4 hours which must be implemented on all ETCS-L2 routes at the same time. No additional possessions may be granted during this time. There is some flexibility as regards the other four nights. (Check whether there is any conflict with other projects, set priorities and, if necessary, impose certain restrictions on the maintenance windows).

#### **SBB "Maintenance Production 2025" project**

The aim of the "Maintenance Production 2025" (UP2025) project is to ensure that the timetable remains stable and that maintenance of the SBB network is undertaken over the long term; it also aims to increase productivity still further. UP2025 also plans

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<sup>5</sup> Global System for Mobile Communications – Rail

<sup>6</sup> Radio Block Center

<sup>7</sup> Overview map standard gauge network (Level 2 = light blue routes)

additional maintenance windows on top and main traffic routes. This aims to reduce the overall number of possessions and to optimize the length of those possessions.

### **Regular TCRs**

Applications for "major impact" TCRs must be registered with the construction department within the central planning office at X-43 months, followed by an initial cumulative assessment (regional, national and international) and by the definition of framework conditions by the relevant portfolio manager responsible for possessions.

Before the next step at X-26 months, the TCR request must be specified in greater detail and submitted in the form of an outline construction programme schedule. At the same time, any "high impact" TCR requests must be declared for the first time. The cumulative assessment will need to be updated and applications coordinated with other TCRs. A similar procedure will be used for "medium impact" TCRs at X-16 months.

Once a TCR has been received for evaluation and consultation, a rough, capacity-based plan will then be developed. The plan will then be presented to the RUs during a meeting for them to accept it.

### **Consultation process**

Once the outline replacement plan, based on residual capacities, has been accepted by the stakeholders involved (the RUs affected and, in the case of regional services, those cantons that place orders for them), the corresponding TCR will be approved for implementation. The replacement service plan, train by train, will be developed and resubmitted to the stakeholders six months before construction work starts. Stakeholders will then have about two weeks to evaluate the plan so that the final version will be available five months before construction work starts.

Depending on the duration and extent of the capacity reduction, the TCR will be published in the national network usage plan (NNP) and taken into account in the annual train path catalogue and timetable.

### **Approval and escalation procedure**

Possessions for construction works which, according to the definition, require an outline plan, will be studied within the outline plan framework, presented to the Steering Meeting (StM) Capacity Management and approved. All railway undertakings (RUs) and the Swiss train path allocation body (TVS) are represented at the steering

meetings. Plans are divided into "simple" (few implications for RUs) and "complex" (medium to serious implications for RUs). Stakeholders, and if necessary the cantons, will be involved proactively and at an early stage in the approvals procedures. This is especially true for "complex" plans.

Information is exchanged at meetings, during timetable workshops or by email. The RUs concerned, the TVS and possibly the canton (as the ordering party for licensed passenger services) are all involved, without discrimination, in order to discuss the details of the plan and the needs of all those involved and in order to find a common option. If it is of assistance, partners (e.g., planners, project managers) can also be involved. In the case of a complex plans, information may be exchanged before the StM or, in the case of a simple plan, after the StM (if appropriate).

If, despite a constructive exchange of views between the RUs, TVS and possibly the cantons, any outline plans are rejected twice during the StMs, or if no common solution can be found, the proposed plans will be escalated. Three escalation steps are provided for:

1. Regional committee
2. National committee: MAR6 (Medium-Term Service Provision and Resource Plans)
3. Top-level national committee: timetable sounding board

### **ÖBB Infra**

Measures for maintenance, inspection, servicing and renewal of facilities, as well as construction and expansion of the network are carried out in line with the "construction operations planning" process that corresponds with the provisions of Annex VII in EU Directive 2012/34.

ÖBB-Infrastruktur AG carries out scheduled construction work such that the effects on rail services are kept to a minimum.

When planning restrictions, it is carried out in accordance with the below premises:

1. Type of closure
  - Total closures (route closures) on double-track routes are only planned if it is wholly inevitable due to structural reasons and/or for employee protection reasons, and no other construction methods can be chosen at that point.
2. Importance of the route in the network / function of the route

- On international axes (with focus on the connection aspect), restrictions are kept as brief as possible so that the impacts on rail operations are minimized in terms of time.
- For routes on the remainder of the core network, as well as routes on the supplementary network (with focus on the access aspect), blocks are planned such that the access aspect (particularly for freight RUs) is maintained as far as possible. This is generally linked to a longer working period, or a longer period where restrictions apply.

### 3. Bundling construction measures

- If a restriction makes it necessary to temporarily amend the scheduled timetable for long-distance passenger traffic and use a back-up timetable (temporary schedule change), then other temporary capacity restrictions are bundled together in terms of time and location on the affected route section or axis so that the amended scheduled timetable with journey times that are generally longer can be ideally exploited.
- If a restriction makes it necessary to temporarily reduce volumes in the scheduled timetable (cancellations and/or diversions for local passenger traffic or freight traffic), then other temporary capacity restrictions are bundled together in terms of time and location on the affected route section or axis so that reduced capacity requirements can be ideally used for further restrictions.

### 4. Use of periods with reduced demand

- When planning restrictions, periods with lower capacity utilization (nights, weekends) are given priority. This should ensure that the effects on rail traffic are kept to a minimum.

### 5. Particular market requirements

- Specific customer requirements are already consciously included in the planning, if already known at the time of planning the restrictions.

## **TCR Windows**

On the network of ÖBB-Infrastruktur, regular maintenance windows are only scheduled for tunnel segments. The planning process for maintenance windows is analogous to the planning of regular TCRs caused by construction sites. Maintenance windows are usually planned in periodical intervals; however, the time and duration of the maintenance windows can be adjusted in case other Temporary Capacity Restrictions occur on adjacent lines or corridors. The maintenance windows are published online on the Web-BBP Construction plan website.

## **Regular TCRs**

The effects of railway infrastructure restrictions are largely dependent on the railway infrastructure that is available and the specific timetable framework.

Based on the provisions from Annex VII of “EU Directive 2012/34/EU for establishing a single European railway area”, expected restrictions are categorized as follows.

		Amount of train paths cancelled or re-routed per day			
		< 10%	10% – 30%	30% - 50%	> 50%
Duration of TCR	> 30 days	Kat IV	Kat III	Kat II	Kat I
	7 days – 30 days	Kat IV	Kat III	Kat II	Kat II
	24h – 7 days	Kat IV	Kat III	Kat III	Kat III
	< 24h	Kat IV	Kat IV	Kat IV	Kat IV

Table 4: Categorization of TCRs

The deadlines as per Annex VII EU Directive 2012/34/EU are used for publication of restrictions in the network statements.

TCRs are classified as relevant for the timetable if at least one of the two criteria below is met when planning capacities on railway infrastructure.

- Amendments to planned capacity on infrastructure are required
  - Train cancellation
  - Diversion
  - Temporary change in schedule
- Amendments of train parameters are required
  - Train length
  - Traction type
  - Train profiles
  - etc.

Infrastructure restrictions only causing delays are not considered relevant for the timetable. TCRs that are relevant for the timetable are either already adjusted in the annual timetable or handled later with temporary amendments in the construction or ad-hoc timetable.

Year-round capacity restrictions are to be considered in the annual timetable and are therefore included in the Capacity Model Baseline.

All other major and high impact TCRs are taken into account in “**Capacity Model TCR Periods**”, provided that they are already known at the time of creation and that their impact on infrastructure capacity can be assessed at this point.

## Consultation Process

Capacity restrictions with impact on more than one network are coordinated between the relevant infrastructure managers. The deadlines for concluding coordination can be found in the diagram below. Every publication in the network statements takes place after a consultation with the applicants and the service facilities operators.

		Date of publication				
		X-24	X-18	X-13,5	X-12	X-6
Category	Kat I	First publication	Coordination concluded		Second Publication	Update
	Kat II	First publication		Coordination concluded	Second Publication	Update
	Kat III			Coordination concluded	First publication	Update
	Kat IV					First publication

Table 5: Publication deadlines as per Annex VII

Only “Category I – Major Impact TCRs” restrictions are handled in the capacity strategy.

## RFI

TCRs are listed in the ePIR RFI web-portal, explaining the section and the period of execution of the works, with an estimate of the effects on the capacity (possibility of route limitations, detours, timetable changes, etc.) including the volume of traffic cancelled / diverted, in full compliance with the Delegated Decision 2017/2075, the definitive detail of which will be known with the delivery of the timetable. Any alternative route will also be explained, to allow RUs to proceed coherently as early as the path request phase.

TCRs and maintenance windows (IPO) are defined according on RFI technical needs; their planning is based on the principle to minimize waste of capacity and effects on railway traffic, therefore a proper clustering of works is carried out during a preliminary planning stage.

## TCR windows

According to RFI Network Statement, maintenance windows that are not requested by maintenance are released for additional capacity to answer RU’s ad hoc requests.

Generally, duration, number and location of maintenance windows have only minor adaptation in subsequent timetables.

Every line has periodical maintenance windows, on a weekly basis, either on daytime or night-time. The use of IPOs makes possible to avoid timetable adjustments, as they are integrated into the running timetable, guaranteeing the ordinary/extraordinary maintenance, and upgrading of the infrastructure. On double track lines, IPOs are planned with the aim to get relevant simultaneous closure intervals on sections where most relevant works are expected to be carried out.

Generally, no trains are planned during IPOs; in few cases related to PSO trains, special timetable arrangements are taken to manage them during one-track closures.

The (IPO) maintenance windows along all the entire network are published annually in the Network Statement and can be consulted by the RUs on the RFI ePIR portal.

In the event that a major TCR is planned, on the alternative lines can be considered a possible reduction in the duration of the IPOs taking into account also the inputs provided by the RUs.

The table below provides a summary of the IPOs that will be planned in TT26 on the infrastructure managed by RFI.

Line	Duration	Daytime/nighttime	N. per week
<b>Maintenance windows (IPO)</b>			
Milano - Domodossola	About 5 h	Daytime / simultaneous 2-track closure	5
Verona - Brennero	About 4 h	Nighttime / simultaneous 2-track closure	5
Venezia - Tarvisio Boscoverde	About 3 h	Daytime / simultaneous 2-track closure	5
Trieste - Villa Opicina	About 2 h	Daytime / simultaneous 2-track closure	5
Trieste - Villa Opicina	About 5 h	Nighttime / simultaneous 2-track closure	5

*Table 6: Maintenance windows*

## Regular TCRs

Whenever maintenance needs exceed what available by maintenance windows, specific additional TCRs can be planned. The percentage of traffic diverted / cancelled

is calculated considering the planned timetable, referring to the day with the greatest scheduled traffic volume within the duration of the temporary capacity restriction. If the TCR affects weekdays and holidays, the weekday with the highest scheduled traffic volume is selected; if the TCR affects only non-weekdays, the day with the highest volume of traffic is selected.

### **Consultation process**

RFI carries out a consultation phase by sending to all Applicants/RUs and neighbouring IMs, at X-25 before the relevant annual timetable, the program of infrastructural unavailability; in case of request and if possible, an alternative hypothesis for the execution of the works is provided.

RFI considers the comments received during the publication phase at X-24, possibly organizing ad hoc meetings. Subsequently, before the entry into force of the timetable, the IM sends to all Applicants/RUs and neighbouring IMs possibly involved the updated TCRs program for a second consultation phase, by publishing the revised TCRs programs within 18 months after coordination with neighbouring infrastructure managers and considering the comments received in the second consultation with Applicants through the RFI ePIR portal.

## **2.3 International coordination and consultation**

### **Infrabel – ProRail – DB Netz („BeNeDe Group“)**

Trilateral TCR-planning currently focuses during several meetings a year on the coordination of TCRs among Infrabel, ProRail and DB Netz two timetables ahead.

The same two-day model and GANTT-Chart as for the border to Scandinavia were experimented on 21<sup>st</sup> and 22<sup>nd</sup> September 2022 with a focus on Timetable 2025. Day 2 (22<sup>nd</sup> September) was attended by approximately forty representatives of the market.

Just as for the border to Scandinavia, the same format will be applied for Timetable 2026 (X-31) in May 2023. Timetable 2025 (X-19) will further be addressed.

### **DB Netz – SBB Infrastruktur („Rhine Valley Rail“-Group)**

Bilateral coordination of TCRs has so far taken place as part of the regular TCR-planning processes two to three years ahead, depending on the TCRs at stake. The



Annex VII-target approach for international coordination and consultation including TCR-bundling, cross-border overview of diversionary lines and estimation of capacity, has been tested between DB Netz, SBB Infrastruktur, SNCF Réseau and applicants ahead of a total closure in the Rhine Valley in the late summer 2024.

The first Day 1-exchange, using a GANTT-Chart well established in the area, took place on 16<sup>th</sup> November 2022 and focused on Timetable 2025 (X-27). Timetable 2026 will be addressed as of May 2023 (X-31).

The introduction of Day 2, both for Timetable 2025 and Timetable 2026, which was originally planned for Autumn 2022 (respectively X-27 and X-39), has been postponed to May 2023. Reason for this is the launch of the program “High-Performance Network”, with consequences on TCR-Planning cornerstones not reliable enough to be shared and bring added value to the market.

### **SBB Infrastruktur – RFI**

Bilateral strategic coordination takes place at Steering Committee meetings (high-level representatives of RFI & SBB-I). Periodical bi-lateral meetings are held to detail TCR harmonization. In addition, there is a constant interface between the territorial TCRs managers from SBB-I & RFI.

### **DB Netz – ÖBB Infrastruktur – RFI („Brenner Group“)**

TCR-coordination and consultation on the Brenner corridor has been up and running for over ten years, and addresses TCRs two to three years ahead, depending on the TCRs at stake, as well as short term information matters whenever deemed appropriate. It is structured in two meetings, in June and November, during which a first part (“day 1”) dedicated to coordination with neighbouring IMs is followed by a second part (“day 2”) enlarged to applicants.

In this area, the GANTT-Chart has not been introduced considering that another, well established Excel-based overview had previously been used. This overview will continue to be used until the TCR-Tool can be used.

The last Day 1 – Day 2-cycle took place on the Brenner segment on 17<sup>th</sup> October and 9<sup>th</sup> November, with a focus shortened to Timetable 2025 (X-27). As for the Rhine Valley Rail-Group, reason for this is the launch of the program “High-Performance Network”, with consequences on TCR-Planning cornerstones not reliable enough to be shared

and bring added value to the market. Timetable 2026 will be addressed again in May 2023 (X-31).

### **Infrabel – ACF/ CFL**

Infrabel, ACF and CFL coordinate the TCRs with impact on each other's neighbouring network together with SNCF Réseau on two levels (starting from X-33)

- Coordination via the established trilateral working group for all TCRs impacting the borders (freight and passenger combined).
- Coordination of the border point Tv-Gy in order to ensure the electric supply of the national and neighboring networks if works are planned.

In practice, both levels are combined into one process with recurrent meetings.

To determine where TCR's must be located on the network in order to have an impact on the neighboring network, an international perimeter has been agreed upon for the three countries concerned.

### **RFI – SZ**

About the Villa Opicina – Sezana border, bilateral meetings (RFI – SŽ-Infrastruktura) are held usually every two-three months; in addition, other periodical meetings are organized by the Rail Freight Corridors n. 5 (Baltic – Adriatic) and n. 6 (Mediterranean) for IMs coordination and IMs/RUs consultation.

## **2.4 Selected Major Impact TCRs**

Country	TCR (project name)	Project proposal defined	Project approved by the IM's management	Financing secured	Comments/ Explanations
NL	Amsterdam C. – Weesp / Bijlmer / Sloterdijk	yes	yes	yes	8 out of 10 platform tracks available at Amsterdam C.; during 3 weeks per year 6 out of 10 platform tracks available. Construction works planned between end of 2023 until April 2028.

NL	's-Hertogenbosch - Boxtel / Tilburg	yes	yes	yes	Prolonged speed restriction (80km/h) between 's-Hertogenbosch en Vught Aansluiting and 2 out of 3 tracks available. Construction works start in May 2025 for several years.
NL	Schiphol Airport - Bijlmer / Weesp	yes	yes	yes	2 out of 4 platform tracks available. Reduced capacity for traffic. Construction works start in May 2026 and last for 9 months.
LU	Bettembourg	yes	yes	yes	Total closure for 4 weeks from mid-July due to bridge construction.
LU	Howald	yes	yes	yes	Track reorganization for 5 weeks from mid-August.
LU	Luxembourg-Bettembourg	yes	yes	yes	Total closure due to connection between the additional line and the Howald's station for 9 weeks from mid-July.
LU	Luxembourg-Bettembourg	yes	yes	yes	Total closure due to Definitive connection between the new line and the train station Howald for 9 weeks from mid-July
FR	Mantes la Jolie	yes	yes	yes	Superstructure renewal between Q3 2024 and 2027

FR	Etoile 74: La Roche sur Foron	yes	yes	yes	Modernisation signalization during 2026 from Q2 2026.
FR	Compiègne	yes	yes	yes	Control center modification during 2026 and 2027.
FR	Sout Lyon	yes	yes	yes	Control center modification during 2026.
DE	SFS Köln - Rhein/Main	yes	yes	yes	ETCS equipment. Construction works are planned during 2025 and 2026. Track closures are expected.
DE	Node Köln - Expansion south of Gummersbacher Straße (ASG)	yes	yes	yes	Track extension from 4 to 6. Construction works are planned during 2025 and 2026. Track closures are expected.
DE	Uelzen - Salzwedel - Stendal and Stendal - Magdeburg - Halle (OKN) and node Stendal	yes	yes	yes	Double slip and double track expansion. Construction works are planned during 2025 and 2026. Track closures are expected.
DE	ABS 46 Emmerich - Oberhausen	yes	yes	yes	Multi-track expansion. Construction works are planned during 2025 and 2026. Track closures are expected.
DE	Rheintalbahn	yes	yes	yes	Diverse culverts and renewal F-cables in the area Freiburg. Construction works

					are planned between 2025 and 2027. Track closures are expected.
DE	Node Dresden	yes	yes	yes	Renewal grade separation structure. Construction works are planned between 2025 and 2027. Track closures are expected.
DE	Node Hamburg	yes	yes	yes	Bridge renewals. Construction works are planned between 2025 and 2027. Track closures are expected.
DE	Dresden – Bad Schandau	yes	yes	yes	Construction of new rail link Dresden – Prag. Construction works are planned between 2025 and 2027. Track closures are expected.
DE	VDE 8.1 and node Bamberg	yes	yes	yes	Railway expansion Nürnberg – Bamberg and ETCS. Construction works are planned during 2026. Track closures are expected.
DE	Fallersleben – Lehrte	yes	yes	yes	Track and switch renewals. Construction works are planned during 2026 and 2027. Track closures are expected.
AT	Linz – Wels	yes	yes	yes	Temporary single-track operation due to

					four-track upgrade, Ongoing from 2023 until 2030.
AT	Himberg	yes	yes	yes	Single-track operation in alternating sections due to station reconstruction during 2025 and 2026.
AT	Ebenfurth	yes	yes	yes	Occasional single-track operation due to construction of loop during 2025 and 2026
AT	Nordeinfahrt Wr. Neustadt	yes	yes	yes	Single-track operation due to four-track upgrade during 2025 and 2026
AT	Connecting railway (Vienna Meidling–Vienna Hütteldorf/Vienna Penzing)	yes	yes	yes	Single-track operation in alternating sections due to line extension in 2026.
AT	Suburban main city railway route Floridsdorf–Vienna Meidling	yes	yes	yes	Temporary total closures due to modernization during 2025 and 2026.
AT	Feldkirch–Buchs	yes	yes	yes	Temporary total closures (06/2026–10/2026) due to line extensions in 2026.
AT	Gänserndorf–National border near Bernhardsthal	yes	yes	yes	Single-track operation in alternating sections due to line extension in 2026.
IT	Verbania - Premosello (Domodossola line)	yes	yes	yes	Total continuous closure starting Q3 2026 for 60 days (overlapping the following TCR). RUs are asked to request paths in annual

					timetabling via other lines.
IT	Iselle - Domodossola (Domodossola line)	yes	yes	yes	Total continuous closure starting Q3 2026 for 40-50 days (overlapping with previous TCR). RUs are asked to request paths in annual timetabling via other lines.

Table 7: List of MVP-relevant selected Major Impact TCRs with temporary capacity impacts during TT2026

## 3. Expected Traffic Flows and Traffic Planning

### 3.1 General Principles

Traffic flows are quantified in the present document at border points. Figures derive from national estimates and respond to no methodology that would be common to the involved Infrastructure Managers. Unless stated otherwise, the figures are harmonized and correspond to average values per traffic type per hour, without a differentiation between peak and off-peak hours.

Though non-binding, they provide an average bookable capacity per hour for respectively long-distance passenger, regional passenger (wherever relevant highlighting capacity for regional express traffic) and freight trains for Timetable 2026. Further assessment and more detailed differentiation will occur with the Capacity Model and, wherever deemed appropriate for Timetable 2026, the Capacity Supply.

### 3.2 National Specificities

#### **Infrabel**

##### *Status*

As not all TTR process elements can already be implemented for timetable 2026, most notably because of the missing legal framework, the capacity model that Infrabel will develop will only have an advising character.

##### *Concept*

Infrabel intends to deliver a market driven capacity model and supply, which we intend to achieve by using the following elements:

- Historical data
- Capacity Needs Announcements (CNA)

For the historical data, we will base ourselves on:

- a growth prognosis for the entire network based on real train runs divided into five daily timeframes, as for TT2018:
  - the two peak hours



- 06:00 – 09:00
  - 16:00 – 19:00
  - daytime: 09:00 – 16:00
  - evening: 19:00 – 22:00
  - nighttime 22:00-06:00
- planned and finalized train runs over the last 3 timetable years, including evolutions detected.

Both models are then compared to make final decisions per line or O/D.

For the Capacity Needs Announcements, we will invite all possible applicants to share their assessments for future traffics. For TT2025, this was done in pilot mode, in order to test the CNA process and the newly developed module in the ECMT-tool. For TT2026, the exact modalities will be communicated in due time after the evaluation of the TT2025 CNA pilot phase.

The elements described above give direction to the volume of capacity needed and the parameter sets used to construct the standard catalogue paths used as a basis for the capacity model and supply. These elements will be, just as will be the case with the border times, harmonized with ProRail, and in later stages, with all neighboring IMs. These parameter sets may differ from line to line and axis to axis but are not rigid in nature. The goal of the standard catalogue paths is to optimize the available capacity in a manner that allows optimal use by the concerned clients. Paths requested and used should take into account and be in line with the capacity model and supply. This means that optimization and adaptation to specific customers' needs remains possible to a certain degree, on a case-by-case basis. On top of this, the capacity model and supply does not intend to pre-plan all available capacity, but to allow sufficient room for a pragmatic and flexible use.

### *Scope*

The lines for which a capacity model and supply for timetable 2025 and 2026 will be drafted have been limited to the lines included in the TTR pilot Amsterdam-Brussels and focus on the trains with international relevance (thus not only international trains). The most important reason for this is that Infrabel wants to make use of the RNE tool ECMT to publish and update the capacity model, in order to provide an international overview. At this stage however, the tool is not stable and user-friendly enough to allow the creation and updating of capacity models beyond the chosen geographical scope.

An interface is scheduled to be developed between Infrabel planning tools and ECMT, which will enable us to increase the scope significantly when proved successful.

The goal of the TTR Capacity Model and Supply is to show the available capacity on any given day. This means that on days for which TCRs have been scheduled, an alternative model and supply are elaborated. However, as this increases the complexity of the conception of the capacity model and supply greatly, in the first phases, Infrabel will offer the available capacity in the model and supply only on a standard non-TCR day. On top of this, a limited number of variants will be provided in case of TCRs with international consequences, harmonized between Infrabel and ProRail. These will be published in ECMT if the development of the tool is adequate. In other cases, these will be published in pdf form.

### **ProRail**

The starting point for the traffic flows for timetable 2026 is the allocated timetable 2023, including the intended developments in both passenger and freight traffic up to and including 2026 in the scope of the MVP. Thereby we use the intended Medium Term (MLT) product steps, also known as Capacity Needs Announcements. For freight traffic, we also use the forecasts for 2026, from which we derive the number of freight paths required per origin-destination relationship.

The number of trains per category is indicated for the busiest hour, which is usually the morning rush hour. If there are trains from the above categories that run only 1 or a few times a day, these trains are not included separately in this capacity strategy. These trains are included in the capacity model, the next TTR phase. In addition, there are train paths that cannot be used every hour of the day due to exclusions with other trains, due to bridge openings, due to restrictions due to noise or due to TCR's and/or Maintenance Windows.

For freight traffic, we only include train numbers for commercial freight trains in this TTR phase. This does not include individual locomotives and trains of transporting contractors. Furthermore, freight trains in the special transport category (e.g. out of gauge) will not take into account in this phase.

For the different train categories, several parameters are included in the table below. These parameters serve as a starting point for planning. All other parameters for each train category are included in the Network Statement for 2024<sup>8</sup>. These include:

- Loading gauges: Appendix 12
- Axle loads and load per unit of length for freight trains: Appendix 13
- Automatic train control systems: Appendix 14
- Tractive power supply systems: Appendix 17
- Platform lengths: Appendix 19 <sup>9</sup>
- Standard freight paths: Appendix 22

In the 2026 capacity strategy, we identify the relevant changes compared to the parameters from the Network Statement 2024, taking into account any other limitations in the infrastructure.

Category	Parameters
<b>Freight train; standard freight path</b>	Speed: max 100 km/h  Traction, length, weight and planned speed: See appendix 22 of Network Statement 2024
<b>High-speed passenger train</b>	Speed: max. 300 km/h  Length: max. 400m
<b>Long distance passenger train</b>	Speed: max. 140km/h - 200 km/h  Length: Depends on stopping locations, see appendix 19 of the Network Statement
<b>Regional express passenger train</b>	Speed: max. 140km/h  Length: Depends on stopping locations, see appendix 19 of the Network Statement
<b>Regional passenger train</b>	Speed: max. 140km/h  Length: Depends on stopping locations, see appendix 19 of the Network Statement

Table 8: Parameters for capacity planning for each train category

More information about developments for passenger traffic and freight traffic are mentioned in the national Capacity Strategy document.

<sup>8</sup> Network Statement 2024, version 1.0, 9 December 2022, reference T20180019-117460140-6314

<sup>9</sup> Appendix 19 provides an insight into maximum platform lengths per corridor. The overview of track and platform lengths on the Logistics Portal includes the exact current length per (platform) track. Impactful changes to these (platform) lengths within the scope of the Capacity Strategy will be mentioned in the list of infrastructure projects.

## **ACF/CFL**

The traffic flows for the “Capacity Strategy” are analyzed at the border points of Luxembourg. The capacity for 2026 has been elaborated using with the historical data, consultation with the neighboring network as well as the strategy team of our main RU.

The figures have also taken into consideration the impact of the transformation of our network. For passenger traffic, the Ministry of Mobility and Public Maintenance defined the forecast until 2035 in the National Mobility Plan 2035<sup>10</sup>. For freight traffic, we predicted the future demand based on discussions with our freight customers. We expect to include more details of it with the tool CAN (capacity Needs Announcements).

## **SNCF Réseau**

In order to present the Capacity Strategy, we are using the reticular documents, elaborated in one hand with our historical data, and on the other hand with the forecasts provided from the marketing department, in link with our main business partners. We share then these data with our neighbors, to coordinate the result.

## **DB Netz**

In the TTR-context and ahead of the implementation of the “Deutschlandtakt”, DB Netz is working on developing instruments for drivable, network-wide optimized capacity planning.

A first try was published as a pilot 1<sup>st</sup> April 2022 on DB Netz’s website. The mKoK<sup>11</sup> (Medium-term concept for optimized capacity utilization) elaborated on previous Deutschlandtakt-planning processes, Timetable 2021 as well as on customer input on planned changes or additional trains compared to Timetable 2021. It applied primarily to Timetable 2024 and has been used in Germany to drive the allocation of framework contracts for Timetables 2024 and 2025. It has been furthermore the best available data basis for the present Chapter in the Capacity Strategy 2025.

DB Netz proceeded for the Capacity Strategy 2026 slightly differently. The mKoK 2024-2025 will be updated in an mKoK 2026-2031 – yet not until the first quarter of 2024 in

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<sup>10</sup> Published at <https://mmtp.gouvernement.lu/fr/dossiers.gouvernement%2Bfr%2Bdossiers%2B2022%2Bpnm2035.html>

<sup>11</sup> Published at <https://fahrweg.dbnetze.com/fahrweg-de/kunden/nutzungsbedingungen/nutzungsbedingungen/rahmenvertrag-1369214>

its final, published version. For that reason, it is expected to deliver the basis for the Capacity Model 2026.

As regards the present Capacity Strategy 2026, DB Netz used the Technical Basis Timetable (“Technischer Basisfahrplan” or “TBF”), a non-published, sample timetable, the purpose of which is originally to evaluate the impact of TCR-planning on timetable concepts. The TBF compiles the last available Annual Timetable (ATT) as well as known and proven changes in timetable concepts and new concepts, to the extent applicants involved us in planning and/or defining them.

The figures below, delivered per hour per market segments (long distance passenger, regional passenger, and rail freight traffic) result from the following steps:

- a rule-of-three calculation of the number of trains per market segment in the hour with highest demand on basis of TBF-data.
- a comparison with the train numbers of the neighboring Infrastructure Managers and, in case of divergences, a plausibility check both against the latest available Annual Timetable (ATT) and the mKoK 2024/2025.
- eventually and in coordination with TBF- as well as ATT-experts the most plausible figure was selected. In general, non-recurrent traffic (“Einzellagen”) were withdrawn from the estimate.

As a result, these experience-based figures, though considering forward-looking yet non-exhaustive knowledge of possible, future market development, are to be read as not more than an indication (“best guess”) most likely to be updated when preparing the Capacity Model.

Category	Name	Parameters
Long distance	Electric multiple unit train	250 km/h – 300 km/h (High Speed Traffic) 230 km/h (Tilting System)
Long distance	Electric multiple unit train	230 km/h
Long distance	Locomotive-hauled train	160 km/h – 200 km/h
regional	Regional-Express (RE)	Accelerated regional and local transport
regional	Regionalbahn (RB)	Regional and local transport with all stops

regional	Suburban train (e.g.: S-Bahn)	Local transport
freight	Sample train 1	E-traction, 1.600 t, 100 km/h
freight	Sample train 2	E-traction, 1.600 t, 120 km/h
freight	Sample train 4	E-traction, 2.000 t, 100 km/h
freight	Sample train 5	E-traction, very heavy or very slow
freight	Sample train 6	Diesel, 1.600 t, 100 km/h
freight	Sample train 7	Diesel, 2.000 t, 100 km/h

*Table 9: Overview of train categories and parameters*

## **SBB Infrastruktur & BLS Netz**

According to TTR, it is possible, in the capacity strategy for individual routes, to define whether they should be classified as "pre-planned" (all planned capacities as ready-made capacity products - similar to today's train path catalogue), as "semi-pre-planned" (ready-made capacity products as well as residual capacities for tailor-made orders) or as "non-pre-planned" (no ready-made capacity products, only tailor-made orders). Since it would be necessary to define the maximum capacity of a route for the "pre-planned" variant, something which in practice is very difficult to achieve, TTR@CH envisages focusing on the "semi-pre-planned" variant in its capacity strategy. In this way, for example, those train paths guaranteed in the NNP can be identified in the capacity model and in the subsequent train path catalogue as ready-made products; if there are further capacity needs, customer-oriented solutions can then still be found within any residual capacities which may be available.

As mentioned above, the NNP 2026 already covers the TTR requirements for the "Transport planning and traffic flows" sections. In Switzerland, the various needs of the market and of stakeholders are ascertained at a very early stage. Approximately every 10 years, the federal government commissions an expansion phase. This expansion phase is planned in partnership with the various stakeholders - the federal government, cantons, sectors of the industry (including terminals and service facilities), RUs, etc. - under the leadership of the Federal Office of Transport (FOT). The outcome is an agreed service concept including the essential infrastructure measures. Parliament

approves the expansion phase including the service concept and allocates the financial resources for the necessary infrastructure. The network usage concept (NNK) secures the train paths required for the long-distance, regional and freight services. Any stakeholder affected can request changes to the service concept during the change management process conducted annually on behalf of the federal government. The network usage plan (NNP) describes in written form the planned capacity distribution between long-distance, regional, freight and other traffic types (e.g. car-carrying trains) in the implementation years up to X-6 years in advance. Stakeholders are also consulted annually in the NNP process by means of a preliminary technical review and are given the opportunity to contribute accordingly. The table below shows the most important planning parameters for the standard passenger and freight train categories:

Category	Product	Parameter
Long-distance traffic	InterCity / InterRegio	400m, R135%
Long-distance traffic	ICN (tilting technology)	400m, N180%
Regional traffic	RegioExpress	300m, R135%
Regional traffic	S-Bahn / Regio (double-decker)	150m, R135%
Regional traffic	S-Bahn / Regio	75m, R135%
Freight traffic, national	Standard	1 Re482, 1600t, 750m, D65, V/min 100 km/h
Freight traffic, national	Express	1 Re420, 800t, 400m, A95, V/min 120 km/h
International freight services	Transit via Gotthard	1 Re482*, 1600t, 750m, D70, V/min 100 km/h (North-South) 1 Re482*, 1400t, 750m, D70, V/min 100 km/h (South-North) * Bellinzona – Chiasso Section = 2 Re482
International freight services	Transit via Lötschberg	2 Re482, 1600t, 750m, D70, V/min 100 km/h (North-South) 2 Re482, 1400t, 750m, D70, V/min 100 km/h (South-North)

Table 10: standard passenger and freight train categories<sup>12</sup>

Note: Basic details of the rolling stock listed can be found in the network utilisation concept. There are different requirements as regards acceleration and maximum

<sup>12</sup> Sources: Timetable planning documents for domestic + transit freight train categories / planning document for STEP AS2030

speed for passenger services. More details of N-series and of rolling stock capable of fast acceleration are given in the NNP.

The NNP sets out in writing the planned capacity distribution between long-distance traffic, regional traffic, freight traffic and other traffic types (e.g., car-carrying trains). The NNP contains the capacities available in a standard hour and during passenger traffic peak hours (06.00-09.00 and 16.00-19.00, Monday to Friday, excluding public holidays) that are guaranteed for allocating train paths in the 2026 timetable. Timings to the precise minute as well as connections and connecting services shown on the network charts are not binding. The number of train paths shown on the route sections equates to the maximum number of train paths guaranteed for a particular type of traffic on this entire route section. Subsections of this route section may have fewer train paths. The NNP 2026<sup>13</sup> does not yet list any restrictions due to possessions.

## **ÖBB Infrastruktur**

Existing infrastructure (for the 2023 timetable) is supplemented by:

- Known amendments to the infrastructure for the timetable 2026
- Known infrastructure restrictions that presumably have to be taken into account for the timetable 2026

The current 2022 timetable is supplemented by the following:

- Known requests for the scheduled timetable for 2023
- Known expansion of services in passenger traffic for the timetable 2026
- Approx. 8% increase for freight traffic 2022-2026, rounded up to entire trains (2% per year)
- Adjustments in the scheduled timetable that are triggered due to new infrastructure (e.g. commissioning construction and expansion plans)
- Adjustments in the scheduled timetable that are triggered due to infrastructure restrictions that presumably have to be taken into account for the 2026 timetable.

## **RFI**

Traffic flows are quantified in the present document at border points. Figures derive from IM's estimates. The figures are harmonized and correspond to average values per traffic type per hour, without a differentiation between peak and off-peak hours.

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<https://company.sbb.ch/content/dam/internet/corporate/de/sbb-als-geschaeftpartner/flotte-unterhalt/onestopshop/NNP-2026.pdf.sbbdownload.pdf> (as 02.12.2019)



Though non-binding, they provide an average bookable capacity per hour for respectively long-distance passenger, regional passenger (wherever relevant highlighting capacity for regional express traffic) and freight trains for Timetable 2026. Further assessment and more detailed differentiation will occur with the Capacity Model for Timetable 2026.

As a general statement, on single-track corridor lines, which have a high degree of capacity saturation, a rigid path catalogue is in force, as path timetable and available channels are defined by a clock-face model that considers pre-determined dwelling times at the cross-border stations.

On other lines, for which there is a lower level of capacity saturation, the available paths are published in pre-planned mode. A certain level of flexibility in the construction of the Timetable is admitted, to take into account all market needs.

In compliance with the Network Statement of RFI, the general approach is to manage the freight timetable construction phase through a pre-planned path offer (Paths catalogue). The possible offer of Rolling Planning capacity, starting from the predefined and pre-built capacity catalogue, will depend on the regulatory developments currently being studied at European level as well as on the decisions taken in the RNE area regarding the implementation of the steps of the TTR project for timetable 2026.

Passenger trains timetabling is based mainly upon Framework Agreements; further market demands are considered as well, according to the criteria stated in RFI Network Statement.

The table below lists the reference parameters for passenger and freight trainsets that will be used in the Capacity Model:

Line	Passenger trains				Freight trains	
	High-speed	Long-distance	Express regional	Regional	D4 P/C 80 750 m	D4 P/C 50 < 750 m
<b>Maximum trainset speed**</b>	300 km/h	200 km/h	160 km/h	160 km/h	100 km/h	100 km/h
<b>Maximum trainset length*</b>	400 m	400 m	250 m	250 m	750 m	< 750 m

\* Maximum length allowed at each stop to be checked on Network Statement

\*\* Maximum trainset speed, not necessarily attainable on the specific MVP lines

Table 11: Main parameters for passenger and freight trains

The harmonization with neighboring IMs, for each border section here dealt with, has been reached on daytime system paths per hour per direction. Further paths, not systematic, could be considered in timetabling construction phase. According to the approach used in this document, the numbers provided relate to cross-network trains, i.e., to train paths that run on line sections managed by each of the bordering IMs.

### 3.3 Traffic flows

Border point	passenger train paths per hour per direction		freight train paths per hour
	long distance	regional	
Essen (BE) - Roosendaal (NL)	0	1	3 north to south 2 south to north
Meer (BE) - Hazeldonk (NL)	4	0	0
Visé (BE) - Eijsden (NL)	0	2	1

Border point	passenger train paths per hour per direction		freight train paths per hour
	long distance	regional	
Aubange (BE) - Rodange (LU)	0	0	1
Athus (BE) - Rodange (LU)	0	2	0,5
Sterpenich (BE) - Kleinbettingen (LU)	1	2	0
Gouvvy (BE) - Troisvierges (LU)	0	1	0

Border point	passenger train paths per hour per direction		freight train paths per hour
	long distance	regional	
Aubange (BE) - Mont-St. Martin (FR)	0	0	0,5

Border point	passenger train paths per hour per direction		freight train paths per hour
	long distance	regional	
Montzen (BE) - Aachen West (DE)	0	0	4*
Hergenrath (BE) - Aachen Süd (DE)	1	1	0

\* Up to five freight train paths per hour may be possible.

Border point	passenger train paths per hour per direction		freight train paths per hour*
	long distance	regional	
Venlo (NL) - Kaldenkirchen (DE)	0	1	3
Zevenaer (NL) - Emmerich (DE)	1	1	4*
Oldenzaal (NL) - Bad Bentheim (DE)	0,5	1	2
Heerlen (NL) - Herzogenrath (DE)	0	2	0**

\* Up to five freight train paths per hour may be possible.

\*\* In principle, path capacity allows 8 freight trains per direction between approx. 22:00 and 6:00. Currently not feasible due to noise restrictions in the Netherlands. If a freight train runs in other hours, a regional passenger train has to be cancelled.

The figures displayed in this chapter disregard in principle the effect of TCRs on capacity. The duration of ABS Emmerich-Oberhausen (s. Chapter 2.4) justifies publishing adjusted capacity estimates during periods of single track and total closure on the segment Emmerich - Oberhausen. The use of diversionary routes via Aachen-Montzen-Netherlands or Herzogenrath-Heerlen are currently in discussion with the involved stakeholders. Whether these diversionary routes provide for enough capacity depends on various IM parameters, legal regulations in the Netherlands (noise protection) and the exact design of Timetable 2024.

Single track closure Emmerich	passenger train paths per hour per direction *		freight train paths per hour per direction *
	long distance	regional	
Venlo (NL) - Kaldenkirchen (DE)	0	1	3
Zevenaar (NL) - Emmerich (DE)	0,5	1	1,8
Oldenzaal (NL) - Bad Bentheim (DE)	0,5	1	2,5**
Heerlen (NL) - Herzogenrath (DE)	0	2	0***

\* Total capacity (regular traffic + diversion)

\*\* This number deviates from the number published by ProRail (2 freight paths per hour per direction) in the Capacity Strategy 2026. This agree-to-disagree is known to both IMs and will be further elaborated together with the TCR Emmerich - Oberhausen. Further developments will consider the coordination formats set out in Annex VII.

\*\*\* In principle, path capacity allows 8 freight trains per direction between approx. 22:00 and 6:00. Currently not feasible due to noise restrictions in the Netherlands

Total closure Emmerich	passenger train paths per hour per direction *		freight train paths per hour per direction *
	long distance	regional	
Venlo (NL) - Kaldenkirchen (DE)	0,5	0	3,5
Zevenaar (NL) - Emmerich (DE)	0	0	0
Oldenzaal (NL) - Bad Bentheim (DE)	0,5	1	2,5
Heerlen (NL) - Herzogenrath (DE)	0	2	0**

\* Total capacity (regular traffic + diversion)

\*\* In principle, path capacity allows 8 freight trains per direction between approx. 22:00 and 6:00. Currently not feasible due to noise restrictions in the Netherlands.

Border point	passenger train paths per hour per direction		freight train paths per hour
	long distance	regional	
Aubange (LU) - Mont St. Martin (FR)	0	3	0,5
Bettembourg (LU) - Zoufftgen (FR)	1	5	0

Border point	passenger train paths per hour		freight train paths per hour
	long distance	regional	
Flensburg Weiche (DE) - Padborg (DK)	1,5	0	2

Border point	passenger train paths per hour*		freight train paths per hour*
	long distance	regional	
Frankfurt (Oder) Brücke (DE) - Slubice / Rzepin (PL)	1	0	2
Horka (DE) - Wegliniec (PL)	0	0	1

\* Due to PKP-PLK planning to implement TTR at a later stage, the numbers displayed in this table have not been aligned for TT 2026 and are solely endorsed by DB Netz.

Border point	passenger train paths per hour*		freight train paths per hour*
	long distance	regional	
Bad Schandau (DE) - Decin (CZ)	1	1	3,5
Schirnding (DE) - Cheb (CZ)	0	1	0
Furth im Wald (DE) - Ceska Kubice (CZ)	0	0,5	0

\* Due to SZ planning to implement TTR at a later stage, the numbers displayed in this table have not been aligned for TT 2026 and are solely endorsed by DB Netz.

Border point	passenger train paths per hour		freight train paths per hour
	long distance	regional	
Trier (DE) - Wasserbillig (LU)	0	2	0,5

Border point	passenger train paths per hour		freight train paths per hour
	long distance	regional	
Perl (DE) - Apach (FR)	0	0,5	0
Saarbrücken (DE) Metz Sablon (FR)	0,5	1	2
Kehl (DE) - Strasbourg (FR)	0,5	2	1,5
Müllheim (DE) - Mulhouse (FR)	0	1	1
Wörth (DE) - Lauterbourg (FR)	0	1	0

Border point	passenger train paths per hour per direction		freight train paths per hour
	long distance	regional	
Basel Bad/ Basel Bad Rbf (DE) - Basel SBB/ Basel SBB RB (CH)	1,5	3	5*

\* An increase to eight freight train paths per hour will only be possible with four-track strong trailer (not before 2028).

Border point	passenger train paths per hour per direction		freight train paths per hour
	long distance	regional	
Kiefersfelden (DE) - Kufstein (AT)	2	2	3
Freilassing (DE) - Salzburg (AT)	3	6	2*
Passau (DE) - Schärding (AT)	0,5	1	3,5
Lindau-Reutin (DE) - Lochau-Hörbranz (AT)	0,5	2	0,5

\* Up to 4 freight train paths per hour may be possible to Salzburg Liefering.

Border point	passenger train paths per hour per direction		freight train paths per hour
	long distance	regional	
Basel St. Johann (CH) - St. Louis (FR)	0,5	4	2

Border point	passenger train paths per hour per direction		freight train paths per hour
	long distance	regional	
Brig (CH) - Domodossola (IT)	0,5	0	3,5
Bellinzona (CH) - Luino (IT)	-	0,5	2
Chiasso (CH) - Como (IT)	1	2 R + 1 RE	4

Border point	passenger train paths per hour		freight train paths per hour
	long distance	Regional	International
Steinach/Tirol (AT)- Brennero/Brenner (IT)	0,5	0*	3
Thörl-Maglern (AT) - Tarvisio (IT)	Non systematic	Non systematic	2

\* Regional traffic from Austria (1 path/hour) terminates at the border station Brennero/Brenner.

Border point	passenger train paths per hour		freight train paths per hour
	long distance	Regional	International
Summerau (AT)- Horní Dvořiště (CZ)	Non systematic	0	0,5
Gmünd NÖ (AT) - České Velenice (CZ)	0	0,5	Non systematic
Retz (AT) - Šatov (CZ)	0	1	Non systematic
Bernhardsthal (AT) - Břeclav (CZ)	1	1	2

Border point	passenger train paths per hour		freight train paths per hour
	long distance	Regional	International
Rosenbach (AT)- Jesenice (SI)	0,5	0	1
Spielfeld-Strass (AT) - Šentilj (SI)	Non systematic	0,5	1,5

Border point	passenger train paths per hour per direction		freight train paths per hour
	long distance	regional	
Villa Opicina (IT) - Sezana (SI)	Non systematic	Non systematic	3

## **4. Validation & Publication**

The present document adds to but doesn't replace national Capacity Strategies. It will be published by RNE on its own webpage accessible directly or by means of link from the page dedicated by each participating IM to its own Capacity Strategy.