

RFC Rhine-Alpine

IMPLEMENTATION PLAN Update 2023

ANNEX C: Development of capacity bottlenecks State of play 2023



30 October 2023

WG Infrastructure and Terminals (WG I&T)

Introduction

The present document is an update of the Capacity Bottleneck analysis 2020. It shows the current infrastructural bottlenecks in 2023 and the expected infrastructural bottlenecks for 2025 and 2030.

The calculation of bottlenecks for rail infrastructure is quite complicated. National calculation methodologies at IMs and national decision processes on infrastructure development are different and a common bottleneck analysis for RFC Rhine-Alpine turned out to be an impossible task. Therefore the MB of RFC Rhine-Alpine decided to set up the present CBA on the basis of the national investment plans to identify the infrastructural bottlenecks. This is a joint corridor approach, consisting of a combination of the national information provided by the different IMs. The information in this document has been compiled by the WG Infrastructure & Terminals.

Infrastructural bottlenecks

The WG-members gave information on the expected Capacity Bottlenecks in the future years for their own countries. Presenting this information in jumping jacks (JJ's) showing where the Capacity Bottlenecks can be found on the entire corridor.

The Netherlands, Belgium and Switzerland opted to make a distinction between actual Capacity Bottlenecks (when the demand nearly exceeds the available capacity – indicated in red) and potential Capacity Bottlenecks (where demand is showing an evolution that might cause capacity problems – indicated in yellow). These three IMs determine (potential) capacity bottlenecks by applying a certain percentage to the capacity (use). Italy also identifies actual Capacity Bottlenecks. However, in Italy, the concept of a potential capacity bottleneck does not exist. RFI only knows sections/nodes with limited capacity.

In Belgium, in 2023 the results of a new study identified a number of potential bottlenecks for 2030. The study was based on the assumption that freight traffic will increase by 50% in 2030.

In Switzerland, SBB Infrastructure and BLS Netz focus only on the allocated capacity for freight traffic to determine the existence of bottlenecks, as this, according to them, presents a more accurate view in the context of the national infrastructure usage plan (Netz Nutzungs Plan). All other IMs chose to take both passenger and freight traffic into account.

DB Netz AG prefers to only show capacity bottlenecks when capacity exceeds the demand, i.e. when the section is congested. This information is drawn from the document on “overloaded railways” (Überlastete Schienenwege ÜLS).

ProRail takes a differentiated look, assessing dedicated freight nodes, shunting yards and switches on the one hand and all lines including Havenspoorlijn and Betuweroute A15 on the other hand. Bottlenecks on dedicated freight nodes, shunting yards and switches are determined with the use of overloaded hours, while capacity on lines is calculated in basic hour patterns. This method is not used by any other IM.

To be able to use this information in the MoTs decision processes, this bottleneck information is shown in different ways. These different ways actually represent the remaining (possible) bottlenecks from the point of view of the status of decision making of the related project planning and investments on the corridor.

These decision processes are not the same in all the countries but using the available information we distinguish between five stages in decision making / lifecycle of a project:

- Realised (RD), meaning that the building process was completed and the project is operational. This stage is not considered in the CBA.
- Realisation (R), meaning that all necessary decisions are taken and money is available. The necessary funds are in place The building process is ready to start or has already started.
- Secured (S), meaning that all necessary decisions are taken and money is available and the necessary funds are in place.
- Planned (P), meaning that already first decisions are taken and financial reservations are planned. In other words plans for the project have been approved and also the budget is planned.
- To be decided (TBD), meaning that solutions how to solve problems are known, but no formal decisions are taken yet and financial funds are not yet known. In other words, concrete plans for the project still need to be developed.

The jumping jacks in annexes 1 to 12 show the evolution of the (potential) bottlenecks when:

- a) only the projects with the Realisation (R) status and Secured (S) status are taken into account,
- b) when both the projects with the Realisation (R) status, Secured (S) status and the Planned (P) status are taken into account
- c) when the projects with the Realisation (R) status, Secured (S) status, Planned (P) status and the projects with the To Be Determined (TBD) status are taken into account.

The used project information is published in CIP and can be found in annex 13. For the bottlenecks in Germany, information on projects can also be found in the 'Plan zur Erhöhung der Schienenwegkapazität' (PEK), which is the plan to increase rail capacity, linked to each individual bottleneck.

Present Situation (2023)

In the **Netherlands** there two nodes are identified as a bottleneck: Pernis and SY Waalhaven Zuid.

2 sections are marked as a potential bottleneck:

- the section between Venlo and Venlo Border
- the section between Breda and Tilburg

In **Belgium** there are 3 sections marked as potential capacity bottlenecks:

- the section between Brugge and Gent
- the section between Gent and Schellebelle
- the section between Antwerpen Berchem and Lier

In **Germany** there are 5 capacity bottlenecks:

- the section between Kaldenkirchen and Viersen.
- the section between Aachen West and Stolberg.
- the section between Hürth-Kalscheuren and Remagen.
- the section between Mannheim – Zeppelinheim (the relevant section for RFC Rhine – Alpine is Gross Gerau – Biblis).
- the section between Offenburg and Basel Bad Rbf
(the relevant sections in the ÜLS are between Offenburg – Abzw. Gundelfingen and Abzw. Leutersberg – Weil am Rhein).

In **Switzerland** there is 1 bottleneck

- the section between Frutigen and Brig (Lötschberg Base Tunnel)

No sections are marked as potential bottlenecks.

In the **Border Section Switzerland-Italy** there is one bottleneck

- the section between (Brig -) Iselle – Domodossola due to :
 - the existing infrastructure bottlenecks on the RFI side, only 2 of the 3 train paths can currently be offered as SIM train paths (4m corridor).
 - current regular works in 2020, not all the published train paths can be offered at present.
 - the existing infrastructure bottlenecks on the RFI side, only 3 train paths instead of 4 (freight traffic) can be offered in the AS 2035.

In **Italy** there are 6 bottlenecks

- the section between Luino and Laveno
- the section between Laveno and Sesto Calende
- the section between Busto Arsizio and Rho
- the section between Pioltello and Melzo
- the section between Milano (Rogoredo) and Melegnano
- the section between Voghera and Tortona

7 sections are marked as exceeding the limited capacity threshold:

- the section between Gallarate and Busto Arsizio
- the section between Rho and Milano
- the section between Seregno and Milano
- the section between Milano (Rogoredo) and Pavia
- the section between Pavia and Bressana Bottarone
- the section between Melegnano and Piacenza
- the section between Genova Sestri Ponente - Genova Sampierdarena

Some sections of the Milano Node are also marked as exceeding the limited capacity threshold.

In annexes 1 to 4 this is shown for the different statuses of decision making.

Number of sections with Capacity Bottlenecks in 2023	Infrastructure with plans S+R	Infrastructure with plans S+R+P	Infrastructure with plans S+R+P+TBD	Potential bottleneck	Section which exceeds limited capacity threshold
Netherlands (+nodes)	2	2	2	2	-
Belgium	-	-	-	3	-
Germany	5	5	5	*	-
Switzerland	1	1	1	-	-
Italy (+nodes)	6**	6**	6**	-	7

* Potential bottlenecks have not been identified

** Including the Bottleneck on the border section Iselle – Domodossola, where capacity is managed by TVS / SBB / BLS.

For most of these bottlenecks, plans to overcome them have been made, but they still have to be 'Secured' and built.

Situation 2025

In 2025 the situation improves slightly in Italy, as can be seen in annexes 5 to 8.

In the **Netherlands** there is a bottleneck on 2 sections :

- Roosendaal – Breda
- Zevenaar Oost – Border

Five nodes are marked as a bottleneck: SY Botlek, Pernis and SY Venlo, Kijfhoek and SY Waalhaven Zuid (for 3 nodes studies on how to improve capacity are planned or TBD),

2 sections are marked as a potential bottleneck:

- the section between Breda and Tilburg
- the section between Venlo – Border

In **Belgium** one node is marked as a bottleneck (congested) : - the node Gent Sint-Pieters

6 sections are marked as potential capacity bottlenecks.

- the section between Brugge and Gent
- the section between Gent and Schellebelle
- the section between Gent and Zwijndrecht Fort
- the section between Antwerpen Berchem and Lier
- the section between Antwerpen Schijnpoort and Antwerpen Berchem
- the section between Aarschot and Hasselt

In **Germany** there are 5 bottlenecks:

- the section between Kaldenkirchen and Viersen.
- the section between Aachen West and Stollberg.
- the section between Hürth-Kalscheuren and Remagen.
- the section between Mannheim – Zeppelinheim (the relevant section for RFC Rhine – Alpine is Gross Gerau – Biblis).
- the section between Offenburg and Basel Bad Rbf
(the relevant sections in the ÜLS are between Offenburg – Abzw. Gundelfingen and Abzw. Leutersberg – Weil am Rhein).

In **Switzerland** there are 2 bottlenecks

- the section between Bellinzona and Pino border
- the section between Frutigen and Brig (Lötschberg Base Tunnel)

In the **Border Section Switzerland-Italy** there is one bottleneck

- the section between (Brig -) Iselle – Domodossola due to :
 - the existing infrastructure bottlenecks on the RFI side, only 2 of the 3 train paths can currently be offered as SIM train paths (4m corridor).
 - the existing infrastructure bottlenecks on the RFI side, only 3 train paths instead of 4 (freight traffic) can be offered in the AS 2035.

In **Italy** 5 section remain bottlenecks :

- the section between Luino and Laveno
- the section between Busto Arsizio and Rho
- the section between Pioltello and Melzo
- the section between Milano (Rogoredo) and Melegnano
- the section between Voghera and Tortona

6 sections remain marked as sections which exceed the limited capacity threshold

- the section between Gallarate and Busto Arsizio
- the section between Rho and Milano
- the section between Milano (Rogoredo) and Pavia
- the section between Pavia and Bressana Bottarone
- the section between Melegnano and Piacenza
- the section between Genova Sestri Ponente - Genova Sampierdarena

Number of sections with Capacity Bottlenecks in 2025	Infrastructure with plans S+R	Infrastructure with plans S+R+P	Infrastructure with plans S+R+P+TBD	Potential bottleneck	Section which exceeds limited capacity threshold
Netherlands (+nodes)	7	7	7	2	-
Belgium (+ nodes)	1	1	1	6	-
Germany	5	5	5	*	-
Switzerland	2***	2***	2***	-	-
Italy	5**	5**	5**	-	6

* Potential bottlenecks have not been identified

** Including the Bottleneck on the border section Iselle – Domodossola, where capacity is managed by TVS / SBB / BLS.

*** For the bottleneck between Bellinzona and Luino no infrastructure measures are foreseen because, in combination with the Chiasso and Luino line, there is sufficient capacity available.

Situation 2030

In 2030, as can be seen in annexes 9 to 12: the situation improves in some countries and worsens in others.

In the **Netherlands** 7 nodes are identified as bottlenecks in the R+S and 'R'+ 'S+P' scenario:

- Europoort
- Botlek
- Pernis
- SY Waalhaven Zuid
- Kijfhoek
- Roosendaal
- SY Venlo

In the 'TBD' scenario, the bottlenecks at Europoort, Botlek and Roosendaal are solved

3 sections are marked as potential bottlenecks

- the section between Venlo and Venlo border
- the section between Lage Roosendaal and Breda
- the section between Roosendaal and Breda

In the Netherlands, the exact routing of Bad Bentheim traffic is not yet known. That is why the current 2021 routing has been chosen in this CBA.

In **Belgium** 6 sections/regions are marked as potential bottlenecks:

- the Gent region : Gent Dampoort / Y. Oost Driehoek Ledeborg / Y. West Driehoek Ledeborg
Y. Noord Driehoek Ledeborg / section Y. Melle – Y. Melle West
- the section between Gent and Zwijndrecht Fort: from Sint Niklaas – Lokeren – Y. Bernadette
- the Antwerp Region : Y. Driehoekstraat / Y. Schijn / Y. Walenhoek / Y. Holland
Y. Antwerpen Schijnpoort / Y. Drabstraat
- the section between Antwerpen Berchem , Lier and Aarschot : from Y. Aubry – Lier – Y. Nazareth
- the Aarschot region : section Y. Nazareth - Y. Noord Driehoek Aarschot
section Y. Noord Driehoek Aarschot - Y Zuid Driehoek Aarschot
section Y Zuid Driehoek Aarschot – Y. Holsbeek
section Y. Noord Driehoek Aarschot - Diest
- the section between Y. Rooierweg and Tongeren

In **Germany**, there are 5 bottlenecks:

- the section between Kaldenkirchen and Viersen.
- the section between Aachen West and Stolberg.
- the section between Hürth-Kalscheuren and Remagen.
- the section between Mannheim – Zeppelinheim (the relevant section for RFC Rhine – Alpine is Gross Gerau – Biblis).
- the section between Offenburg and Basel Bad Rbf
(the relevant sections in the ÜLS are between Offenburg – Abzw. Gundelfingen
and Abzw. Leutersberg – Weil am Rhein).

In **Switzerland** there are 2 bottlenecks (R + S + P)

- the section between Bellinzona and Pino border
- the section between Frutigen and Brig (Lötschberg Base Tunnel)

In the **Border Section Switzerland-Italy** there is one bottleneck

- the section between (Brig -) Iselle – Domodossola due to :
 - the existing infrastructure bottlenecks on the RFI side, only 2 of the 3 train paths can currently be offered as SIM train paths (4m corridor).
 - the existing infrastructure bottlenecks on the RFI side, only 3 train paths instead of 4 (freight traffic) can be offered in the AS 2035.

In **Italy** three sections remain bottlenecks :

- the section between Luino and Laveno
- the section between Pioltello and Melzo
- the section between Voghera and Tortona

5 sections remain marked as sections which exceed the limited capacity threshold

- the section between Milano and Pavia
- the section between Pavia and Bressana Bottarone
- the section between Bressana Bottarone and Voghera
- the section between Milano (Rogoredo) and Melegnano
- the section between Melegnano and Piacenza

Number of sections with Capacity Bottlenecks in 2030	Infrastructure with plans S+R	Infrastructure with plans S+R+P	Infrastructure with plans S+R+P+TBD	Potential bottlenecks	Section which exceeds limited capacity threshold
Netherlands (+nodes)	7	7	4	3	-
Belgium	-	-	-	6	-
Germany	5	5	5	*	-
Switzerland	2***	2***	2***	-	-
Italy	3**	3**	3**	-	5

* Potential bottlenecks have not been identified

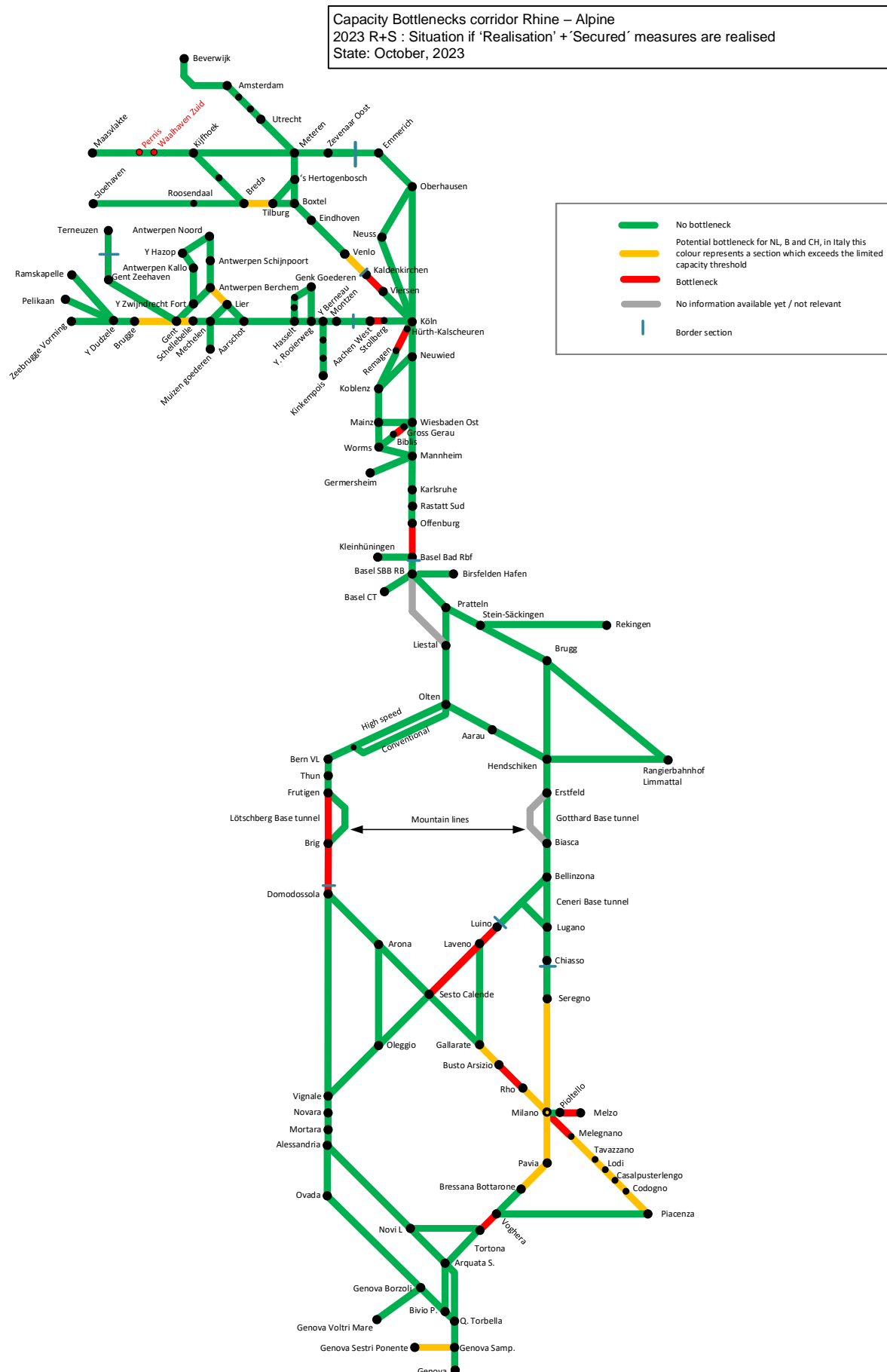
** Including the Bottleneck on the border section Iselle - Domodossola where capacity is managed by TVS / SBB / BLS.

*** For the bottleneck between Bellinzona and Luino no infrastructure measures are foreseen because, in combination with the Chiasso and Luino line, there is sufficient capacity available.

Conclusions

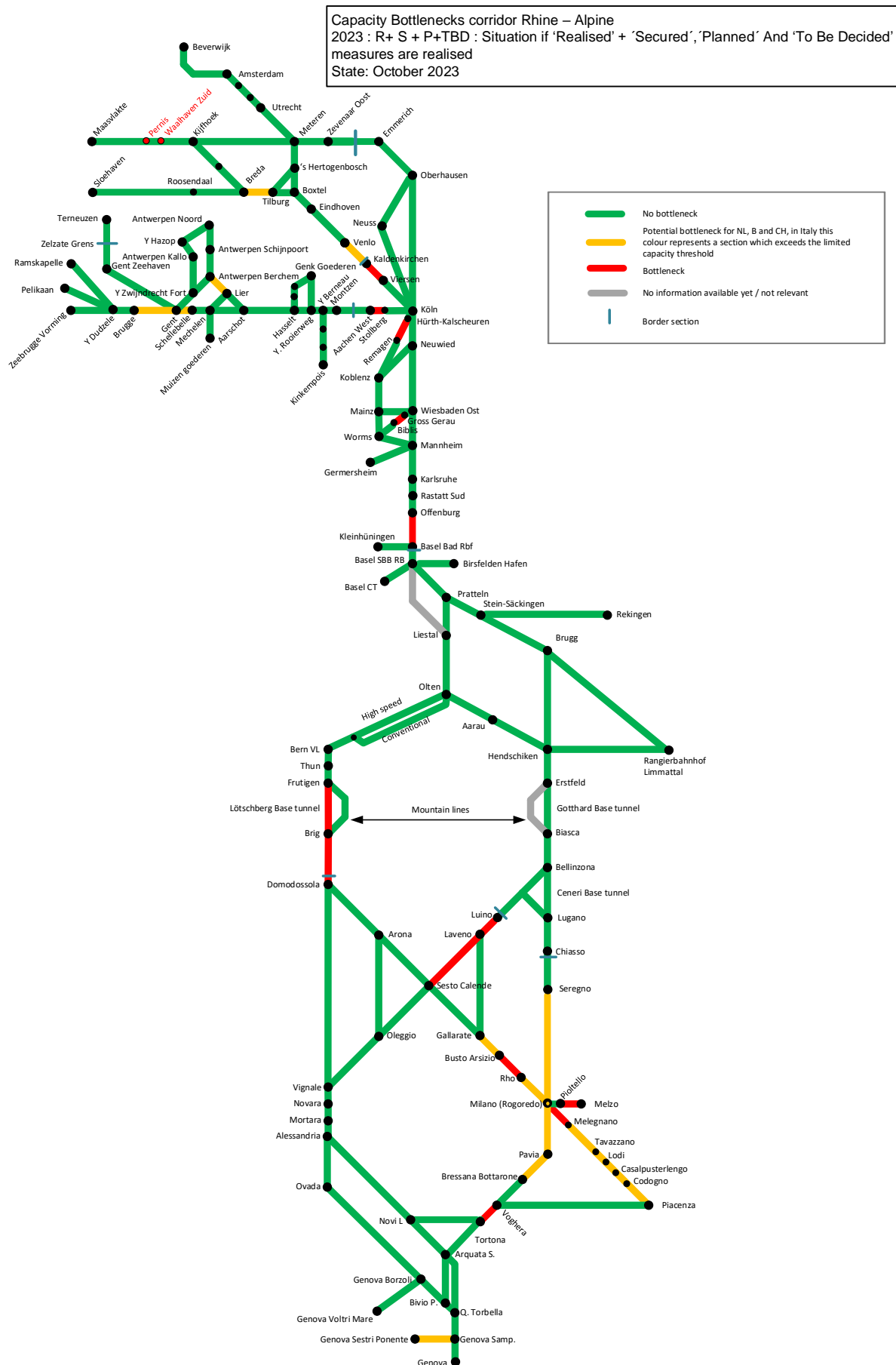
Until 2030, several (potential) capacity bottlenecks are expected to emerge. Even if all currently planned/identified infrastructure projects are realised (situation R+S+P+TBD), there will still remain (potential) infrastructural bottlenecks on RFC Rhine-Alpine. In several cases, especially in Germany, the planning of infrastructure implementation for the identified capacity bottlenecks goes much beyond the year 2030. It is crucial for rail operations on RFC Rhine-Alpine, that all planned infrastructure projects are realised in the best possible way and as quickly as possible. And it is also crucial to create new projects and assure their funding to alleviate all bottlenecks in order to improve the capacity on the corridor.

Annex 1: Capacity Bottlenecks in 2023 (R + S)

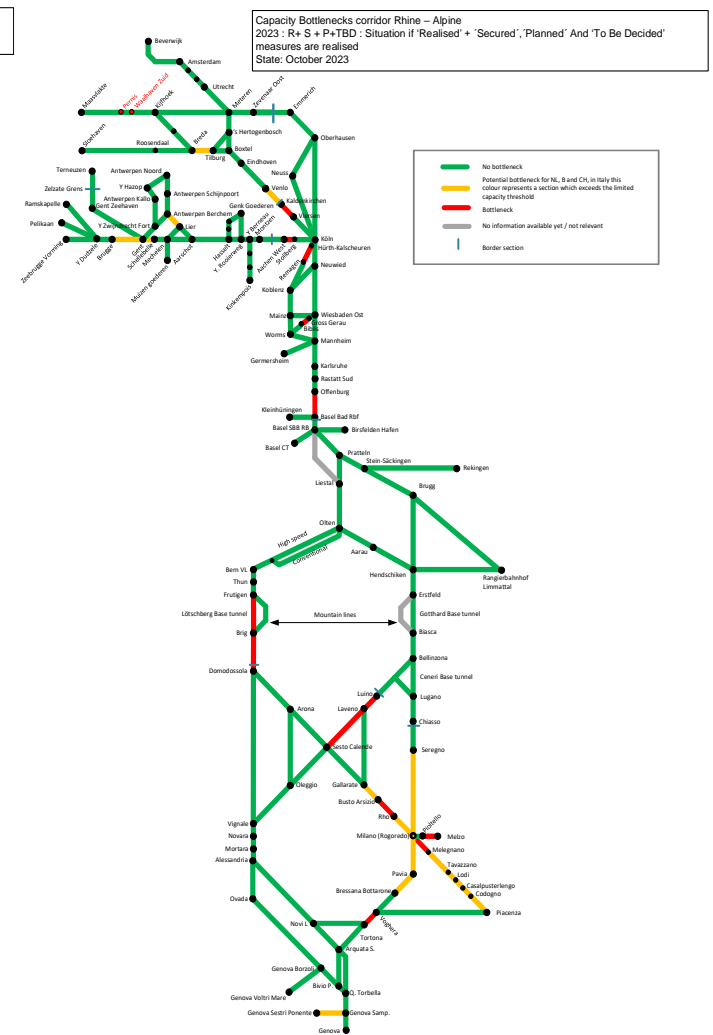
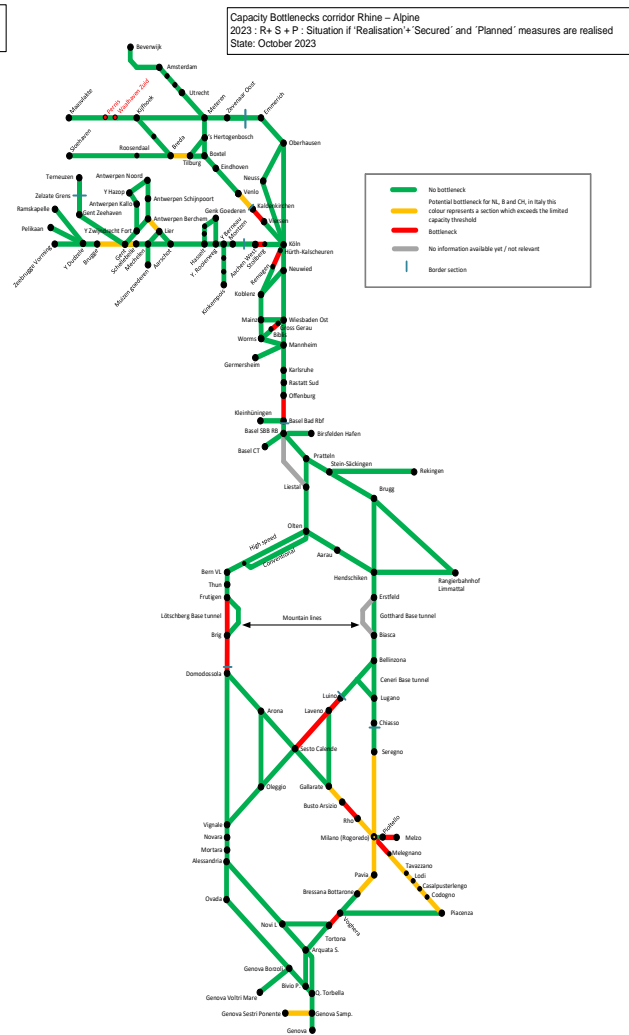
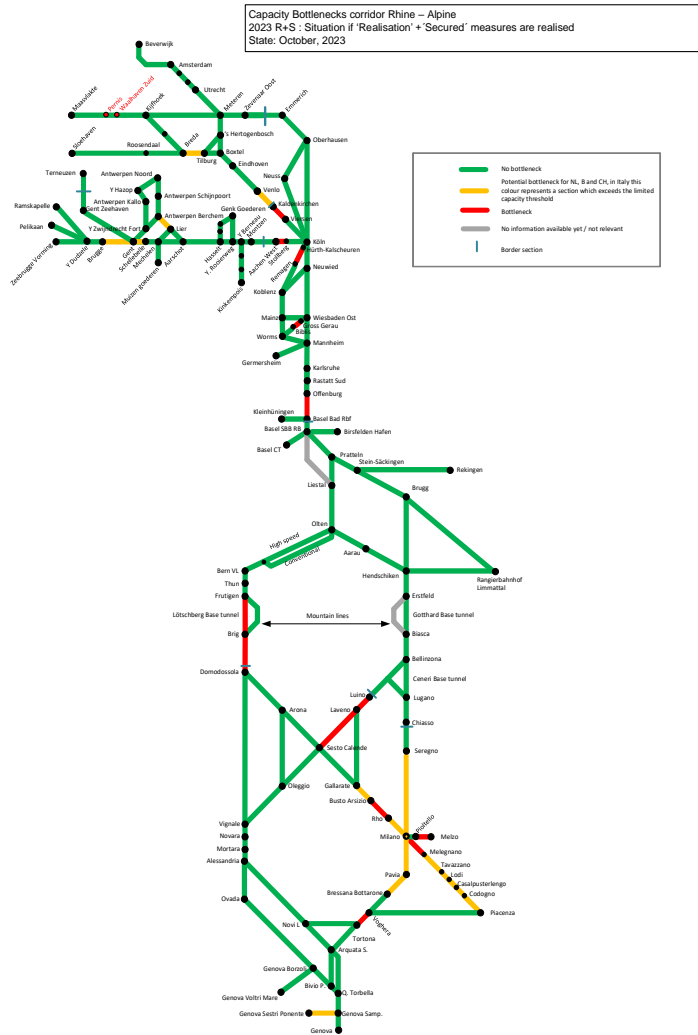




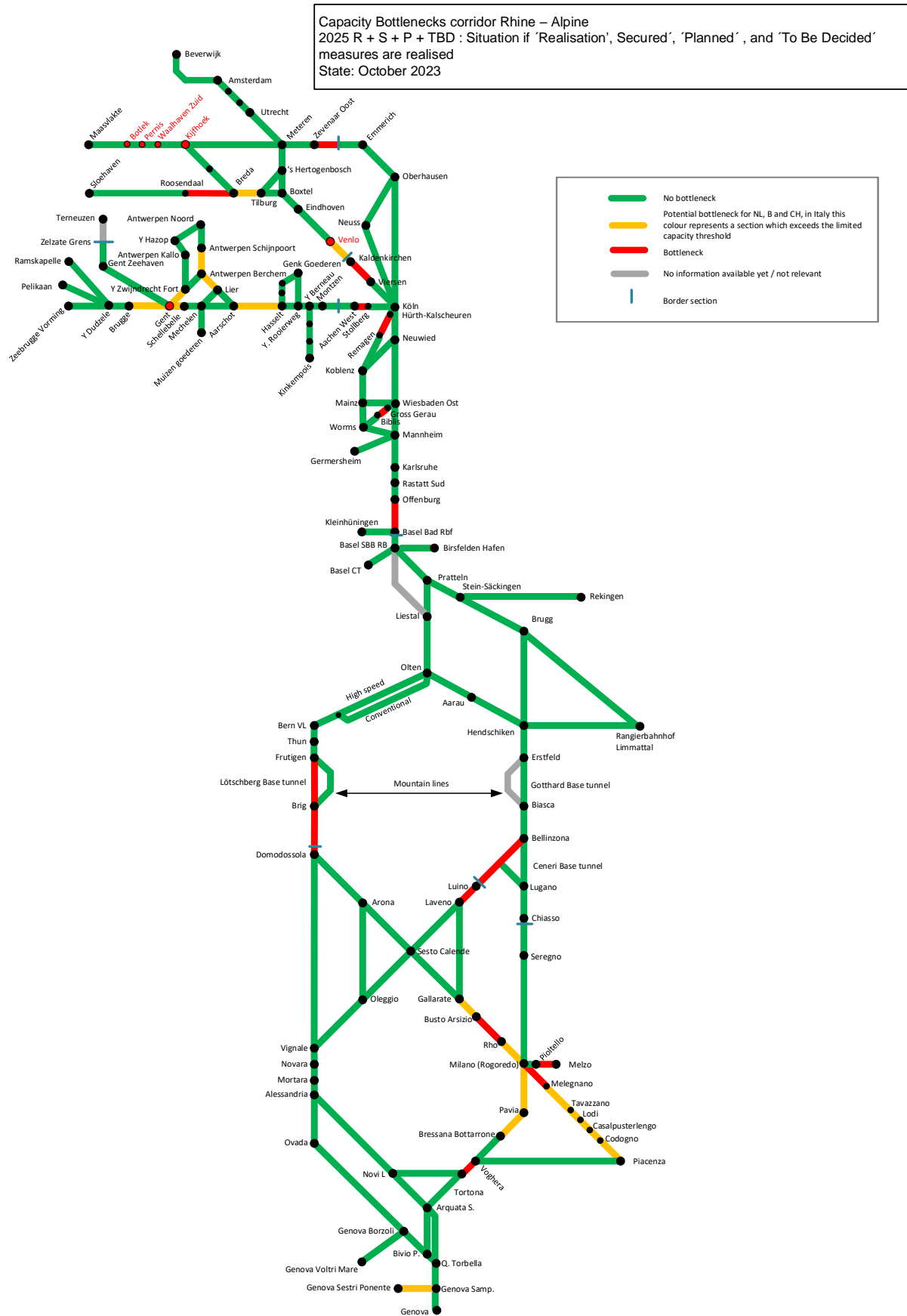
Annex 3: Capacity Bottlenecks in 2023 (R + S + P + TBD)



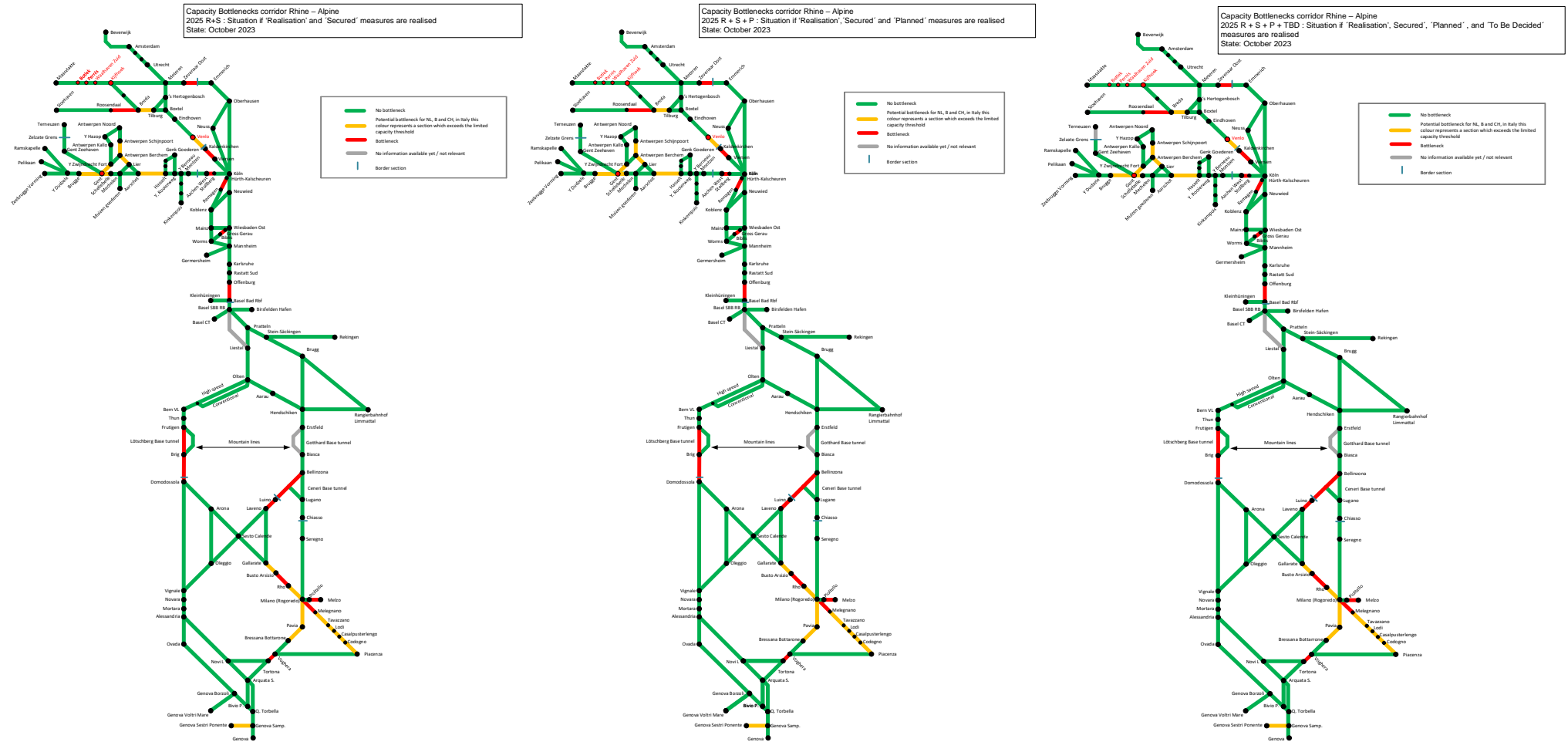
Annex 4: Capacity Bottlenecks in 2023 (R + S / R+S + P / R+S + P + TBD)



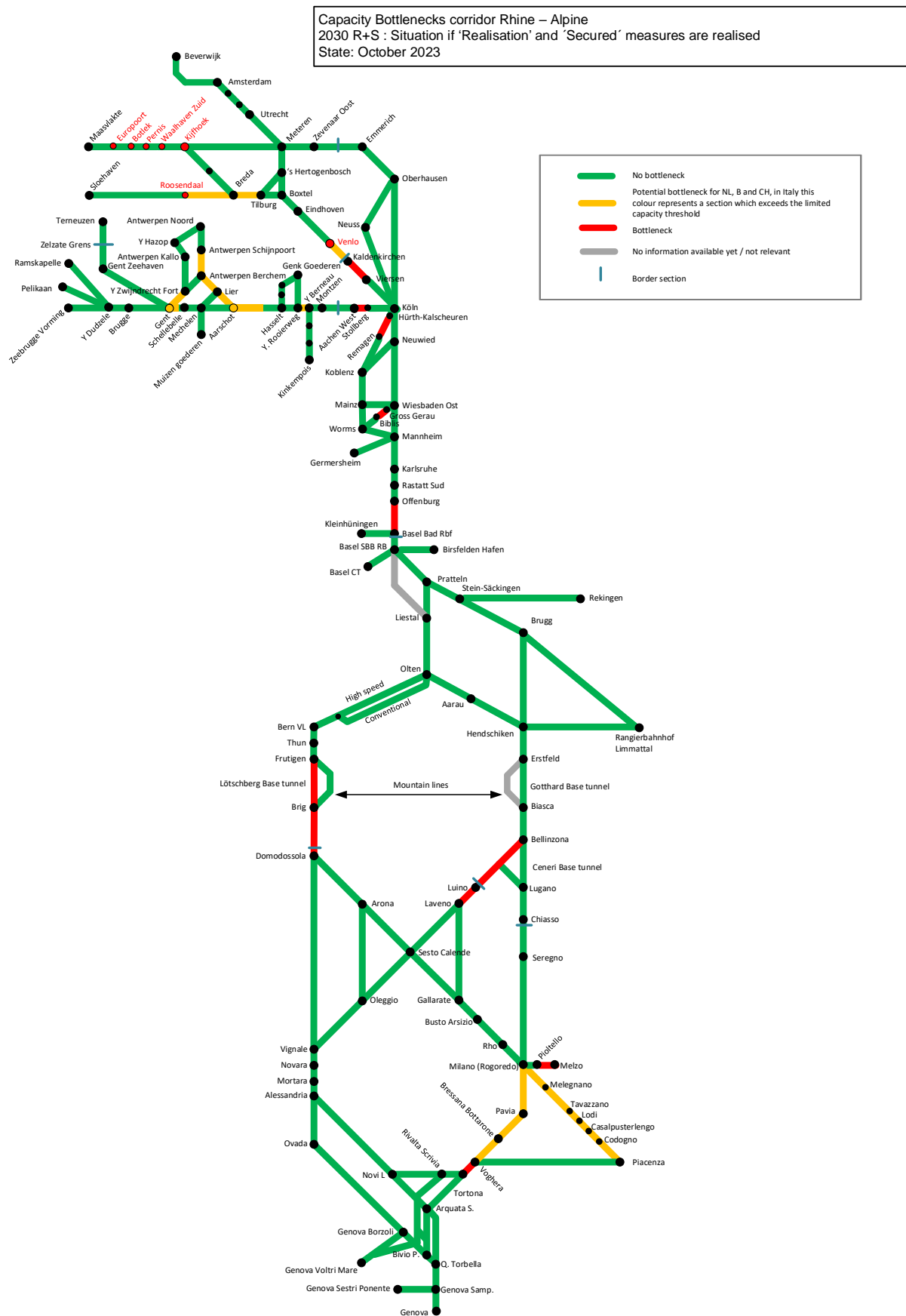
Annex 7: Capacity Bottlenecks in 2025 (R + S + P + TBD)



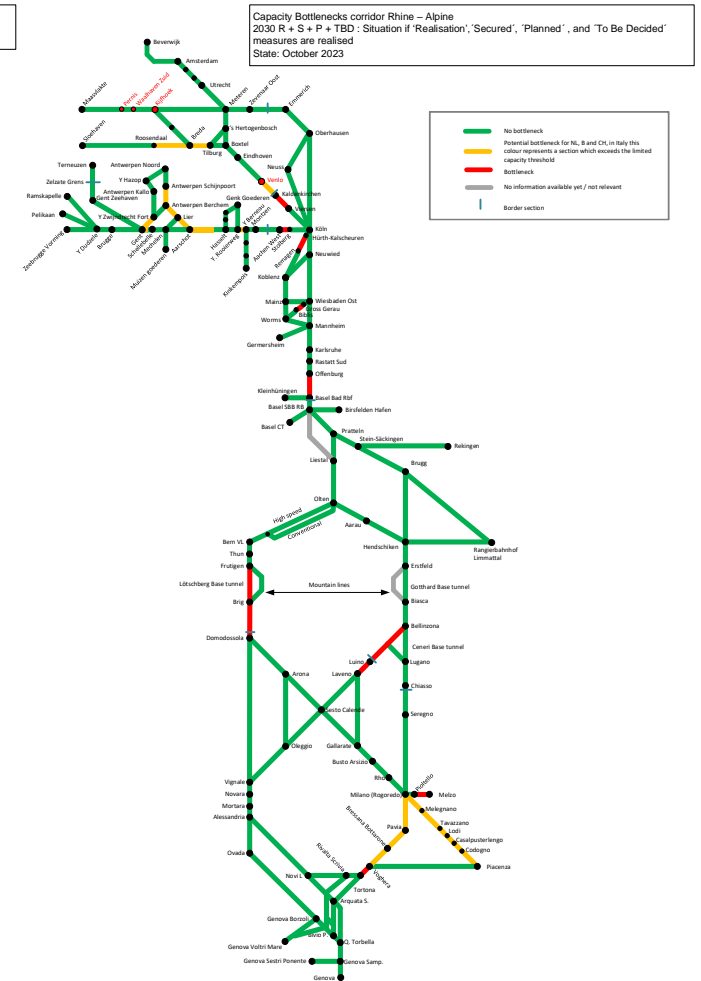
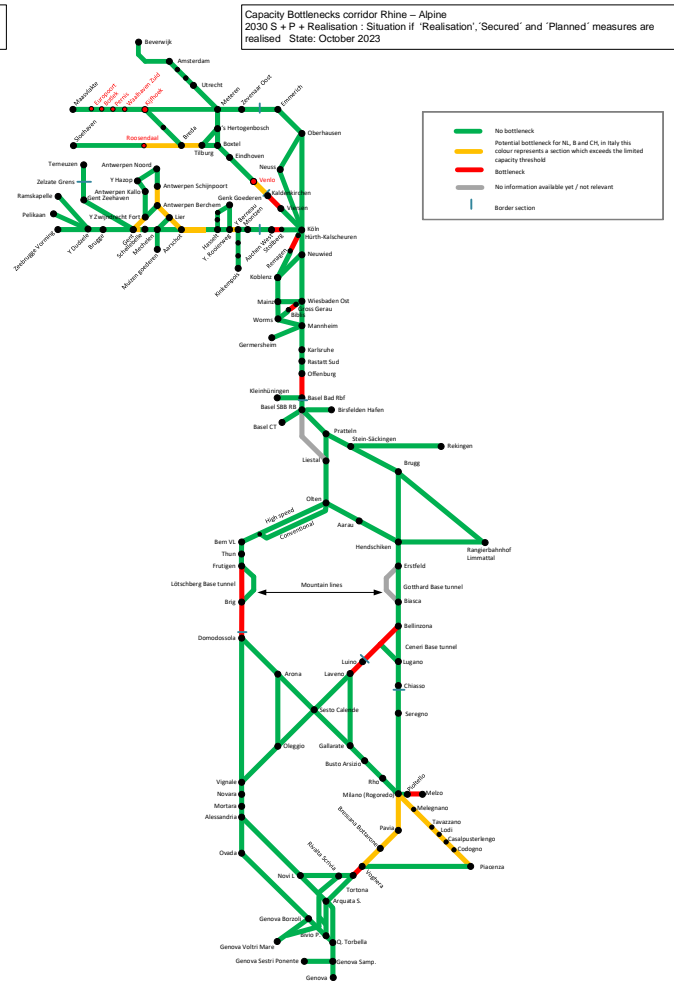
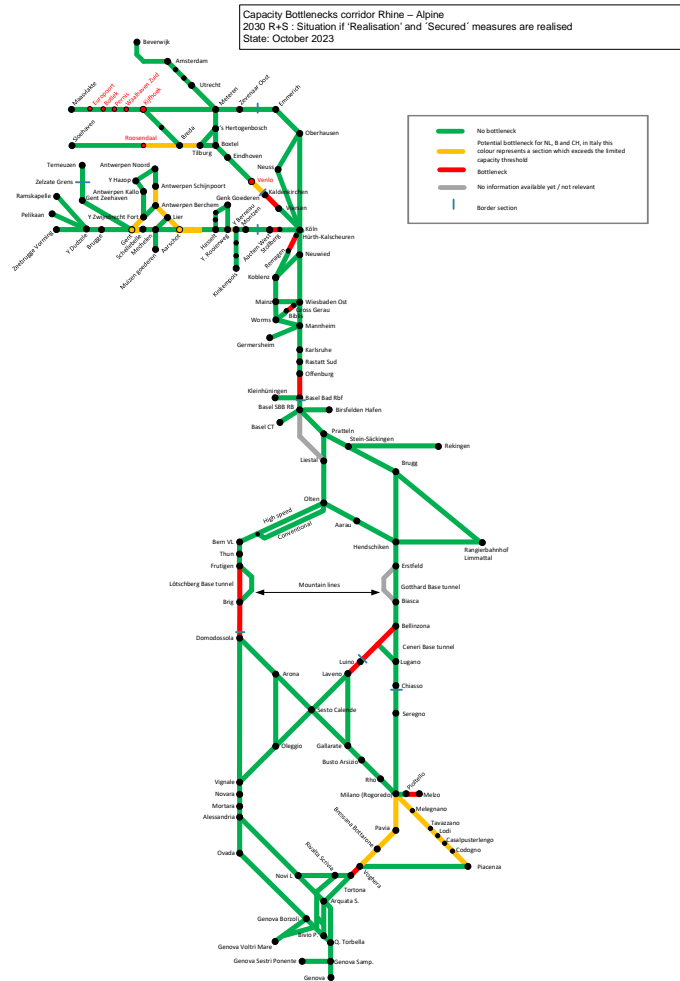
Annex 8: Capacity Bottlenecks in 2025 (R + S / R + S + P / R + S + P + TBD)



Annex 9: Capacity Bottlenecks in 2030 (R + S)



Annex 12: Capacity Bottlenecks in 2030 (R+ S / R + S + P / R + S + P + TBD)



Annex 13: CIP project information (valid 27/10/2023)

The CIP projects can be found in Annex B of the Implementation Plan.