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Emyl Lewicki
Head of Freight and Open Access
Office of Rail and Road (ORR)
25 Cabot Square
London
E14 4QZ

By email: [redacted]

23 May 2025

Dear Emyl,

Ref NR Written Representations – Lumo NW S17 EUS-RCD, 09.05.25 FINAL SIGNED

We are writing in reply to the Network Rail letter to you of 9 May 2025 outlining their representations for a new Track Access Contract (TAC) between Network Rail Infrastructure Limited and East Coast Trains Limited ("Lumo NW").

We welcome the statements made by the Secretary of State for Transport and other representatives of the DfT, recognising the many benefits that can be provided by open access, opening up new markets, driving innovation and fostering competition. The Prime Minister has also offered support this week, noting in the House of Commons that "open access operators have huge potential to offer passengers more choice."

ORR's careful exercise of its regulatory powers to approve open access operations has helped to provide businesses with the confidence to make significant investment in the industry and wider communities such as our recent £500m order for a fleet of Hitachi trains that will be produced in Newton Aycliffe.

We consider that the history of Open Access applications and operations bears out this positive view and that, in reality, successful applications granted by the ORR have universally resulted in service and performance enhancement, higher standards and greater ridership without significant capacity, performance or revenue abstractive outcomes.

This stands to support the success of the independent decision making of the regulator in relation to such applications, ensuring the efficient use of track capacity, greater benefits for passengers, and value for the taxpayer.

Given the constraints on public spending and the need to drive economic growth, there is a responsibility for the rail industry to ensure expensive assets are being utilised to the full. Capacity has been identified on the WCML. Our Lumo NW application can deliver £0.5 billion of economic benefits to the region, and help drive crucial housing projects.

While we provide a number of high-level responses below to the points raised in Network Rail's letter, we are continuing to review the detail of Network Rail's comments and reserve the right to respond

further to them if required. In this respect we would welcome, in particular, any direction from ORR on matters which ORR considers it would benefit from further evidence from us (if any).

Timetable Capacity

- The Network Rail assessment of capacity on WCML (future committed services included) identified 9 paths through the weekday that are not utilised. Network Rail have declared that these are all required for performance firebreaks – i.e. no trains will run in these available paths.
- The economic impact of not utilising these paths is material. For the 6 paths identified for the Lumo NW application Arup have identified £0.5bn of wider economic benefits, which would provide a step change for Greater Manchester and the Liverpool City Region, and importantly improves the connectivity for the boroughs of Bury, Rochdale, Oldham, Salford, and St Helens.
- Declaring all 9 paths as necessary for performance firebreaks is random. There is no evidence that firebreaks work, and a robustly constructed timetable would expect to be a better mitigation for performance.
- Considerable taxpayer money has gone into the modernisation of the WCML with significant ongoing investment as part of CP7 and the taxpayer needs to see the best return from the investment.
- The Government has made growth a key priority. For economic growth, including growing the housing supply, the Lumo NW service can deliver this with a new direct service for Newton-le-Willows, Eccles, and Rochdale. Hull Trains has demonstrated in Humberside that new direct services do have a direct positive effect on housing development.
- Our Lumo NW service to Rochdale will dovetail with our Lumo service to Stirling, to ensure optimal use of capacity, provide considerable customer benefits, and also wider economic benefits.
- We are encouraged that Network Rail have declared there is unused capacity on a Sunday. The current demand behaviour on long distance services shows Sunday to be a highly desirable day for leisure travel, and is a core part of Lumo NW application.

Performance

- As part of our supporting evidence to the Lumo NW application to run services between Rochdale and London Euston we commissioned Trenolab, performance micro-simulation experts, to demonstrate how the Lumo NW service fits on the network and the performance impacts. The findings of this commission have been shared with Network Rail, and are appended to this letter.
- Significant taxpayer money is being spent on improving the railway to ensue more performance reliance. These infrastructure enhancements need to be reflected in reaching any decision on performance impacts. In particular the performance modelling has been undertaken with no consideration for known committed future infrastructure schemes in the Manchester area, these schemes will improve performance.
- Regarding Rochdale platform length, the 5-car class 80X is 130m in length and should comfortably work with the existing Rochdale platform lengths.

Euston Passenger Flow

- We are aware of concerns at Euston station for safe movement of customers through the station concourse. However, Lumo NW would not be introducing more trains above the peak hour than is currently approved. Whilst we agree with Network Rail that Lumo NW will grow the passenger footfall, it should be recognised that the current Euston footfall is still significantly below the footfall in 2019. In 2023/24 the ORR published entry/exits for the station was 36 million, which compares to 46 million in 2018/19.
- There is still plenty more which can be done on helping the pedestrian flow through the station, and we are happy to help work with industry partners to ensure customers move safely through the station.

Power Supply

- We are aware of concerns regarding power supply on the West Coast Mainline, and this is one of the reasons we put the application together on the basis of a dual traction train. There are rolling stock solutions that help mitigate potential power supply issues, with considerable recent technology advancements, we have taken an innovative approach. We undertook a detailed review of how a battery electric train could navigate the pinch points on the WCML and this report was subsequently shared with Network Rail.
- In addition to exploring the use of battery technology, the Hitachi 80x platform that will be deployed on the proposed Lumo NW service, has a 'geo-fencing' function. This functionality uses GPS technology to inform the train it is operating on a section of the route which has power limitations. On the train becoming aware that it is operating on such a section, the driver's ability to draw power is reduced automatically and cannot be overridden. This has been deployed successfully on the ECML, where power draw is reduced from a typical 300 Amps to 125 Amps.
- Whilst we are confident that a battery-electric train can navigate the power supply issue, particularly as strain on power supply will be variable throughout the year, as part of our rolling stock options with Hitachi we have the option to switch to different tractions, a diesel-electric bi-mode train, and a battery-diesel-electric tri-mode train.

Manchester North-West Transformation Programme (MNTP)

- We welcome the infrastructure improvements that the MNTP will bring to Manchester and surrounding communities. We expect these will enhance performance, and should be considered in the performance modelling given the next phase due to be implemented in 2026.

HS2

- Potential delays to the start of HS2 services mean that maximum and efficient utilisation of the existing conventional infrastructure is even more important. Our application can bring about real change to the communities it will serve, and provide much needed capacity to

Manchester, and crucially improve the connectivity for North Manchester boroughs. It is not clear if Manchester will ever benefit from additional capacity from HS2.

- Restricting any decision on track access until the HS2 service going north of Birmingham is finalised is unrealistic. There are significant benefits which can be delivered today and the years prior to HS2 launch. Lumo NW brings significant economic benefits to Greater Manchester and Liverpool City Region, and importantly improves the connectivity immediately for the boroughs of Bury, Rochdale, Oldham, Salford, and St Helens.

TRU

- As we have done on other major infrastructure projects, we will work with industry partners to ensure projects are delivered smoothly, and importantly that the customers are looked after during periods of disruption.
- With the considerable investment going into TRU we expect this to provide enhancement to train performance in the Manchester area.

Complex and Competing Applications

- Network Rail refers to this application against other unsupported applications, and how the application could have an adverse impact on them. We would expect Network Rail to be assessing each application individually against the base case.
- Given the length of time taken to assess the application the base case has subsequently evolved. For the purpose of access applications we have to work against the latest information at application stage and acknowledge known future changes (introduction of Stirling services etc.). The capacity identified exists in latest timetables.

December 2025 Priority Date Notification Statement

- The reference by Network Rail not considering a December 2027 application at this stage is confusing. For an open access operation the application needs to be considered, to ensure there is sufficient time for rolling stock delivery. The case for new rolling stock can only be made with track access secure. Our £500m new trains deal with Hitachi contains an option for further trains, including for this application. This will help to reduce the time that it typically takes from track access approval to operating the service, bringing benefits to Greater Manchester and Liverpool City Region quicker.

In summary, FirstGroup will only submit what we believe are strong applications which have been well stress-tested in respect of network capacity, performance and economics, and our 25-year history in Open Access has demonstrated our success in this area.

This Lumo NW application has a very strong alignment to the Government's aspirations for private sector investment, delivering improved connectivity and driving the economic growth agenda. It builds on our successful track record in these areas, and is based on robust outcomes-based evidence, along with strong stakeholder support.

The Government is encouraging the private sector to deliver for the UK economy and the communities we serve. Furthermore, the Secretary of State for Transport has said that she recognises the benefits that can be provided by Open Access operators in the right circumstances and that both existing and new Open Access operators can open up new markets, drive innovation and offer choice to passengers. We consider that our application does.

We would be grateful if the ORR would take this response into consideration when reviewing the Network Rail submissions and, in the event that queries arise or remain in relation to any of the points Network Rail raises, identify them to us such that we can provide a fully evidenced response.

In the meantime we continue to review the detail of the Network Rail submission and reserve the right to write further in relation to it if necessary.

Yours sincerely,

[redacted]

Stuart Jones

First Rail Open Access Commercial Director

Assessing the impact of new Rochdale-Euston Open Access services on the WCML

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July 17th 2024

Agenda

- **Goal of the study**
- **Approach**
- **Extra services in the proposed timetable**
- **Current and proposed timetable**
- **Analysis of current operations**
- **Simulation results**
- **Preliminary comments**

Goal of the study

Model the impact of 6 new trains per day each way between London Euston and Rochdale via Warrington Bank Quay and Manchester Victoria.

Given the limited differences in the grid between the current (reference) and proposed timetables, it would be possible to consider the current timetable and delays as a reference, almost as if the new services were simply added to it.

However, for higher accuracy it was decided to import and simulate the two timetables separately, and activate the proposed services as a variant of the second. In this way we separate the impact of the changes to the grid from that of the new trains.

Approach

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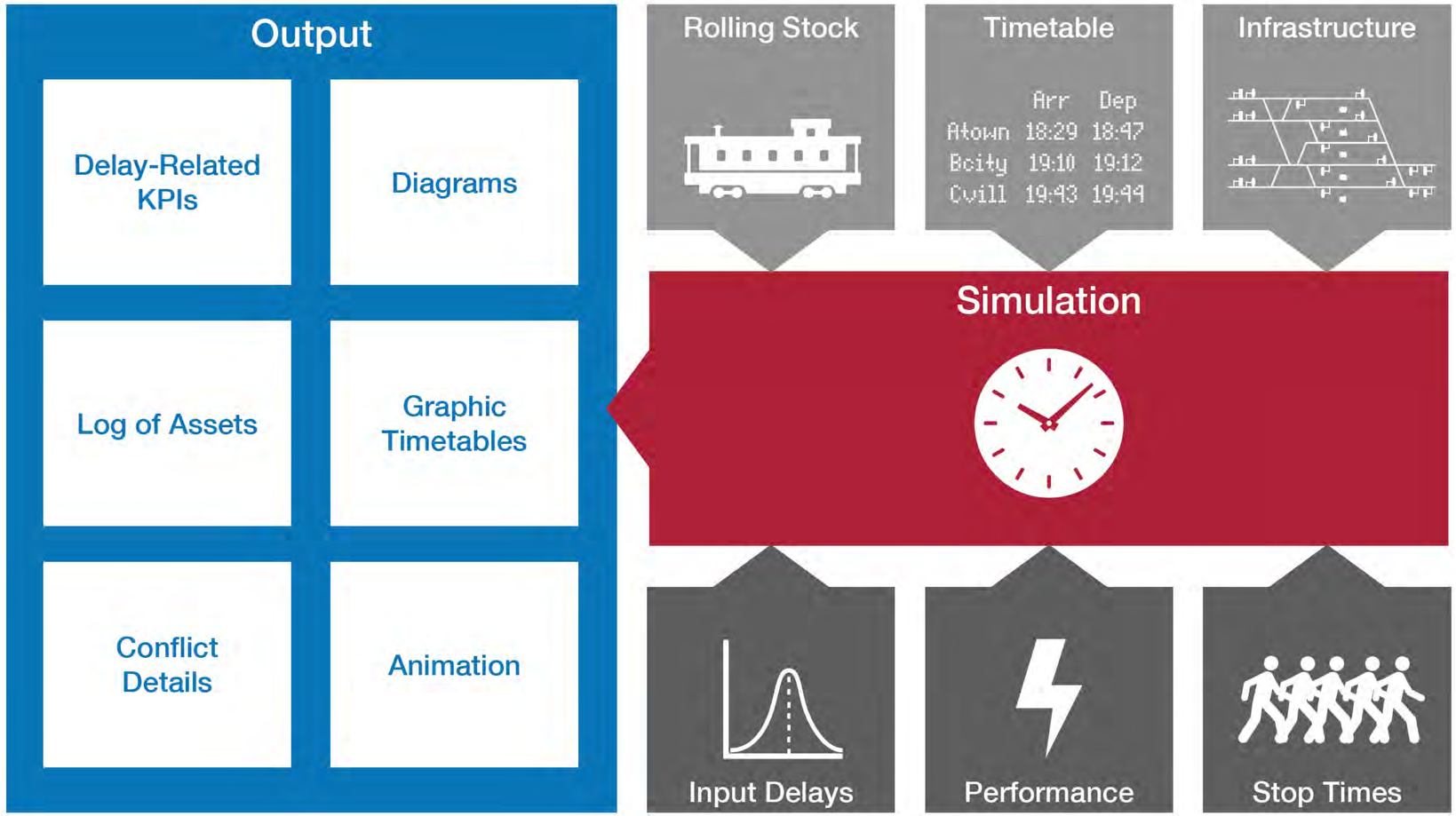
trenissimo estimates performances of operations using stochastic synchronous microscopic simulation**:** the most accurate way to reproduce railway operations.

Microscopic: based on a very detailed model. It combines a detailed infrastructure model, including track layout, signals, gradients and speed restrictions; an event-based signalling and regulation logical model; and a time-step physics engine for calculating train performance – acceleration and braking.

Synchronous: all the motion equations of trains which are moving together on the network are modelled at the same time. Exactly as in real operations.

Stochastic: similar to real operations, the simulation contains a set of variable parameters such as departure delays or dwell times. To obtain a statistically sensible estimation of performance, it is repeated 250 times - a number similar to that of SX days in a year.

Synchronous Microscopic Simulation



- Hansen, I.A., Pachl, J "Railway Timetabling and Operations" Eurailpress (2014)

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These parameters vary the three key process times:

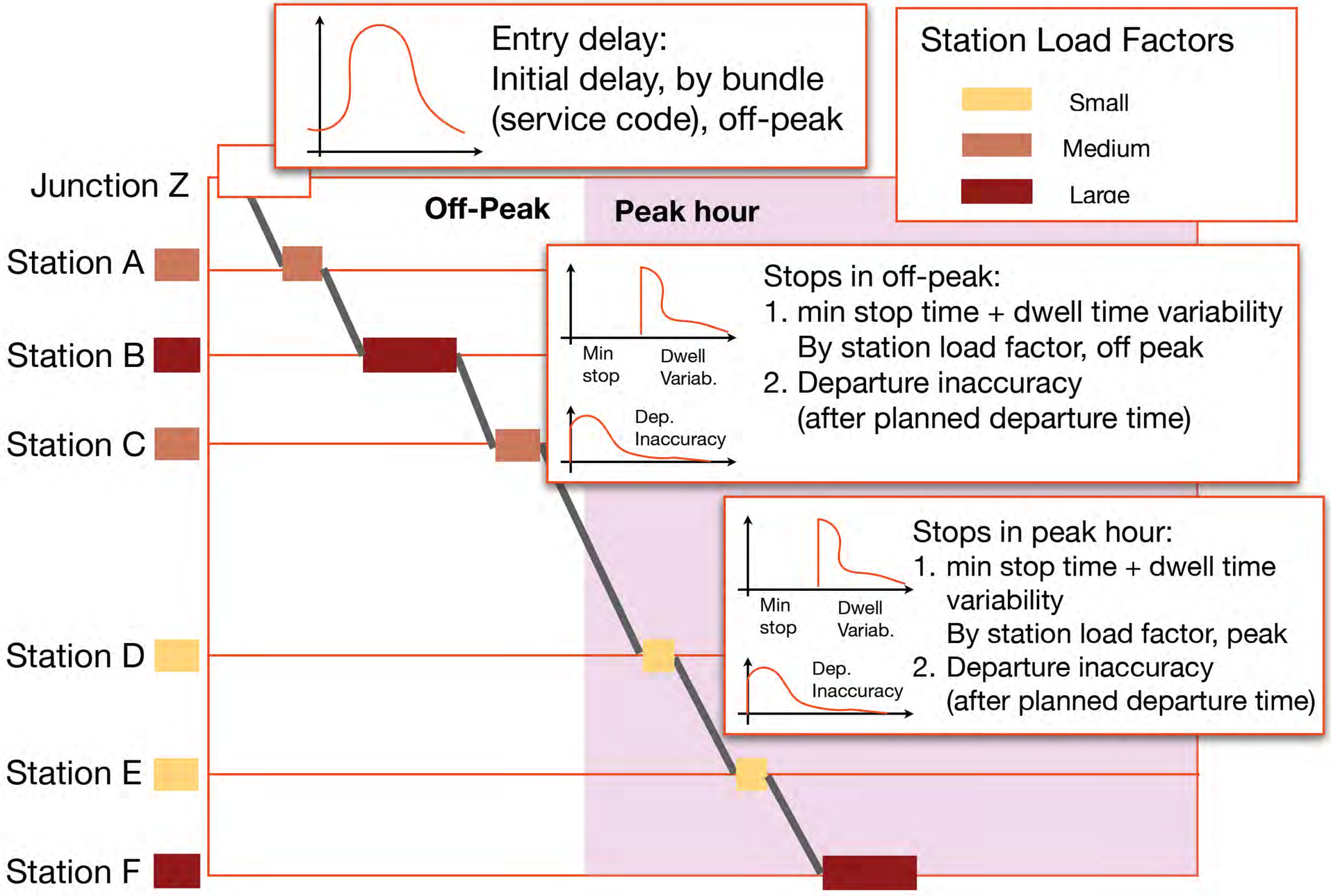
- Delays upon entry into the model area
- Running times of trains
- Dwell times

Entry delays: all model areas are geographically- and time-limited, and thus *trainsets* enter the model with a variable delay either if they start their service in a depot or come from far away. Also when a service terminates and a new service starts the departure process might lead to some additional variability.

Running times: the combination of driving styles, adhesion and specific conditions of the rolling stock lead to variable running times.

Dwell times: dwell times are variable due to the combination of the number of passengers boarding/ alighting (and their luggage, age, distribution on the platform, etc) combined with the departure process.

Thus, considering the entry and stops of a service on a line…



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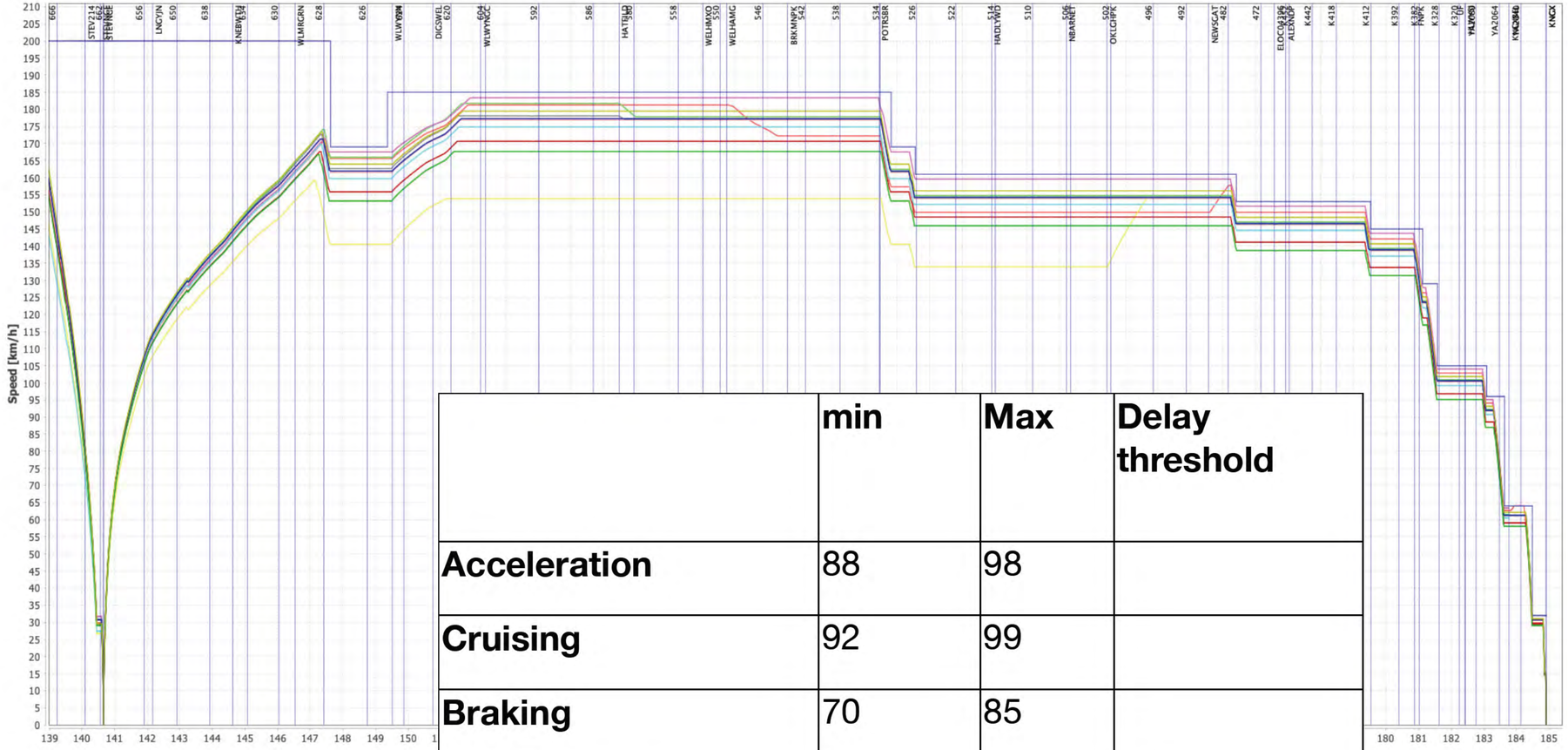
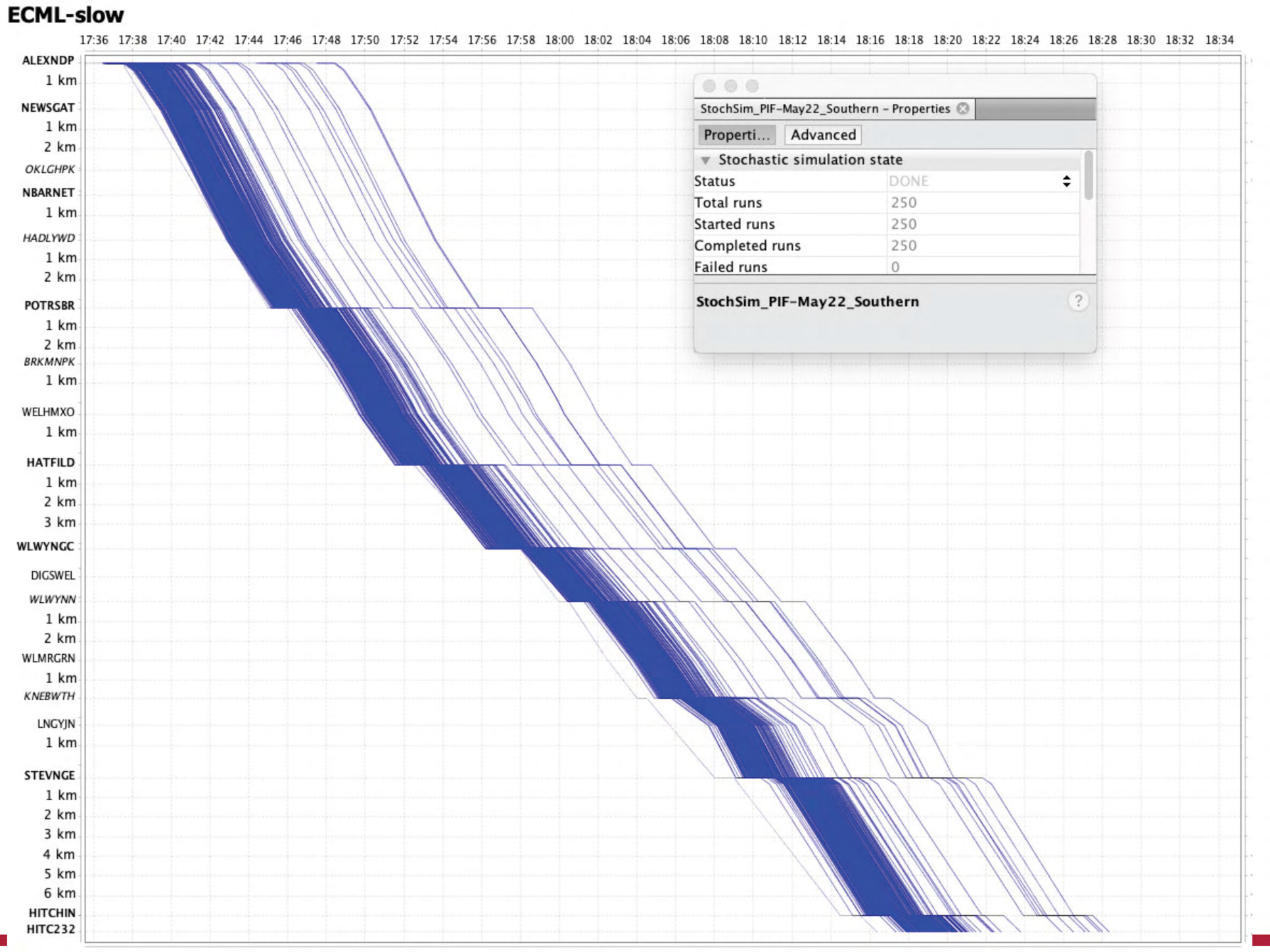
…and its running time

In lieu of an ad-hoc analysis of OTMR/GPS data, the same set of parameters are used for all bundles.
The same *driving style* is picked for a train for all sections in a run.



	min	Max	Delay threshold
Acceleration	88	98	
Cruising	92	99	
Braking	70	85	
Late Running	1	5	180
Early Running	0	3	-120

What we see in the aggregated output



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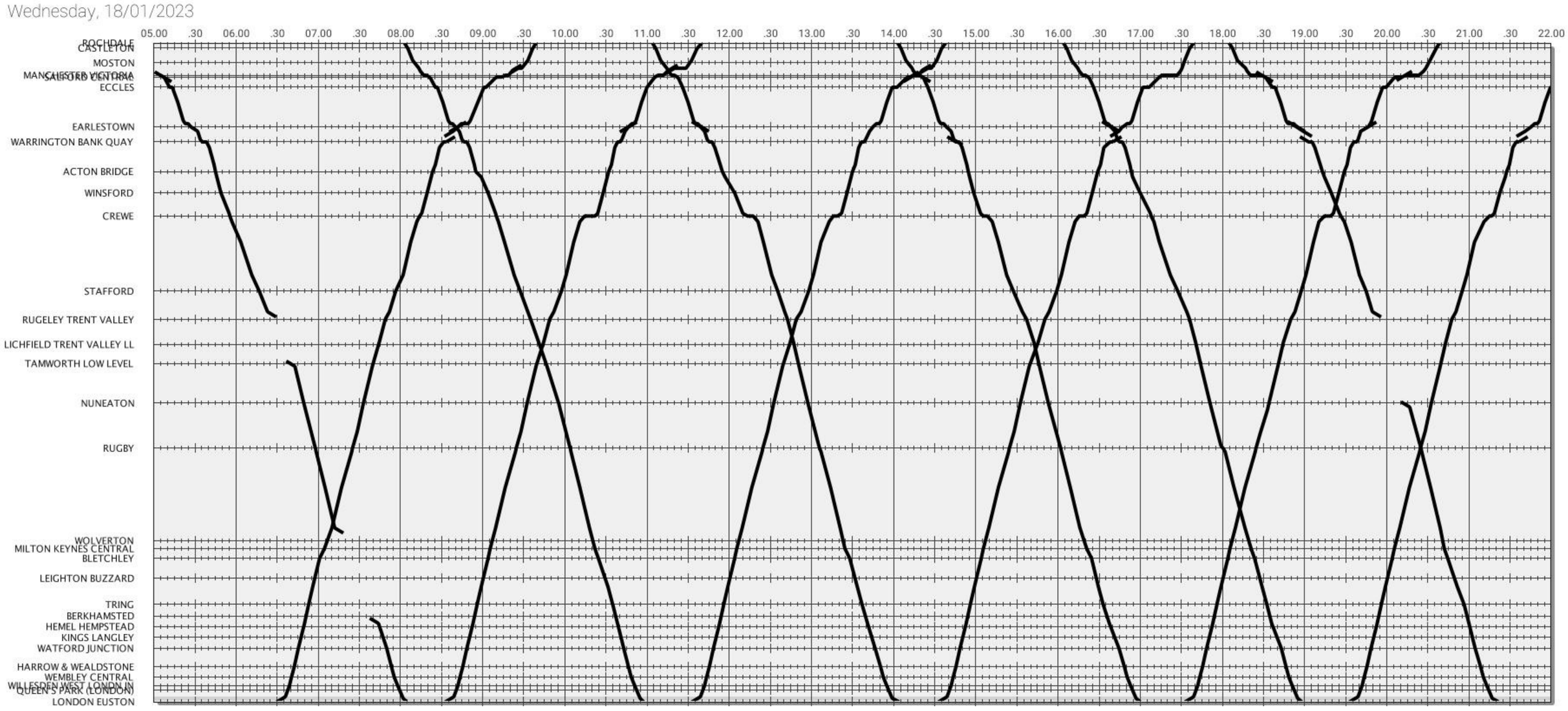
Proposed services



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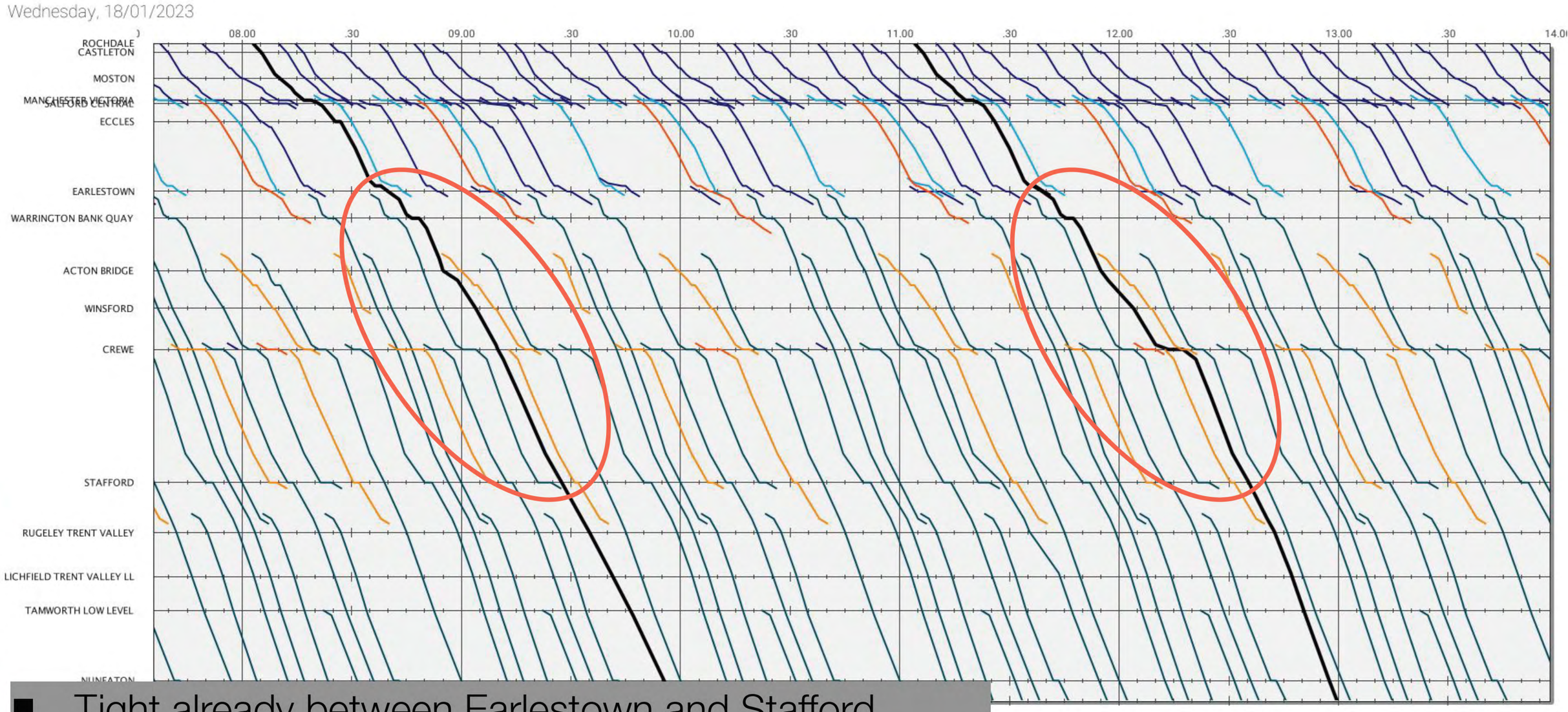
Proposed services - Detail



- Tight already between Earlestown and Stafford

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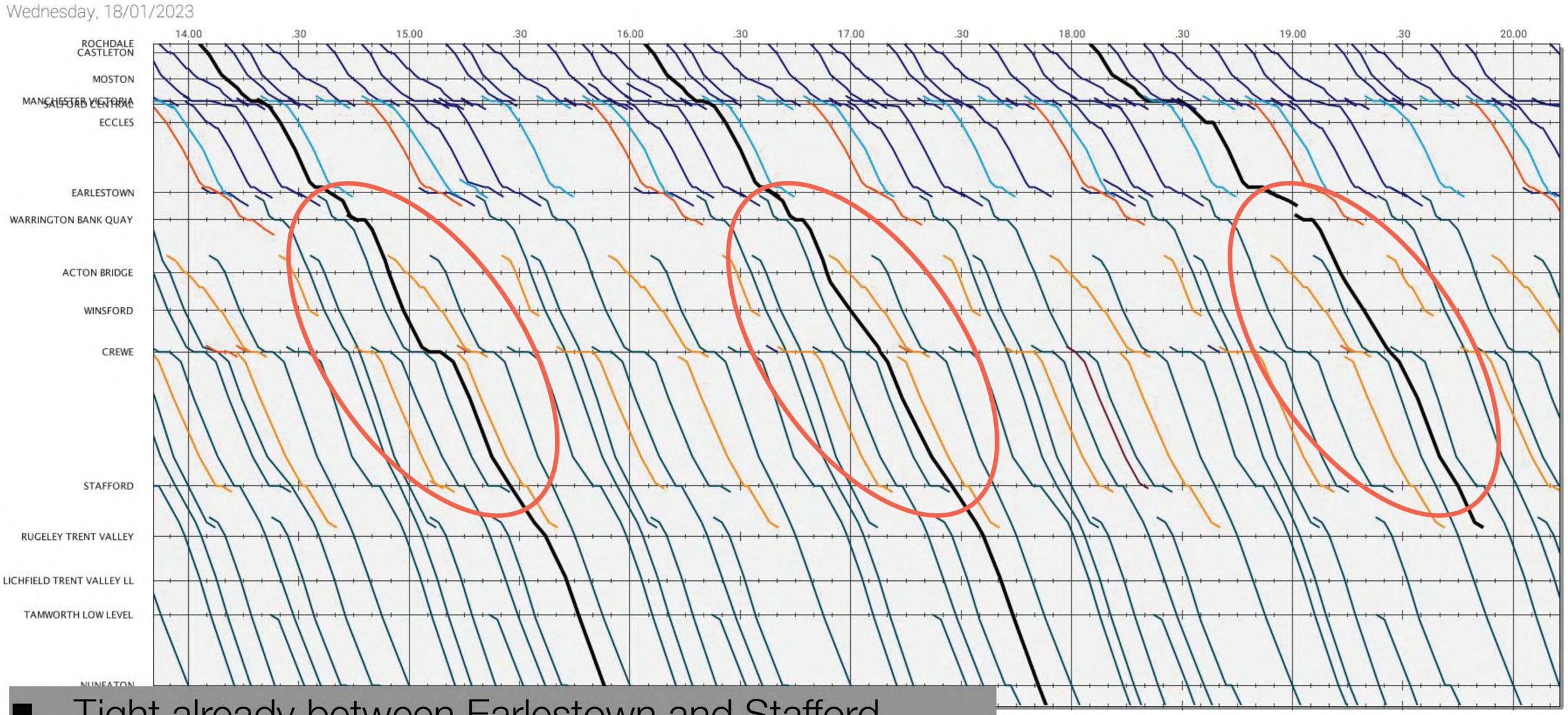

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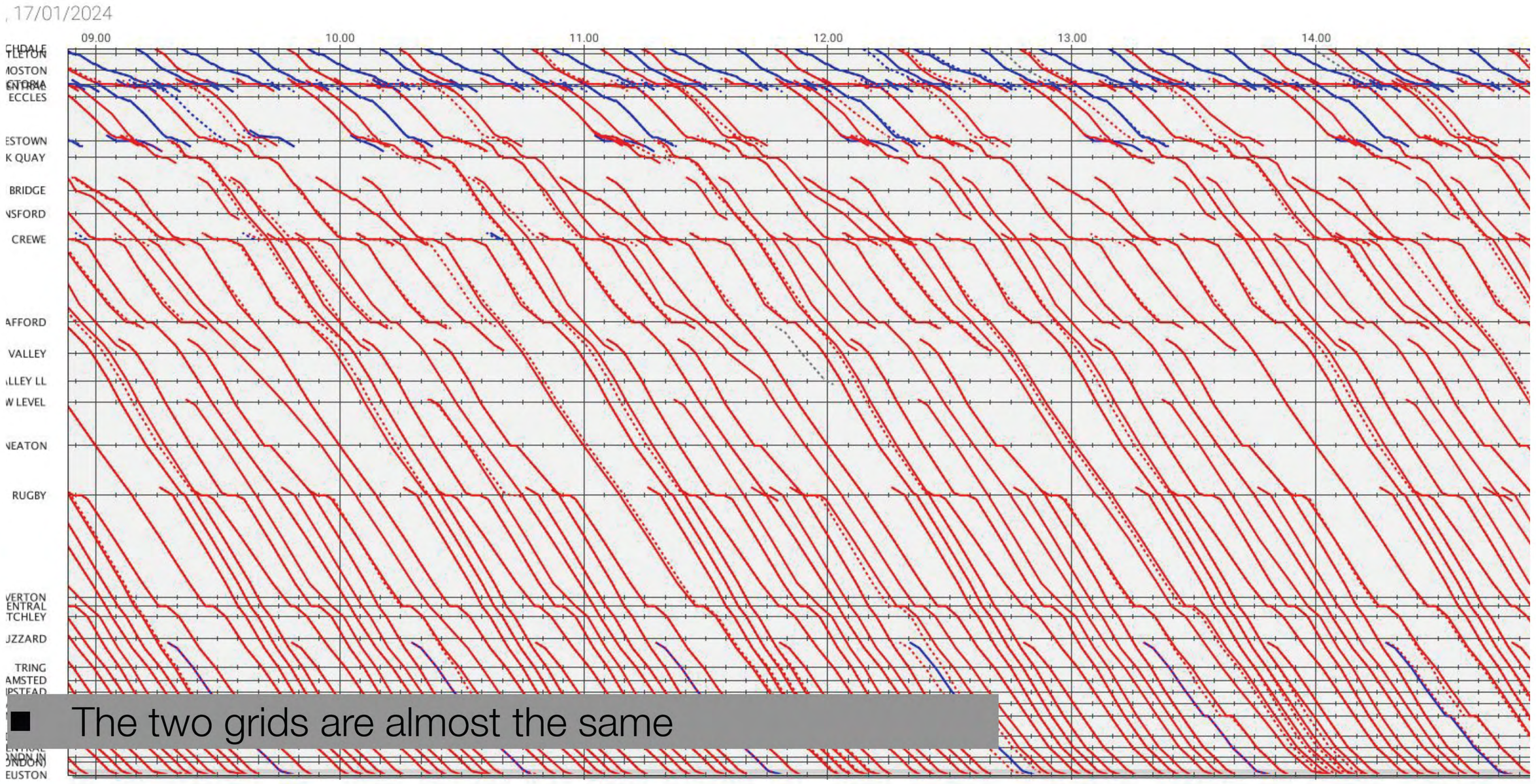
Dec23 vs May25



- The two grids are almost the same

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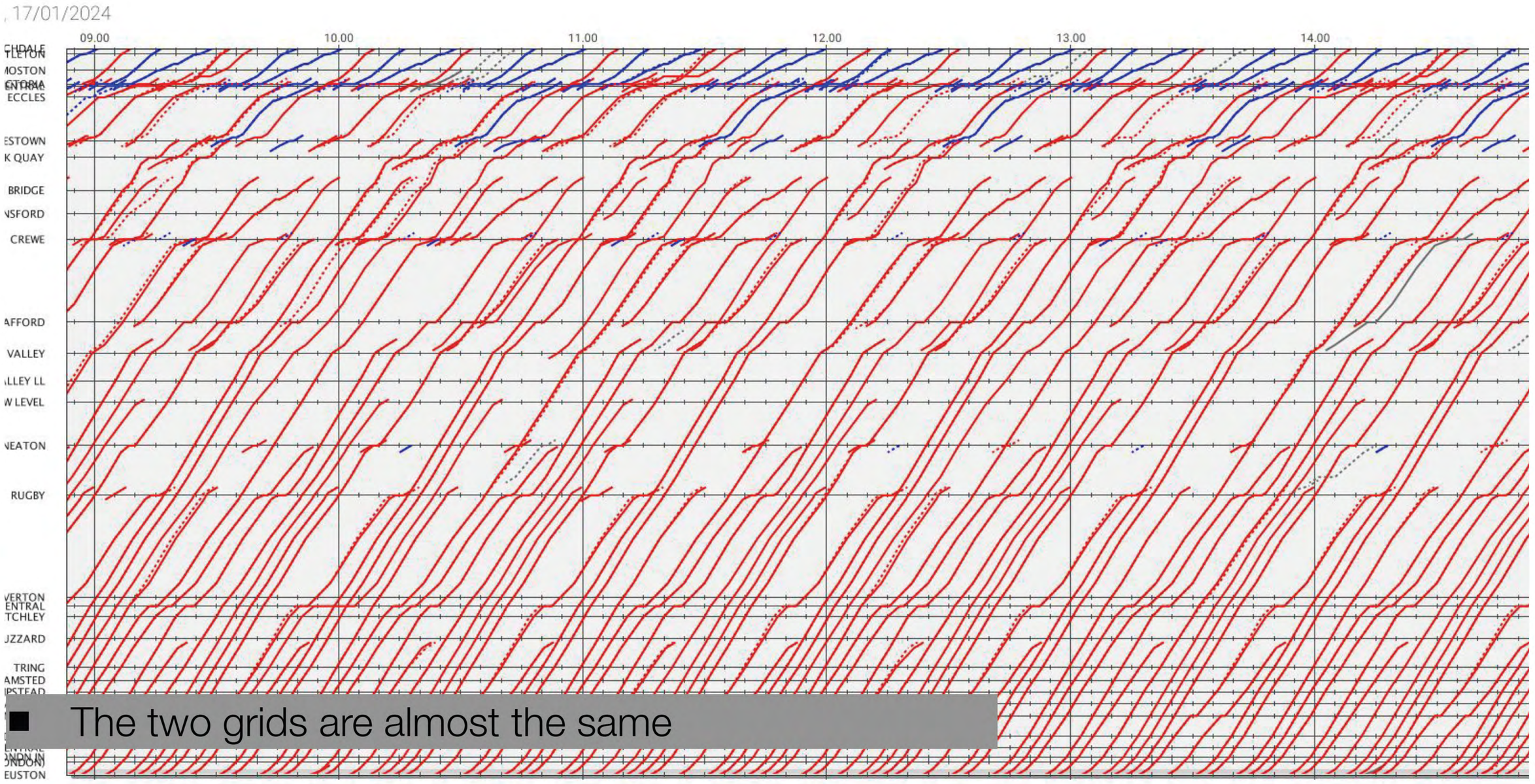
Dec23 vs May25



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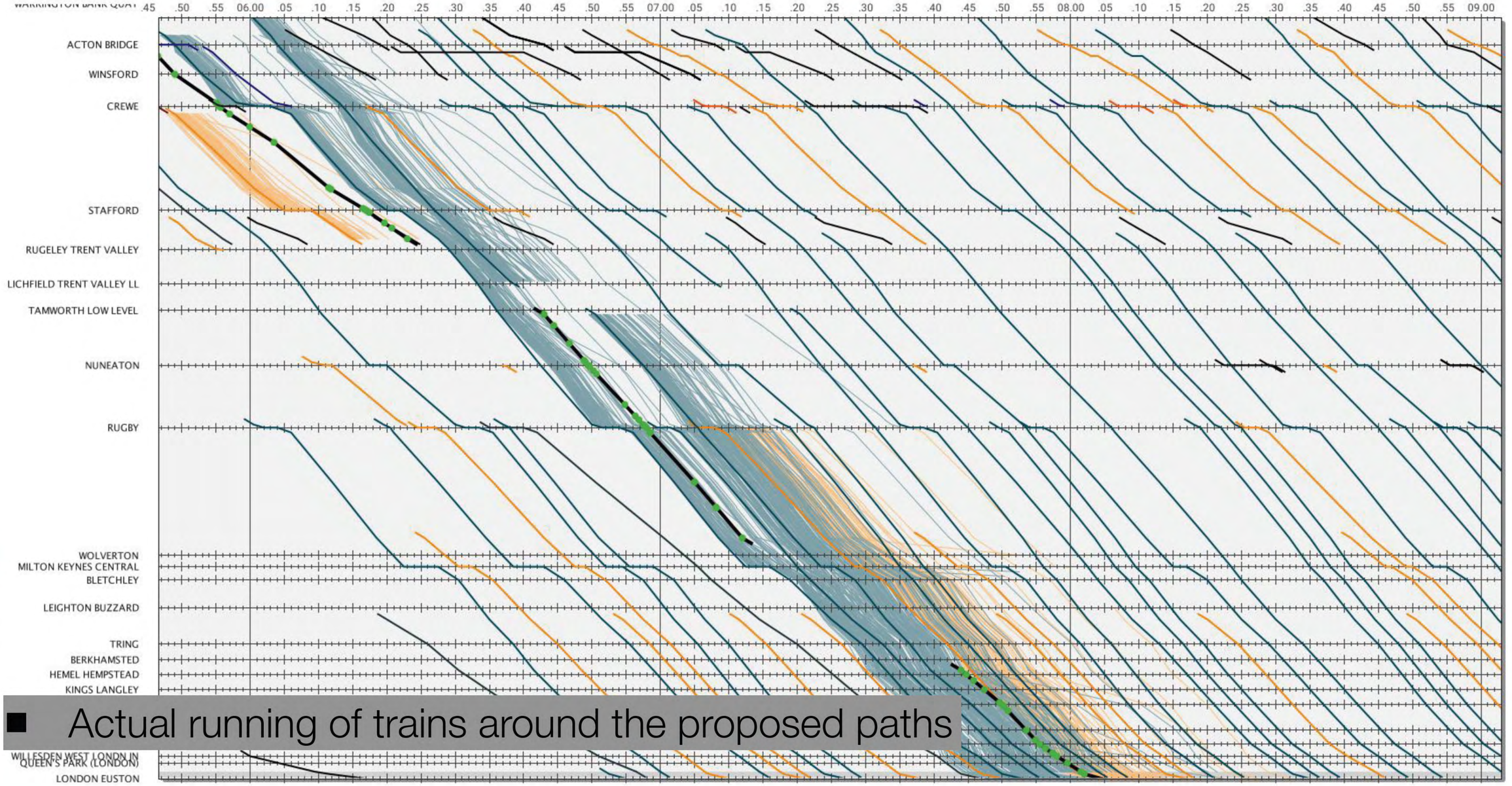
1M59



- Actual running of trains around the proposed paths

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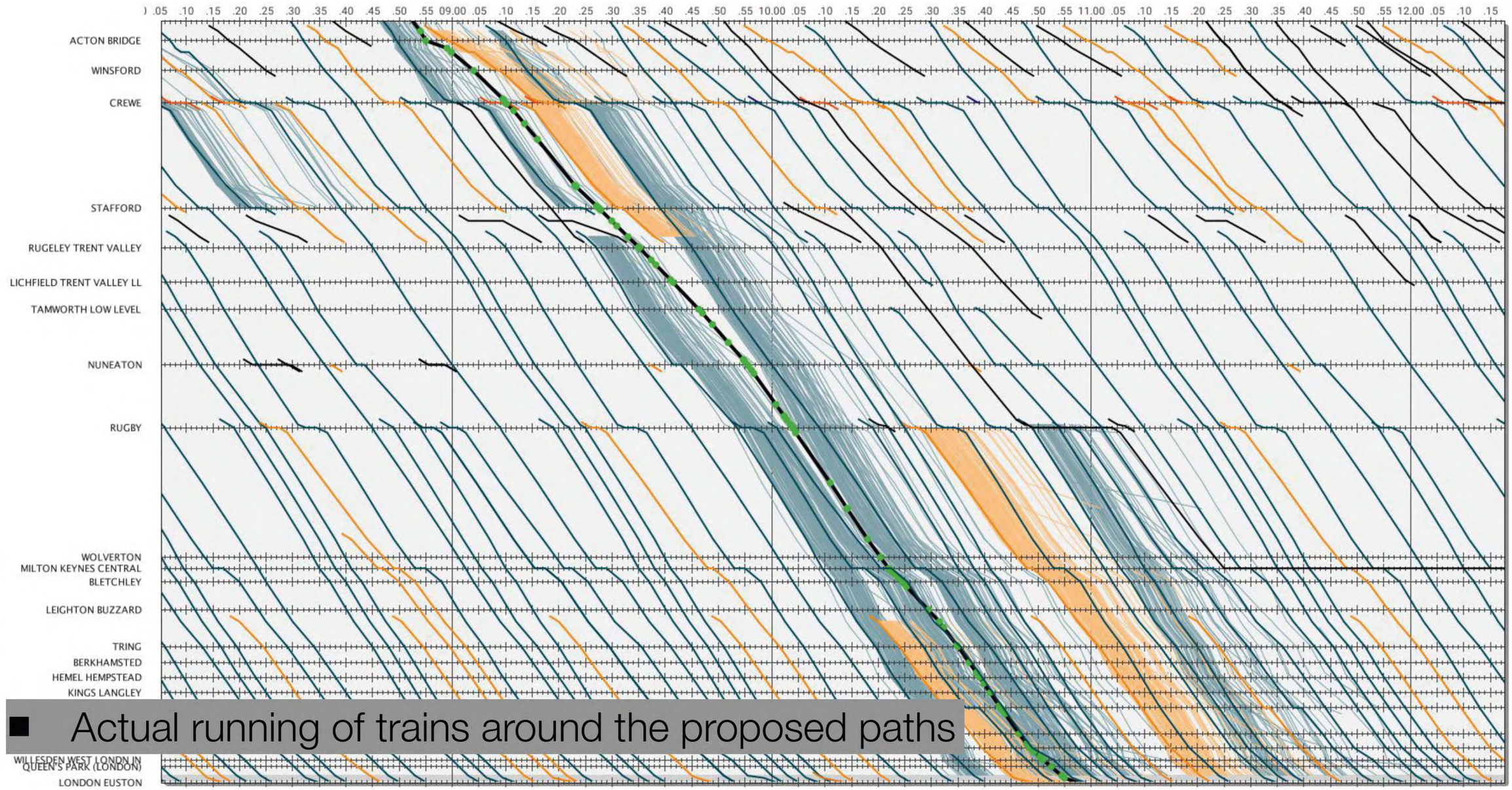

- Actual running of trains around the proposed paths

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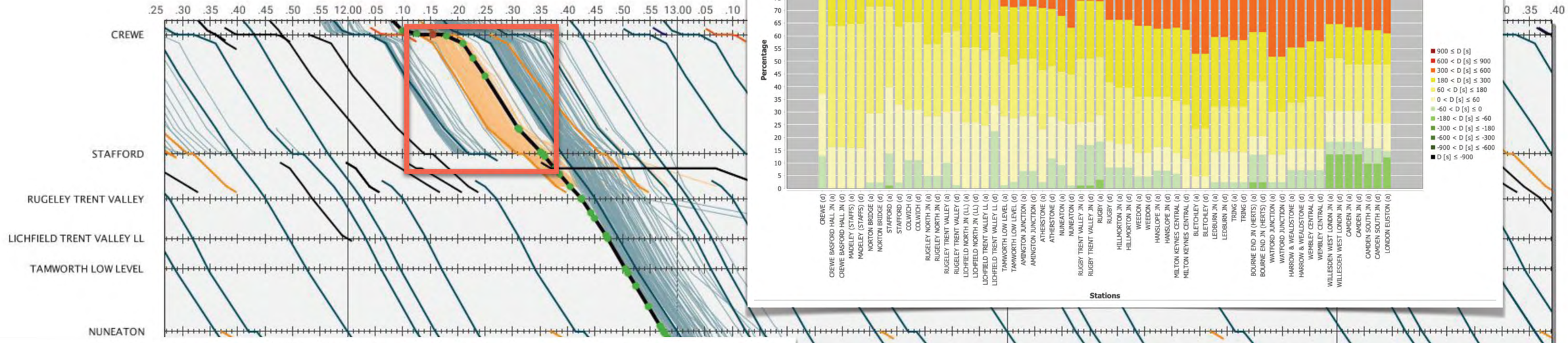
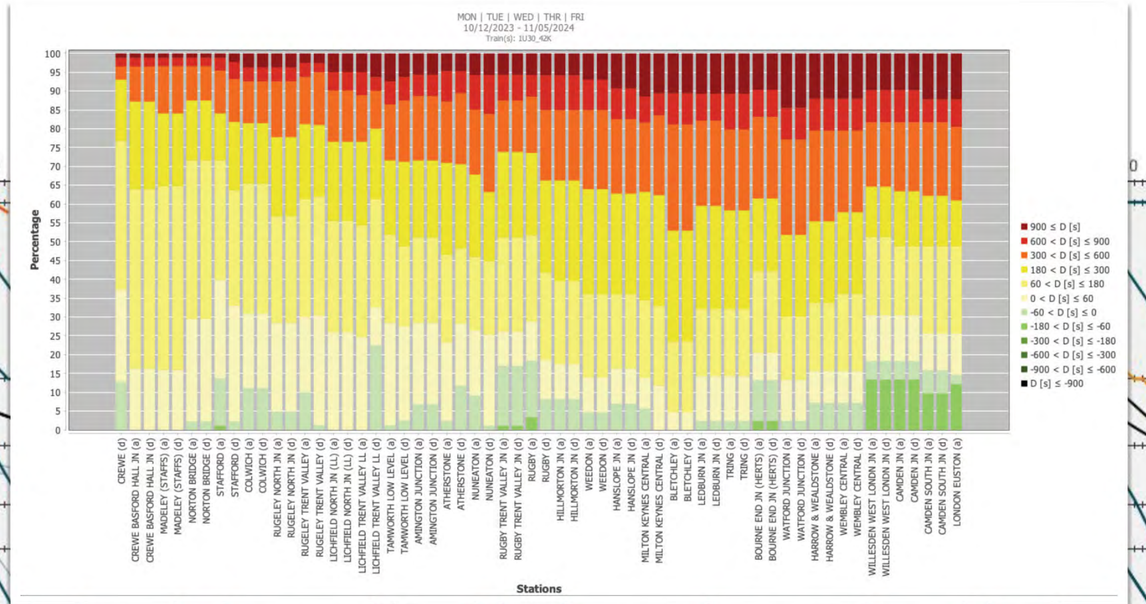
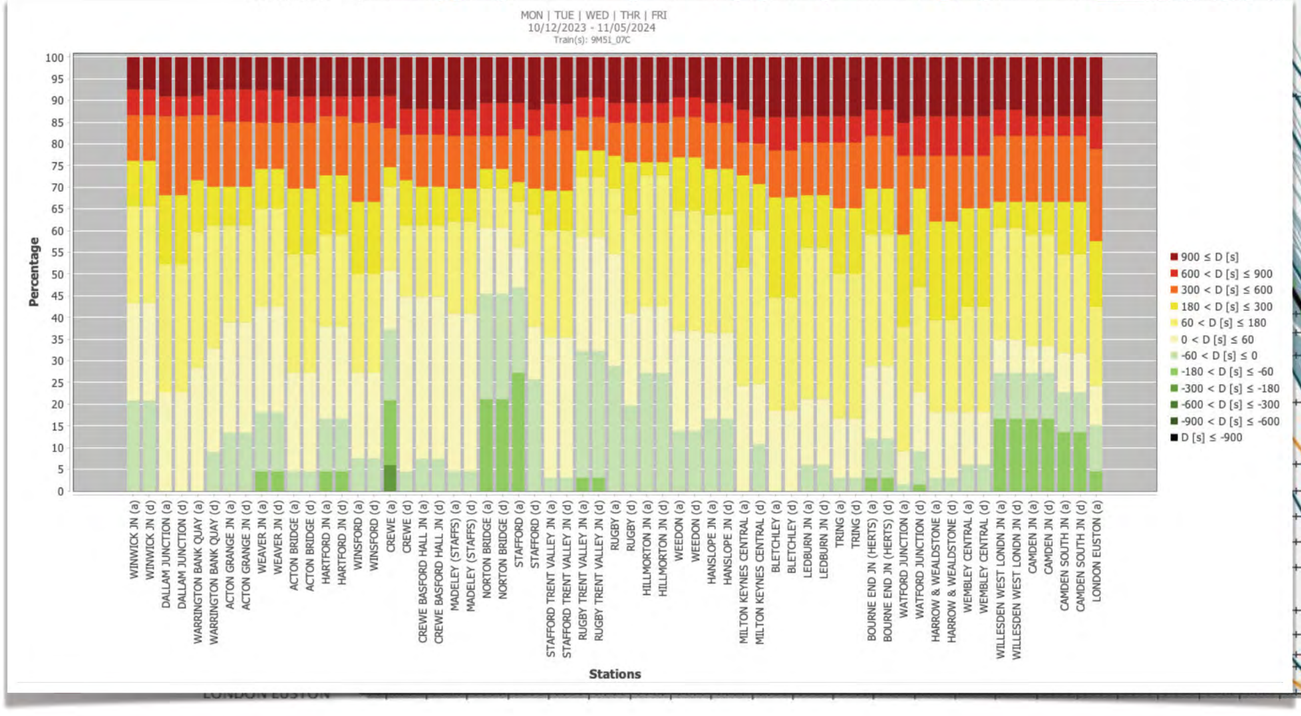

.25 .30 .35 .40 .45 .50 .55 12.00 .05 .10 .15 .20 .25 .30 .35 .40 .45 .50 .55 13.00 .05 .10
CREWE
STAFFORD
RUGELEY TRENT VALLEY
LICHFIELD TRENT VALLEY LL
TAMWORTH LOW LEVEL
NUNEATON


MON | TUE | WED | THR | FRI
10/12/2023 - 11/05/2024
Train(s): 1U30_42K
Percentage
Stations
900 ≤ D [s]
600 < D [s] ≤ 900
300 < D [s] ≤ 600
180 < D [s] ≤ 300
60 < D [s] ≤ 180
0 < D [s] ≤ 60
-60 < D [s] ≤ 0
-180 < D [s] ≤ -60
-300 < D [s] ≤ -180
-600 < D [s] ≤ -300
-900 < D [s] ≤ -600
D [s] ≤ -900


MON | TUE | WED | THR | FRI
10/12/2023 - 11/05/2024
Train(s): 9M51_07C
Percentage
Stations
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600 < D [s] ≤ 900
300 < D [s] ≤ 600
180 < D [s] ≤ 300
60 < D [s] ≤ 180
0 < D [s] ≤ 60
-60 < D [s] ≤ 0
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-300 < D [s] ≤ -180
-600 < D [s] ≤ -300
-900 < D [s] ≤ -600
D [s] ≤ -900

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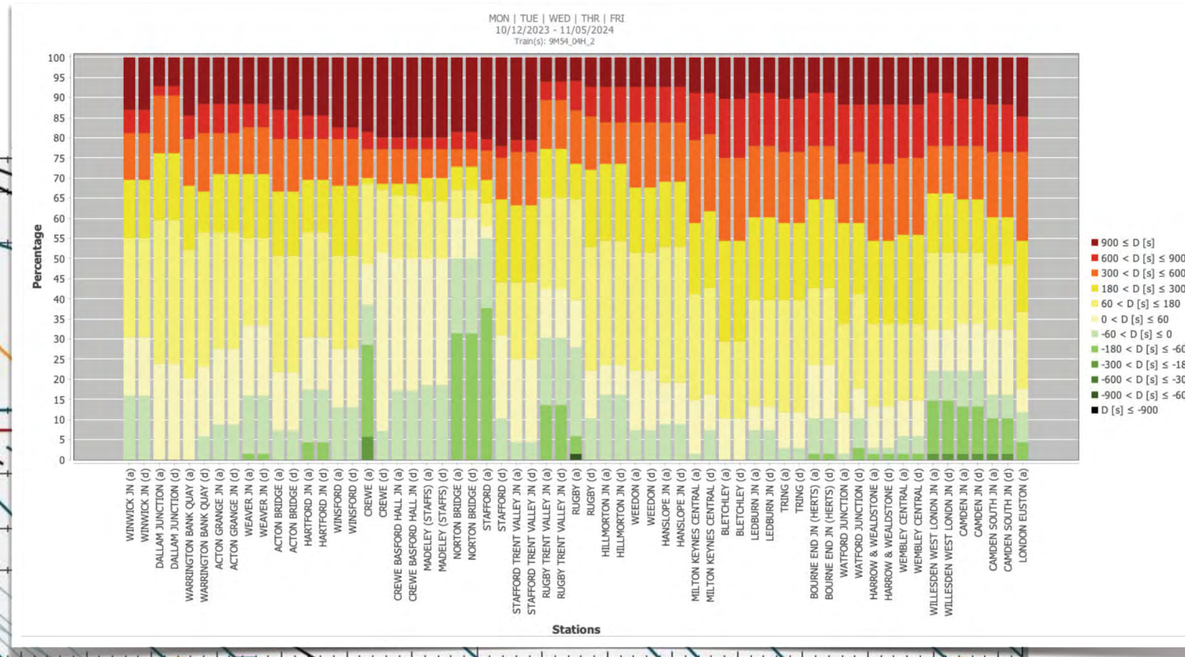

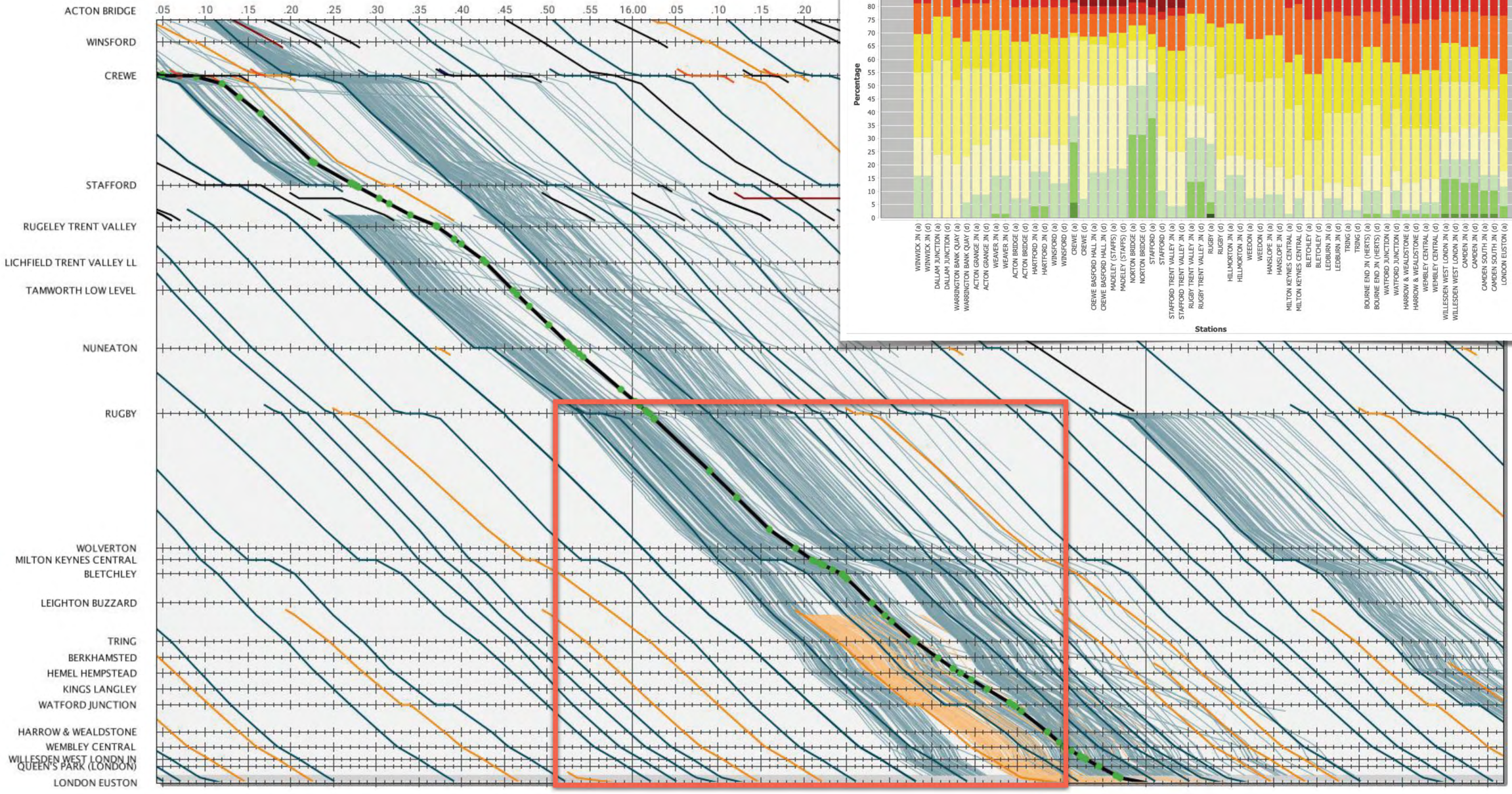

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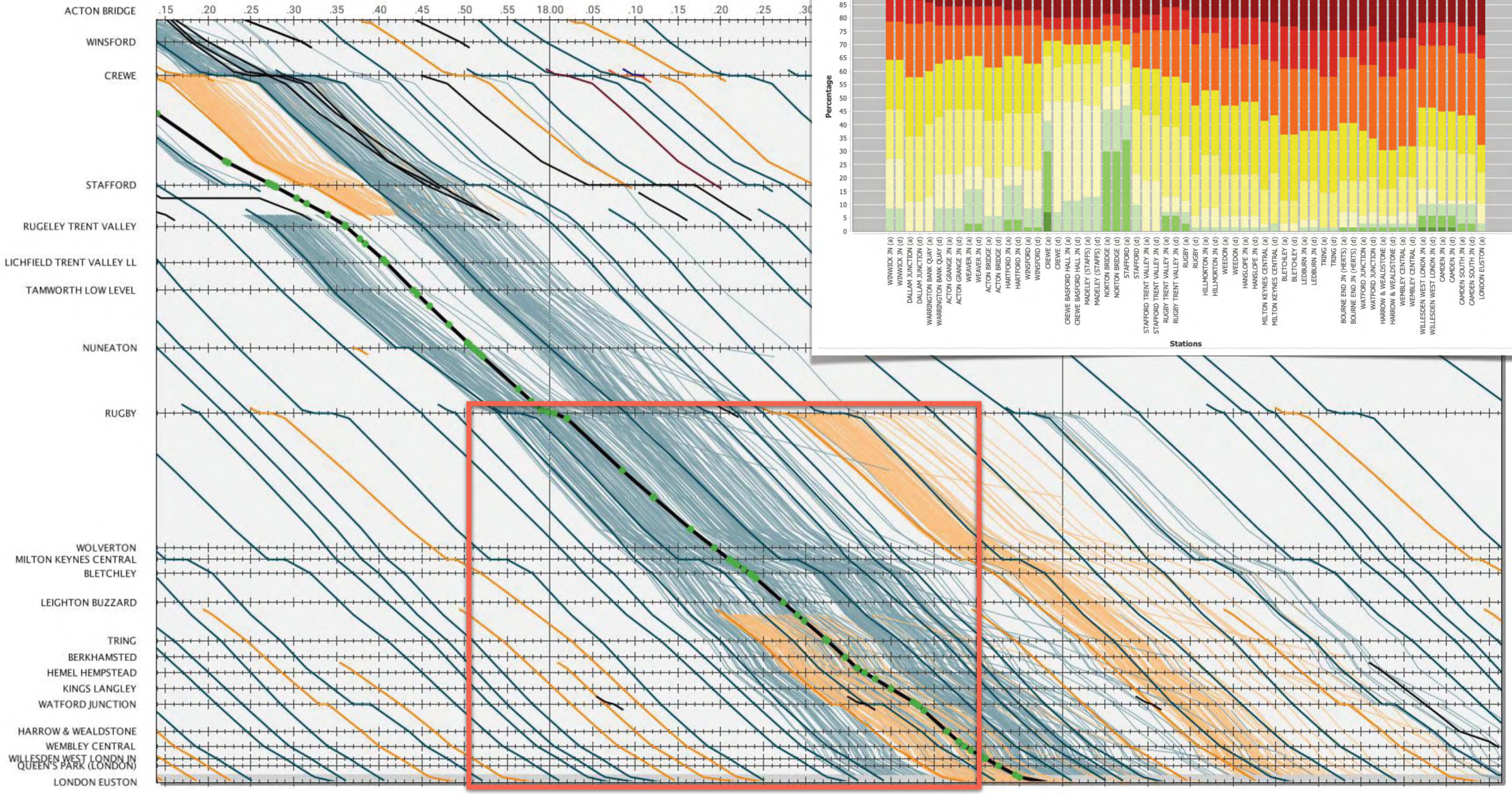

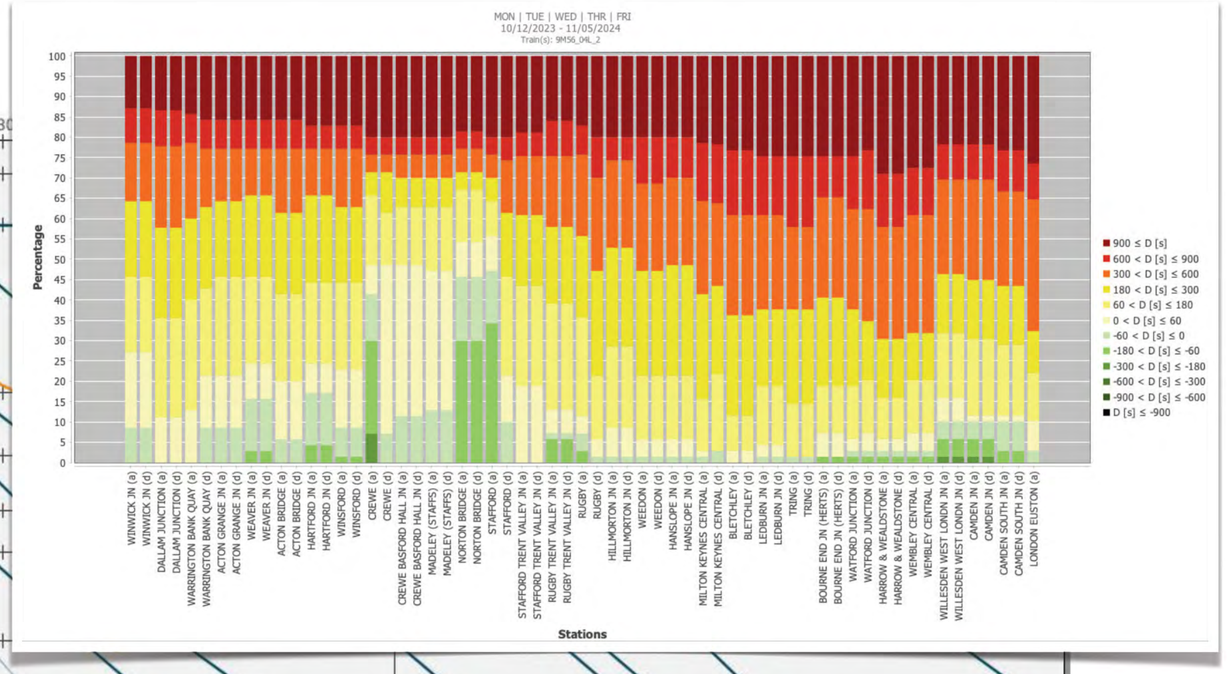

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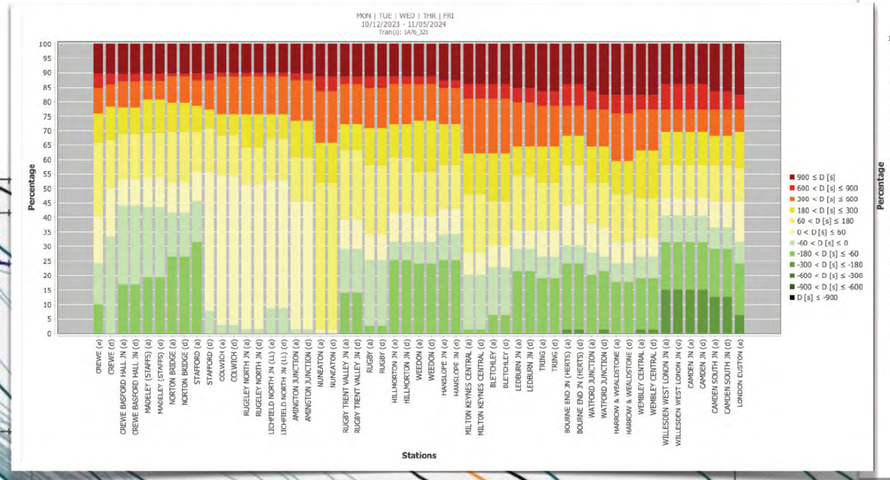

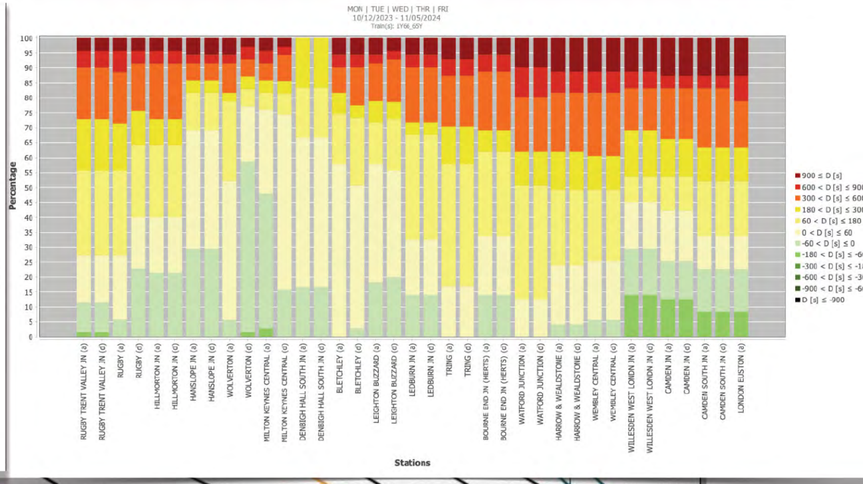

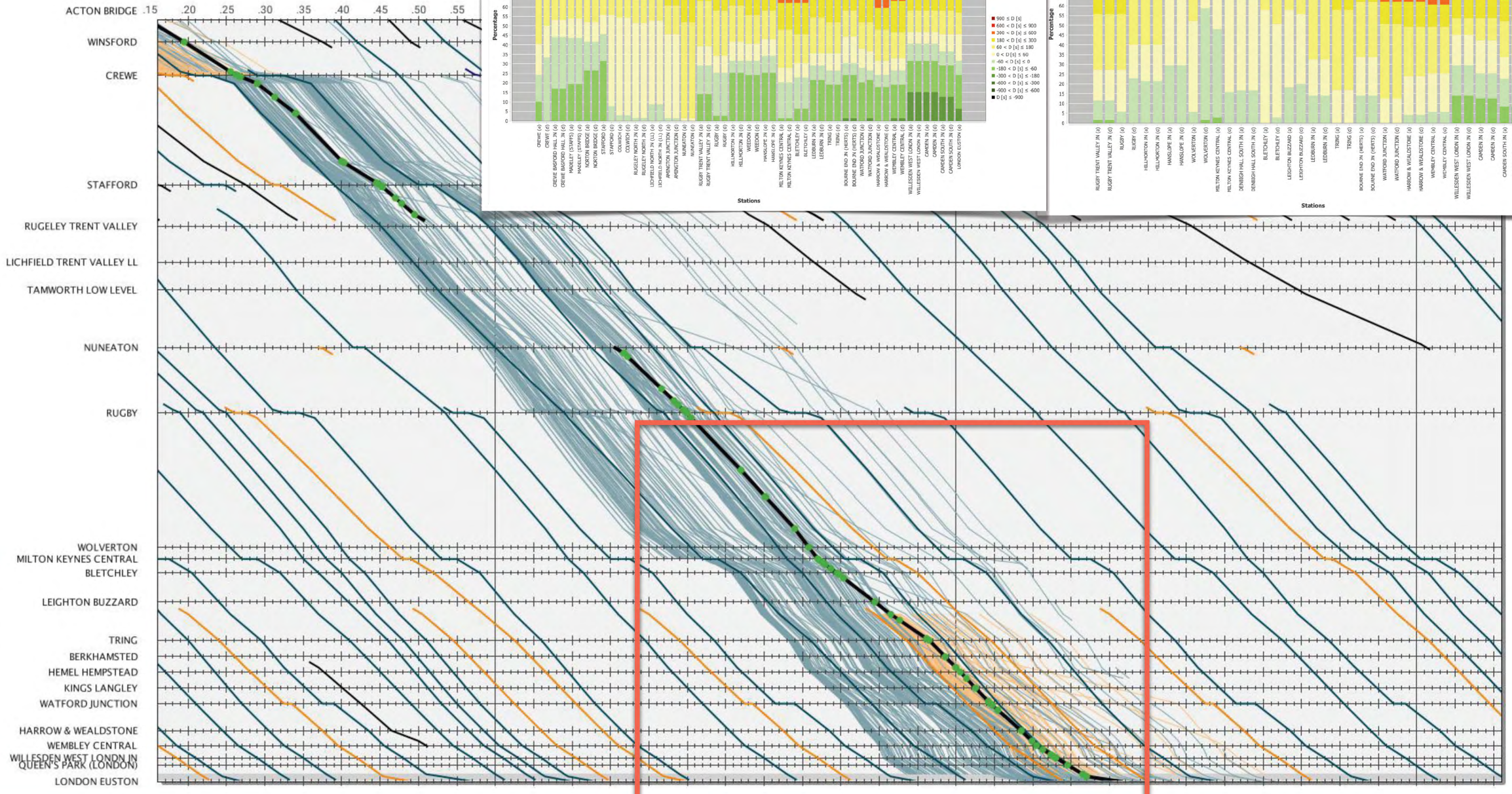

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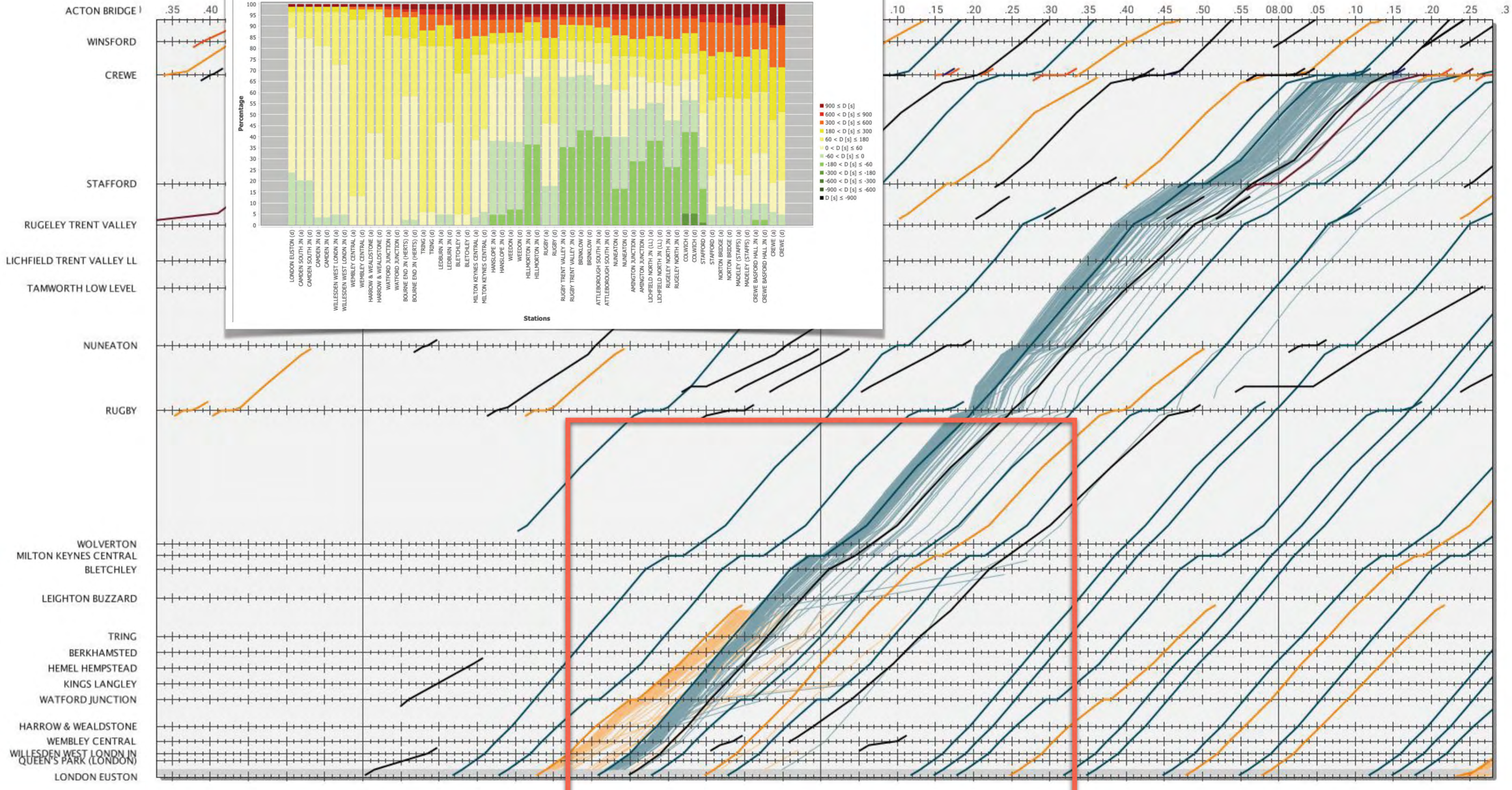

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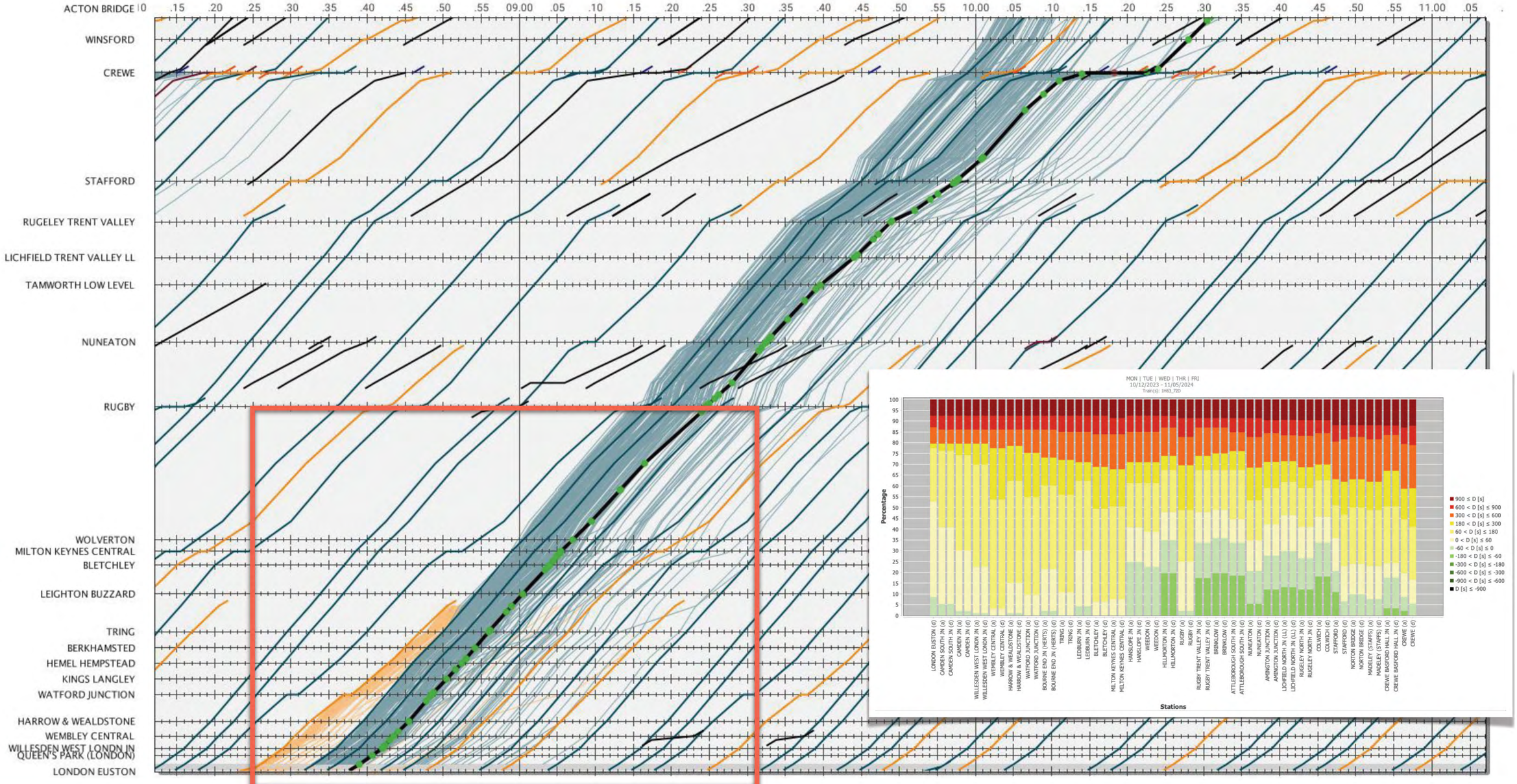

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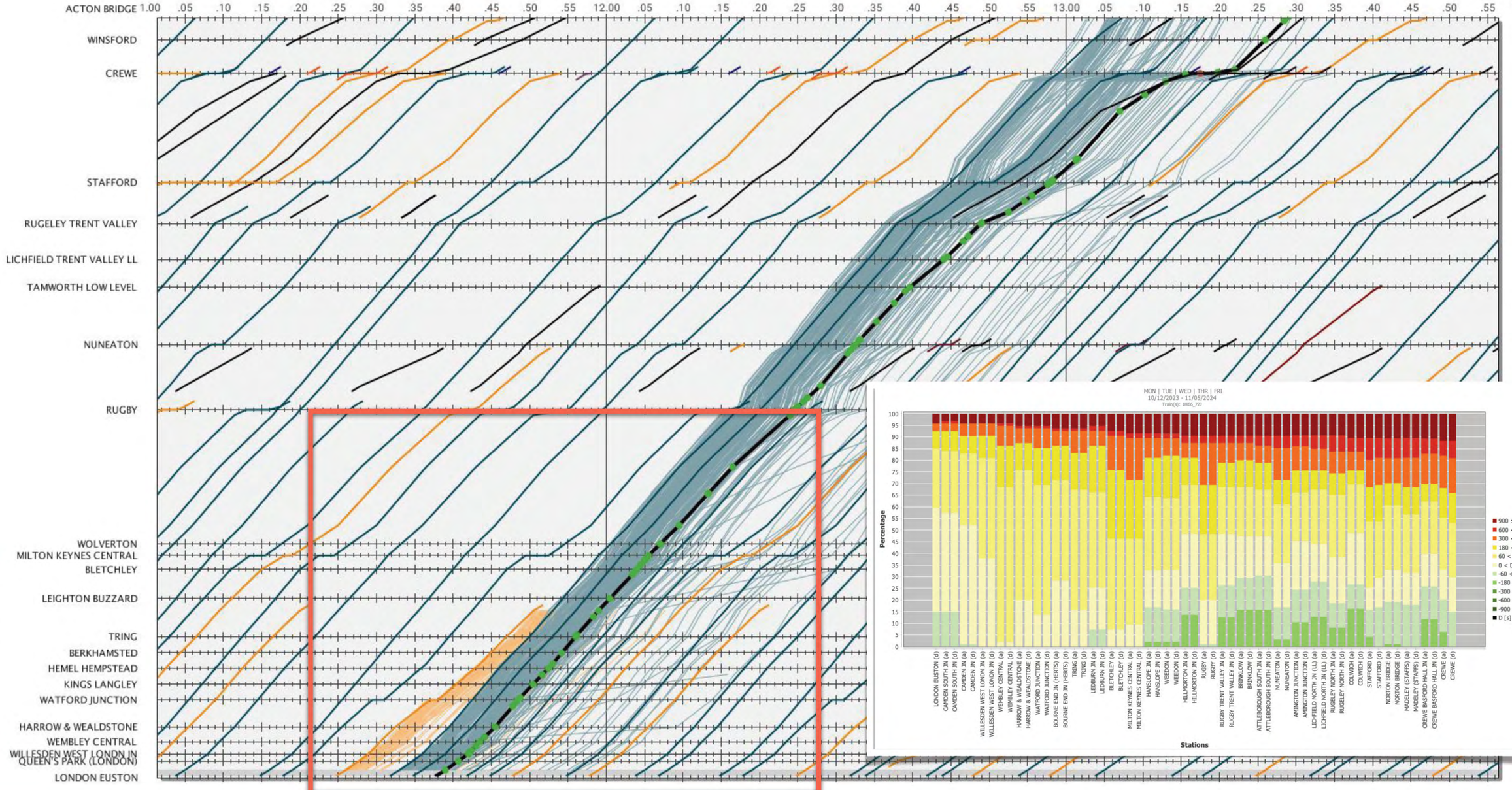

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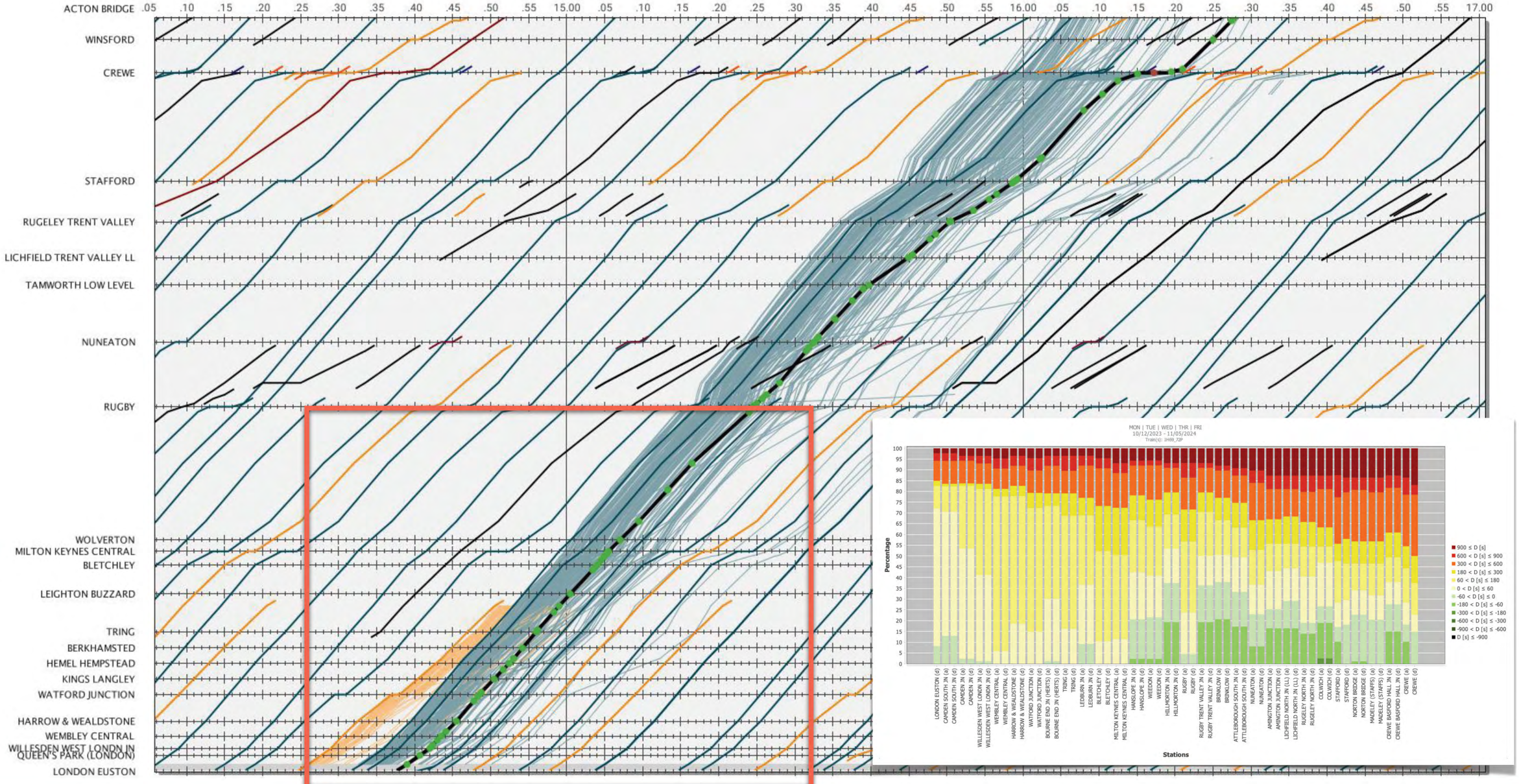

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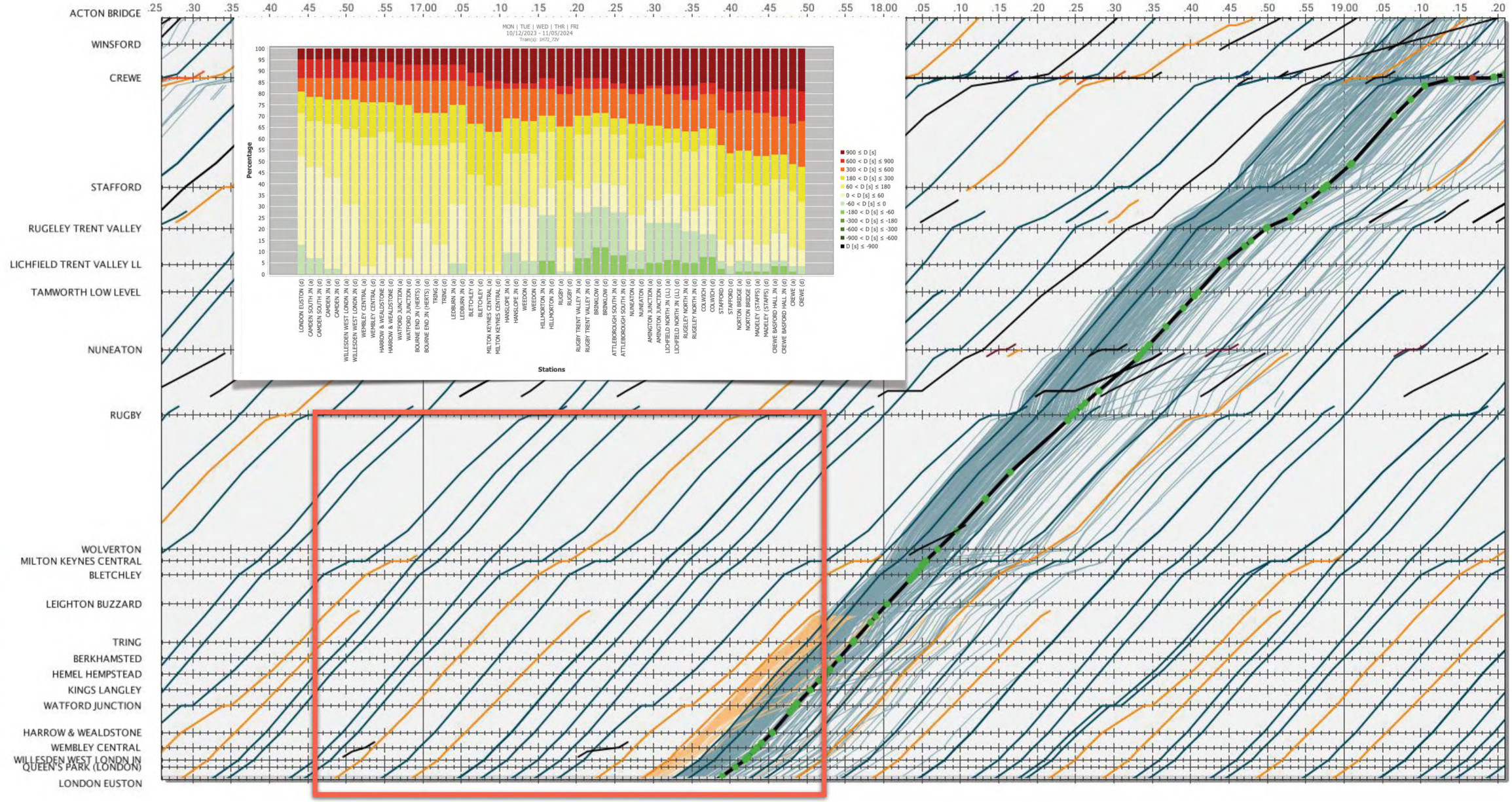

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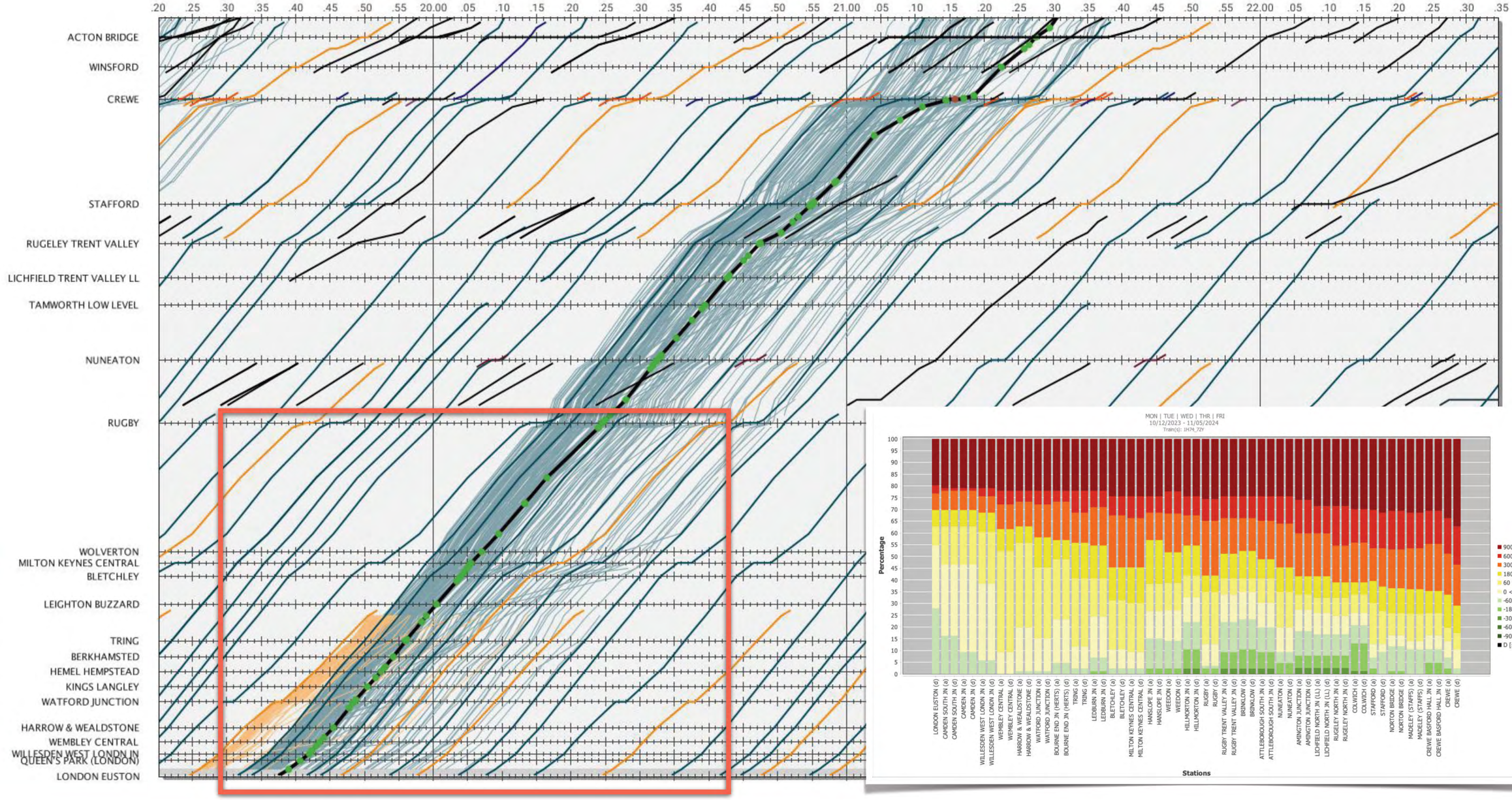

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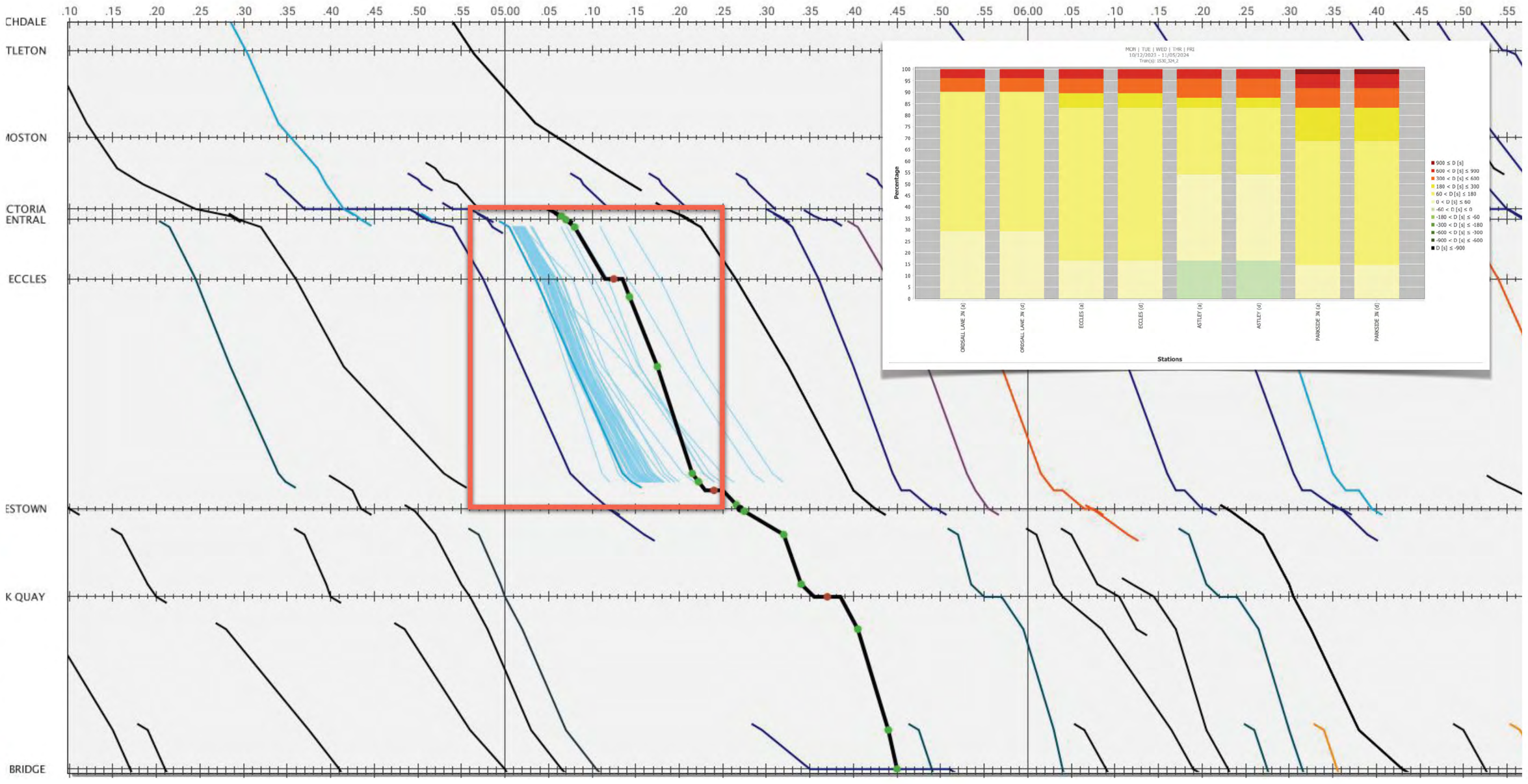
1M59



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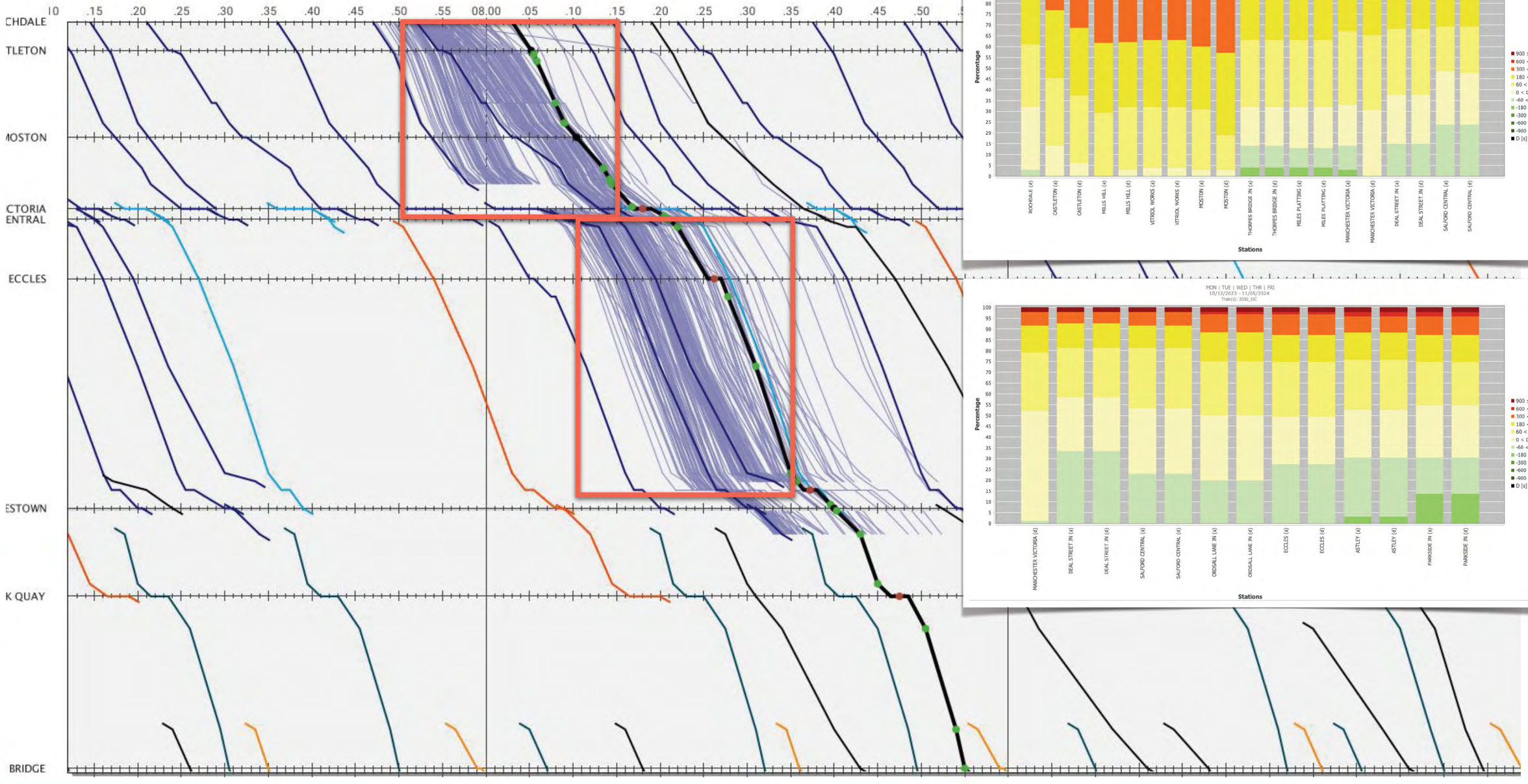

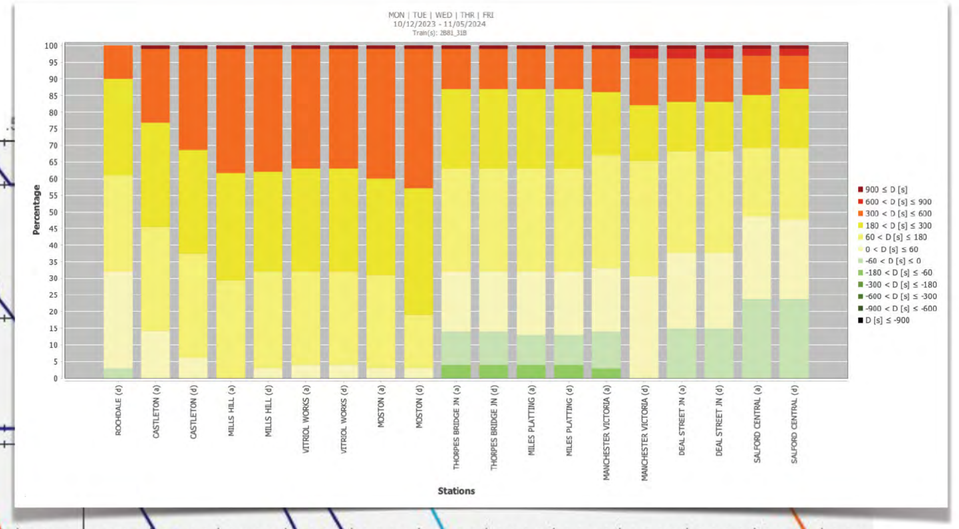

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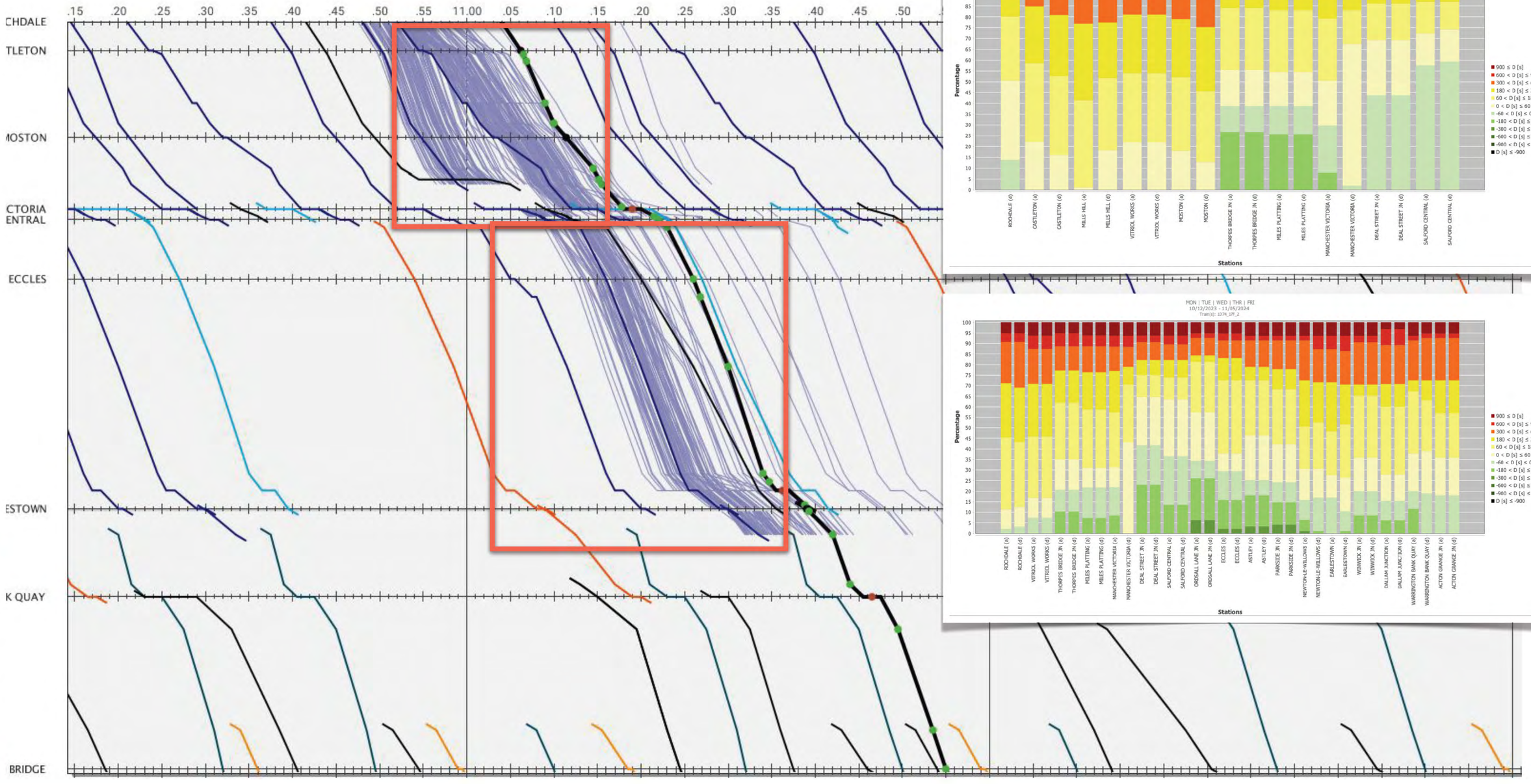
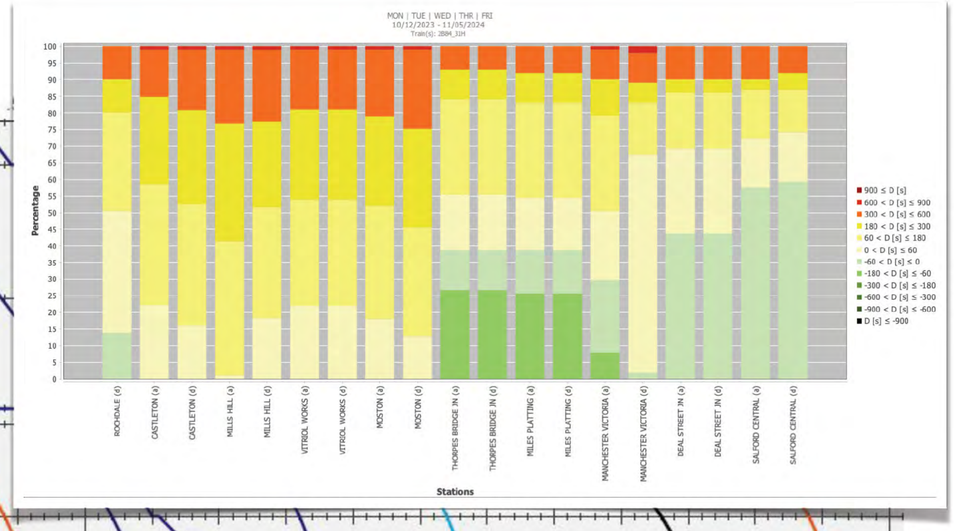
1M67





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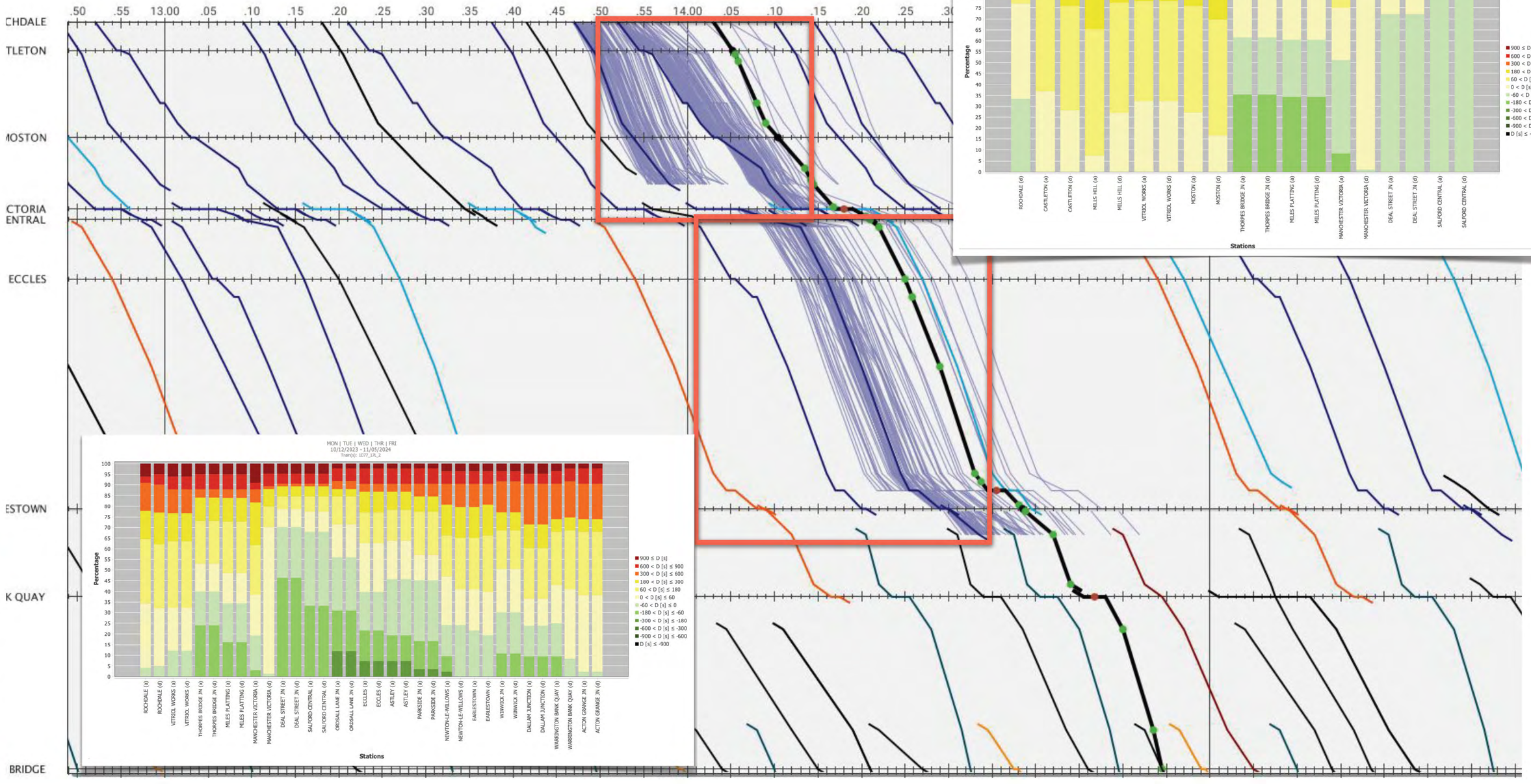
1M71



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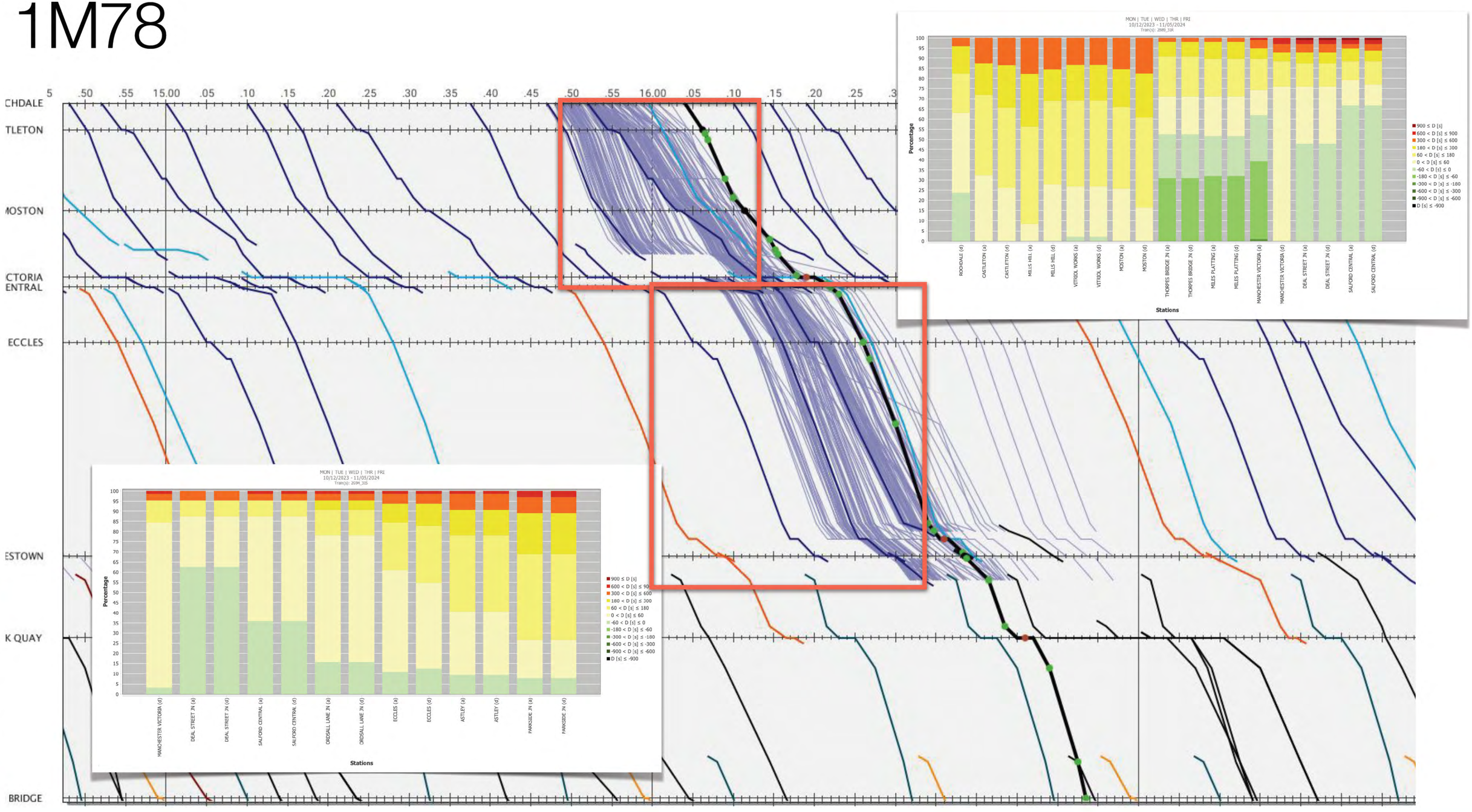
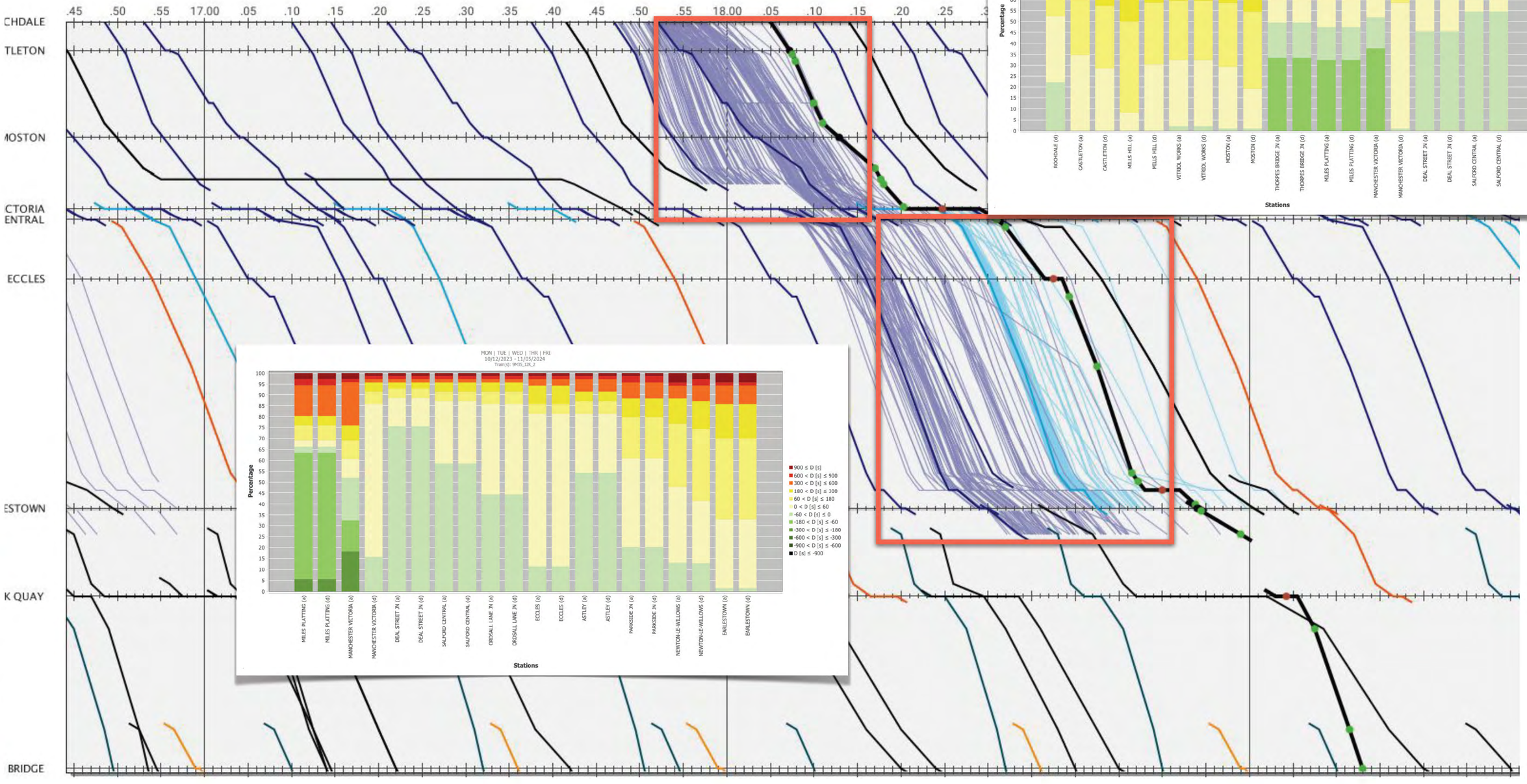
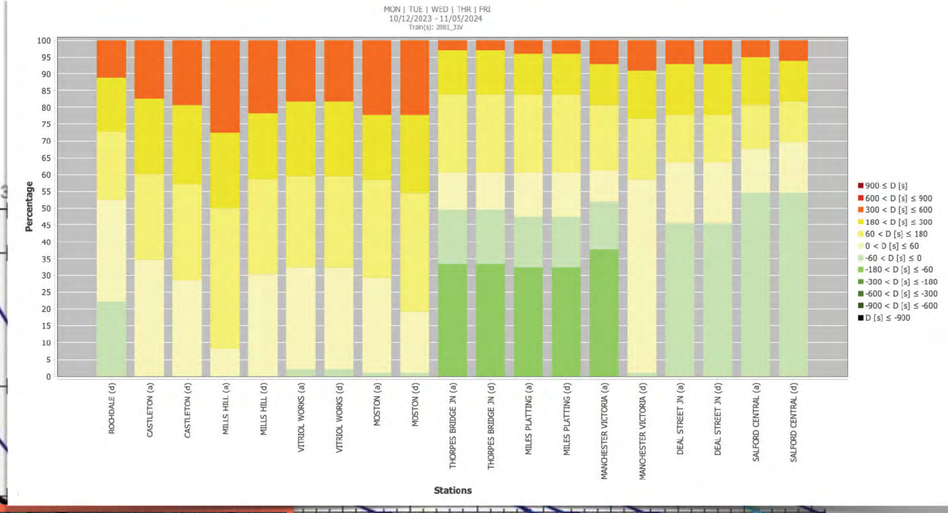


mtr trenolab

1M79





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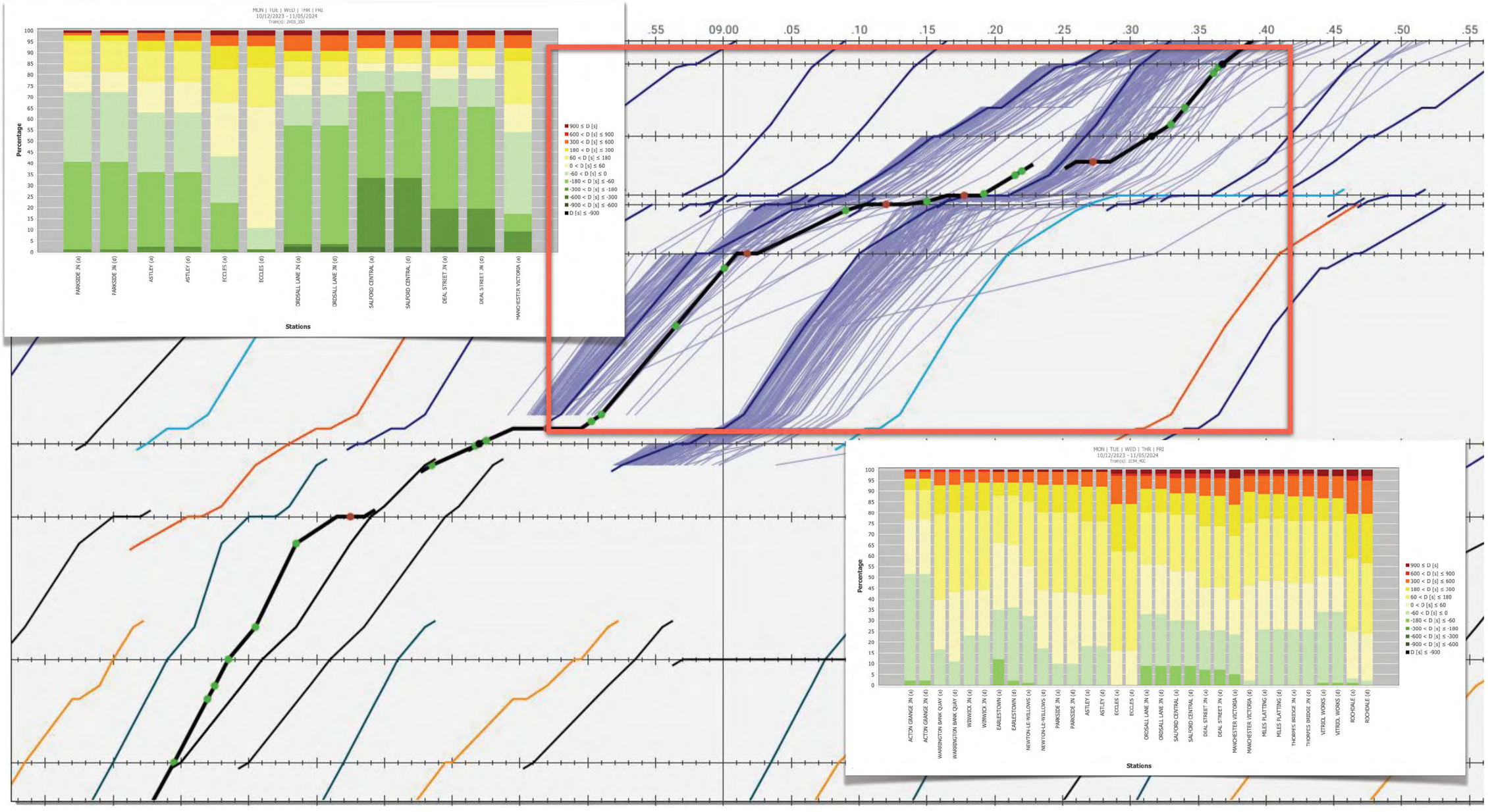
1S50



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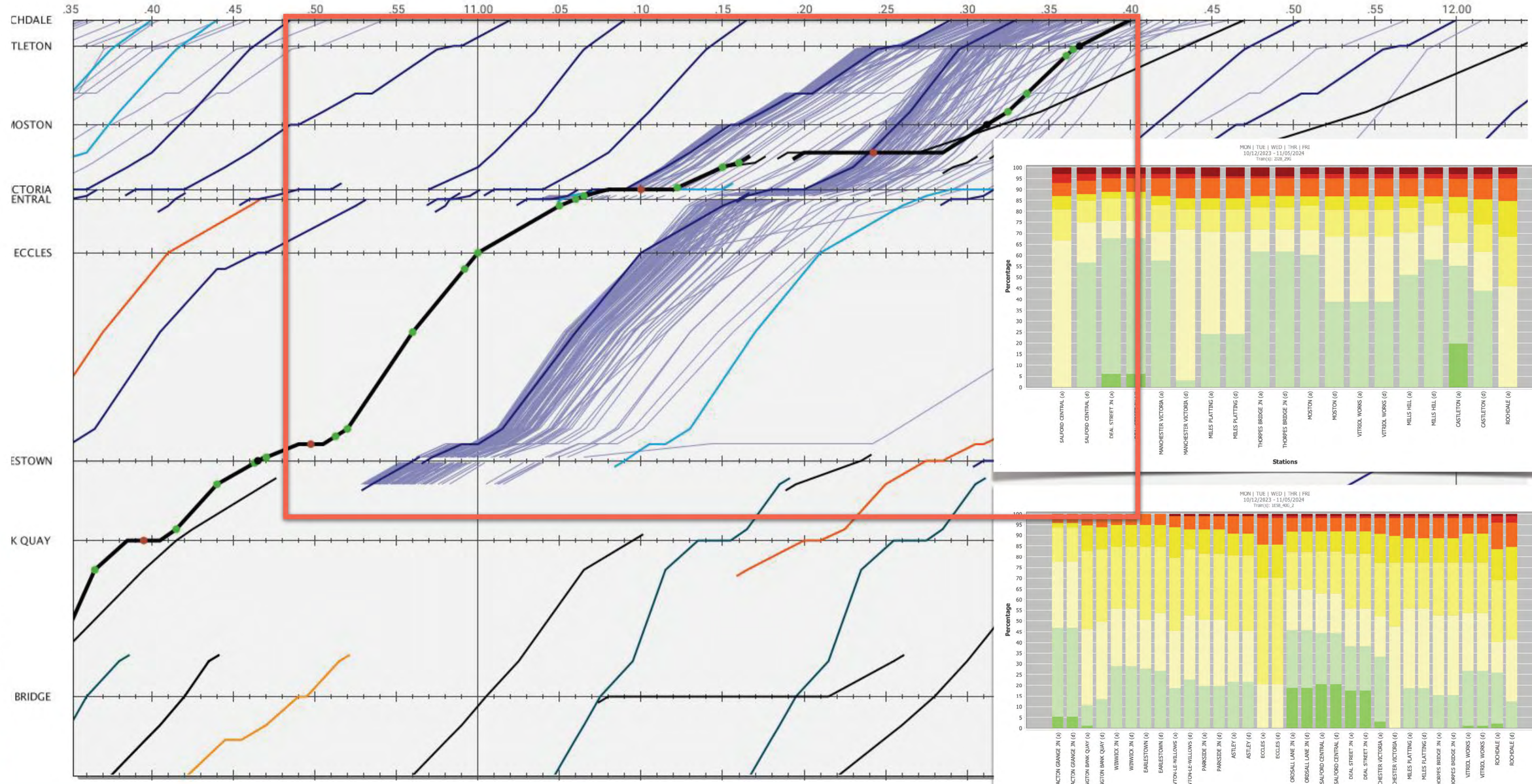
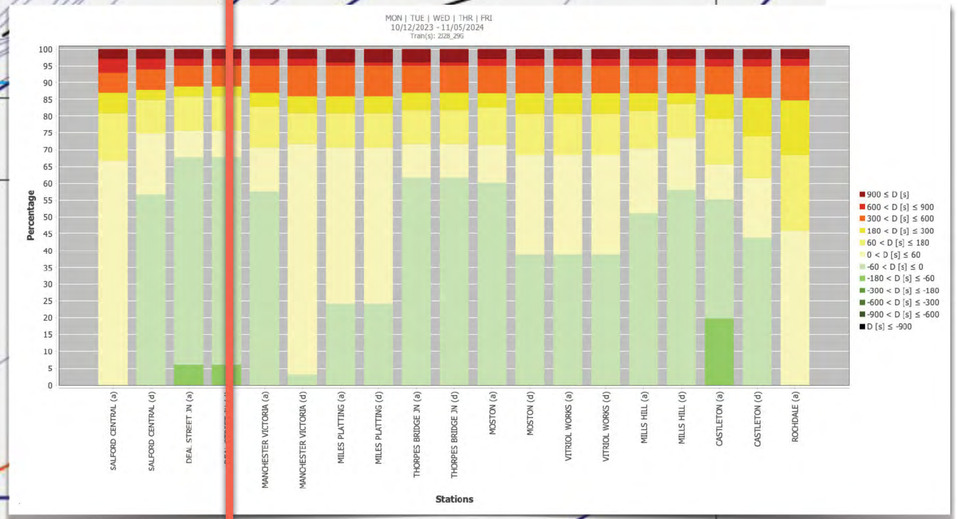
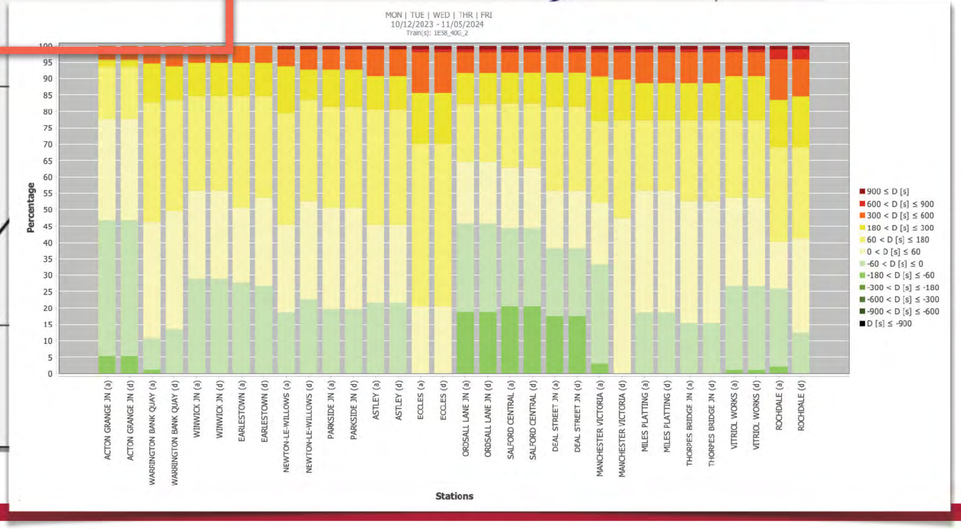
1S52







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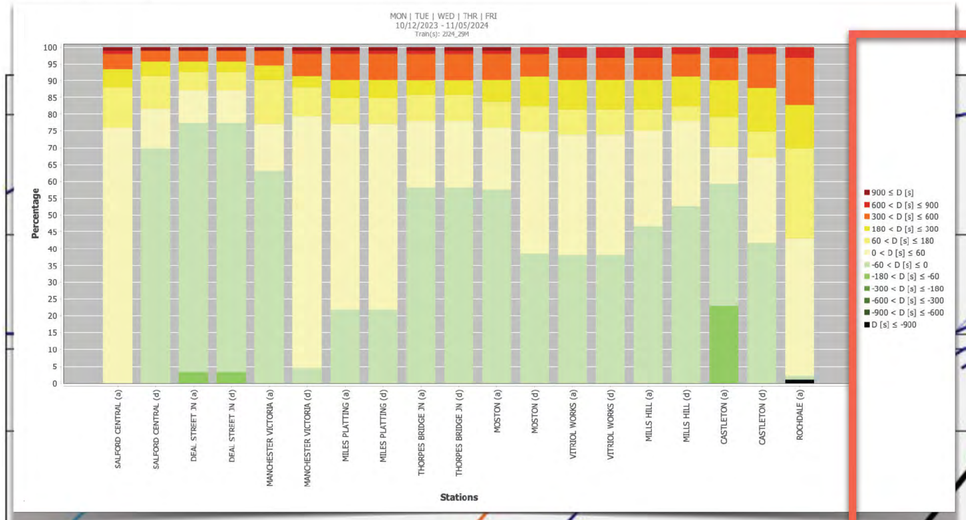

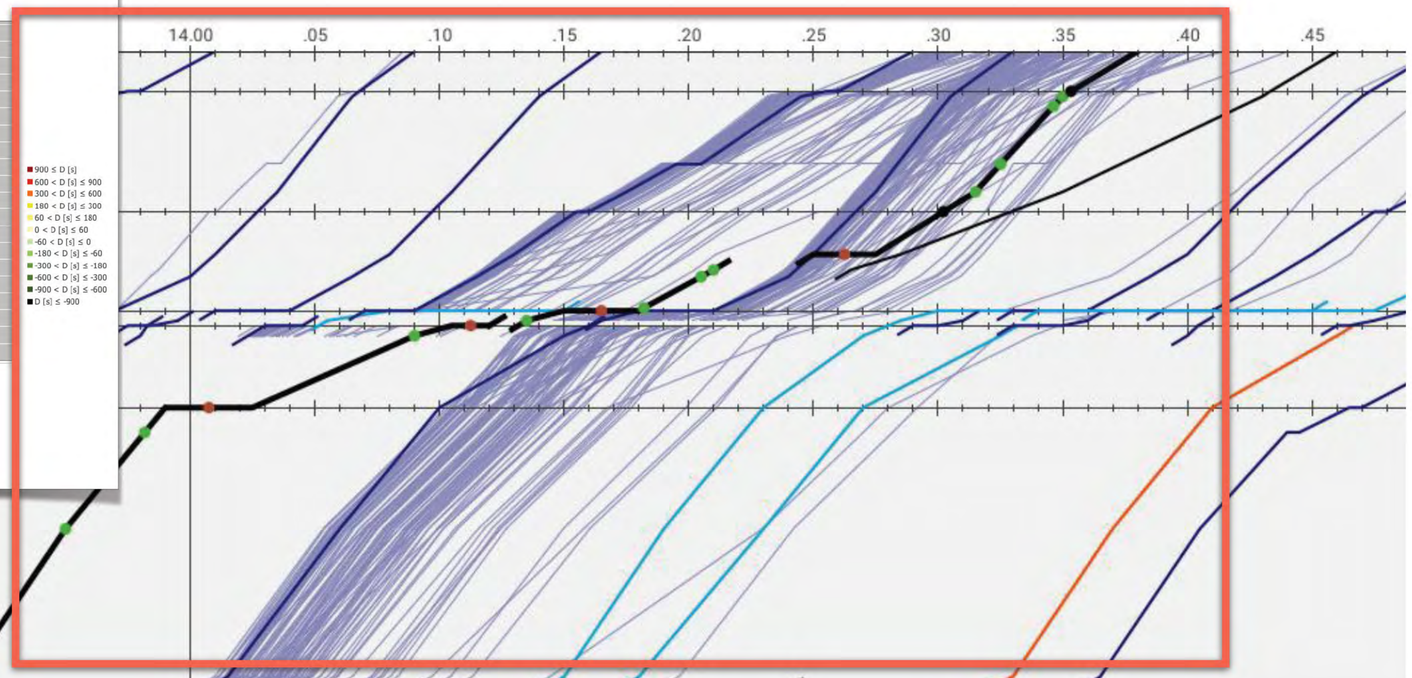

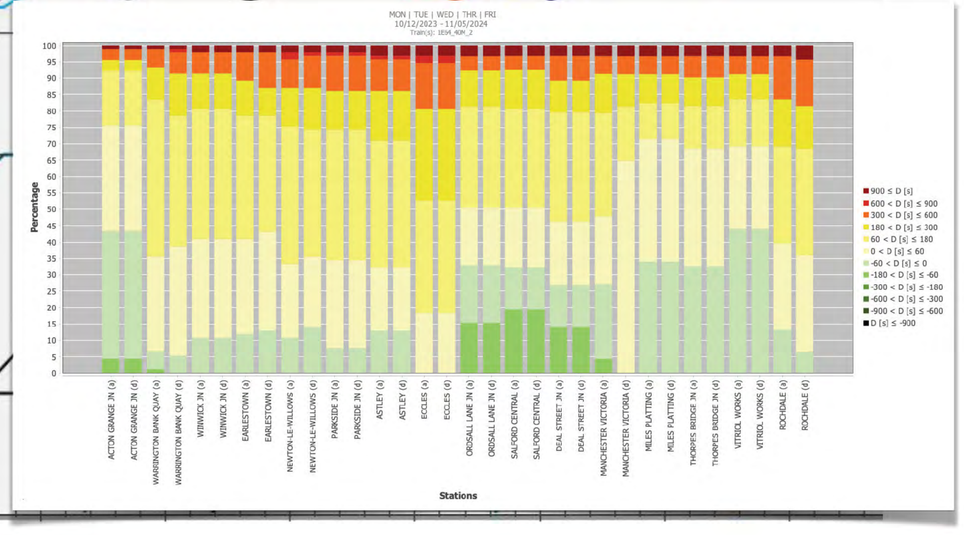

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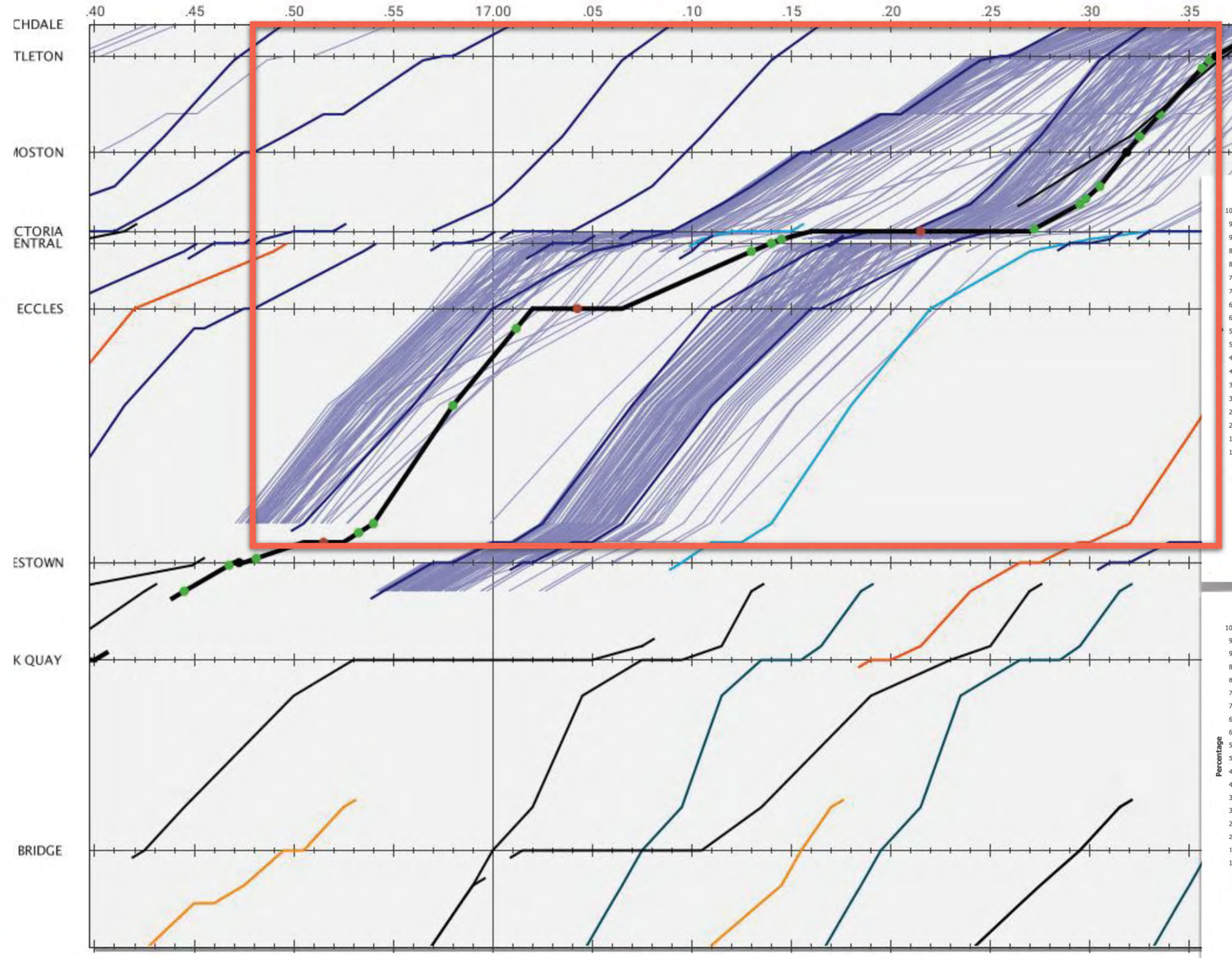
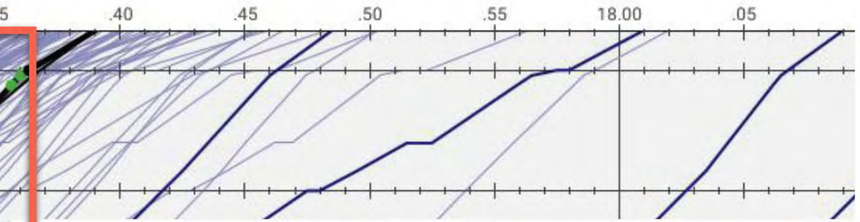
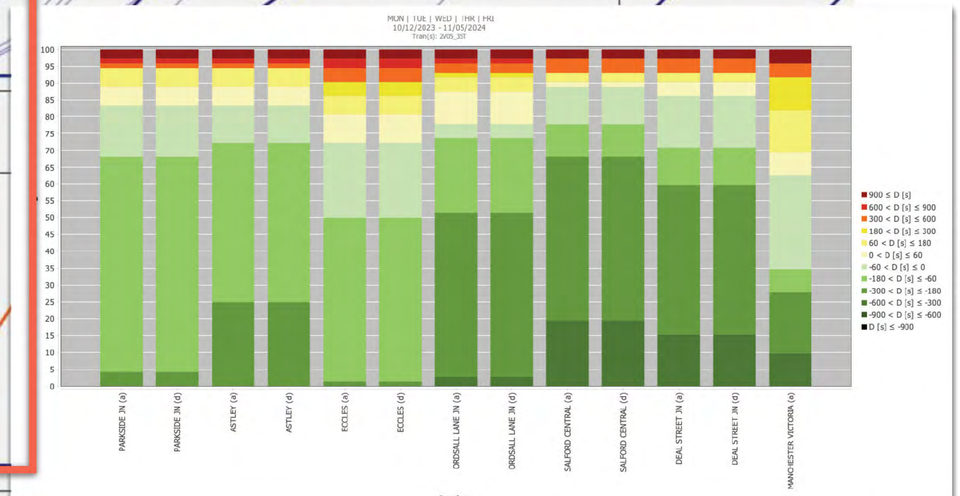
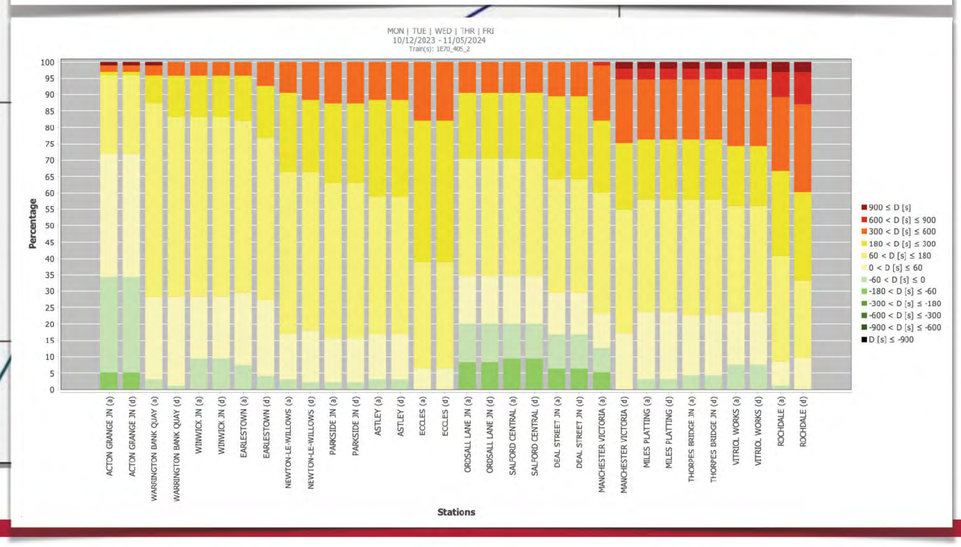
1S60









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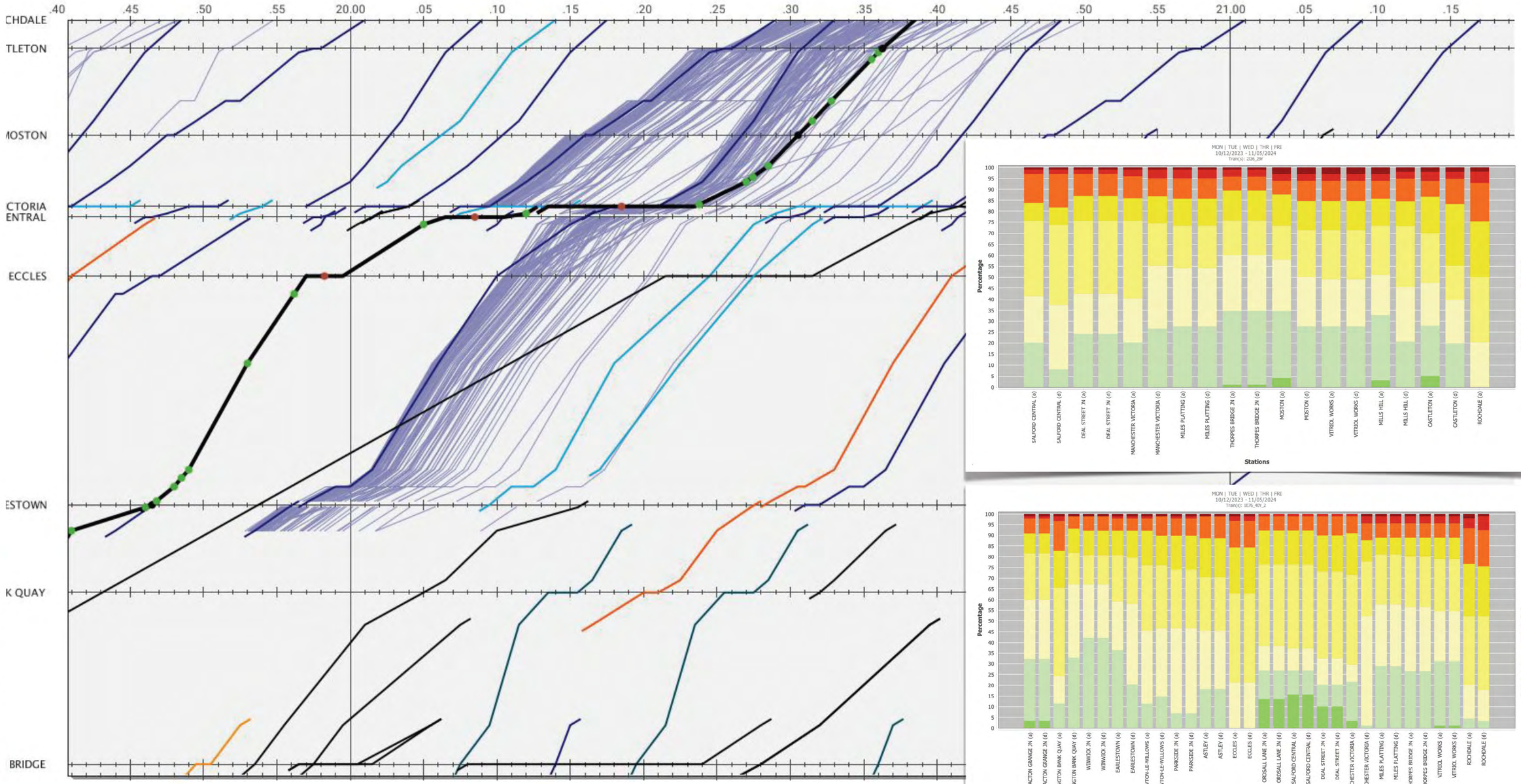

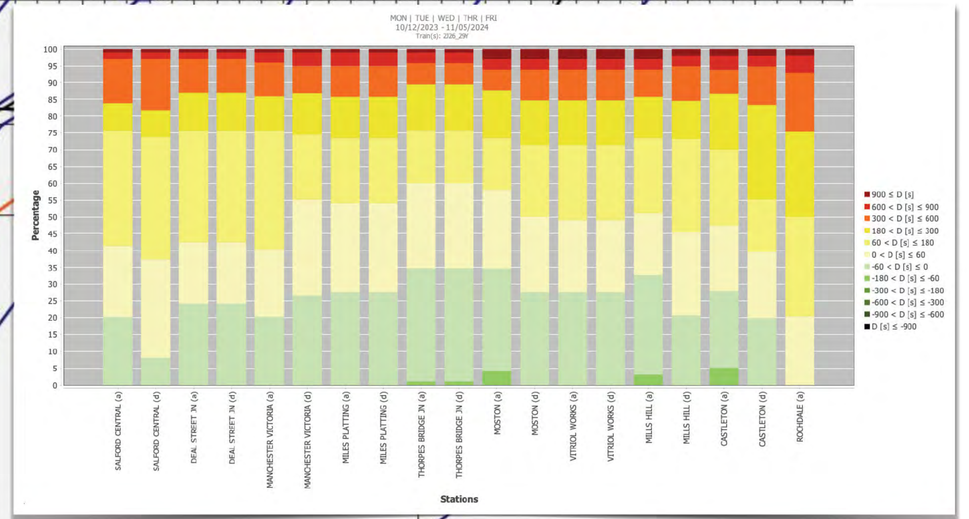

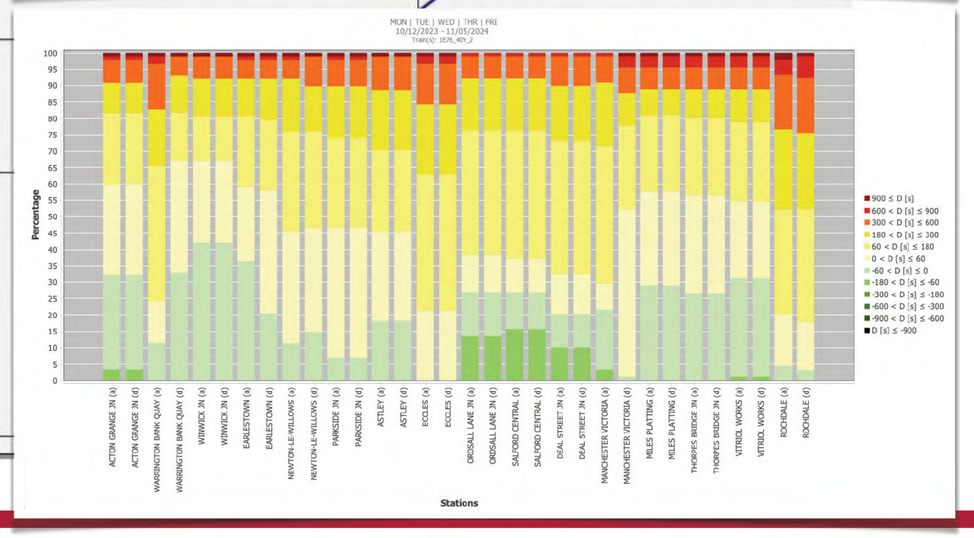

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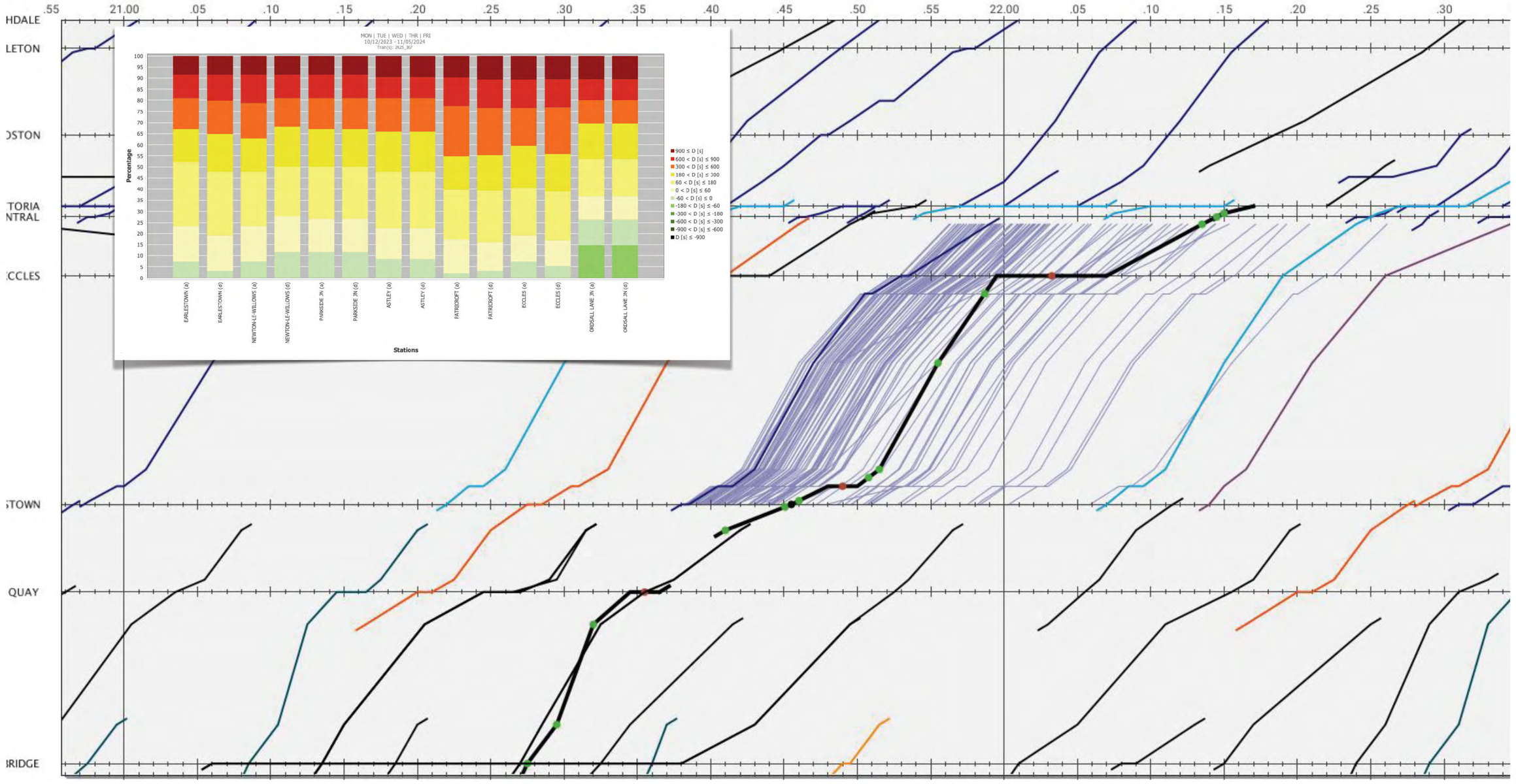
1S70



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Agenda

- Goal of the study
- Approach
- Current and proposed timetable
- Extra services in the proposed timetable
- Analysis of current operations
- **Simulation results**
- Preliminary comments

Simulation - Approach

We tested the timetables in two ways:

- First, we ran a **deterministic** test, in which all trains ran with no variation (no input delay, extra dwell time) and at their maximum performance. The goal of this test was to verify that the timetable is feasible and free from conflicts.

- Second, we ran a **stochastic “normal variation”** test repeated for 250 iterations, in which all trains ran with no input delay, but with realistic dwell times and train performances, including the professional driving policies. The goal of this test was to understand the performance of the new services and their potential impact on other trains in the timetable.

Deterministic simulation

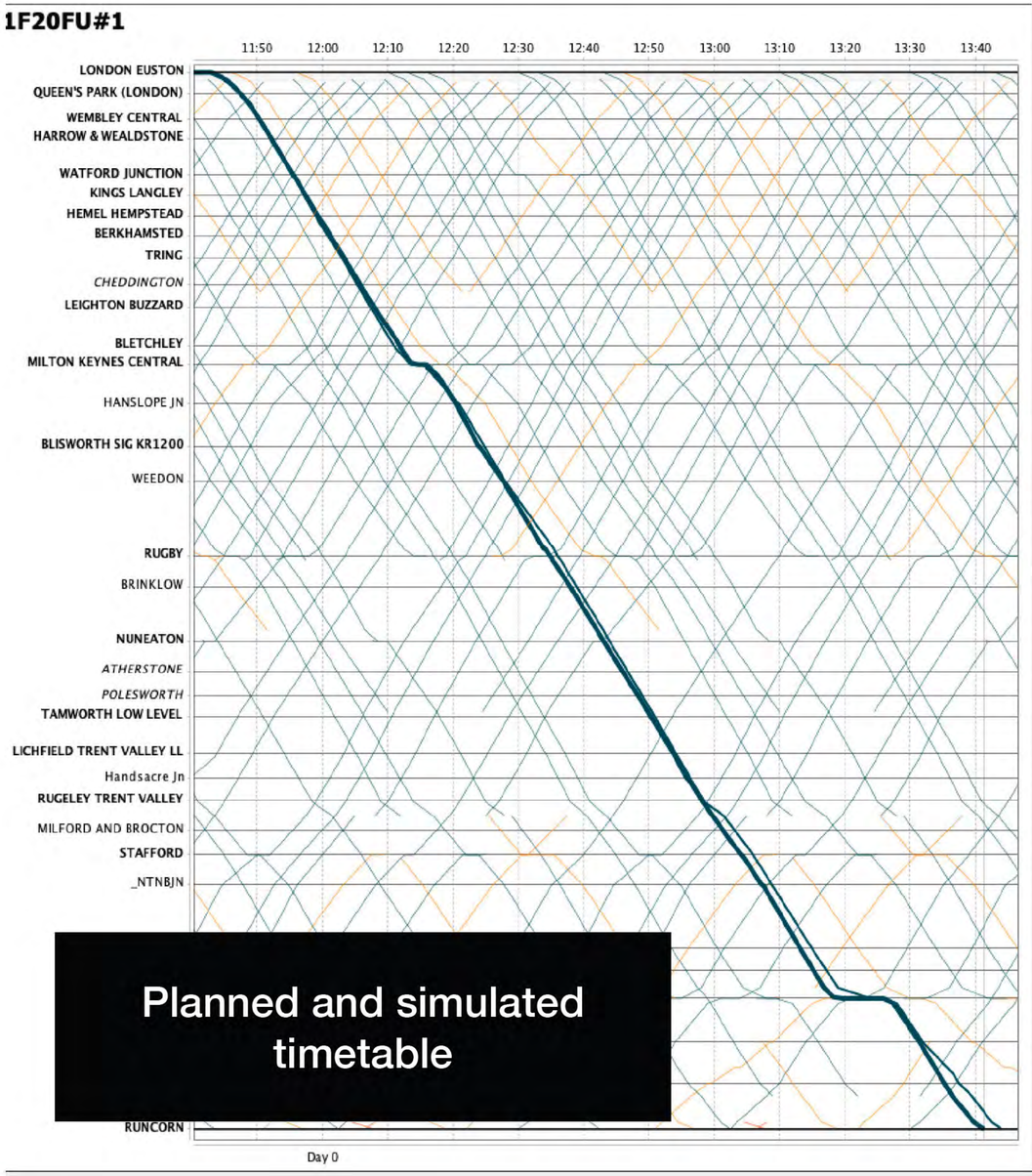
In brief, the deterministic simulation shows that:

- The proposed timetable is free from conflict when running under ideal conditions.

- All trains would arrive at destination on time or almost on time.

- The proposed timetable is very tight for Down trains operated with 80x (either operated by Lumo and by Avanti) as a result of the very tight SRTs. The next slide shows the simulated speed profile and resulting planned and simulated timetable for a test train. These slight delays (under ideal conditions) would recover after Milton Keynes, but obviously their magnitude and recoverability would be more critical under more realistic conditions.

Deterministic simulation: Down 80x service



Station	Track	Type	Pl. Arrival	Act. Arrival	Arrival De...	Pl. Depart...	Act. Depa...	Departure...	Primary D...	Running ti...	Avg. speed
LONDON EL	3	Stop	11:03:00	11:03:00	00:00:00	11:43:00	11:43:00	00:00:00	00:00:00	00:01:40	49 km/h
EUSTON SIG	W5 12	Pass	11:44:53	11:44:40	-00:00:13	11:44:53	11:44:40	-00:00:13		00:00:22	72 km/h
CAMDEN SC		Pass	11:45:30	11:45:02	-00:00:28	11:45:30	11:45:02	-00:00:28		00:00:37	80 km/h
CAMDEN JN		Pass	11:46:00	11:45:39	-00:00:21	11:46:00	11:45:39	-00:00:21		00:01:55	103 km/h
QUEEN'S PA	8	Pass	11:47:41	11:47:34	-00:00:07	11:47:41	11:47:34	-00:00:07		00:01:09	134 km/h
WILLESDEN '	DF	Pass	11:49:00	11:48:43	-00:00:17	11:49:00	11:48:43	-00:00:17		00:00:17	149 km/h
WILLESDEN		Pass	11:49:14	11:49:00	-00:00:14	11:49:14	11:49:00	-00:00:14		00:00:11	152 km/h
HARLESDEN		Pass	11:49:23	11:49:11	-00:00:12	11:49:23	11:				
WILLESDEN :		Pass	11:50:00	11:49:54	-00:00:06	11:50:00	11:				
WEMBLEY CI	3	Pass	11:50:30	11:50:24	-00:00:06	11:50:30	11:				
NORTH WEI		Pass	11:51:07	11:50:58	-00:00:09	11:51:07	11:				
HARROW &	3	Pass	11:52:30	11:52:13	-00:00:17	11:52:30	11:				
BUSHEY		Pass	11:54:47	11:54:44	-00:00:03	11:54:47	11:				
WATFORD S		Pass	11:55:19	11:55:20	00:00:01	11:55:19	11:				
WATFORD JI	6	Pass	11:55:30	11:55:31	00:00:01	11:55:30	11:				
WATFORD N		Pass	11:55:44	11:55:51	00:00:07	11:55:44	11:				
KINGS LANC	1	Pass	11:57:14	11:57:26	00:00:12	11:57:14	11:				
APSLEY		Pass	11:58:17	11:58:36	00:00:19	11:58:17	11:				
HEMEL HEM	1	Pass	11:58:59	11:59:22	00:00:23	11:58:59	11:				
BOURNE EN		Pass	11:59:30	11:59:56	00:00:26	11:59:30	11:				
BOURNE EN SIG		Pass	11:59:32	12:00:05	00:00:33	11:59:32	12:				
BERKHAMST	1	Pass	12:00:53	12:01:17	00:00:24	12:00:53	12:01:17	00:00:24		00:02:04	172 km/h
TRING	1	Pass	12:03:00	12:03:21	00:00:21	12:03:00	12:03:21	00:00:21		00:00:12	181 km/h
TRING NOR		Pass	12:03:11	12:03:33	00:00:22	12:03:11	12:03:33	00:00:22		00:02:14	177 km/h
CHEDDINGT		Pass	12:05:18	12:05:47	00:00:29	12:05:18	12:05:47	00:00:29		00:00:44	176 km/h
LEDBURN JN		Pass	12:06:00	12:06:31	00:00:31	12:06:00	12:06:31	00:00:31		00:01:30	176 km/h
LEIGHTON E	1	Pass	12:07:28	12:08:01	00:00:33	12:07:28	12:08:01	00:00:33		00:03:19	157 km/h
BLETCHLEY		Pass	12:10:24	12:11:20	00:00:56	12:10:24	12:11:20	00:00:56		00:00:24	178 km/h
BLETCHLEY		Pass	12:10:48	12:11:44	00:00:56	12:10:48	12:11:44	00:00:56		00:00:12	175 km/h
BLETCHLEY	1	Pass	12:11:00	12:11:56	00:00:56	12:11:00	12:11:56	00:00:56		00:00:31	182 km/h
DENBIGH H		Pass	12:11:46	12:12:27	00:00:41	12:11:46	12:12:27	00:00:41		00:00:32	172 km/h
DENBIGH H		Pass	12:12:32	12:12:59	00:00:27	12:12:32	12:12:59	00:00:27		00:00:12	163 km/h
KNOWLHILL		Pass	12:12:48	12:13:11	00:00:23	12:12:48	12:13:11	00:00:23		00:00:31	112 km/h
MILTON KE		Pass	12:13:16	12:13:42	00:00:26	12:13:16	12:13:42	00:00:26		00:00:59	27 km/h
MILTON KE	6	Stop	12:13:30	12:14:41	00:01:11	12:15:30	12:16:01	00:00:31	00:00:00	00:02:12	114 km/h
WOLVERTO	1	Pass	12:17:36	12:18:13	00:00:37	12:17:36	12:18:13	00:00:37		00:02:17	177 km/h
HANSLOPE J		Pass	12:21:00	12:20:30	-00:00:30	12:21:00	12:20:30	-00:00:30		00:03:23	202 km/h
BLISWORTH DM		Pass	12:24:46	12:23:53	-00:00:53	12:24:46	12:23:53	-00:00:53		00:00:10	72 km/h
BLISWORTH SIG		Pass	12:24:50	12:24:03	-00:00:47	12:24:50	12:24:03	-00:00:47		00:03:40	156 km/h
WEEDON		Pass	12:28:00	12:27:43	-00:00:17	12:28:00	12:27:43	-00:00:17		00:06:13	181 km/h
RUGBY SIGN	DN	Pass	12:35:29	12:33:56	-00:01:33	12:35:29	12:33:56	-00:01:33		00:00:13	10 km/h
HILLMORTO		Pass	12:35:30	12:34:09	-00:01:21	12:35:30	12:34:09	-00:01:21		00:00:40	167 km/h
RUGBY	DFL	Pass	12:36:00	12:34:49	-00:01:11	12:36:00	12:34:49	-00:01:11		00:00:22	99 km/h
RUGBY NOR		Pass	12:36:15	12:35:11	-00:01:04	12:36:15	12:35:11	-00:01:04		00:00:04	508 km/h
RUGBY TREI		Pass	12:36:30	12:35:15	-00:01:15	12:36:30	12:35:15	-00:01:15		00:00:39	163 km/h

Planned and simulated timetable

The arrival delays are slightly positive (or just slightly negative) in most sections.

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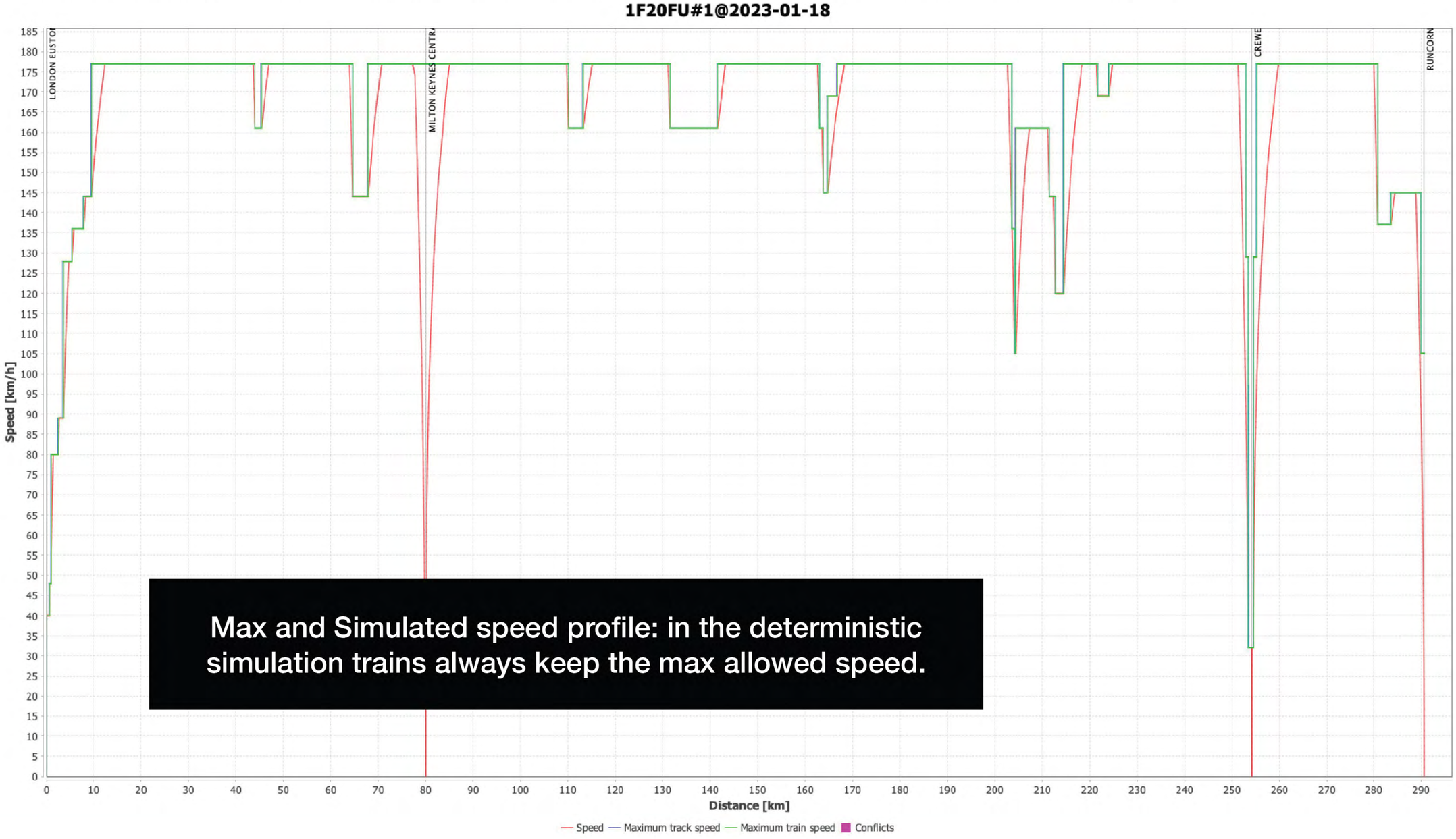
Deterministic simulation: Down 80x service



Max and Simulated speed profile: in the deterministic simulation trains always keep the max allowed speed.

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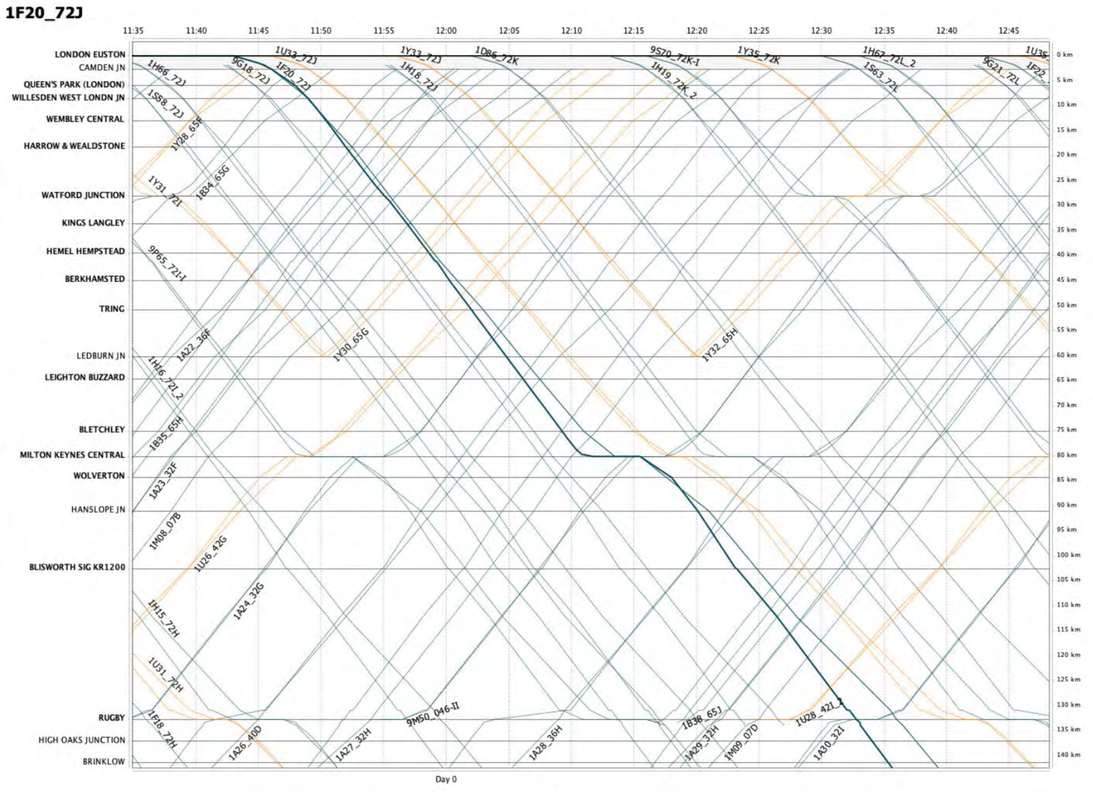
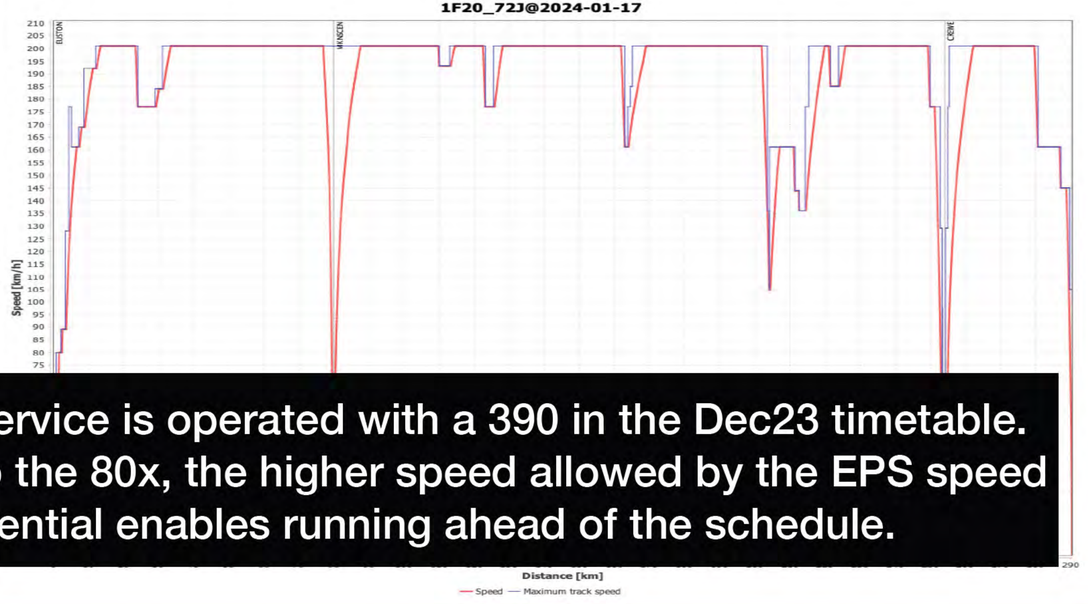
Dec23 Timetable - Class 390

Station	Track	Type	Pl. Arrival	Act. Arrival	Arrival Delay	Pl. Departure	Act. Departure	Departure Delay
LONDON EUSTON	2	Stop	11:03:00	11:03:00	00:00:00	11:43:00	11:43:00	00:00:00
EUSTON SIG WM51	W512	Pass	11:44:53	11:44:41	-00:00:12	11:44:53	11:44:41	-00:00:12
CAMDEN SOUTH JN		Pass	11:45:30	11:45:09	-00:00:21	11:45:30	11:45:09	-00:00:21
CAMDEN JN		Pass	11:46:00	11:45:48	-00:00:12	11:46:00	11:45:48	-00:00:12
QUEEN'S PARK (LON	8	Pass	11:47:41	11:47:44	00:00:03	11:47:41	11:47:44	00:00:03
WILLESDEN WEST LC	DF	Pass	11:49:00	11:48:44	-00:00:16	11:49:00	11:48:44	-00:00:16
WILLESDEN NORTH		Pass	11:49:14	11:48:58	-00:00:16	11:49:14	11:48:58	-00:00:16
HARLESDEN JN		Pass	11:49:23	11:49:08	-00:00:15	11:49:23	11:49:08	-00:00:15
WILLESDEN SUDBUR		Pass	11:50:00	11:49:44	-00:00:16	11:50:00	11:49:44	-00:00:16
WEMBLEY CENTRAL	3	Pass	11:50:30	11:50:11	-00:00:19	11:50:30	11:50:11	-00:00:19
NORTH WEMBLEY JN		Pass	11:51:07	11:50:41	-00:00:26	11:51:07	11:50:41	-00:00:26
HARROW & WEALDS	3	Pass	11:52:30	11:51:47	-00:00:43	11:52:30	11:51:47	-00:00:43
BUSHEY		Pass	11:54:47	11:54:04	-00:00:43	11:54:47	11:54:04	-00:00:43
WATFORD SOUTH JC		Pass	11:55:19	11:54:40	-00:00:39	11:55:19	11:54:40	-00:00:39
WATFORD JUNCTIOI	6	Pass	11:55:30	11:54:51	-00:00:39	11:55:30	11:54:51	-00:00:39
WATFORD NORTH J		Pass	11:55:44	11:55:11	-00:00:33	11:55:44	11:55:11	-00:00:33
KINGS LANGLEY	1	Pass	11:57:14	11:56:41	-00:00:33	11:57:14	11:56:41	-00:00:33
APSLEY		Pass	11:58:17	11:57:43	-00:00:34	11:58:17	11:57:43	-00:00:34
HEMEL HEMPSTEAD	1	Pass	11:58:59	11:58:24	-00:00:35	11:58:59	11:58:24	-00:00:35
BOURNE END JN (HI		Pass	11:59:30	11:58:53	-00:00:37	11:59:30	11:58:53	-00:00:37
BOURNE END SIGNA	SIG	Pass	11:59:32	11:59:02	-00:00:30	11:59:32	11:59:02	-00:00:30
BERKHAMSTED	1	Pass	12:00:53	12:00:04	-00:00:49	12:00:53	12:00:04	-00:00:49
TRING	1	Pass	12:03:00	12:01:50	-00:01:10	12:03:00	12:01:50	-00:01:10
TRING NORTH JN		Pass	12:03:11	12:02:01	-00:01:10	12:03:11	12:02:01	-00:01:10
CHEDDINGTON		Pass	12:05:18	12:03:59	-00:01:19	12:05:18	12:03:59	-00:01:19
LEDBURN JN		Pass	12:06:00	12:04:37	-00:01:23	12:06:00	12:04:37	-00:01:23
LEIGHTON BUZZARI	1	Pass	12:07:28	12:05:56	-00:01:32	12:07:28	12:05:56	-00:01:32
BLETCHLEY DRAYTC		Pass	12:10:24	12:08:32	-00:01:52	12:10:24	12:08:32	-00:01:52
BLETCHLEY WATER		Pass	12:10:48	12:08:53	-00:01:55	12:10:48	12:08:53	-00:01:55
BLETCHLEY	1	Pass	12:11:00	12:09:04	-00:01:56	12:11:00	12:09:04	-00:01:56
DENBIGH HALL SOU		Pass	12:11:46	12:09:32	-00:02:14	12:11:46	12:09:32	-00:02:14
DENBIGH HALL NOF		Pass	12:12:32	12:10:00	-00:02:32	12:12:32	12:10:00	-00:02:32
KNOWLHILL JN		Pass	12:12:48	12:10:11	-00:02:37	12:12:48	12:10:11	-00:02:37
MILTON KEYNES SO		Pass	12:13:16	12:10:38	-00:02:38	12:13:16	12:10:38	-00:02:38
MILTON KEYNES CE	6	Stop	12:13:30	12:11:33	-00:01:57	12:15:30	12:15:30	00:00:00
WOLVERTON	1	Pass	12:17:36	12:18:01	00:00:25	12:17:36	12:18:01	00:00:25
HANSLOPE JN		Pass	12:21:00	12:20:07	-00:00:53	12:21:00	12:2	
BLISWORTH SIG KR1	DM	Pass	12:24:46	12:23:06	-00:01:40	12:24:46	12:2	
BLISWORTH SIG KR1	SIG	Pass	12:24:50	12:23:14	-00:01:36	12:24:50	12:2	
WEEDON		Pass	12:28:00	12:26:26	-00:01:34	12:28:00	12:2	
RUGBY SIGNAL KR9	DN	Pass	12:35:29	12:32:02	-00:03:27	12:35:29	12:3	
HILLMORTON JN		Pass	12:35:30	12:32:14	-00:03:16	12:35:30	12:3	
RUGBY	DFL	Pass	12:36:00	12:32:47	-00:03:13	12:36:00	12:32:47	-00:03:13





The same service is operated with a 390 in the Dec23 timetable. Compared to the 80x, the higher speed allowed by the EPS speed differential enables running ahead of the schedule.

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Normal variation

In brief, the deterministic simulation shows that:

- ➡ Between Warrington and Rochdale, in both directions, the additional trains do not impact other services.
- ➡ Between Warrington and Euston (Up) the new trains do not show a lower performance compared to the others before them, nor impact the following trains.
- ➡ Between Euston and Warrington (Down) the new timetable appears tighter than the previous as a result of the tight SRTs between Euston and Stafford. Thus, even without the proposed services, the other trains (that use an 80x) show a lower performance compared to the Dec23 timetable.
- ➡ On top of this performance decrease, the proposed paths also appear very tight between Euston and Stafford, leading to a lower P3, but fully recover afterwards. The following trains show a further, although remarkably smaller (compared to their drop in May25 vs Dec23) decrease in performance.

Example output

Given the similarity of the timetables, our analysis considered the new paths and several trains preceding and following them, in all scenarios.

For each proposed path, we prepared a table showing punctuality at 3’ in a set of key timing points in columns, with the paths in time order as rows: first those preceding the proposed path, then the proposed path (bold) and the ones following it. The table includes both the trains on the WCML and in Manchester. Below is an example Up train:

Stations towards London →

		Dec-25 Var							
		RCHDALE	MNCRVIC	WRGTNBQ	CREWE	STAFFRD	NNTN	RUGBY	EUSTON
Preceding trains in MAN	2B81FB#1		100.00						
	9M14FT#1		100.00						
Preceding trains on WCML	1A75EU#1				100.00	100.00	97.01	97.76	64.18
	1Y30EA#1							100.00	98.51
Proposed path	**1M79FA#1**		100.00	100.00	100.00	100.00	100.00	97.01	100.00
Following trains in MAN	2K63FB#1		100.00						
	1D43JS#1			100.00					
Following trains on WCML	1G66DE#1				100.00	99.25			
	1A76EU#1				100.00	100.00	100.00	100.00	100.00
	1M17EW#1			100.00	100.00	100.00	100.00	100.00	82.09

Low P3 at EUS, not caused by the extra path

Almost perfect

Also the trains immediately following show a very high P3

Low P3 at EUS, not caused by the extra path

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Results - Up: Same trains in Dec23 and Dec25 with and without the additional services

dic-23								
	RCHDALE	MNCRVIC	WRGTNBQ	CREWE	STAFFRD	NNTN	RUGBY	EUSTON
1S30_324_2								
1U02_425					100.00	100.00	100.00	100.00
1R06_365				100.00	100.00	100.00	100.00	100.00
1M59FA#1								
-								
1R07_656							100.00	100.00
1R08_115			100.00	100.00	100.00	100.00	100.00	100.00
1U02_425					100.00	100.00	100.00	100.00
2B81_31B_2		100.00						
2G92_31C								
9M48_075-I			100.00	100.00	100.00			
1A15_32D						91.60	100.00	100.00
9A31_11A-II							100.00	100.00
1M61FA#1								
2K63_29A		100.00						
9M25_125		100.00						
1G45_36D				100.00	100.00			
1U24_42E					100.00	97.90	100.00	98.32
1A16_36D				100.00	100.00	100.00	100.00	100.00
2B84_31H_2		100.00						
1D74_17F_3		100.00	100.00					
9M52_04D-I			100.00	100.00	100.00			
1U30_42K_2					100.00	97.06	99.58	97.90
1A33_32J						93.28	100.00	100.00
9M51_07C-II							100.00	100.00
1M67FA#2								
2K66_29G_2		100.00						
9M28_12D_2		100.00						
1G51_36J_2				100.00	100.00			
1A34_36J				100.00	100.00	100.00	100.00	100.00
2B87_31N_2		100.00						
1D77_17L_3		100.00	100.00					
9M55_07J_2-I			100.00	100.00	100.00			
1A51_32P						94.96	100.00	100.00
9M54_04H_2-II							100.00	100.00
1M71FA#1								
2K69_29M_2		100.00						
9M31_12J_2		100.00						
1G57_36P_2				100.00	100.00			
1U36_42Q_2					100.00	95.80	98.74	95.80
1A52_36P				100.00	100.00	100.00	100.00	88.66
2B89_31R_2		100.00						
2G94_31S								
9A84_30R-I			100.00	100.00	100.00			
1A63_32T						91.18	100.00	100.00
9M56_04L_2-II							100.00	100.00
1M78FA#1								
2K61_29Q_2		100.00						
9M33_12N_2		100.00						
1G61_36T_2				100.00	100.00			
-								
1A64_36T				100.00	100.00	100.00	100.00	100.00
2B81_31V_2		100.00						
9M35_12R_2		100.00						
1A75_36X				100.00	100.00	100.00	100.00	100.00
1Y66_65Y							100.00	88.66
1M79FA#1								
2K63_29U_2		100.00						
1D33_32W			100.00					
-								
1A76_32X				100.00	100.00	100.00	100.00	100.00
1M17_07T_2			100.00	100.00	100.00	100.00	100.00	100.00

dic-25								
	RCHDALE	MNCRVIC	WRGTNBQ	CREWE	STAFFRD	NNTN	RUGBY	EUSTON
1S30LP#1								
1U02MK#1					100.00	100.00	100.00	100.00
1R06EA#1				100.00	100.00	100.00	100.00	100.00
1M59FA#1								
2F10FN#1			100.00					
1R07EU#1							100.00	65.71
1R08EA#1				100.00	100.00	100.00	100.00	89.80
1U02MK#1					100.00	100.00	100.00	100.00
2B81FA#1		99.59						
2F21FA#1								
9M49EX#1-I			100.00	100.00	100.00			
1A15EU#1						88.98	100.00	87.35
1B31EU#1							100.00	97.96
1M61FA#1								
2K63FA#1		100.00						
9M04FT#1		100.00						
1G45DE#1				100.00	99.59			
1U24ES#1					100.00	98.37	99.18	99.18
1A16EU#1				100.00	100.00	99.59	100.00	75.92
2B84FA#1		100.00						
1D74FA#1		100.00	100.00					
9M52EX#1-I			99.59	100.00	100.00			
1U30ES#1					100.00	100.00	100.00	100.00
1A33EU#1						89.39	100.00	90.20
1B40EU#1							100.00	93.06
1M67FA#2								
2K66FA#1		100.00						
9M07FT#1		100.00						
1G51DE#1				100.00	99.59			
1A34EU#1				100.00	100.00	100.00	100.00	97.14
2B87FA#1		100.00						
1D77FA#1		100.00	100.00					
9M55EX#1-I			100.00	100.00	100.00			
1A51EU#1						91.43	100.00	90.61
1B49EU#1							100.00	88.98
1M71FA#1								
2K69FA#1		100.00						
9M10FT#1		100.00						
1G57DE#1				100.00	100.00			
1U36ES#1					100.00	99.18	99.59	95.51
1A52EU#1				100.00	100.00	99.59	99.59	74.29
2B89FA#1		100.00						
1D79FA#1		100.00	100.00					
9M57QJ#1-I			100.00	100.00	100.00			
1A63EU#1						97.14	100.00	98.37
1B55EU#1							100.00	89.80
1M78FA#1								
2K61FB#1		100.00						
9M12FT#1		100.00						
1G61DE#1				100.00	100.00			
1U40ES#1					100.00	97.96	98.78	98.37
1A64EU#1				100.00	100.00	100.00	100.00	77.55
2B81FB#1		100.00						
9M14FT#1		100.00						
1A75EU#1				100.00	100.00	97.55	99.59	64.49
1Y30EA#1							99.59	98.37
1M79FA#1								
2K63FB#1		100.00						
1D43JS#1			100.00					
1G66DE#1				100.00	100.00			
1A76EU#1				100.00	100.00	100.00	100.00	100.00
1M17EW#1			100.00	100.00	100.00	100.00	100.00	71.84

Dec-25 Var								
	RCHDALE	MNCRVIC	WRGTNBQ	CREWE	STAFFRD	NNTN	RUGBY	EUSTON
1S30LP#1								
1U02MK#1					100.00	100.00	100.00	100.00
1R06EA#1				100.00	100.00	100.00	100.00	100.00
1M59FA#1			100.00	100.00	100.00	100.00	100.00	100.00
2F10FN#1			100.00					
1R07EU#1							100.00	65.71
1R08EA#1			100.00	100.00	100.00	100.00	100.00	89.80
1U02MK#1					100.00	100.00	100.00	100.00
2B81FA#1		99.59						
2F21FA#1								
9M49EX#1-I			100.00	100.00	100.00			
1A15EU#1						88.98	100.00	87.35
1B31EU#1							100.00	97.96
1M61FA#1		100.00	100.00	100.00	100.00	100.00	100.00	99.59
2K63FA#1		100.00						
9M04FT#1		100.00						
1G45DE#1				100.00	99.59			
1U24ES#1					100.00	98.37	99.18	99.18
1A16EU#1				100.00	100.00	99.59	100.00	75.92
2B84FA#1		83.67						
1D74FA#1		100.00	100.00					
9M52EX#1-I			99.59	100.00	100.00			
1U30ES#1					100.00	100.00	100.00	100.00
1A33EU#1						89.39	100.00	90.20
1B40EU#1							100.00	93.06
1M67FA#2		100.00	100.00	100.00	100.00	96.33	95.51	100.00
2K66FA#1		100.00						
9M07FT#1		100.00						
1G51DE#1				100.00	99.59			
1A34EU#1				100.00	100.00	100.00	100.00	94.69
2B87FA#1		100.00						
1D77FA#1		100.00	100.00					
9M55EX#1-I			100.00	100.00	100.00			
1A51EU#1						91.43	100.00	90.61
1B49EU#1							100.00	88.98
1M71FA#1		100.00	100.00	100.00	100.00	100.00	100.00	100.00
2K69FA#1		100.00						
9M10FT#1		100.00						
1G57DE#1				100.00	100.00			
1U36ES#1					100.00	99.18	99.59	95.51
1A52EU#1				100.00	100.00	99.59	99.59	74.29
2B89FA#1		100.00						
1D79FA#1		100.00	100.00					
9M57QJ#1-I			100.00	100.00	100.00			
1A63EU#1						97.14	100.00	98.37
1B55EU#1							100.00	89.80
1M78FA#1		100.00	100.00	100.00	100.00	100.00	100.00	100.00
2K61FB#1		100.00						
9M12FT#1		100.00						
1G61DE#1				100.00	100.00			
1U40ES#1					100.00	97.96	98.78	94.29
1A64EU#1				100.00	100.00	100.00	100.00	77.55
2B81FB#1		100.00						
9M14FT#1		100.00						
1A75EU#1				100.00	100.00	97.55	99.59	64.49
1Y30EA#1							99.59	97.96
1M79FA#1		100.00	100.00	100.00	100.00	100.00	98.78	99.59
2K63FB#1		100.00						
1D43JS#1			100.00					
1G66DE#1				100.00	100.00			
1A76EU#1				100.00	100.00	100.00	100.00	100.00
1M17EW#1			100.00	100.00	100.00	100.00	100.00	75.51

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Results - Up: Same trains in Dec23 and Dec25 with and without the additional services

dic-23								
	RCHDALE	MNCRVIC	WRGTNBQ	CREWE	STAFFRD	NNTN	RUGBY	EUSTON
1S30_324_2								
1U02_425					100.00	100.00	100.00	100.00
1R06_365				100.00	100.00	100.00	100.00	100.00
1M59FA#1								
-								
1R07_656							100.00	100.00
1R08_115			100.00	100.00	100.00	100.00	100.00	100.00
1U02_425					100.00	100.00	100.00	100.00
2B81_31B_2		100.00						
2G92_31C								
9M48_075-I			100.00	100.00	100.00			
1A15_32D						91.60	100.00	100.00
9A31_11A-II							100.00	100.00
1M61FA#1								
2K63_29A		100.00						
9M25_125		100.00						
1G45_36D				100.00	100.00			
1U24_42E					100.00	97.90	100.00	98.32
1A16_36D				100.00	100.00	100.00	100.00	100.00
2B84_31H_2		100.00						
1D74_17F_3		100.00	100.00					
9M52_04D-I			100.00	100.00	100.00			
1U30_42K_2					100.00	97.06	99.58	97.90
1A33_32J						93.28	100.00	100.00
9M51_07C-II							100.00	100.00
1M67FA#2								
2K66_29G_2		100.00						
9M28_12D_2		100.00						
1G51_36J_2				100.00	100.00			
1A34_36J				100.00	100.00	100.00	100.00	100.00
2B87_31N_2		100.00						
1D77_17L_3		100.00	100.00					
9M55_07J_2-I			100.00	100.00	100.00			
1A51_32P						94.96	100.00	100.00
9M54_04H_2-II							100.00	100.00
1M71FA#1								
2K69_29M_2		100.00						
9M31_12J_2		100.00						
1G57_36P_2				100.00	100.00			
1U36_42Q_2					100.00	95.80	98.74	95.80
1A52_36P				100.00	100.00	100.00	100.00	88.66
2B89_31R_2		100.00						
2G94_31S								
9A84_30R-I			100.00	100.00	100.00			
1A63_32T						91.18	100.00	100.00
9M56_04L_2-II							100.00	100.00
1M78FA#1								
2K61_29Q_2		100.00						
9M33_12N_2		100.00						
1G61_36T_2				100.00	100.00			
-								
1A64_36T				100.00	100.00	100.00	100.00	100.00

dic-25								
	RCHDALE	MNCRVIC	WRGTNBQ	CREWE	STAFFRD	NNTN	RUGBY	EUSTON
1S30LP#1								
1U02MK#1					100.00	100.00	100.00	100.00
1R06EA#1				100.00	100.00	100.00	100.00	100.00
1M59FA#1								
2F10FN#1			100.00					
1R07EU#1							100.00	65.71
1R08EA#1			100.00	100.00	100.00	100.00	100.00	89.80
1U02MK#1					100.00	100.00	100.00	100.00
2B81FA#1		99.59						
2F21FA#1								
9M49EX#1-I			100.00	100.00	100.00			
1A15EU#1						88.98	100.00	87.35
1B31EU#1							100.00	97.96
1M61FA#1								
2K63FA#1		100.00						
9M04FT#1		100.00						
1G45DE#1				100.00	99.59			
1U24ES#1					100.00	98.37	99.18	99.18
1A16EU#1				100.00	100.00	99.59	100.00	75.92
2B84FA#1		100.00						
1D74FA#1		100.00	100.00					
9M52EX#1-I			99.59	100.00	100.00			
1U30ES#1					100.00	100.00	100.00	100.00
1A33EU#1						89.39	100.00	90.20
1B40EU#1							100.00	93.06
1M67FA#2								
2K66FA#1		100.00						
9M07FT#1		100.00						
1G51DE#1				100.00	99.59			
1A34EU#1				100.00	100.00	100.00	100.00	97.14
2B87FA#1		100.00						
1D77FA#1		100.00	100.00					
9M55EX#1-I			100.00	100.00	100.00			
1A51EU#1						91.43	100.00	90.61
1B49EU#1							100.00	88.98
1M71FA#1								
2K69FA#1		100.00						
9M10FT#1		100.00						
1G57DE#1				100.00	100.00			
1U36ES#1					100.00	99.18	99.59	95.51
1A52EU#1				100.00	100.00	99.59	99.59	74.29
2B89FA#1		100.00						
1D79FA#1		100.00	100.00					
9M57QJ#1-I			100.00	100.00	100.00			
1A63EU#1						97.14	100.00	98.37
1B55EU#1							100.00	89.80
1M78FA#1								
2K61FB#1		100.00						
9M12FT#1		100.00						
1G61DE#1				100.00	100.00			
1U40ES#1					100.00	97.96	98.78	98.37
1A64EU#1				100.00	100.00	100.00	100.00	77.55

Dec-25 Var								
	RCHDALE	MNCRVIC	WRGTNBQ	CREWE	STAFFRD	NNTN	RUGBY	EUSTON
1S30LP#1								
1U02MK#1					100.00	100.00	100.00	100.00
1R06EA#1				100.00	100.00	100.00	100.00	100.00
1M59FA#1								
2F10FN#1			100.00					
1R07EU#1							100.00	65.71
1R08EA#1			100.00	100.00	100.00	100.00	100.00	89.80
1U02MK#1					100.00	100.00	100.00	100.00
2B81FA#1		99.59						
2F21FA#1								
9M49EX#1-I			100.00	100.00	100.00			
1A15EU#1						88.98	100.00	87.35
1B31EU#1							100.00	97.96
1M61FA#1		100.00	100.00	100.00	100.00	100.00	100.00	99.59
2K63FA#1		100.00						
9M04FT#1		100.00						
1G45DE#1				100.00	99.59			
1U24ES#1					100.00	98.37	99.18	99.18
1A16EU#1				100.00	100.00	99.59	100.00	75.92
2B84FA#1		83.67						
1D74FA#1		100.00	100.00					
9M52EX#1-I			99.59	100.00	100.00			
1U30ES#1					100.00	100.00	100.00	100.00
1A33EU#1						89.39	100.00	90.20
1B40EU#1							100.00	93.06
1M67FA#2		100.00	100.00	100.00	100.00	96.33	95.51	100.00
2K66FA#1		100.00						
9M07FT#1		100.00						
1G51DE#1				100.00	99.59			
1A34EU#1				100.00	100.00	100.00	100.00	94.69
2B87FA#1		100.00						
1D77FA#1		100.00	100.00					
9M55EX#1-I			100.00	100.00	100.00			
1A51EU#1						91.43	100.00	90.61
1B49EU#1							100.00	88.98
1M71FA#1		100.00	100.00	100.00	100.00	100.00	100.00	100.00
2K69FA#1		100.00						
9M10FT#1		100.00						
1G57DE#1				100.00	100.00			
1U36ES#1					100.00	99.18	99.59	95.51
1A52EU#1				100.00	100.00	99.59	99.59	74.29
2B89FA#1		100.00						
1D79FA#1		100.00	100.00					
9M57QJ#1-I			100.00	100.00	100.00			
1A63EU#1						97.14	100.00	98.37
1B55EU#1							100.00	89.80
1M78FA#1		100.00	100.00	100.00	100.00	100.00	100.00	100.00
2K61FB#1		100.00						
9M12FT#1		100.00						
1G61DE#1				100.00	100.00			
1U40ES#1					100.00	97.96	98.78	94.29
1A64EU#1				100.00	100.00	100.00	100.00	77.55
		100.00						
		100.00						
				100.00	100.00	97.55	99.59	64.49
							99.59	97.96
		100.00	100.00	100.00	100.00	100.00	98.78	99.59
		100.00						
			100.00					
				100.00	100.00			
				100.00	100.00	100.00	100.00	100.00
			100.00	100.00	100.00	100.00	100.00	75.51

This slide shows the proposed and other relevant trains. The proposed paths are highlighted in light blue. All of them show a very high performance.

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Results - Up: Same trains in Dec25 with and without the additional services

dic-25								
	RCHDALE	MNCRVIC	WRGTNBQ	CREWE	STAFFRD	NNTN	RUGBY	EUSTON
1M59FA#1								
2F10FN#1			100.00					
1R07EU#1							100.00	65.71
1R08EA#1			100.00	100 00	100 00	100.00	100.00	89.80
1U02MK#					100 00	100.00	100.00	100 00
1M61FA#1								
2K63FA#1		100.00						
9M04FT#1		100.00						
1G45DE#1					99.59			
U24ES#1					100.00	9 .37	99.18	99 18
1M67FA#2								
2K66FA#1		100.00						
9M07FT#1		100.00						
1G51DE#1				100.00	99.59			
1A34EU#1				100.00	100.00	100.00	100.00	97.14
1M71FA#1								
2K69FA#1		100.00						
9M10FT#1		100.00						
1G57DE#1				100.00	100.00			
1U36ES#1					100.00	99.18	99.59	95.51
1M78FA#1								
2K61FB#1		100.00						
9M12FT#1		100.00						
1G61DE#1				100.00	100.00			
1U40ES#1					100.00	97.96	98.78	98.37
1M79FA#1								
2K63FB#1		100.00						
1D43JS#1			100.00					
1G66DE#1				100.00	100.00			
1A76EU#1				100.00	100.00	100.00	100.00	100.00

Dec-25 Var								
	RCHDALE	MNCRVIC	WRGTNBQ	CREWE	STAFFRD	NNTN	RUGBY	EUSTON
1M59FA#1			100.00	100 00	100 00	100.00	100.00	100.00
2F10FN#1			100.00					
1R07EU#1							100.00	65.71
1R08EA#1			100.00	100 00	100 00	100.00	100.00	89.80
1U02MK#					100 00	100.00	100.00	100 00
1M61FA#1		100.00	100.00	100.00	100.00	100 00	100.00	99.59
2K63FA#1		100.00						
9M04FT#1		100.00						
1G45DE#1					99.59			
U24ES#1					100.00	9 .37	99.18	99 18
1M67FA#2		100.00	100.00	100.00	100.00	96 33	95.51	100 00
2K66FA#1		100.00						
9M07FT#1		100.00						
1G51DE#1				100.00	99.59			
1A34EU#1				100.00	100.00	100.00	100.00	94.69
1M71FA#1		100.00	100.00	100.00	100.00	100.00	100.00	100.00
2K69FA#1		100.00						
9M10FT#1		100.00						
1G57DE#1				100.00	100.00			
1U36ES#1					100.00	99.18	99.59	95.51
1M78FA#1		100.00	100.00	100.00	100.00	100.00	100.00	100.00
2K61FB#1		100.00						
9M12FT#1		100.00						
1G61DE#1				100.00	100.00			
1U40ES#1					100.00	97.96	98.78	94.29
1M79FA#1		100.00	100.00	100.00	100.00	100.00	98.78	99.59
2K63FB#1		100.00						
1D43JS#1			100.00					
1G66DE#1				100.00	100.00			
1A76EU#1				100.00	100.00	100.00	100.00	100.00

Euston approach delay unchanged by new service

Nearly-perfect performance

New service recovers delay, slight knock-on to next Euston train

New train performs perfectly and has no effect on other trains

Nearly-perfect performance, slight knock-on to next Euston train

Some loss of performance on approach to Euston

This slide focuses on the performance of the proposed trains and their impact on the services following them.

Results - Down: Same trains in Dec23 and Dec25 with and without the additional services

dic-23								
	EUSTON	RUGBY	NNTN	STAFFRD	CREWE	WRGTNBQ	MNCRVIC	RCHDALE
1H61_726		100.00	100.00	100.00	100.00			
1S39_65A				100.00	100.00	100.00		
2A12_36C								
2V03_35D							100.00	
2J24_29C_2							100.00	100.00
1S50FA#1								
-								
1F11_726		100.00	100.00	100.00	100.00			
1H17_65A				100.00	100.00			
1E54_40C						100.00	100.00	100.00
2I07_35D_2							100.00	100.00
1H63_72D		100.00	100.00	100.00	100.00			
9P47_72A-II				100.00	100.00	100.00		
2A14_36G								
2J28_29G_2							100.00	100.00
1S52FA#1								
9S54_72D-I		100.00						
1F14_72D		100.00	100.00	100.00	100.00			
1E58_40G_2						100.00	100.00	100.00
2I11_35H_2							100.00	100.00
1H66_72J		100.00	100.00	99.16	100.00			
9S60_72G-II				100.00	100.00	100.00		
2A17_36M								
2J24_29M_2							100.00	100.00
1S54XX#1								
9G18_72J		100.00						
1F20_72J		100.00	100.00	100.00	100.00			
1E64_40M_2						100.00	100.00	100.00
2I17_35N_3							100.00	100.00
1H69_72P_2		100.00	100.00	100.00	100.00			
9S77_72M_2-II				100.00	100.00	100.00		
2A20_36S								
2V05_35T							100.00	
1S60FA#1								
9G27_72P		100.00						
1F26_72P_2		100.00	100.00	100.00	100.00			
1E70_40S_2						100.00	100.00	100.00
2I23_35T_2							100.00	100.00
1H72_72V_2		97.90	98.32	97.90	100.00			
9S93_72T_2-II				98.74	100.00	100.00		
2A23_36Y								
2J26_29Y_2							100.00	100.00
1S66FA#1								
9S97_72V-I		100.00						
1F32_72V_2		100.00	100.00	100.00	100.00			
1E76_40Y_2						100.00	100.00	100.00
2I29_35Y_3							100.00	100.00
1H74_72Y_2		100.00	100.00	100.00	100.00			
1H96_40Z						100.00		
2A25_367								

dic-25								
	EUSTON	RUGBY	NNTN	STAFFRD	CREWE	WRGTNBQ	MNCRVIC	RCHDALE
1H61FU#1		82.86	84.08	82.04	100.00			
9E08GP#1							100.00	
-								
-								
2J24FA#1							100.00	100.00
1S50FA#1								
9S40LX#1-I		100.00						
1F11FU#1		71.02	49.39	49.80	82.45			
1H98CP#1				100.00	100.00			
1E54GA#1						100.00	100.00	100.00
2I07FA#1							100.00	100.00
1H63FU#1		100.00	100.00	99.59	100.00			
9S45QJ#1-II				100.00	100.00	100.00		
9E10GP#1							100.00	
2J28FA#1							100.00	100.00
1S52FA#1								
9S50LX#1-I		100.00						
1F14FU#1		71.43	50.20	47.35	96.73			
1E58GA#1						99.18	100.00	100.00
2I11FA#1							100.00	100.00
1H66FU#1		100.00	100.00	100.00	100.00			
9S60LX#1-II				100.00	100.00	100.00		
9E13GP#1							100.00	
2J24FB#1							100.00	100.00
1S54XX#1								
9S65QJ#1-I		100.00						
1F20FU#1		77.14	56.73	50.61	93.88			
1E64GA#1						100.00	100.00	100.00
2I17FA#1							100.00	100.00
1H69FU#1		99.59	99.59	99.18	100.00			
9S75LX#1-II				100.00	100.00	100.00		
9E16GP#1							100.00	
-								
1S60FA#1								
9S80LX#1-I		100.00						
1F26FU#1		73.47	49.80	45.71	63.67			
1E70GA#1						100.00	100.00	100.00
2I23FA#1							100.00	100.00
1H72FU#1		100.00	100.00	100.00	100.00			
9S90LX#1-II				100.00	100.00	100.00		
9E19GT#1							100.00	
2J26FC#1							100.00	100.00
1S66FA#1								
9S95LX#1-I		100.00						
1F32FU#1		71.43	50.61	47.76	95.92			
1E51GT#1							100.00	
2I29FA#1							100.00	100.00
1H74FU#1		100.00	100.00	100.00	100.00			
-								
2A25FA#1								

Dec-25 Var								
	EUSTON	RUGBY	NNTN	STAFFRD	CREWE	WRGTNBQ	MNCRVIC	RCHDALE
1H61FU#1		82.86	84.08	82.04	100.00			
9E08GP#1							100.00	
-								
-								
2J24FA#1							100.00	100.00
1S50FA#1		93.47	79.59	94.69	100.00	100.00	100.00	100.00
9S40LX#1-I		84.49						
1F11FU#1		62.04	37.14	42.45	79.59			
1H98CP#1				100.00	100.00			
1E54GA#1						100.00	96.73	99.18
2I07FA#1							100.00	100.00
1H63FU#1		100.00	100.00	100.00	100.00			
9S45QJ#1-II				100.00	100.00	100.00		
9E10GP#1							100.00	
2J28FA#1							100.00	100.00
1S52FA#1		41.63	24.08	97.55	96.73	100.00	100.00	100.00
9S50LX#1-I		71.84						
1F14FU#1		62.04	40.82	38.37	96.33			
1E58GA#1						99.18	100.00	100.00
2I11FA#1							95.51	95.51
1H66FU#1		100.00	100.00	100.00	100.00			
9S60LX#1-II				100.00	100.00	100.00		
9E13GP#1							100.00	
2J24FB#1							100.00	100.00
1S54XX#1		38.78	21.63	100.00	100.00	100.00	100.00	100.00
9S65QJ#1-I		69.39						
1F20FU#1		65.31	45.71	40.00	92.65			
1E64GA#1						100.00	100.00	100.00
2I17FA#1							100.00	100.00
1H69FU#1		99.59	99.59	99.18	100.00			
9S75LX#1-II				100.00	100.00	100.00		
9E16GP#1							100.00	
-								
1S60FA#1		48.16	26.53	100.00	99.18	100.00	100.00	100.00
9S80LX#1-I		79.18						
1F26FU#1		65.71	42.45	38.37	62.04			
1E70GA#1						99.18	99.59	100.00
2I23FA#1							99.18	99.18
1H72FU#1		100.00	100.00	100.00	100.00			
9S90LX#1-II				100.00	100.00	100.00		
9E19GT#1							100.00	
2J26FC#1							100.00	100.00
1S66FA#1		46.12	66.94	93.88	93.47	100.00	100.00	100.00
9S95LX#1-I		75.51						
1F32FU#1		64.90	44.49	42.04	95.51			
1E51GT#1							100.00	
2I29FA#1							100.00	100.00
1H74FU#1		100.00	100.00	100.00	100.00			
-								
2A25FA#1								
		20.82	10.61	19.59	20.00	91.02	100.00	
		44.49						
		55.92	33.47	33.47	99.59			
							100.00	

This slide shows the proposed and other relevant trains. The proposed paths are highlighted in light blue. All of them show a very high performance.

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Results - Down: Same trains in Dec25 with and without the additional services

dic-25								
	EUSTON	RUGBY	NNTN	STAFFRD	CREWE	WRGTNBQ	MNCRVIC	RCHDALE
1S50FA#1								
9S40LX#1 I		100.00						
1F11FU#1		71.02	49.39	49.80	82.45			
1H98CP#1				100.00	100.00			
1E54GA#1						100.00	100.00	100.00
1S52FA#1								
9S50LX -I		100.00						
1F14FU#1		71.43	50.20	47.35	96.73			
1E58GA#1						99.18	100.00	100.00
2I11FA#1							100.00	100.00
1S54XX#1								
9S65QJ#1-I		100.00						
1F20FU#1		77.14	56.73	50.61	93.88			
1E64GA#1						100.00	100.00	100.00
2I17FA#1							100.00	100.00
1S60FA#1								
9S80LX#1-I		100.00						
1F26FU#1		73.47	49.80	45.71	63.67			
1E70GA#1						100.00	100.00	100.00
2I23FA#1							100.00	100.00
1S66FA#1								
9S95LX#1-I		100.00						
1F32FU#1		71.43	50.61	47.76	95.92			
1E51GT#1							100.00	
2I29FA#1							100.00	100.00
1S70FA#1								
9K42FW#1-I		100.00						
1F36FU#1		78.78	51.02	49.39	100.00			
1E55GT#1							100.00	

Dec-25 Var								
	EUSTON	RUGBY	NNTN	STAFFRD	CREWE	WRGTNBQ	MNCRVIC	RCHDALE
1S50FA#1		93.47	79.59	94.69	100.00	100.00	100.00	100.00
9S40LX#1 I		84.49						
1F11FU#1		62.04	37.14	42.45	79.59			
1H98CP#1				100.00	100.00			
1E54GA#1						100.00	96.73	99.18
1S52FA#1		41.63	24.08	97.55	96.73	100.00	100.00	100.00
9S50LX -		71.84						
1F14FU#1		62.04	40.82	38.37	96.33			
1E58GA#1						99.18	100.00	100.00
2I11FA#1							95.51	95.51
1S54XX#1		38.78	21.63	100.00	100.00	100.00	100.00	100.00
9S65QJ#1-I		69.39						
1F20FU#1		65.31	45.71	40.00	92.65			
1E64GA#1						100.00	100.00	100.00
2I17FA#1							100.00	100.00
1S60FA#1		48.16	26.53	100.00	99.18	100.00	100.00	100.00
9S80LX#1-I		79.18						
1F26FU#1		65.71	42.45	38.37	62.04			
1E70GA#1						99.18	99.59	100.00
2I23FA#1							99.18	99.18
1S66FA#1		46.12	66.94	93.88	93.47	100.00	100.00	100.00
9S95LX#1-I		75.51						
1F32FU#1		64.90	44.49	42.04	95.51			
1E51GT#1							100.00	
2I29FA#1							100.00	100.00
1S70FA#1		20.82	10.61	19.59	20.00	91.02	100.00	
9K42FW#1-I		44.49						
1F36FU#1		55.92	33.47	33.47	99.59			
1E55GT#1							100.00	

Similar behavoir of most services: they recover after Nuneaton.
P3 of the following 1F service decreases by a further 10%, but recovers by Crewe.

This services recovers only after Crewe, due to the tighter path.
P3 drop pf following services is bigger.

New trains generally lose performance in the south of WCML but recover by Crewe/Warrington.
1Fxx train delays are increased by introduction of new services, although most of their delay would be found also in absence of the additional services.
9Sxx trains also lose punctuality due to the additional services.

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Initial remarks

Based on the modelling results obtained so far we can affirm that:

- ➡ The proposed paths appear feasible, with no performance risk in the Manchester area.
- ➡ They appear feasible overall with no performance risk under normal, realistic conditions - despite the tight grid between Warrington and Euston.
- ➡ Between Euston and Stafford all paths operated would show systematic delays caused by the very tight SRTs, at least when considering the same variability of driving policies as was estimated for the 390s. Since these delays are fully recovered before Crewe and propagation to the following services is limited, it appears possible to overcome them by simply tweaking the proposed timetable to match the realistic performance of the 80x.

Possible next steps

The simulation considers the current speed limits as defined in the Sectional Appendix: if the 80x were allowed to run at higher speeds (they are capable reaching 125mph but the speed limit is 110mph), this would make the timetable look more robust.

Also, the 805s were modelled using data provided by Hitachi for other 80x models. Although we don't expect any noticeable difference in the outcome, a re-run of the simulation with more "official" data would ensure the correctness of results.

Third, a "full" stochastic run including input delays taken from current operations would allow an estimate of P5 to be obtained. This could be used as a quantitative comparison between Dec23 and May25.

Finally, these results can easily be formatted in a different way, as required - separating WCML and Manchester area, showing other KPIs, etc.

Thank you for your attention!

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July 17th 2024