

Note in response to questions from Smarter Cambridge Transport regarding resilience of selected track option for Cambridge South Infrastructure Enhancements

1. Context

- 1.1. On 10 February Ed Leigh of Smarter Cambridge Transport (SCT) asked Andy Barnes about the relative resilience (in terms of train performance) of different track options considered and that it was something that should be brought to the inspector's attention, particularly if the selected option reduces this resilience when compared to the current infrastructure. The applicant agreed to take this question away.

2. Purpose of this note

- 2.1. To answer this point by setting out key considerations regarding the performance impacts of the proposed rail infrastructure.

3. Clarifications

- 3.1. It is worth noting that the baseline in Network Rail's analysis is not the current infrastructure, but rather that which incorporates the committed major signalling renewal in the area since this would take place even if CSIE was not delivered. This is consistent with the baseline assumed for design and business case purposes.
- 3.2. Ed Leigh of SCT suggested that full four-tracking options from Shepreth Junction to Cambridge station were considered earlier on in the project. This is correct to a degree, but in terms of formal project development these were only considered in any depth for the 'Concept' scope, which looked at the long term beyond the project's remit for delivery (the scope the project is remitted to deliver is known as 'OBC' scope). This distinction is set out in section 4-7-4.7.3.2 of NRE11.2, Mr. Wingfield's Proof.
- 3.3. 'OBC' scope did not actively consider full 4-tracking as an option as this was not necessary to deliver the required outputs.

4. Resilience of selected option

- 4.1. The project has a specific requirement to deliver 'performance neutrality', broadly meaning that overall train performance is not negatively impacted by the introduction of a station at this location with the proposed calling pattern.
- 4.2. This area of the network is a challenging one in which to maintain performance due to the number of origins and destinations of the service at Cambridge, including services which use the Thameslink Core, which is a particularly complicated timetable.
- 4.3. For the purpose of project development and design, performance is measured in terms of Average Minutes Lateness (AML) and Punctuality. These are different from the commonly quoted Public Performance Measure as this is a synthesised metric that cannot be modelled.
- 4.4. The selected track layout, along with the additional work to signalling in the area and the improvements at Shepreth Branch Junction and the headshunt at Hills Road, deliver on this requirement for performance neutrality meaning they can be considered to be at least as 'resilient' as the baseline infrastructure.
- 4.5. This conclusion was reached by using RailSys, an industry recognised dynamic modelling tool. The following steps were undertaken to do this:
 - i. A model of the baseline infrastructure is built within this tool

- ii. A model of the project's proposed infrastructure is built within this tool
 - iii. Three hundred runs of the model using observed data from many trains running in the past as inputs were run on the modelled baseline infrastructure to quantify baseline train performance. This uses a timetable without any station calls at Cambridge South, since the necessary infrastructure is not part of this model.
 - iv. The same inputs were used to run scenarios on the project's proposed infrastructure within the model. This uses a timetable updated to reflect the services calling at the new station.
 - v. These results were compared to show the detriment or increment to the two relevant performance metrics
- 4.6. This is done to avoid comparing modelled project infrastructure against directly observed real life data. This is designed to correct for any differences arising from the difference between the model and reality.
- 4.7. The Project has been recognised as best practice within Network Rail for its application of timetable modelling early in the development process and its ongoing reassessment as the project has progressed.

5. Conclusion

- 5.1. The selected option at least maintains baseline train performance, or resilience as this is an explicit requirement of the project.