

Fraserburgh and Peterhead to Aberdeen Strategic Transport Study (FPASTS): Ellon Rail Study Summary

Overview

In February 2017, AECOM was commissioned by Nestrans to undertake a study to explore the potential for introducing a new rail service between Aberdeen, Dyce and Ellon (along an alignment loosely based on the former Formartine and Buchan line), including service option specification, engineering feasibility, demand forecasting and outline scheme appraisal. This follows an initial appraisal (STAG Part 1) study which considered multi-modal options to improve strategic transport connections from the north of Aberdeen into the city.

The STAG Part 1 study identified a number of potential benefits, including likely public support, for reintroducing a heavy rail service to Ellon. However, it also raised a number of uncertainties regarding the scheme's feasibility, particularly around the potential patronage demand and whether or not annual revenue forecasts would cover estimated annual operating costs. The study also highlighted a broad capital cost range for the scheme. Based on the STAG Part 1 work it was difficult to judge whether there would be a positive business case for the scheme.

While this study is not designed to establish the business case for reintroducing a new rail service between Aberdeen, Dyce and Ellon, it aims to advance the work undertaken at the STAG Part 1 stage to robustly test the feasibility of reintroducing a heavy rail service to Ellon, providing Nestrans with a more informed position of the merits of proceeding with this option to STAG Part 2.

Approach

Figure 1 summarises the process adopted to inform the development of this study.

To inform the options for assessment, technical work has been undertaken to understand what levels of service could feasibly operate on the route in the context of existing line constraints and proposed enhancements, or if not, what additional infrastructure would be required. Accordingly, options have been developed and refined as engineering and operational feasibility work has been taken forward. At an early stage of the process, Network Rail, ScotRail and Transport Scotland were also consulted to aid understanding and agreement on the approach adopted for the study, including baseline assumptions applied and options under consideration.

Operational feasibility has been assessed by developing a working timetable for a 'standard hour' compliant with Network Rail's operational planning rules. The aim was to show that additional services could be accommodated in a way that is operationally robust and compliant with planning rules, or if this was not possible, to identify what additional infrastructure would be needed to achieve this. Supplementary to this, an engineering assessment has been undertaken to understand the likely work required to bring the route up to an appropriate standard for rail passenger services.

Based on the operational and engineering assessments, a final set of options have been defined upon which a rough order of magnitude costs have been prepared.

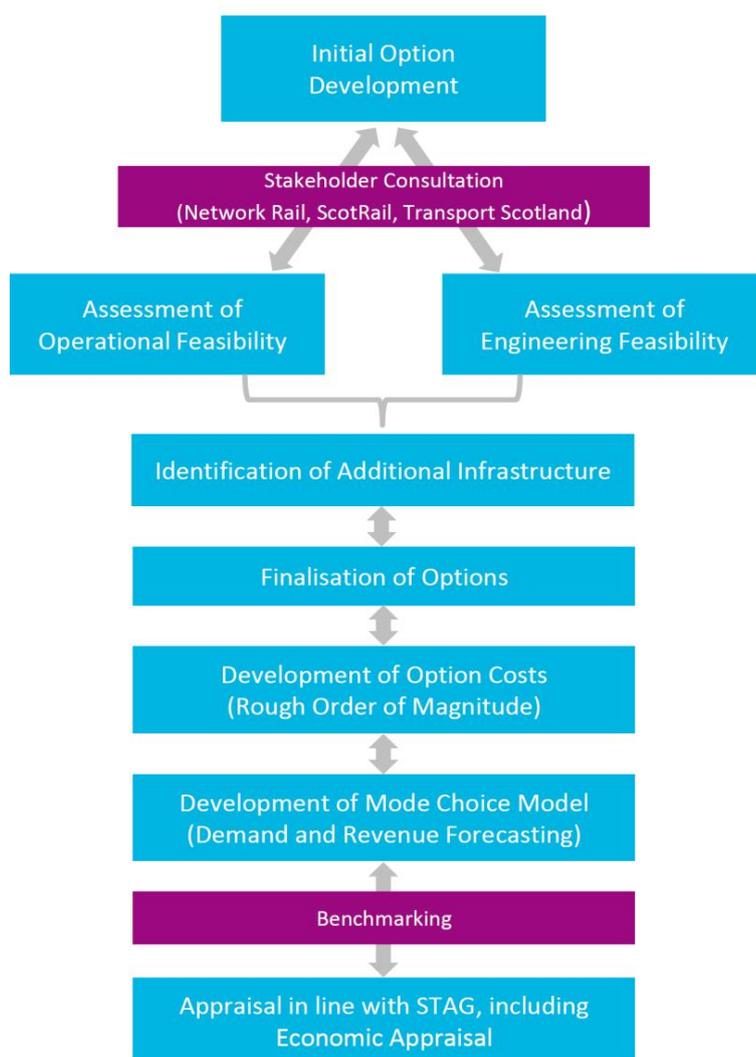


Figure 1: Study Approach

A demand and revenue forecasting exercise has also been undertaken based on the development of a spreadsheet-based mode choice model that enables the representation of trip decision-making within the study corridor. The adoption of this methodology for generating demand forecasts builds upon the STAG Part 1 analysis allowing a more robust understanding of the potential demand generated by the scheme, informed by a detailed assessment of the impact of different service frequencies, park and ride and relative changes in cost and times of other modes within the catchment study area.

Thereafter, the results from the demand forecasting exercise have fed an economic and financial appraisal of the scheme which, alongside an outline assessment of the options in line with STAG, seeks to provide Nestrans with a better understanding of the potential benefits of re-establishing the rail line.

Findings

Based on the operational and engineering assessments, three options were developed for the purposes of assessment in this study as follows:

- Option 1: Aberdeen/Dyce to Ellon – hourly service
- Option 2: Aberdeen/Dyce to Ellon – half-hourly service
- Option 3: Aberdeen/Dyce to Ellon and Ellon P&R – half-hourly service

Each of the options involve the reintroduction of rail services between Dyce and Ellon with an intermediate station at Newmachar. Option 3 also includes an extension of the line from Ellon to a new Park & Ride station close to the existing Ellon Park & Ride bus station north east of Ellon. Each option is proposed to tie in to the existing rail line at Dyce and follow the former railway solum to Ellon.

The assessment of operational feasibility found that Option 1 is feasible with the currently planned infrastructure and service enhancements between Aberdeen and Inverurie, whilst Options 2 and 3 are not feasible without elimination of the remaining single track section north of Aberdeen, which would be expected to deliver benefits beyond the Aberdeen – Dyce – Ellon route by unlocking future capacity enhancements for other potential service enhancements through Aberdeen, supporting Nestrans aspirations for developing Aberdeen’s rail network. An engineering assessment of the route also identified existing constraints and possible works required to enable reinstatement of the railway. Based on these assessments, the study identified the following additional infrastructure which would be required to accommodate the options considered, as summarised in Table 1.

Table 1: Distinguishing Infrastructure Elements

Distinguishing Infrastructure Elements	Option 1	Option 2	Option3
Doubling of track north of Aberdeen station		✓	✓
Re-modelling of Dyce station to provide new junction	✓	✓	✓
Single platform station at Newmachar	✓		
Twin platform station at Newmachar		✓	✓
Revised alignment to remove s-curves at Newmachar	✓	✓	✓
Dynamic loop at Newmachar		✓	✓
Single platform station at Ellon	✓	✓	
Twin platform station at Ellon with double track approach			✓
Double track extension on new alignment between Ellon and new Ellon P&R station (island platform)			✓

Informed by the engineering assessment and assumptions, a rough order of magnitude set of costs for the respective options has been developed, which includes maintaining the existing cycle route between Dyce and Ellon. Costs for each of the options (including 66% OB) have been estimated as follows:

- Option 1: £273m
- Option 2: £311m
- Option 3: £381m

An appraisal of the scheme in line with STAG has focused on providing an updated qualitative assessment of the scheme informed by a better understanding of the respective options as established through the operational and engineering assessments. This has established that in transport appraisal terms, overall the reinstatement of an Ellon rail service performs positively with each of the options generally anticipated to deliver benefits against the scheme Transport Planning Objectives and STAG criteria. While each of the options generally perform similarly, additional benefits are identified for Option 3 associated with increased integration opportunities owing to the location of a proposed Park & Ride station adjacent to the A90/Ellon bus Park & Ride, which would increase strategic travel choice for a wider catchment than the other options. The demand forecasts suggest that the scheme could remove between 700 and 1000 car journeys within the study corridor north of Aberdeen on an average weekday by 2036.

However, in terms of implementability, while proposals would likely receive high levels of public support, given the major infrastructure costs associated with each of the options, there are significant question marks over the affordability of the schemes. Economic appraisal suggests that overall costs would outweigh the benefits for each of the options, with operating subsidies required from the opening year for all options and subsidy levels ranging between £1.7m and £4.2m (2017 prices) by 2031.

Specifically, results from the demand and revenue forecasting exercise suggest that the new rail service could attract between 450,000 and 700,000 annual journeys by 2036, with the estimated rail revenue ranging between £2m to £3m (2017 prices) per annum. These estimates are towards the lower end of the original higher level forecasts estimated as part of the initial STAG1 study. Option 3 would provide the greater benefit in terms of demand and revenue results, due to the better access provision to the rail network from locations located north of Ellon (with Ellon Park & Ride station) and the half-hourly service provision running between Ellon and Aberdeen, instead of the hourly service considered for Option 1.

However, translating the demand and revenue forecasting results into the economic appraisal suggests that in BCR terms, each of the options would deliver “poor value for money” under all options, with BCRs ranging between 0.2 and 0.3. In economic appraisal terms, Option 2 would deliver the strongest BCR at 0.28:1. This suggests that the benefits would have to increase significantly, or the costs reduce significantly, in order to achieve a breakeven overall economic case for the scheme. The sensitivity testing that has been undertaken suggests that there is the potential for the BCR to improve through, for example, a combination of different growth forecasts and assumptions around car parking costs in Aberdeen. It is also worth considering that new evidence related to the opening of new rail lines in Scotland may generate fresh evidence to use in developing this scheme. However, it remains doubtful whether these would be enough to achieve a breakeven overall economic case for the scheme.

It is worth noting, however, that in a scenario whereby the rail infrastructure is assumed to already exist (i.e. no capital costs attributed to the scheme) then a positive BCR (i.e. a value greater than 1.0) would be achievable. This indicates that the *operation* of the service might be expected to generate a positive economic business case – which would assist in justifying the additional financial franchise subsidy likely to be required.

Finally, the results from the benchmarking exercise suggest that there are rail schemes across Scotland where the actual outturn rail demand was significantly higher than the initial estimations used in the appraisal processes. However, examination of the forecast patronage for the Ellon rail service options against comparable local stations, such as Inverurie and Stonehaven, and against the levels of demand now being experienced on the Borders Line suggest that the demand forecasts for Ellon benchmark reasonably well. On that basis, it would be difficult to conclude that the significant additional demand that would be required to generate a positive economic business case would be achievable for this rail scheme. There are precedents for delivering rail schemes in Scotland that have indicated poor value for money, which serves to demonstrate that decisions to invest in rail schemes can and do take into account a much wider set of considerations.