

# EXECUTIVE SUMMARY



## ***Introduction***

- 1.1** AirTrack is a major rail initiative designed to provide improved access to Heathrow from the south, with new direct links to the airport from South London and important centres such as Guildford, Woking and Reading.
- 1.2** Current levels of traffic congestion for much of the day on the M25, M4, M3 and other major routes to Heathrow create significant journey times to the airport for air passengers, visitors and workers, with the unreliability of journeys representing a particular problem, especially for air passengers wanting to catch their flights. Other potential public transport services, e.g. improved coach services, would experience the same congestion as other road traffic.
- 1.3** A rail-based approach is therefore the only long term solution to the access problem to Heathrow from the south and west, where the volume of demand is set to increase still further following the completion of Terminal 5 and with the potential for even greater growth following the recent Airports White Paper. The success of Heathrow Express has demonstrated that, even with a sizeable fare premium, a dedicated rail service is able to make a significant impact on the mode share for journeys to the airport.
- 1.4** Various proposals for improving rail access to Heathrow from the south and southwest have been studied since the early 1990s. The current work has reviewed these proposals and has determined what is considered to be the most viable scheme. The definition of AirTrack reflects a balance between providing a number of key destinations with a direct link to Heathrow and serving a large number of stations resulting in a much longer journey time. The version of AirTrack that has emerged probably represents the most effective way of providing a direct rail link to the widest catchment area for the expected capital outlay.
- 1.5** The Outline Business Case was submitted to the Strategic Rail Authority in April 2004 by the AirTrack Forum, a group of local authorities and private organisations keen to promote the scheme as a means of enhancing access to Heathrow. The Outline Business Case was prepared in accordance with the SRA's recent Appraisal Criteria. The purpose of this report is to summarise the principal conclusions of the Outline Business Case.

## ***Principal Objectives***

2.1 AirTrack has been developed to satisfy a number of key objectives:

- to meet national, regional and sub-regional policy objectives by improving public transport links to international airports and to support longer term objectives by providing infrastructure that can help facilitate orbital rail services in the Thames Valley and west of London areas;
- to make better use of rail network capacity, by improved integration with other services at key interchange hubs to enable a wide coverage of connections to Heathrow and other important destinations;
- to provide relief to the already congested local and regional road networks and therefore help to improve environmental conditions;
- to contribute significantly to the sustainable growth of the South East economy and, as a corollary, the national economy;
- to increase public transport's share of surface access journeys for all passengers to Heathrow (air passengers, visitors and staff) and hence contribute to BAA's target of 40% public transport mode share by 2007 and 50% in the longer term;
- to provide access to the developing regional transport hub at Heathrow and enable a large number of non-airport related journeys to be undertaken on public transport, and
- to introduce a network of new services that is sustainable.

## The AirTrack Proposal

### The AirTrack Services

3.1 AirTrack would comprise three sets of services operating to Terminal Five at Heathrow Airport from:

- London Waterloo, with stops at Clapham Junction, Richmond, Twickenham, Feltham and Staines;
- Guildford with stops at Woking, Chertsey and Staines; and
- Reading with stops at Wokingham, Bracknell and Staines.

### The AirTrack Network of Services



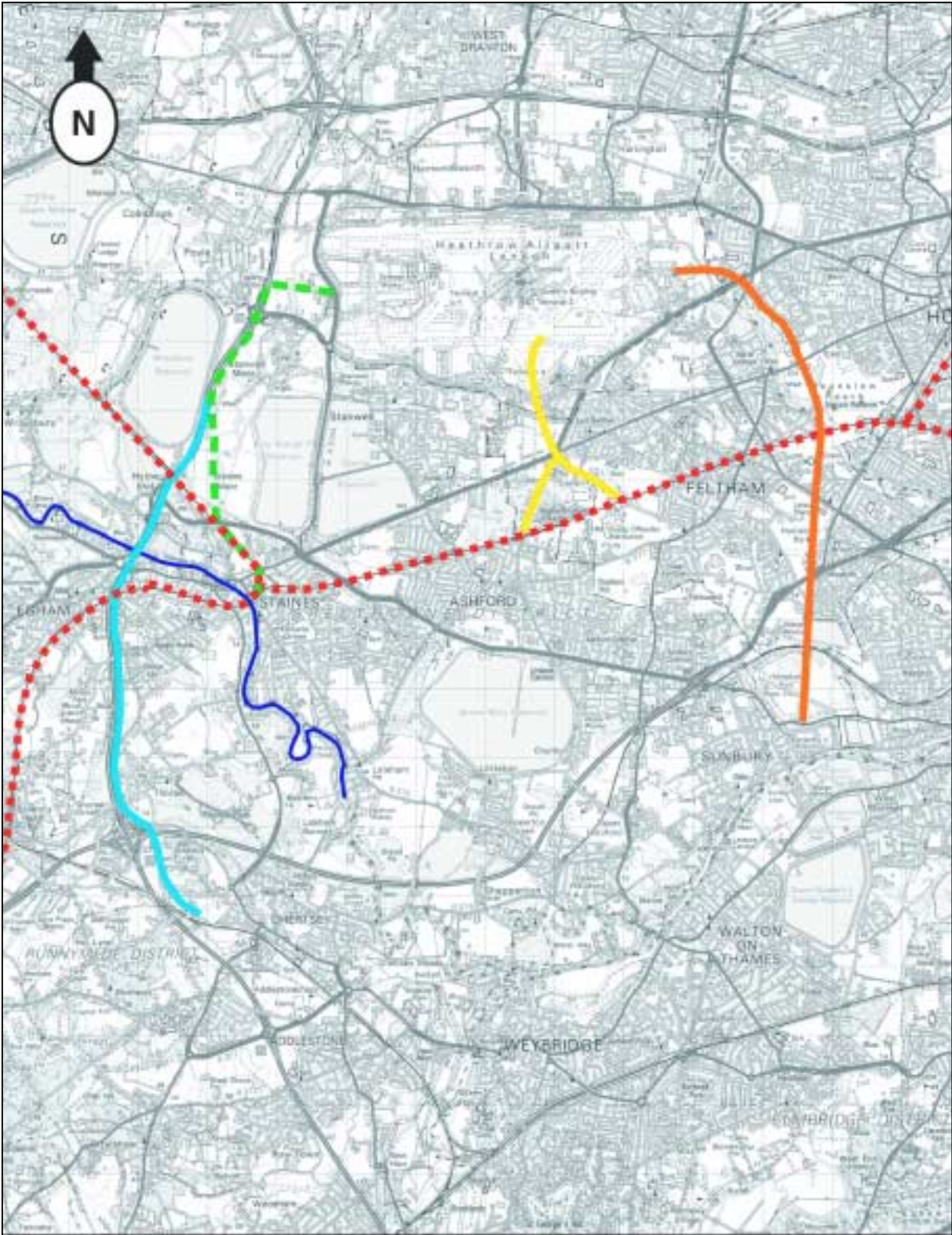
3.2 Alternative stopping patterns have been examined but it is felt that this set of services represents the preferred balance between maximum coverage and minimum journey times; the inclusion of additional stops at Ascot and Egham may be appropriate at later stages in the project development. The AirTrack services would have the following main characteristics:

- the three services (from Terminal Five to London Waterloo, Reading and Guildford) would each operate on a 30 minute headway service throughout the week;
- weekday operating hours broadly between 0500 and 2400;
- at this stage, it has been assumed that the service would be operated using trains comprising eight cars each with a seating capacity of 50, although initially it would be possible to use four-car trains for the Reading and Guildford lines;
- rolling stock appropriate to operate within the underground sections to/from Terminal 5;
- for comparison purposes, a premium of £2 for journeys starting or ending at Terminal Five has been adopted; and

- running times from Heathrow to Waterloo and Guildford of 33 minutes and to Reading of 38 minutes.

### **New Infrastructure Elements**

- 3.3** For the most part, AirTrack would operate on the current rail network, using existing tracks, stations and other infrastructure in the area. However, AirTrack contains four main elements of new infrastructure.
- 3.4** The Staines Chord providing a direct link between the two existing lines (to Windsor and Virginia Water) in Staines town centre. The new double track chord line enables trains to run from the Airport directly through to Reading and Guildford via Virginia Water. An alternative approach, involving the reversing of Reading and Guildford trains at Staines station, would avoid the need to construct the chord but would significantly increase passenger journey times and would create severe operating problems.
- 3.5** A new station at Staines High Street on the Staines to Windsor line. Close to the Iron Bridge, the proposed station would provide much improved access to Staines town centre, adjacent to the recently developed High Street and Two Rivers area.
- 3.6** New alignment across Staines Moor and Stanwell Moor linking the Windsor Line with Heathrow Airport Terminal Five. The new alignment diverges from the existing Windsor line about 1 km north-west of Staines High Street station and then turns north towards the M25, following the alignment of a former railway embankment. It then runs alongside the Wraysbury River and M25, passing under the A3113 Airport Way adjacent to M25 Junction 14. The double tracks then curve round to the east to reach Terminal Five station in tunnel. An alternative route, running parallel to the M25 from Heathrow south to Egham, was also considered but was rejected due to a combination of increased construction costs and lower demand.
- 3.7** New station facilities at Terminal Five. The new station box at Terminal Five has been designed to accommodate four platforms. Initially, the Heathrow Express trains from Paddington will use the two northern platforms (3 and 4). BAA is constructing the enlarged station and has safeguarded the route out of the airport to the west. The AirTrack project will include the fit-out of the passenger and rail facilities so that platforms 1 and 2 can be accessed from Staines.
- 3.8** In the design of the infrastructure and facilities, AirTrack will adopt current techniques and practices. This represents the current views about AirTrack. Further work will be needed to progress the scheme through to implementation. In such work, it is likely that details of the specification will change as the scheme evolves. This may be due to a number of factors; for example as a result of issues highlighted in the detailed design; changes to the current rail operations in the area; comments from stakeholders involved in the further development (e.g. Network Rail, SRA, BAA, train operating companies, the local planning authority, Spelthorne Borough Council, etc); or from the Transport and Works Act process. As the scheme is refined, it will be important to maintain an understanding of how the changes impact on the overall assessment of the scheme.



**Key**

- M25 Route
- - - Airtrack Route
- . . . Existing Railway Route
- SWELTRAC Route
- River Thames
- HASQUAD 'Eastern' Route

**ATKINS**  
 WS Atkins Consultants Ltd  
 Registered Office: Parkway Drive, Feltham Road, Feltham, Surrey TW18 9BB  
 Project: **THE AIRTRACK CORRIDOR**

Drawing Title: **RAIL LINKS TO HEATHROW**

Scale: NTS	Drawn: DT	Date: October 2003
Drawing No: 5021818/003	FIGURE 3.2	

## **Rail Operations**

- 3.9** It is proposed that AirTrack would operate in addition to the existing services and not as a replacement for the current suburban services. In this way, it would avoid the potential disbenefits of a reduction in service for passengers affected adversely when AirTrack replaces a stopping service. The Winter 2003/04 timetable has included a reduction (to 2 tph) in the off-peak level of service on the Waterloo – Reading line, with the objective of contributing to an overall improvement in reliability across the network.
- 3.10** In developing the AirTrack scheme, we have assumed that, by the time that AirTrack begins operations in 2011, efficiency and reliability gains would have been achieved across the southern suburban rail network such that the former paths could be reinstated in some form. Furthermore, our initial analysis shows that up to three additional AirTrack services per hour could be timetabled in the peaks, with some re-timing of other services. Indeed, in two out of the three peak hours, four AirTrack services could just be accommodated if the timetable was recast slightly. Hence, it should be feasible to accommodate 2 tph on the approaches to Waterloo.
- 3.11** The increased level of service created by AirTrack, particularly during the peak period, will increase the demand for terminal space at Waterloo. At this stage, following an initial review, we have assumed that additional platform capacity could become available at Waterloo perhaps in association with the recasting of other services.

## **Capital and Operating Costs**

### Capital Cost Estimates

- 4.1** The pre-feasibility estimate of the construction capital costs for the proposed infrastructure works from Staines to Heathrow Terminal 5 are summarised below. In line with recent guidance in HM Treasury Green Book, an optimism bias of 66% has applied to all capital costs.
- 4.2** Construction is projected to take place between 2008 and 2011, with AirTrack opening in late 2011.

### **AirTrack Capital Costs**

Scheme	Estimate Total £ million
Implementation Construction Costs including:	19.20
• System wide services (signalling, electrification, E&M & telecoms.)	15.00
• Permanent Way	21.30
• Civils (general, viaduct & landscaping etc.)	106.50
• Terminal 5 (station, tunnelling, etc)	4.40
• Stations, platforms & minor buildings	38.90
• Main Contractor's Preliminaries	205.30
Implementation On-Costs including: Project Management (including Network Rail costs), Design Fees, Land Purchase Costs, and Possession Costs.	50.50
Optimism Bias (66%)	168.80
<b>Total Cost of Implementation</b>	<b>424.60</b>
<i>Exclusions: Escalation, VAT, TOC Compensation, Funding Costs, TWA/Planning Costs, Third Party Costs, Track Access and Operating Costs, Capital Allowances.</i>	

### **Operating Cost Estimates**

- 4.3** The estimated annual operating costs, in 2003 prices, for AirTrack are summarised below. These are based on an assumed daily operation between 0500 and 2400 for 365 days per annum in line with the current Heathrow Express operations.
- 4.4** With the operation of two tph on each route, from Heathrow to Waterloo, Reading and Guildford, based on the proposed running times, each of the three AirTrack services will require three trains. Assuming that AirTrack would be part of an existing franchise, a single spare train would be required, giving a total of ten trains to operate the service. At the present time, it is expected that the service would be operated by DC voltage Desiro units modified for operation in tunnels approaching Terminal Five to satisfy current fire safety regulations.
- 4.5** There will be a requirement for 24 drivers to operate each route.
- 4.6** The derivation of track access charges for AirTrack is complicated by its

operation on a mixture of an existing, well-used, section of the network, on a completely new track/station constructed for the scheme and on new infrastructure outside the ownership of Network Rail (within Terminal Five). Information of access charges has been sought from Network Rail and, until the results of its assessment are received, interim figures based on the Rail Regulator's 2003 review have been applied.

- 4.7** The traction energy costs are based on journey distances 37, 45 and 34 kms for the Waterloo, Reading and Guildford routes, respectively and a cost of DC power for a Desiro class of EMU. Annual light maintenance and cleaning costs have been included. Taking into account that the introduction of AirTrack would increase the train movements monitored by signallers, additional signalling resources have been included within the systems operations costs.
- 4.8** In accordance with the recent guidance in the Treasury Green Book, an allowance for optimism bias varying between 20% and 40% has been applied to the elements of operating costs.

**AirTrack Annual Operating Costs** (*£ million per annum, 2003 prices*)

Area of Expenditure	Cost
Drivers and Conductors	£6.67
Track Access Charges	£2.17
Train Leasing Costs	£7.66
Traction Energy	£3.41
Train Maintenance	£5.03
System Operations	£0.21
<b>TOTAL per annum</b>	<b>£25.15</b>

## ***Demand and Revenue Forecasts***

- 5.1** Demand forecasts for AirTrack were derived using a multi-modal model developed in 2002 by Atkins for the Thames Valley Multi-Modal Study (TVMMS), with enhancements to improve its functionality with respect to access to Heathrow. Future demand at Heathrow was obtained from SERAS with assumptions of 78 mppa in 2015 rising to 89 mppa by 2030 and then maintaining that level.
- 5.2** The table below gives total AirTrack boardings for the Central Case for the morning peak period (0700-1000) on an average weekday in 2011. The table highlights the level of non-Heathrow traffic that would use the service and, hence, how AirTrack would contribute to a reduction in crowding on parallel services.

**AirTrack Total Boardings (2011 am peak period)**

<b>Route</b>	<b>Total AirTrack Boardings</b>	<b>Trips to/from Heathrow</b>
Heathrow - Waterloo	3420	670
Waterloo - Heathrow	1590	780
Heathrow - Guildford	1940	820
Guildford - Heathrow	3320	1200
Heathrow - Reading	1950	830
Reading - Heathrow	2240	1300
<b>Total Boardings</b>	<b>14460</b>	<b>5610</b>

- 5.3** On this basis, there would be over 5500 passengers using AirTrack to travel to or from Heathrow in the three-hour morning peak period, equivalent to an average of about 180 per train travelling towards Heathrow and 125 per train leaving Heathrow. The Heathrow trips account for over a third of the total AirTrack boardings, with the services also being used for commuting trips, particularly on the service into Waterloo and between Guildford and Woking.
- 5.4** On the approaches to London, some commuters switch to the AirTrack Heathrow - Waterloo service from overcrowded suburban services, joining the route at Staines and other intermediate points. This has an impact of the level of crowding on the AirTrack service itself.
- 5.5** The passenger and revenue forecasts assume a build-up of demand to/from Heathrow, with 50% of the projected levels in Year 1 of operation, 75% in Year 2 and 100% thereafter. For the other sections of the route, the passenger levels would be linked to demand on existing services and hence 100% of the projected level is assumed from Year 1. On this basis, the net revenue for the scheme (after allowing for the abstraction of

revenue from other rail services) rises from £20.8 million in Year 1, to £25.0 in Year 2, £28.6 million in Year 3 and reaching £42.0 million in Year 30. These revenue figures compare with equivalent operating costs of £25.2 million.

**5.6** This analysis of the demand implications of AirTrack also serves to highlight the sources of the principal benefits from the scheme; benefits experienced by future public transport passengers due to the faster direct services to Heathrow and the relief provided by AirTrack to passengers currently travelling in crowded conditions. The full appraisal of the AirTrack scheme, including these and other benefits, is summarised in the Appraisal Summary Table. In preparing the environmental component of the AST, particular attention has been paid to the contents of the Planning Brief prepared by Spelthorne Borough Council.

## **Outline Business Case**

- 6.1** An Outline Business Case (OBC) for AirTrack has been prepared for submission to the Strategic Rail Authority (SRA) on behalf of the AirTrack Forum. It demonstrates that AirTrack performs strongly within each of the criteria used by the SRA to assess schemes.

### **Affordability**

- 6.2** The AirTrack financial performance is extremely strong, with the possibility that no revenue support will be required from the SRA. Although, at this stage in the project's development, it is difficult to present firm conclusions about contributions from the private sector and other public sector bodies, a number of interesting potential sources of funding are available.

### **Value for Money**

- 6.3** AirTrack presents a strong overall economic case, with significant benefits for both users and non-users accruing from the scheme, in that the appraisal highlights healthy performance in terms of the main measures – a Benefit Cost Ratio of 2.7 and a Net Present Value to SRA funding ratio of 5.3.

### **Delivery**

- 6.4** AirTrack has been developed by the AirTrack Forum, a group of local authorities and private organisations keen to promote the scheme as a means of enhancing access to Heathrow. The Forum has stimulated discussion and support for the scheme from a wide range of interested organisations, including the key stakeholders. Involvement with the stakeholders will be maintained as the scheme is developed further. AirTrack uses existing railway technology, well proven construction techniques and, because of its relatively self-contained scope, should have little operational impact on the national rail network during construction. These factors help to give confidence that AirTrack can be implemented in a predictable and economical way.

### **Value Added**

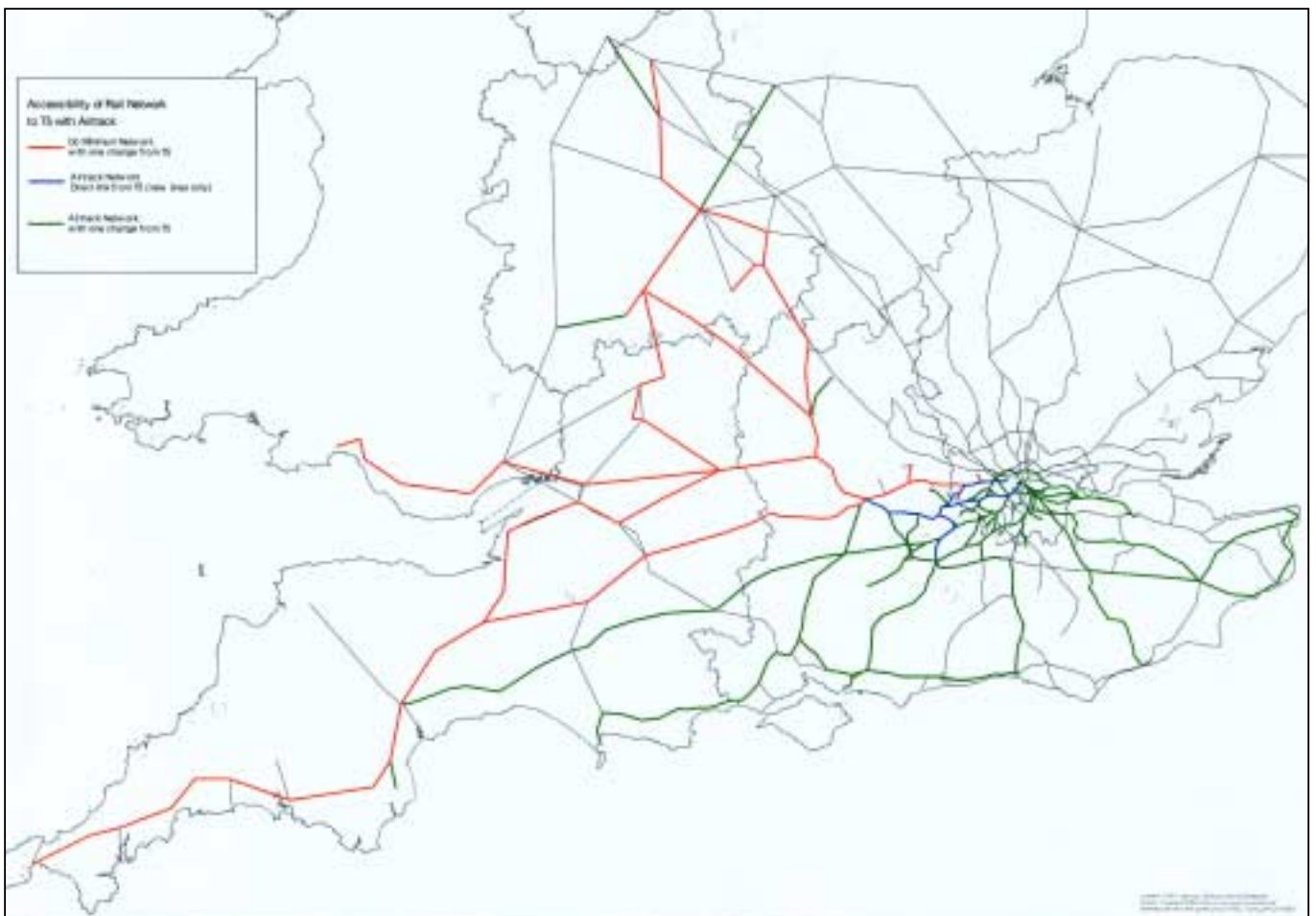
- 6.5** The introduction of AirTrack would represent a significant enhancement to rail services in the region and hence it is vital for the SRA to play a major role in its development and to contribute its particular expertise and resources to the project.
- 6.6** The preparation of the OBC has highlighted that the introduction of AirTrack would produce a number of significant economic advantages for businesses and passengers as well as considerable improvements for transport in the area.
- 6.7** AirTrack would attract over 15 million passengers per annum, with about one-third travelling to, or from, Heathrow and the remainder visiting destinations within the region.
- 6.8** The current orbital public transport system in the area is ineffective and, by substantially improving it, AirTrack would encourage people to switch from using their car on the heavily congested roads in the area, reducing the number of cars on the roads during each 3-hour morning peak period by 5000.

**6.9** AirTrack significantly enhances the accessibility to Heathrow, with an extensive area of southern England lying within one rail interchange from the airport, ranging from Dover to Exeter and extending through the cross-county network to the Midlands and North – this is highlighted by the figure.

**6.10** AirTrack could be in operation within 10 years – it will require comparatively straightforward infrastructure, using upgraded existing track and rail facilities for much of its length and necessitating only short sections of new railway route.

**6.11** The AirTrack Central Case which forms the basis for the OBC is estimated to produce a present value operating surplus of around £110 million over the 30 year appraisal period.

**Accessibility of Rail Network to Terminal Five with AirTrack (one interchange)**



**Economic Appraisal**

**6.12** The appraisal work undertaken so far indicates that the scheme generates good benefits, with a healthy Benefit Cost Ratio of 2.7. The revenue generated by AirTrack is predicted to exceed operating costs, such that the SRA indicator of Net Present Value in relation to SRA funding (NPV/K) is 5.3. In many areas of the appraisal, a cautious or conservative approach has been adopted, resulting in the overall performance of the scheme being robust.

- 6.13** A range of sensitivity tests were undertaken to demonstrate the robustness of the AirTrack scheme including changes to the stopping pattern, removal of the premium fare, and the introduction of AirTrack as a replacement of existing services rather than a completely new service. In addition, the tests have explored how improvements to the operating environment would favour AirTrack, e.g. through the introduction of area-wide congestion charging, a cross linking with HEx or the operation of the Waterloo line at the higher frequency of 4 tph. These tests help to provide confidence in the performance of the AirTrack appraisal.
- 6.14** The scheme will not only benefit Heathrow users and workers, and those travelling on the road network, but will also have an impact on businesses in the region by acting as a catalyst for enhancements across the area, either from stimulating new developments or reducing problems such as labour immobility and shortages. The travel benefits would also be enjoyed by travellers outside the Heathrow area, by enhancing the capacity on the suburban rail network (particularly on the approaches to London Waterloo) and the scheme would provide crowding relief for existing passengers.

## ***Funding the Scheme***

- 7.1** A number of alternative approaches for procuring the scheme have been examined, including the construction and operation of the infrastructure, the rolling stock and the services (which could be procured either as discreet elements or as a package of two, or even all three), and the potential sources of funding available. It has not been possible to be specific about which procurement route would be most suitable for AirTrack, as the project is still at an early stage, but we were able to conclude which seemed the most suitable structure and the most likely investors.
- 7.2** We concluded that the provision of services and procurement of rolling stock is likely to be through the existing, mature TOC and ROSCO frameworks. Using the incumbent TOC as service provider and lessee of rolling stock would minimise inefficiency and avoid introducing another structure into an already complex rail market. The introduction of AirTrack services could be bid as an option at franchise renewal or negotiated as a variation to the franchise.
- 7.3** It is unlikely that significant public sector grant funding for capital works (including Network Rail funding) would be available for AirTrack, due to affordability constraints and the desire to transfer risk to the private sector. Third party contributions may be available for both design and operating phases, either from BAA (as principal private sector beneficiary) or from hypothecation of taxes or congestion charges. There is also the potential for some Section 106 contributions, although these may be modest in volume. The amounts available, if at all, would depend on further development of the business case.
- 7.4** The most likely procurement route for the capital works would seem to be a Special Purpose Vehicle, which is likely to be Design Build Finance Transfer (DBFT) or Design Build Finance Manage (DBFM). Both would leverage private skills and finance. DBFT would maintain the integrity of the rail network but may not achieve as much risk transfer. Making DBFM work would require solving the safety concern over Network Rail not controlling maintenance. Other procurement routes such as BAA development should not be ruled out. Developing the optimum procurement structure will require significant financial and commercial issues to be resolved, including defining the contractual commitments, minimising the interfaces and optimising the risks that are transferred.

## ***The Next Steps***

- 8.1** As highlighted above, the OBC demonstrates AirTrack to be a realistic and financially viable business proposition which brings a wide range of benefits to both its users and the wider community. With the support of the SRA, additional work is necessary to develop the scheme further, including the detailed design of the infrastructure components, a review of the operational issues, a consideration of the full environmental impacts, consultation with stakeholders and other organisations, and the exploration of the financing options. This additional work will contribute to the preparation of the Transport and Works Act submission and subsequent inquiry.
- 8.2** When the necessary development tasks have been completed, it is estimated that construction could occur between 2008 and 2011, with operation of the first AirTrack services to Heathrow at the end of 2011.

**Appraisal Summary Table for Central Case**

Problems: Weak public transport access to Heathrow from south and west			
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE
Environment	Noise	In general, with rail services already operating along route, no noticeable change in noise. Some reduction in road traffic noise through diversion from car but levels likely to be imperceptible. In Staines town centre, negligible change against existing background noise from aircraft and road traffic. Some localised increase in noise at proposed Staines High Street station – mitigation measures required to minimise impact. Across southern part of Staines Moor, some increase in noise where scheme runs on embankment and mitigation measures/screening required. Over northern Staines Moor/ Stanwell Moor, line is adjacent to M25 and hence no perceptible change.	Less than 0.5% of the length of the modelled roads would experience roadside noise level changes of 1dB (A) or more.
	Local Air Quality	No local emissions from scheme – additional emissions confined to source of electricity generation. Reductions in road traffic levels through modal shift will create negligible, although positive, benefits spread over wide area. AQMA has been declared for whole of Spelthorne borough and proposals are unlikely to affect the designation.	In the first year of operation: PM10 - 1.6 tonnes pa (-0.2%) NOx - 33 tonnes pa (0.2%)
	Greenhouse Gases	Some additional CO2 emissions through electricity generation balanced by reduced emissions from fewer car journeys.	In the first year of operation: CO2- 18620 tonnes pa (-0.3%)
	Landscape	Along new sections across Staines Moor, will be necessary to introduce mitigation measures with new planting to minimise impact of scheme on landscape, and will be particularly important to replant along current embankment to maintain existing screening effect. Along northern section of Staines Moor and Stanwell Moor, open nature will require additional of Staines Moor and Stanwell Moor, and M25 and hence improve existing landscape.	Not applicable
	Townscape	For majority of route there will be no impact on townscape. In Staines town centre, use of viaduct rather than embankment for Staines chord will reduce visual impact by creating more open appearance. Mature planting necessary to minimise impact of the chord. In construction of Staines High Street station, will be minor adverse visual impact for local residents and high quality architectural design necessary to minimise visual impact, enhance streetscape and integrate it into town centre.	Not applicable
	Heritage of Historic Resources	No listed buildings across corridor will be affected. In Staines town centre, the chord and station lie in area with high archaeological potential although no specific known sites are affected. Staines Moor includes Neolithic site which will require more detailed examination. Other areas of Staines and Stanwell Moor have already been disturbed by M25 construction and extensive mineral extraction.	Not applicable
	Biodiversity	Construction of route will have a negative impact on biodiversity caused by loss and segregation of habitats and disturbance to wildlife during construction and operation. Within Staines town centre, the impact on biodiversity is small. Across Staines Moor, the scheme could have a serious adverse impact on biodiversity caused by its impact on internationally and nationally designated sites. Hence, particular attention will need to be paid to the design of the scheme in this area and the identification of mitigation measures.	Not applicable
	Water Environment	Construction of the scheme across the Staines Moor flood plain is unfavourable although it may offer opportunities for the physical enhancement of the water environment. Particular attention needs to be paid to an old land fill site to avoid release of polluting substances into water courses. Will be a need to relocate the channel of the Wraysbury River in the vicinity of the M25. The overall reduction in traffic will benefit water quality to some extent by reducing runoff.	Not applicable
	Physical Fitness	The scheme has a negligible impact.	Not applicable
	Journey Ambience	Through its route across Staines Moor, the scheme will improve the overall journey ambience, especially for existing car drivers who switch to public transport and the net impact is expected to be beneficial.	Not applicable

## Appraisal Summary Table for Central Case (cont'd)

Problems: Weak public transport access to Heathrow from south and west			
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE
Safety	Accidents	The scheme results in an improvement in road safety, through the diversion of existing car traffic to public transport. Small increase in rail accidents through extension of rail network.	Net impact of annual reduction in casualties of 49 with value of £48 million over 30 years (discounted)
	Security	Design of scheme will pay particular attention to safety issues and will comply with requirements of Secure Station Award Scheme.	Not applicable
Economy	Economic Efficiency	The scheme provides a substantial return on the investment in 30 year appraisal from assumed opening in 2011. It produces significant benefits in the form of travel time savings to rail passengers and for road traffic remaining on the highway network. For current rail passengers, there are also significant benefits from relief of crowding, particularly on approaches to London. Calculation of revenue makes allowance for abstraction of passengers and revenue from other train operating companies. Additional revenue exceeds increased operating costs.	PV Capital Costs = £344 million PV Operating Costs = £356 million PV TOC Profit = £25 million PV Revenue (net) = £492 million PV Unpriced Benefits = £1453 million NPV = £1220 million Benefit Cost Ratio = 2.7 NPV/K = 5.3
	Reliability	Significant improvement in journey time reliability for existing car drivers who switch to rail. Negligible impact on remaining car drivers.	Not applicable
	Wider Impacts	Benefits to sustainable development of the local economy through significantly improved access to Heathrow, and wider range of options for journey to work, education and social activities, through rail enhancements.	Not applicable
Accessibility	Access to Transport	Scheme provides a significant increase in the accessibility to Heathrow Airport by public transport. Particularly from south and west of the airport, there are significant reductions in the public transport journey times, bringing large areas (especially parts of Surrey, Hampshire, Berkshire and south west London) within reasonable journey times from Heathrow. Also, there is a large increase in the extent of the rail network with direct access to Heathrow or access with just one interchange, particularly from the South and South West.  Within Staines, new station at Staines High Street provides improved accessibility to employment, retail and leisure facilities in the town centre.	Not applicable
	Access for the Disabled	Design of stations and operation of trains will provide specific benefits to the disabled in accessing Heathrow.	Not applicable
	Severance	Small localised increases in severance through construction of chord in Staines town centre and through new link across Staines Moor, although scheme design will include measures to minimise the impact.	Not applicable
	Option Values	The new station and rail services provide another transport option for residents within the catchment areas of the scheme.	Not applicable
Integration	Interchange	The scheme will improve interchange between modes. The scheme is designed to link with key interchange hubs across the rail network, including Heathrow, Woking, Guildford, Reading, Richmond, Clapham and London Waterloo, with local, regional and national connections through these points.	Not applicable
	Land Use policy	The scheme is consistent with land-use policies of the local authorities within the catchment area.	
	Other Policies	The scheme is consistent with regional and national policies with the aim of improving general public transport links and usage and increasing the public transport links to Heathrow Airport in particular.	Not applicable