National Audit Office

The Procurement of the National Roads Telecommunications Services

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL | HC 340 Session 2007-2008 | 4 April 2008

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1 April 2008

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SUMMARY

Background

1 The strategic road network in England consists of 4,800 miles (7,700 km) of trunk roads and motorways. The Highways Agency (the Agency), an executive agency of the Department for Transport, is responsible for the network. In the past, the Agency's focus was on building and maintaining roads rather than managing their operation. In 1998, the Government announced that the role of the Agency was to change to that of a network operator with objectives to reduce traffic congestion through improved traffic monitoring and travel information.

2 The Agency considered that it needed improved motorway telecommunications systems to carry live data about traffic conditions. Most of the Agency's existing systems were the result of nearly 40 years of piecemeal development. Along the motorway network, the telecommunications systems used copper cable to carry voice and data signals, but transmission capacity was limited. By 1998, the Agency had installed fibre optic cable along half of the motorway network, principally to carry CCTV camera images. Parts of the network had been upgraded to digital technology, but most areas used obsolete analogue equipment which was no longer supported by the telecommunications industry. If left unaddressed, the continued use of analogue technology would have left the Agency with insufficient capacity to fulfil its role as a network operator.

3 The Agency decided to upgrade all its telecommunications systems to digital technology. The work would include laying 278 km of high transmission capacity, fibre optic cables to the existing 2,222 km fibre optic cable network **(Figure 1 overleaf)**. After receiving first round bids, the Agency, on affordability grounds, reduced the amount of cable laying to 110 km. Some omitted lengths were not dropped from the project but transferred to a programme of future investment that the Agency can call off from a pre-priced schedule of additional works, when the work is needed and funding is available. By the time of the award of the contract, other lengths had been completed by the Agency **(Figure 2 on page 7)**.

4 In September 2005, the Agency and GeneSYS Telecommunications Ltd, a special purpose company owned by Fluor Corporation and HSBC, signed a 10½-year Public Private Partnership (PPP) contract to upgrade, operate and maintain the telecommunications cables and transmission equipment located alongside the English motorway network. The Agency structured the contract so that:

- Upgrading and operating the telecommunications systems were captured in a PFI type structure. As is common with this type of arrangement, GeneSYS agreed to finance the upgrade works and in return will receive a contractually set, monthly charge of £3.7 million (2004 prices) from the completion of the upgrade through to the end of the contract, provided the services meet the Agency's performance requirements.
- The Agency can order changes to the telecommunications systems (including extensions to the coverage of the fibre optic cabling) from the pre-priced schedule of additional works. Under the related provisions, GeneSYS's prices cover the direct costs of all the work required to implement the ordered changes.

The eventual lifetime cost of the contract therefore depends on the number and value of additional services ordered from GeneSYS. At contract award, the Agency assumed that the 2004 present value of its payments under the contract would be £385 million, the mid-point of a range from £255 million to £515 million (2004 prices), depending on the value of the called-off additional works.

5 From October 2007, following a two-year upgrade of the cable network, roadside devices such as message signs and CCTV cameras may now be linked to traffic control centres through up to date digital telecommunications systems. This project is known as the National Roads Telecommunications Services (the NRTS).

Findings

6 We examined the procurement of the project. Our main findings are as follows.

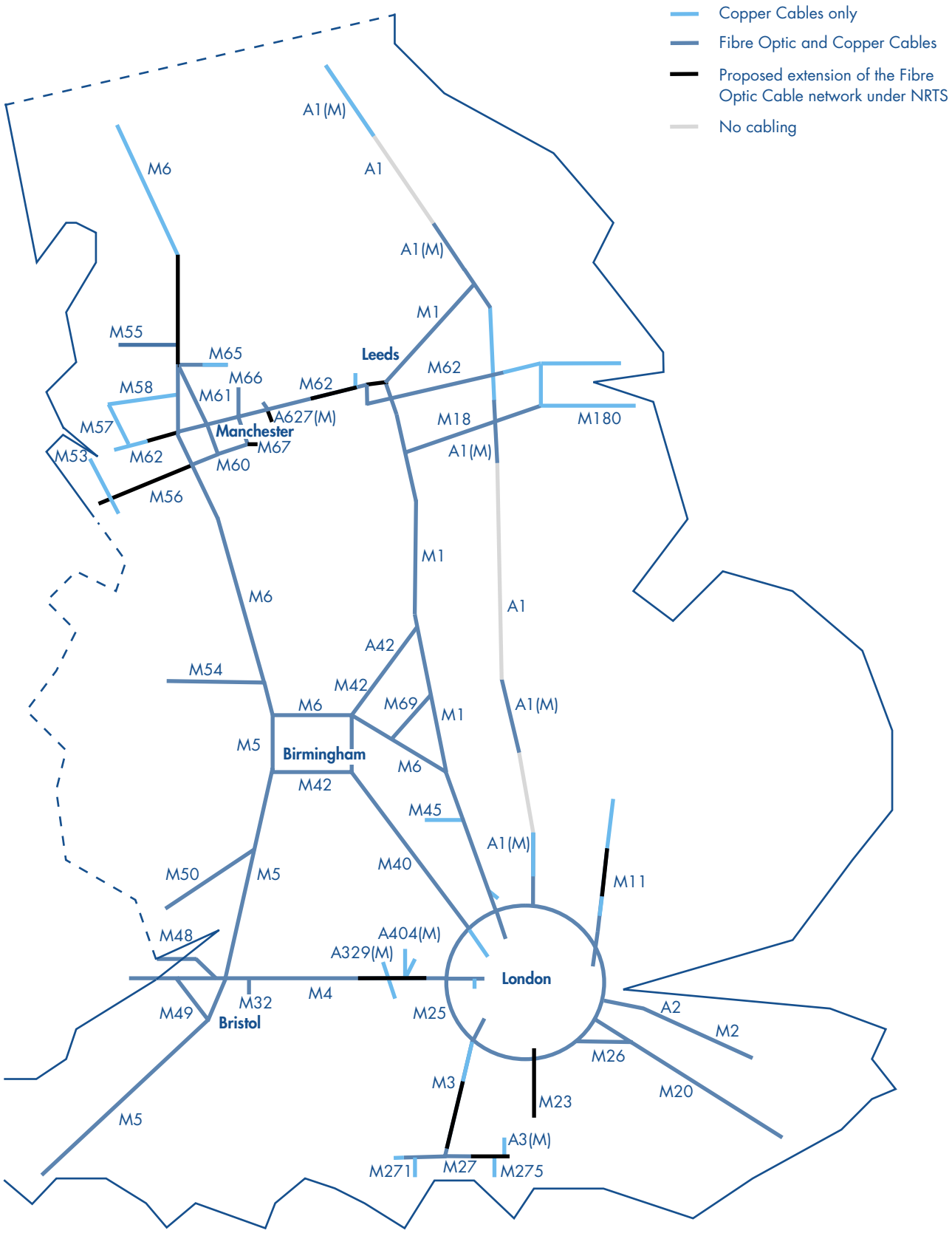
7 The Agency had good value for money grounds for transferring the risks of major cost and time overruns inherent in such a large telecommunications project. The Agency procured the project as a PPP because it transferred risk to a contractor that had borrowed money to upgrade the systems and had something to lose if things went wrong.

8 At the pre-qualification stage, two of the higher scoring potential bidders withdrew from the tendering process. Six potential bidders for the project were identified early on but interest wavered during the extended time taken to produce the bid documents. Concerned that some of the potential bidders might be losing interest, the Agency took the unusual step of issuing a second advertisement. Two of the higher scoring potential bidders did not re-apply. Later on in the tendering period, the competitive field reduced further when two bidders that had responded to the second advertisement dropped out of the running, one because of doubts over the financial viability of a consortium member and the other because of doubts that its proposed technical solution could be developed sufficiently. These withdrawals left two bidders in the competition.

9 Having selected GeneSYS as the preferred bidder, the Agency negotiated the final details of the deal without conceding an increase in price or reallocation of risks. The preferred bidder stage lasted nearly 10 months, which was five months below the average for PFI projects that closed between 2004 and 2006 (Figure 9 in the National Audit Office's report *Improving the PFI tendering process*, HC 149, Session 2006-2007). During this stage, GeneSYS's bid price fell by £2 million, without changes to the allocation of risks. The outcome of these negotiations demonstrates that price rises during the preferred bidder stage of a PPP procurement are not inevitable.

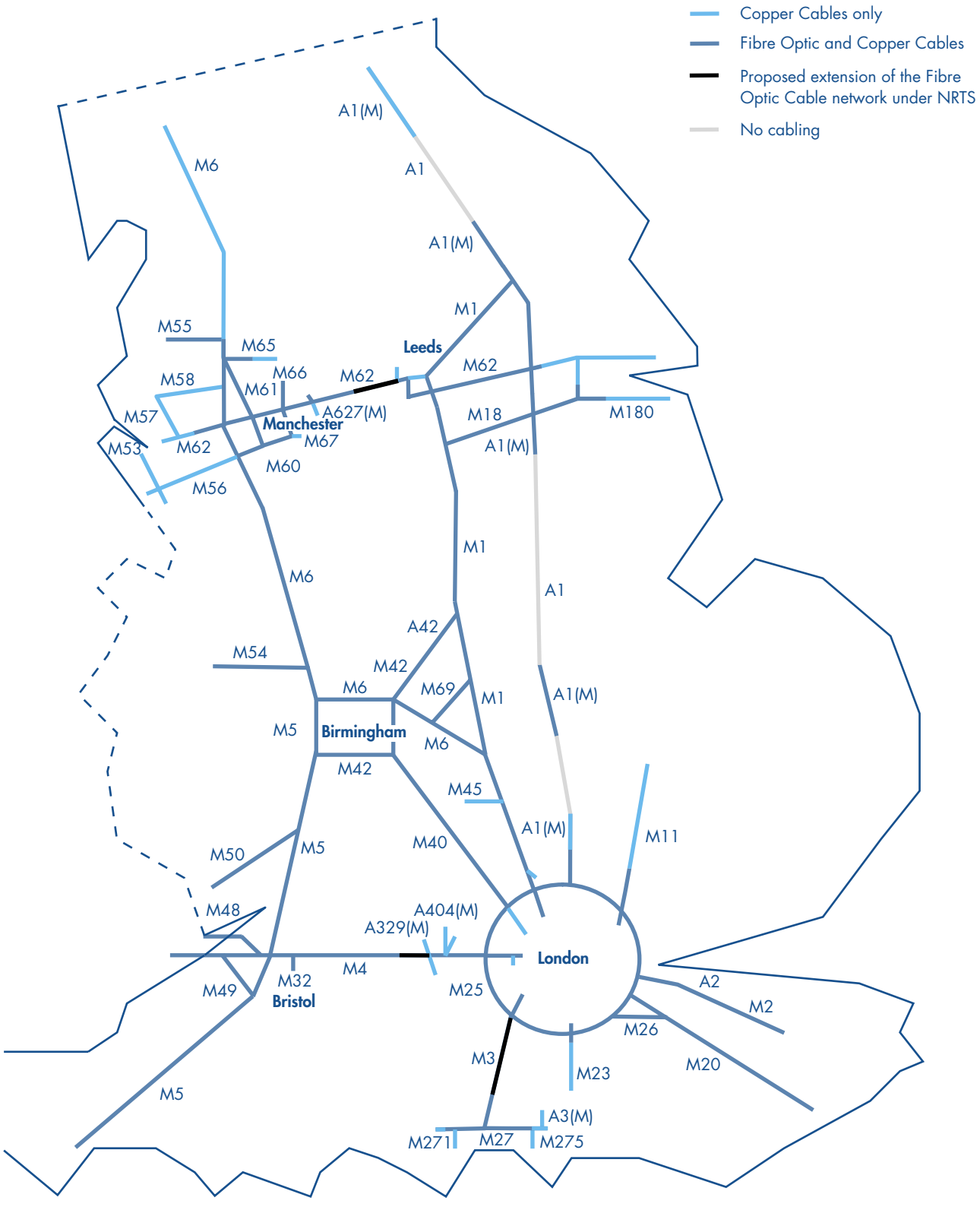
10 The tendering phase lasted more than four years, over two years longer than originally planned and the cost of professional advice at £15.5 million exceeded the Agency's estimates by £10 million. There were a number of external events and major changes in scope that lengthened the timetable. The majority of the lengthening was due to the Agency's requirement for high quality contract documents. As a consequence, the advisers' costs increased. The frequent revisions of the budget for the advisers (Appendix 5) suggest that the Agency struggled to quantify the amount of work needed to complete the procurement.

1 In 2003, the original tender documents included extending the Agency's fibre optic cable network by 278 kilometres



Source: Highways Agency

2 On affordability grounds, the Agency reduced the extension to its fibre optic cable network under the NRTS contract from 278 kilometres to 110 kilometres



Source: Highways Agency

NOTE

1 Between 2003 and the award of the NRTS contract in September 2005, the Agency installed 168 kilometres of fibre optic cable under its then existing contractual arrangements. Some of this work included lengths omitted from the NRTS project under the affordability review, including lengths along the M3, the M4 and the M62.

11 At contract award, the Agency's estimate of the present value cost of the Public Sector Comparator (PSC) (£415 million in 2004 prices) was marginally more expensive than the PPP deal (£385 million in 2004 prices). While negotiating the deal, the Agency sought to benchmark the cost of the PPP by estimating, in the PSC, what a conventional procurement might cost. The PSC was designed to produce a single figure comparison for a given quantity of work and included an upward adjustment of £85 million for risks. The purpose of the risk adjustment was to inform the Agency's decision on whether to pursue a PPP deal or a conventional procurement for the complex NRTS requirements. In calculating the risk adjustment for this novel project, and given the inevitable uncertainties, the Agency relied on the experience and judgement of its advisers. In our view, for most PPP contracts involving the construction of fixed assets, it is preferable to provide a range for the costs for the comparator, as opposed to a single point estimate. We would also expect to see allowances for events turning out better than expected.

12 The new services are now up and running and benefits for road users from other Agency projects dependent on the NRTS are beginning to be realised. The upgraded telecommunications systems went live in October 2007. Enhancements to existing means of communicating with road users are beginning to come on stream and new means are planned. It is, however, too early to make a full assessment of operational performance or of the effectiveness of the pre-pricing arrangements for additional works.

Value for Money Conclusion

13 In respect of the value for money of the procurement alone, there are inevitable uncertainties in the estimated costs of a PSC, but the Agency has secured, through competition, a PPP with fixed prices and in-built flexibility for a cost similar to the Agency's financial estimate of a conventional project. During the preferred bidder stage, the Agency did not concede either an increase in price, or reallocation of risks. Unlike conventional procurements, a PPP has the potential value for money advantage of transferring risks to the private sector. Some risks have already materialised and have been borne by GeneSYS, rather than by the taxpayer. The relatively short elapse of time since the new services went operational in October 2007 precluded collection of sufficient material for us to judge the value for money of the operational delivery of the services.

14 The overall value for money of the NRTS project depends on how useful the new telecommunications systems prove to be in relation to the Agency's implementation of other projects now enabled by these new systems.

Recommendations

i Encouraging market interest in a PPP project is crucial to the creation of competitive tension. Some of the Agency's higher scoring, pre-qualified bidders did not respond when the Agency re-advertised the project nearly a year after it had first invited parties to express an interest in bidding. **Delaying going to the market until the scope and structure of a project are clear should result in a more realistic time table.**

ii In putting together the PPP deal, the Agency negotiated a range of contractual terms designed to protect value for money, including the pre-priced schedule of additional works that the Agency can call off as and when required. **Authorities should always consider carefully whether the expected scale of future changes to the services they require make a standard PPP contract suitable. If not, they should consider introducing protections similar to those negotiated by the Agency for the NRTS.**

iii Current Treasury guidance recommends that authorities use a public sector comparator in the early stages of a project to assist in the selection of the best procurement route. Inevitable uncertainties in pricing a comparator project, particularly adjustments for risk, mean that authorities should not rely on a single figure public sector comparator but should consider a range of values. **Public sector comparators should not be used as the sole test of value for money for a particular procurement route. Instead, authorities should conduct wider analyses of the costs and benefits of each available procurement route.**

iv The procurement team's preparations for the preferred bidder negotiations included acquiring extensive knowledge of GeneSYS's financial model and the underlying costs. During the competitive phase of the procurement, the Agency required bidders to submit their financial models and input costs as part of their bids. Later, the Agency incorporated GeneSYS's financial model and the costs into the contract to aid in the evaluation of future changes not covered by the pre-priced schedule of works. **Authorities should follow the Agency's example. They should obtain and analyse their bidders' price build ups, as well as the bidders' financial models, to assess the reasonableness of the tendered prices. Authorities should also ensure that they retain an understanding of the bases of their contractors' prices sufficient to test the value for money of any variations to the services.**

v While authorities will always require high quality professional advice to get good value for money when procuring a PPP deal, it is equally important that costs are monitored carefully. This is particularly important where a project, such as the NRTS, undergoes major changes in scope and structure. **Authorities should produce realistic procurement budgets and timetables, especially for the use of professional advisers and prepare realistic updates for any agreed changes in project scope.**

vi During the procurement, the NRTS project experienced two major changes. The first brought the operation and maintenance of local connections between over 14,000 roadside devices and the national trunk cable network into the scope of the project. The second transferred some upgrades of the network, which were not immediately required, out of the proposed initial works and into the call-off arrangement for pre-priced additional works. While the Agency had justifications for the changes, the case for change may not be so clear in future PPP projects. **When a project is to undergo major changes in scope, Authorities should formally evaluate the impact of the changes on the overall value for money of the project.**

vii The Agency's practice of delegating day-to-day management of projects to advisers meant that we have not been able to access all the information we required from the Agency in a timely manner. Changes in staff within an authority and in advisory firms will occur over time and it would be unacceptable if, in future years, nobody understood the background to the key characteristics of a PPP deal. **Authorities should always have easy access to key documents and maintain, in-house, a good understanding of the contractual and operational issues associated with their projects.**

PART ONE

The project is intended to enable the Agency's role as a road network operator

This part sets out the background to the procurement of the contract for the National Roads Telecommunications Services, which we assess in Parts 2 to 4. Following a change in the Agency's strategic aims, its existing plans to replace ageing telecommunications systems assumed greater importance. Following a review, the Agency opted for a PPP because there were good value for money grounds for transferring the risks of major cost and time overruns inherent in such a large telecommunications project.

1.1 The strategic road network in England comprises some 4,800 miles (7,700 km) of trunk roads and motorways **(Figure 3)** carrying a third of all road traffic, including two thirds of all heavy freight traffic. The Highways Agency (the Agency), an executive agency of the Department for Transport, is responsible for the construction, maintenance, operation and improvement of the network.

The Government wanted the Agency to focus on managing the operation of the strategic road network

1.2 In the past, the Agency's business focus was on building and maintaining roads rather than managing the operation of the network. In 1998, the Government announced that the role of the Agency was to change to that of a network operator with a new strategic aim: "to contribute to sustainable development by maintaining, operating and improving the trunk road network".[1] The Government also announced that it had asked the Agency to develop a new system of regional control centres to improve the reliability of the road network and to tackle the effects of traffic congestion through better traffic monitoring and by providing road users with traffic and travel information.

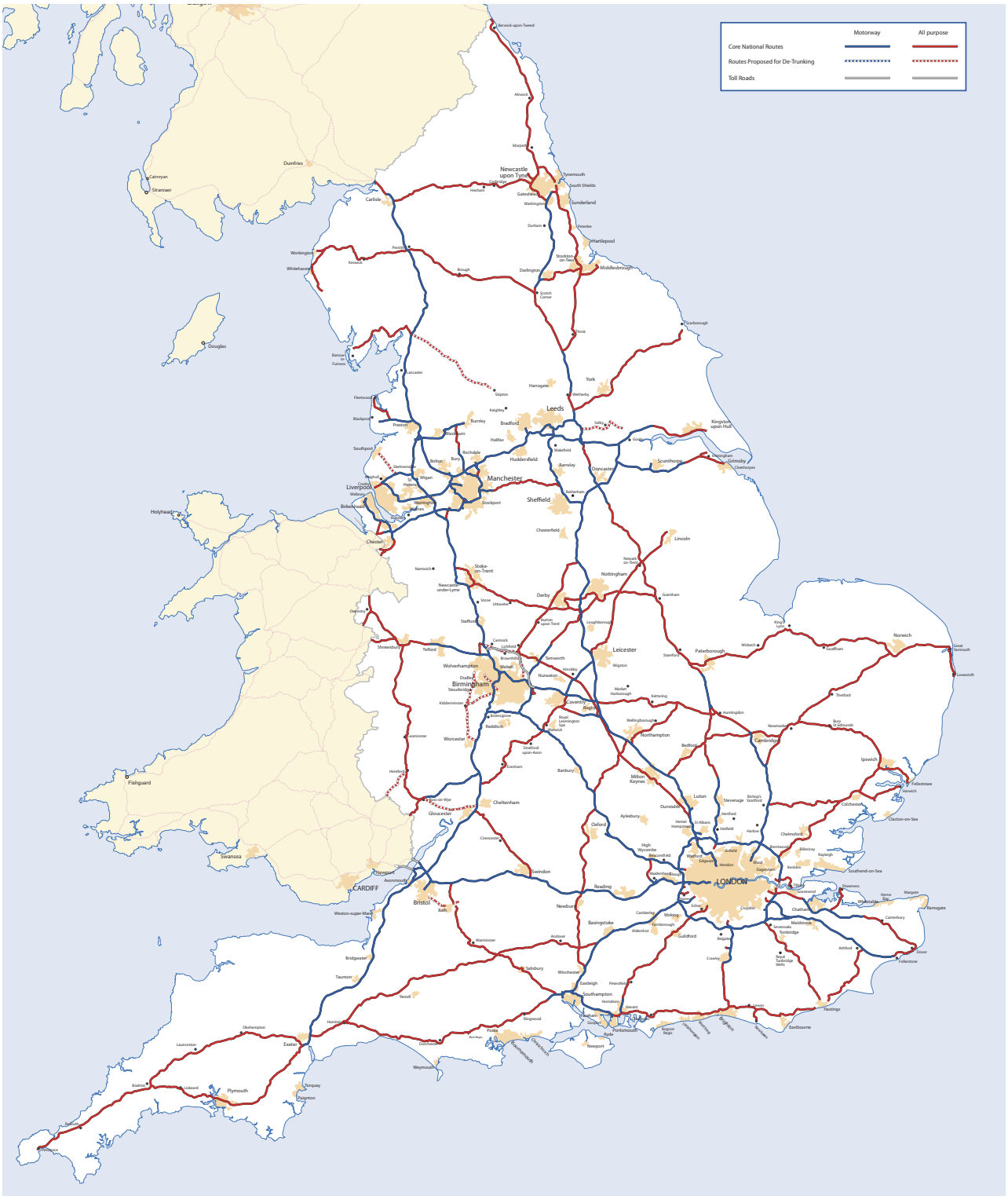
Technology supporting the existing telecommunications systems was nearing the end of its life

1.3 In its new role, the Agency considered that it needed enhanced telecommunications systems to obtain live data about road and traffic conditions and to transmit this information to road users and other parties, such as the police and broadcasters. The Agency also wanted to deploy the next generation of traffic management systems that it had trialled on the section of the M25 between the A3 and the M40.

1.4 Almost all of the Agency's existing telecommunications systems were located alongside motorways **(Figure 4 on page 12)**. These systems were the result of nearly 40 years of piecemeal development in 32 local areas that connected approximately 14,000 roadside devices, such as emergency roadside telephones and closed circuit television cameras, to their local police control offices **(Figure 5 on page 13)**. Nationally, the transmission cabling consisted of a mix of fibre optic and copper cables and transmission equipment was housed in approximately 150 mostly small brick buildings, located every 20 kilometres along the motorway network. Between these transmission stations, cable jointing boxes, at every 500 metres, connected local roadside devices to the trunk telecommunications cables.

1 White Paper, *A New Deal for Transport: Better for Everyone* and the associated Roads Review, *A New Deal for Trunk Roads in England*

3 The Agency's network of motorways and all purpose trunk roads

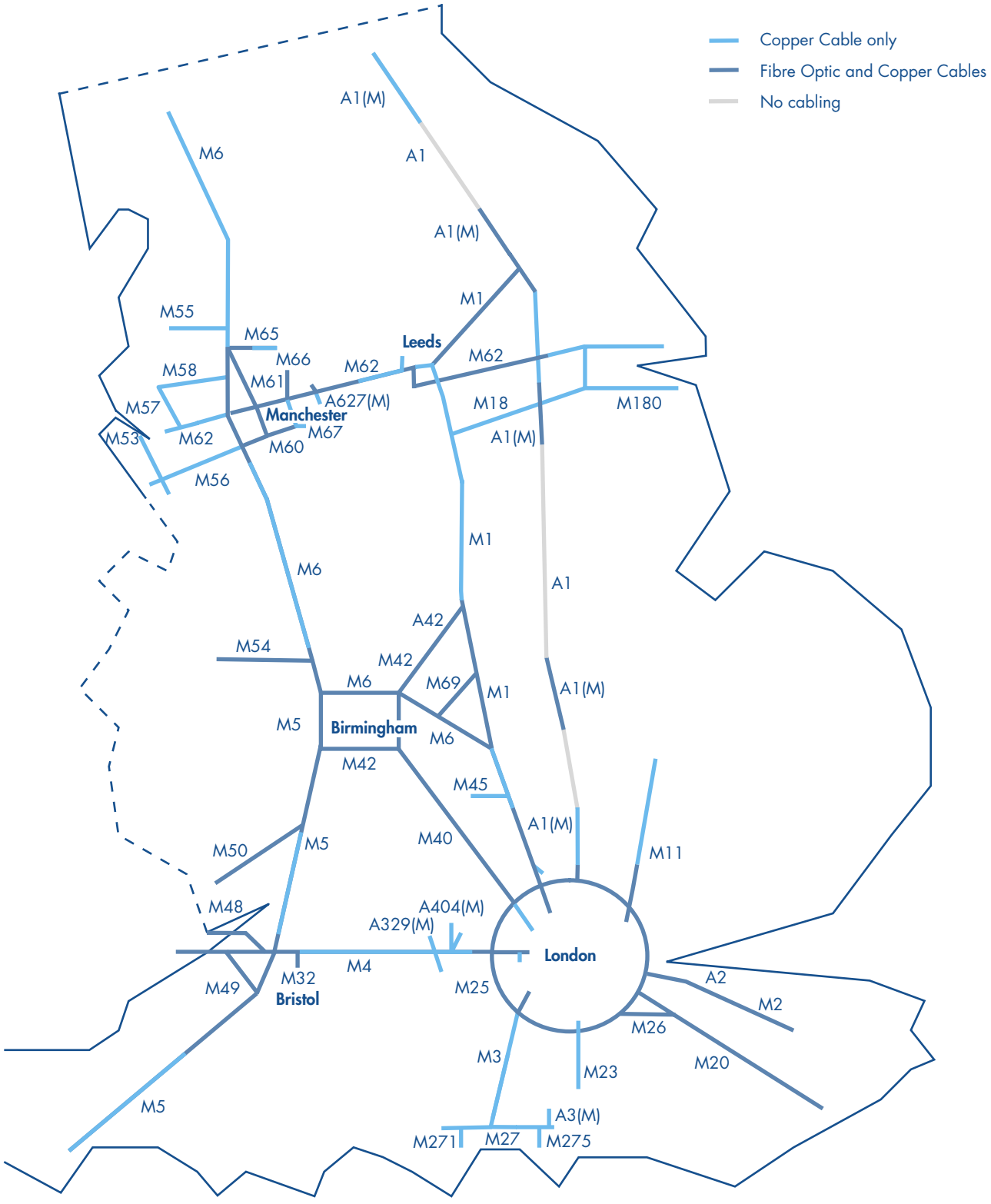


Source: Highways Agency

NOTE

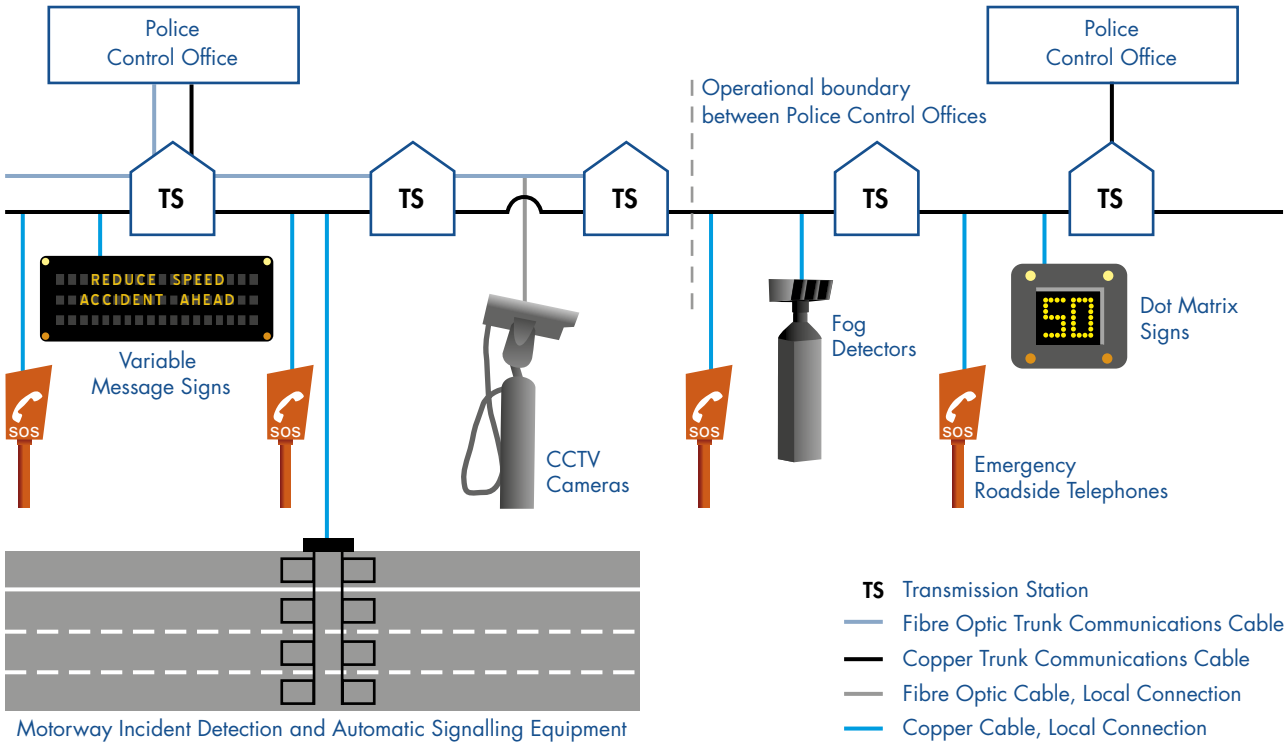
This map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office.

4 In 1999, the Agency's existing motorway telecommunications network covered 2,900 kilometres of motorways and included 1,650 kilometres of fibre optic cabling



Source: Highways Agency

5 The Agency's motorway telecommunications network in 1998 connected roadside devices to police control offices



Source: National Audit Office

1.5 The quality and capability of the transmission assets and technology varied from area to area. Along the motorway network, the telecommunications systems used copper cable to carry voice and data signals, but transmission capacity was limited. By 1998, the Agency had installed fibre optic cable along half of the motorway network, principally to carry CCTV camera images. While some local areas had upgraded parts of their systems to digital technology, most areas used obsolete analogue technology to transmit voice, data and CCTV signals to and from their local police control offices. A national telecommunications system, which supported telecommunications between police control offices, was also based on obsolete analogue technology. This technology was no longer supported by the telecommunications industry and sources of spares and skilled support were not widely available. If left unaddressed, the continued use of analogue technology would have left the Agency with insufficient transmission capacity to meet its expected future telecommunications needs as the operator of the English network of motorways.

The Agency already had in place a programme of projects to improve its telecommunications systems

1.6 When the Government announced the Agency's new role in 1998, there were already a number of initiatives underway to improve the motorway telecommunications systems:

- Development of a business case to upgrade the national telecommunications system between police control offices from outmoded analogue technology to the then current industry standard for digital transmissions.
- A programme to install, across congested parts of the motorway network, more: message signs, operated from police control offices; motorway incident detection equipment; and automatic signalling equipment. Included within the programme was the installation of new fibre optic cables over parts of the system.

- Procurement of a new Traffic Control Centre to monitor traffic and to implement strategic responses to both planned and unplanned events. The project required CCTV and data links from each of the 32 police control offices, as well as linking the centre directly to an expanding network of traffic detection equipment.

1.7 In June 1998, the Agency decided to investigate whether it should undertake a single project to install fibre optic cables across the motorway network, rather than continue to rely on ad hoc installation for specific projects. The Agency also wanted to consider what role the private sector could have in such a project. This was the beginning of the project for the National Roads Telecommunications Services (the NRTS).

1.8 The Agency expected that the private sector would be interested in commercial opportunities to use spare capacity in the cable network and to lease land and structures along motorway corridors for mobile phone aerials. It envisaged that the private sector would also be interested in developing and rolling out roadside devices that could communicate directly with passing vehicles.

Advisers were appointed to explore procurement options

1.9 To investigate all its procurement options, the Agency needed access to market expertise and decided to seek a consortium of advisers for all advice rather than make single appointments for each specific area such as legal, financial and technical advice. The Agency wanted to establish a single point of contact with its advisers and to avoid the risk of advisers duplicating advice.

1.10 In April 1999, following a competition, the Agency appointed KHHD, a consortium comprising KPMG, Herbert Smith, Hyder Consulting and Detica Ltd (then known as the Smith Group). The contract had two stages. For the first stage, KHHD agreed to conduct a feasibility study of the procurement options for a fixed price of £0.5 million. The second stage was for KHHD to provide advice during the procurement phase, if the Agency decided to go ahead with the project.

The Agency accepted KHHD's advice advocating further investment in the telecommunications systems

1.11 The investigation found that better telecommunications infrastructure would be essential to the Agency's road network operator role. The Agency accepted this conclusion and, based on information from within the Agency about future needs, estimated that demand for data transmission was likely to increase over the medium-term. The forecast was therefore consistent with the Agency's then programme of telecommunications' related projects. The Agency's implementation of this programme is subject to availability of funding, so the reliability of the demand forecast cannot be fully validated for several years.

There was also market interest to exploit commercial opportunities

1.12 The advisers also explored opportunities associated with a private sector partner commercially exploiting the Agency's telecommunications assets. The view was that third party revenue could off-set some, if not all, of the cost of improving the telecommunications systems.

- **The use of spare capacity in the fibre optic cables:** While telecommunications operators were interested in managing the Agency's systems, by the time such companies were invited to tender, they placed little value on the commercial exploitation of spare capacity in the trunk cables. They considered that the amount of spare capacity would be relatively small. They were also concerned that some lengths of the fibre optic cables would prove inefficient because of their age.
- **The leasing of sites from the Agency for mobile phone masts and aerials:** Mobile phone companies confirmed their interest in locating masts and aerials on the Agency's land and structures along motorway corridors. The interest, however, was tied to immediate need associated with the roll out of 3G services and demand was likely to fade over time.
- **The development of roadside to vehicle communications:** KHHD considered that there was an opportunity for the Agency and a private sector party to develop roadside to vehicle communications. This opportunity was, however, dependent on technology developments. In the event, the Agency decided, in spring 2001, not to pursue this idea because the technology risk might have compromised the whole project, but it could still be developed in the future if offered by a third party.

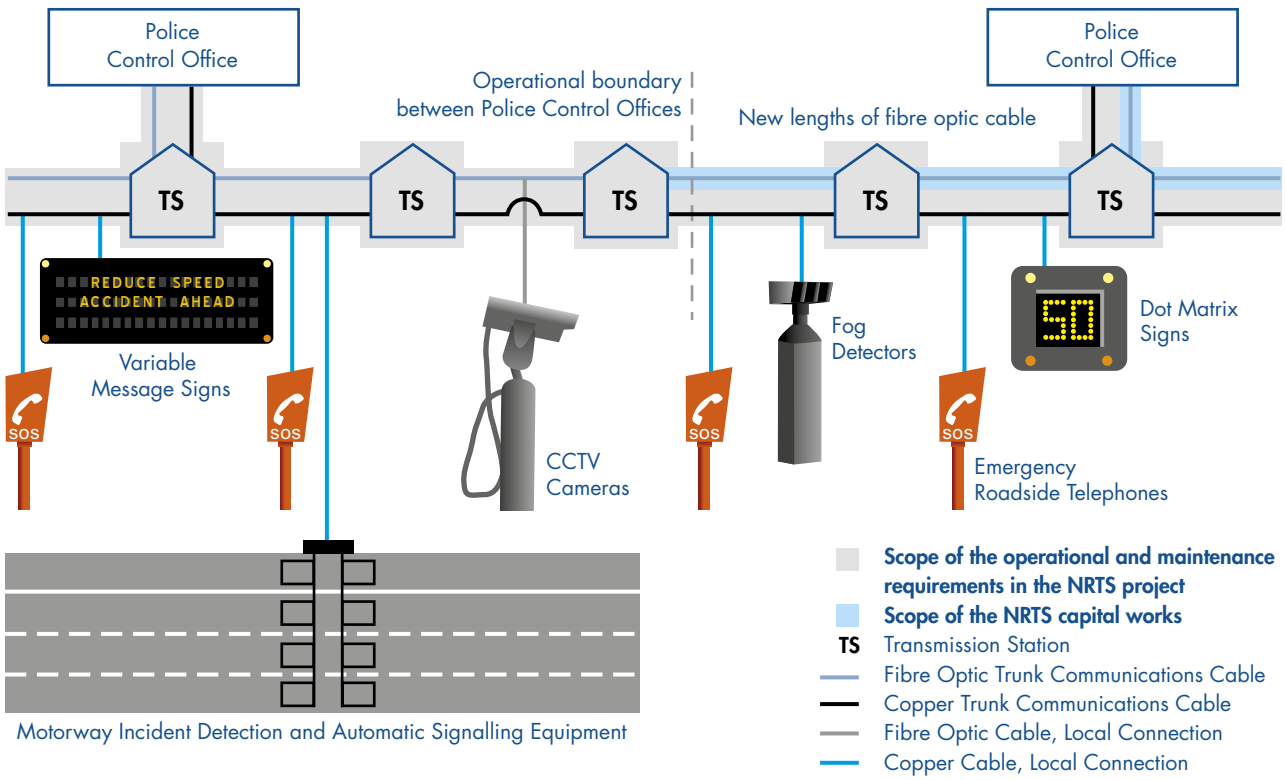
1.13 The Agency decided to extend and upgrade its telecommunications systems around fibre optic cables running between transmission stations along the motorways that linked Manchester, Leeds, Birmingham, Bristol and London and would include spurs running to Exeter, Southampton and Dover. This cable network included links to police control offices, but excluded local connections between roadside devices and the trunk cables **(Figure 6)**. The upgraded systems would meet the Agency's expected future demand for telecommunications capacity and the Agency expected that there would be market interest in commercial exploitation of the improved assets.

The Agency concluded that a Public Private Partnership was the best way to build and operate the new systems

1.14 As well as considering the scope of work to complete the network of fibre optic cables, the Agency had to select a procurement route. The advisers reviewed a comprehensive set of options ranging from:

- conventional contracting in which the Agency would manage separate contractors to design, build and operate the new systems; through to
- a Public Private Partnership (PPP) in which a consortium of contractors would not only take the risks involved in the design, build and operation stages but also provide the finance necessary to get the project underway.

6 The original scope of the NRTS project encompassed maintaining, upgrading and extending the national trunk communications cable network and links to police control offices



Source: National Audit Office

1.15 At the stage of the feasibility study, it was KHHD's view that a private sector partner would be more successful than the Agency at raising third party revenue. High level financial models of the PPP approach and a conventional procurement, at the time, indicated that when allowances were included for third party revenues, the present value of the net cost of a PPP option stood at £40 million (1999 prices)[2], while the net cost of a conventionally procured option was £60 million. If third party revenues had been excluded, the net cost of the conventional procurement would have increased to £90 million and the net cost of a PPP would have increased to £110 million.

1.16 KHHD informed the Agency that any comparison between the costs of the alternatives should be treated with caution as the models were early estimates based on initial proposals for the project. Although it seems that a conventional procurement would have been cheaper were third party revenues excluded, the Agency concluded that the most suitable arrangement was a PPP. It reasoned that this type of arrangement would:

- encourage a longer term, strategic approach to the Agency's service requirements;
- improve resilience in the trunk cable network;
- replace hitherto bespoke investments with off-the-shelf technology;
- spread the cost of upgrading and improving the telecommunications systems over the contract term through payment of the unitary charge; and
- facilitate opportunities to generate third party revenue.

1.17 Apart from spreading the cost of the project through the use of private finance (which is not a value for money consideration), the benefits of the PPP approach listed above could, however, have been obtained using conventional procurement. The Agency believed that a key attraction of a PPP was the opportunity to transfer risk to a private sector partner that had borrowed money to upgrade the systems and, in the event of encountering difficulties, would act to avoid losing its investment. The Agency's reasons for transferring risk were that:

- It had not before attempted such a large telecommunications project involving a nationwide upgrade to new technology;
- Telecommunications was not considered a core activity. The Agency therefore decided that the more appropriate course was to buy in the skills of a telecommunication network operator while concentrating its skills on the newly acquired role of road network operator; and
- Even if such capacity and skills could have been assembled, the financial consequences of cost and time overruns would have remained with the Agency.

1.18 In pursuing a PPP, the Agency wanted to ensure that the price of the risk transfer was reasonable. It, therefore, checked to ensure that the cost of the PPP was no higher than the cost of a conventional procurement, adjusted for risk.

The project evolved to take in telecommunications elements of other projects

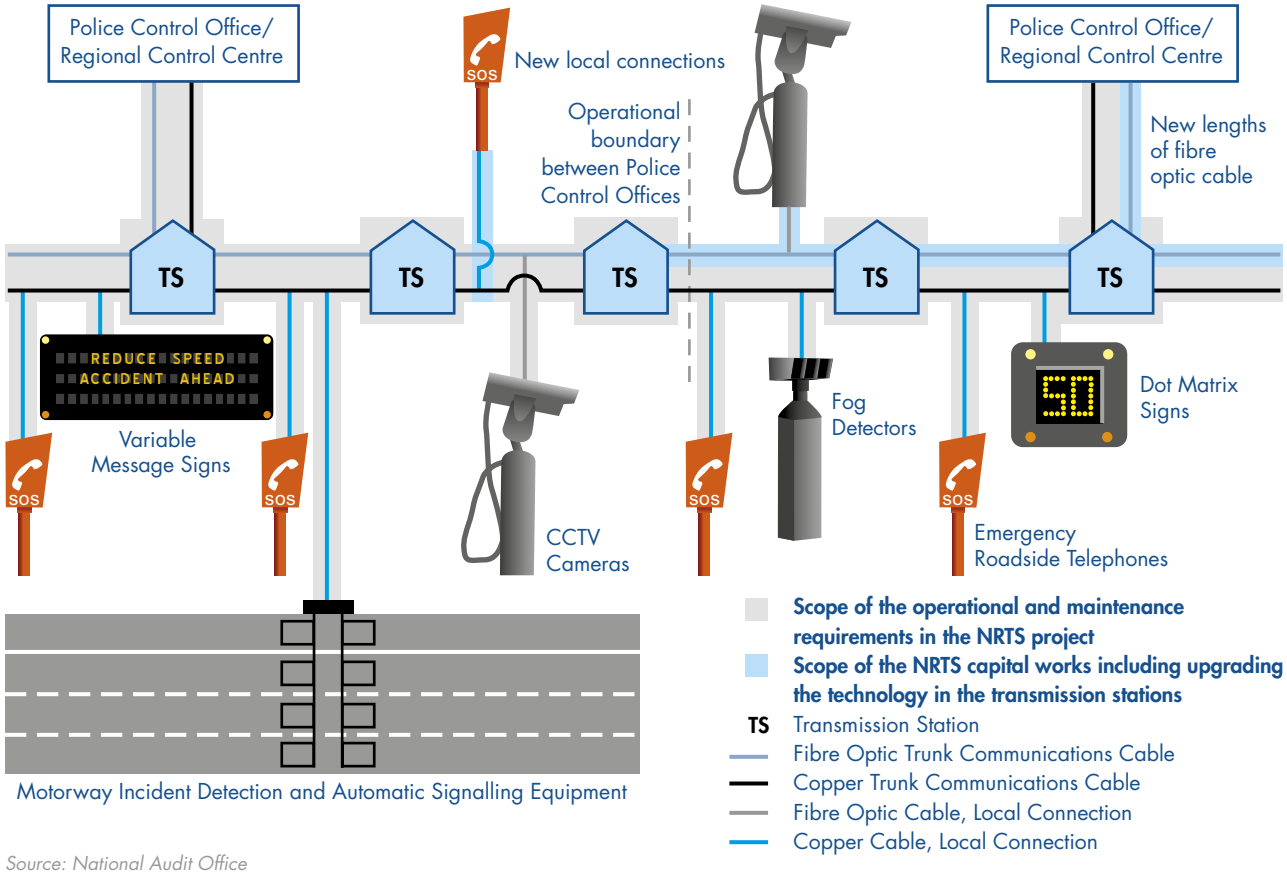
1.19 After receiving ministerial approval in July 2000, the Agency began planning for a competition to procure the new transmission systems. By March 2001, however, the project had changed from that contemplated in the feasibility review. To realise potential economy and efficiency gains, the Agency decided to incorporate into the NRTS:

- The operation and maintenance of links between roadside devices and transmission stations, which were then costing the Agency about £7 million per annum (1999 prices);
- The planned £6 million (1999 prices) upgrade of transmission equipment; and
- The £80 million (1999 prices) programme to install local connections linking new roadside devices to the system.

Under the changed scope, the contractor would have end-to-end responsibility for transmission services, while responsibility for roadside devices and police control office applications would to remain with the Agency **(Figure 7)**. As a result, the estimated net cost of the project increased from £40 million to £345 million (1999 prices).

2 The Agency discounted the cash flows using a discount rate of six per cent, which was the Government's discount rate for procurements commencing prior to April 2003. For consistency, all present values appearing in the main text of this report have been calculated using the six per cent discount rate.

7 The expanded scope of the NRTS project encompassed: upgrading and extending the national trunk communications cable network; upgrading the technology in the transmission stations; upgrading links to police control offices; and adding and maintaining local connections



Source: National Audit Office

NOTE

1 In January 2003, Ministers brought forward the Agency's plan to replace the 32 police control offices with seven regional control centres.

1.20 In September 2005, the Agency and GeneSYS, a special purpose company owned by Fluor Corporation and HSBC, signed a 10½-year PPP contract for the NRTS. The Agency had considered a 20-year contract but decided that the technology risk was too great. The Agency structured the contract so that:

- Upgrading and operating the telecommunications systems were captured in a PFI type structure. As is common with this type of arrangement, GeneSYS agreed to finance the upgrade works and in return will receive a contractually set, monthly charge of £3.7 million (2004 prices) from completion of the works through to the end of the contract, provided the services meet the Agency's performance requirements.
- The Agency can order changes to the services from a pre-priced schedule of additional works. Under the related provisions, GeneSYS's prices cover the direct costs of the all work required to implement the ordered changes.

1.21 At the end of the procurement, the Agency assumed that the present value of its payments under the contract would be £345 million (1999 prices), the mid-point of an estimated range from £230 million to £460 million for the Agency's future payments to GeneSYS (**Figure 8** shows the amounts in 2004 prices). The actual value of the payments will depend on the number and value of additional telecommunications services ordered by the Agency. This outcome resulted from a tendering process that involved the following stages:

- A period of pre-tendering preparation of bid documents and investigation of market interest (including the publication of two notices in the Official Journal of the European Communities);
- A competitive bid process from January 2003 to August 2004;
- A period of negotiations with a preferred bidder; and
- A comparison of costs under the PPP option with the costs of the public sector comparator at each of the key stages of the tendering process.

8 2004 present values of the estimated range for the Agency's payments to GeneSYS

Estimated range of payments	2004 present values discounted at: 6 per cent[1] / £ millions (1999 prices)[2]	6 per cent[1] / £ millions (2004 prices)
Lower limit[3]	230	255
Upper limit[4]	460	515
Mid point	345	385

Source: National Audit Office

NOTES

1 The Agency discounted its projected future payments using a discount rate of six per cent, which, at the start of the procurement, was the Government's discount rate. For consistency, all present values appearing in the main text of this report have been calculated using the six per cent discount rate. In 2003, the Government reduced its discount rate to 3½ per cent for projects not already in procurement. Applying the new discount rate to the Agency's range of payments under the NRTS contract yields present values at 2004 prices of £300 million (lower limit), £600 million (upper limit) and £450 million (mid point).

2 The 2004 present values in 1999 prices were calculated by deflating the 2004 present values in 2004 prices using the Office for National Statistics' Retail Prices Index CHAW (all items).

3 The Agency's lower limit was based on the assumption that over the course of the contract it would order no additional works other than a minimal number associated with pre-existing commitments.

4 The Agency's upper limit was based on the assumption that over the course of the contract it would have the funds to order all the additional works on its related forward investment programme.

PART TWO

The Agency secured a PPP that transferred risk at a cost that was slightly less than the estimated cost of a conventional procurement

In September 2005, over five years after starting the procurement, the Agency and GeneSYS signed a Public Private Partnership contract for the NRTS. Despite delays in the tendering period, the Agency preserved competitive tension almost to the selection of a preferred bidder, avoided deal drift afterwards and secured contractual arrangements close to the terms it wanted.

The Agency closely controlled the tendering stage of the procurement

2.1 Key factors that can influence whether a procurement is likely to lead to a deal that is value for money are:

- bid documents that clearly and comprehensively describe rights and obligations of the parties;
- stimulating good market interest; and
- conducting the procurement in a strong competitive environment.

The Agency came close to achieving all three.

The Agency obtained a lot of information about its existing assets, but the quality was not uniformly high

2.2 Under the proposed PPP, the Agency wanted its contractor to take over responsibility for the operational performance of the existing telecommunications infrastructure. To achieve this transfer of responsibility, the Agency wanted the bidders to have access to a comprehensive set of reliable information about the condition of the assets and their performance. Such a set of information was intended to allow bidders to price the services without building in large contingences for uncertainty.

2.3 A major exercise was therefore undertaken by the Agency to assemble information about the condition and performance of its existing telecommunications networks. The Agency spent over £400,000 in advisers' fees as the procurement team collected and maintained over 15,000 documents about the existing telecommunications systems; information that the Agency made available to bidders.

2.4 The eventual winning bidder, GeneSYS, confirmed that the information that the Agency had collected was plentiful. GeneSYS, however, had concerns about the reliability of the data, particularly since the Agency, as part of its risk transfer goal, refused to warrant the accuracy of the provided material. While the company was prepared to bear performance risk associated with the existing assets, it did so on the basis of its own due diligence work.

The Agency produced detailed documentation on what was required from a contractor

2.5 The Agency wanted its bidders to be in no doubt about the extent of the contractor's obligations. One of the key objectives in the procurement was the production of bid documents that would facilitate the negotiation of a contract in which the services were accurately specified. Between July 2000 and January 2003, the procurement team invested effort (costing over £3.3 million in advisers' fees) to produce an output specification, a draft contract and other tender documents intended to capture accurately and unambiguously the desired services. The procurement team consulted across the Agency to understand the organisation's telecommunications requirements as it migrated from a road network builder to a road network operator.

2.6 The Agency's procurement team also identified and outlined restrictive processes and constraints that would govern the contractor's working practices. For example, documents were produced to provide bidders with an understanding of the difficulties and hazards associated with working in close proximity to live motorways. Access to malfunctioning equipment would require liaison with the local motorway maintenance contractor so that appropriate lane closures were in place before repairs began.

2.7 Representatives for the two bidders, GeneSYS and LINK, informed us that they had been impressed by the quality and structure of the bid documents.

The Agency estimated future service demand

2.8 The procurement team prepared a base case demand scenario, founded on the assumption, however unlikely, that the Agency would not require any changes to the services, other than those that were already part of a committed programme of future work to the national road network. The function of the base case was to establish a cost for the initial upgrade of core telecommunications systems and maintaining them over the length of the contract. This upgrade, representing the capital works in the first two years of the contract, would be financed by the contractor **(Figure 9)**.

2.9 The Agency also had uncommitted plans for future work relating to the installation or removal of roadside devices that would require telecommunications services. These plans related to possible new road schemes, new traffic management schemes, extending the coverage of existing traffic monitoring devices and the installation of new types of devices. From the information obtained from across the Agency, the procurement team plotted out the maximum expected demand for the NRTS and this was approved by Agency staff responsible for telecommunications policy. The results were then used to prepare the high demand scenario (Figure 9). The Agency also used this scenario to establish the transmission capacity of the upgraded infrastructure.

2.10 The Agency designed the PPP so that the unitary charge would cover the contractor's cost of financing the initial upgrade of the telecommunications systems and maintaining them over the length of the contract (base case demand scenario) (Figure 9). For each functioning telecommunications service to the roadside devices, the contractor would also receive monthly a contractually set connection maintenance charge (Figure 9). This charge covers the contractor's cost of operating and maintaining the relevant service, over and above costs for the core network included in the unitary charge. If the Agency decided, in the future, to proceed with any of its uncommitted projects (captured in the high demand scenario), the contract was designed so that the Agency could order changes from a schedule of additional works priced during the competitive process (Figure 9). The Agency would therefore have certainty over the cost of variations for additional services. These services range from a connection to a single roadside device, to an extension to the overall coverage of the NRTS. The agreed prices were intended to capture the contractor's capital cost. Once the ordered additional works are completed, each new additional service would, thereafter, attract the monthly connection maintenance charge.

Market interest was stimulated during the tendering period

2.11 In November 2000, the Agency generated market awareness by hosting an industry conference that attracted over 250 delegates from about 100 companies. The delegates learnt that completion of the bid documents and publication of a notice in the Official Journal of the European Communities (OJEC), inviting potential bidders to express their interest in the project, were scheduled for summer 2001. The Agency also stated that it planned to award the contract in autumn 2002 (Appendix 5).

2.12 The Agency published the OJEC notice in August 2001. By October, nine consortia, representing 21 companies (contractors and investors), had responded to the Agency's pre-qualification questionnaire. The questionnaire requested the sort of standard information that clients seek about potential bidders, including financial status, technical capacity and experience. The Agency judged that six responses had passed the qualification standards, with the scores from five being, for all intents and purposes, identical **(Figure 10)**. It, however, did not produce a short list because it was taking longer than expected to produce its bid documents.

2.13 In mid 2002, the Agency became aware that some of the potential bidders had started to doubt the Agency's commitment to the project. If the Agency had had a better understanding of the time required for preparing its bid documents, it could have delayed publication of the original OJEC notice. In so doing, it would have reduced the risk of wavering bidder interest.

9 Coverage of the Base Case and High demand scenarios

	Included work						
	Two year upgrade of core telecommunications systems including migrating from analogue to digital technology and laying fibre optic cables in three locations	Operation and maintenance of core telecommunications systems, both the upgraded and non-upgraded systems	Committed programme of future work	Uncommitted programme of future work	Maintaining local connections: Existing	Maintaining local connections: New connections from committed works	Maintaining local connections: New connections from non-committed works
Demand Scenario							
Base Case	✔	✔	✔		✔	✔	
High	✔	✔	✔	✔	✔	✔	✔
Payment Mechanism	Unitary charge		Pre-priced schedule of additional works		Monthly connection maintenance charge per functioning service		

Source: National Audit Office

10 The Agency received six satisfactory responses to its 2001 pre-qualification questionnaire

Consortium	Members	The Agency's scoring of potential bidders (maximum 100)
GeneSYS	Fluor & Mott Macdonald	81.78
Highway Communications	Thales Translink, Haliburton, Mouchel, Siemens Traffic Controls Ltd	81.17
Roadside Telecommunications Group	Marconi Communications Ltd, Serco Ltd	81.07
Atkom	WS Atkins Investments Ltd, Charterhouse Project Equity Investments Ltd, Cable & Wireless UK Services Ltd	79.80
BT/AMEC	BT, AMEC	79.58
LINK	Pell Frischmann Consultants Ltd, Thus, Royal Bank of Scotland plc, Morrison Construction Ltd	65.69
Balfour Beatty Power Networks	Balfour Beatty Power Networks, Thus	Submission did not qualify for marking
Morricom Ltd	Morricom Ltd, Optic Trunks Ltd	Submission did not qualify for marking
Jasmin	Jasmin	Submission did not qualify for marking

Source: The Highways Agency

2.14 Concerned that some of the bidders were losing interest in the project, the Agency took the unusual step of reissuing the advert in the OJEC in August 2002. While the responses demonstrated continued market interest, with the Agency again receiving nine expressions of interest **(Figure 11)**, two of the higher scoring potential bidders (Highway Communications and Atkom) did not respond. Only four interested potential bidders passed the Agency's qualification standards. All four were short listed to proceed further.

The Agency maintained its bargaining position through to the selection of a preferred bidder

2.15 In January 2003, the Agency issued bid documents to the four short-listed consortia, but two dropped out before bids were submitted in July. The BT/AMEC consortium withdrew because it considered that its proposal to run the services through BT's national network, rather than the Agency's dedicated cable network, could not be developed sufficiently to put the consortium into a strong winning position. The Serco/Marconi consortium dissolved when its potential debt providers became nervous about the financial difficulties that Marconi was then experiencing. Rather than exit the procurement, Serco obtained the Agency's approval to join the LINK consortium.

2.16 Between July and October 2003, the procurement team evaluated the bids from the two remaining parties, GeneSYS and LINK. Both bids included proposals, issues and omissions that the Agency was not prepared to accept. To find workable positions, the Agency introduced an additional stage in the procurement. Between October and December 2003, the Agency regularly met each bidder to work through the non-conforming proposals. In December, the bidders formalised the changes by revising their proposals, issues and omissions in their original bids.

2.17 In the revised bids, all but two of the Agency's non-negotiable issues **(Figure 12)** were fully resolved. The two outstanding issues remained features of GeneSYS's bid, but rather than expel GeneSYS from further participation in the competition, the Agency downgraded the status of the non-negotiable issues to proposals, issues and omissions that it was prepared to consider (Figure 12). The decision avoided a single bidder situation, but was achieved at the risk that the Agency would not later be able to secure the terms it wanted as the momentum of the procurement grew.

11 The Agency received four satisfactory responses to its 2002 pre-qualification questionnaire

Consortium	Members	The Agency's scoring of potential bidders (maximum 100)
Marconi/Serco	Marconi Communications Ltd, Serco Ltd	85.20
GeneSYS	Fluor & Mott Macdonald	80.44
BT/AMEC	BT, AMEC	79.58
LINK	Pell Frischmann Consultants Ltd, Thus, Royal Bank of Scotland plc, Morrison Construction Ltd	65.64
Balfour Beatty Power Networks	Balfour Beatty Power Networks, Thus	Submission did not qualify for marking
Morricom Ltd	Morricom Ltd, Optic Trunks Ltd	Submission did not qualify for marking
Hennelly's	Hennelly's	Submission did not qualify for marking
Colt	Colt	Submission did not qualify for marking
Medlock/Mouchel	Medlock Communications Ltd, Mouchel	Submission did not qualify for marking

Source: The Highways Agency

2.18 In April 2004, the Agency issued bid documents for a Best and Final Offer (BAFO) bidding round and received two bids in June. The Agency considered that the overall quality of GeneSYS's technical solution was higher than LINK's proposal, which was also more expensive. Our technical advisers, Mason Communications Ltd, confirmed that GeneSYS's solution was state of the art. The present value of the cost of LINK's bid was £190 million (2004 prices) higher than GeneSYS's bid **(Figure 13 overleaf)**, which reflected the LINK consortium's more risk averse approach to the project.

2.19 From its analysis of the BAFO bids, the Agency saw that GeneSYS had a clear technical and price advantage over LINK. Even so, GeneSYS's bid continued to contain proposals, issues and omissions that the Agency was reluctant to accept. It therefore introduced a fourth bidding round (known as the Revise & Confirm round) with the purpose of reducing these outstanding issues. Knowing that LINK was unlikely to win the competition, the Agency indicated to the consortium the scale of the task it faced. Consequently, LINK withdrew from the competition.

2.20 The Agency informed GeneSYS of this change to the procurement, but did not appoint it as preferred bidder. The Agency's action avoided LINK incurring cost in fruitless pursuit of the contract, but brought the competitive phase of the procurement to an end before all issues were resolved. Consequently, the Agency ran the risk that the remaining bidder would exploit its single bidder position.

12 Unacceptable proposals, issues or omissions that remained after the bidders clarified their bids in December 2003

GeneSYS	
Technical	
The Agency listed five technical proposals, issues and omissions in GeneSYS's original bid that it was not prepared to accept.	The Agency removed all five issues from its list after GeneSYS provided additional information or demonstrated that it could meet the Agency's requirements.
Commercial	
GeneSYS objected to a provision requiring the contractor to pay its sub-contractors within a stipulated time period.	GeneSYS refused to concede position on when sub-contractors are paid. While the issue remained fully outstanding, the Agency did not consider the point sufficient to exclude GeneSYS from further participation in the competition.
GeneSYS had not complied with the requirement to share with the Agency a full record of its costs, rates, lump sum prices and financials in providing the Services.	GeneSYS agreed to supply a breakdown of equipment costs and its mark-ups as part of its best and final offer. Information about the cost mark-ups, however, would be held by a third party and would only be released to the Agency in the event of it appointing GeneSYS as preferred bidder. The Agency was content with this arrangement.
The Agency listed four other commercial proposals, issues and omissions in GeneSYS's original bid that it was not prepared to accept.	The Agency removed these issues after GeneSYS confirmed that it would relax its position on all four issues. Nevertheless, aspects associated with these issues remained live during the other procurement stages.
LINK	
Technical	
The Agency listed five technical proposals, issues and omissions in LINK's original bid that it was not prepared to accept.	The Agency removed all five issues from its list after LINK provided additional information or demonstrated that it could meet the Agency's requirements.
Commercial	
The Agency listed two commercial proposals, issues and omissions in LINK's original bid that it was not prepared to accept.	The Agency removed the issues from its list after LINK indicated that it was willing to change its position on both issues.

Source: National Audit Office

13 LINK's offer was consistently more expensive than GeneSYS's offer

Bid Round		Cost in present value terms/ £ millions (2004 prices)	
		GeneSYS	LINK
Invitation to Negotiate (July 2003)[1]	Bid	450	690
	Agency's adjustment for outstanding issues[3]	230	220
	Total	**680**	**910**
Evaluation after Clarification (December 2003)[1]	Bid	450	690
	Agency's adjustment for outstanding issues[3]	240	230
	Total	**690**	**920**
Best and Final Offer[2] (June 2004)	Bid	410	600
	Agency's adjustment for outstanding issues[3]	80	170
	Total	**490**	**770**
Revise and Confirm (September 2004)	Bid	410	–
	Agency's adjustment for outstanding issues[3]	15	–
	Total	**425**	–
At contract award	Bid	385	–
	Agency's adjustment for outstanding issues[3]	0	–
	Total	**385**	–

Source: National Audit Office

NOTES

1 These April 2004 priced figures were calculated by inflating April 2003 prices using the Office for National Statistics' Retail Prices Index CHAW (all items).

2 Between the Evaluation after Clarification and the Best and Final Offer, the Agency reduced the scope of works that would be covered by the base service charge.

3 The values that the Agency assigned to the proposals, issues and omissions that did not conform with the Agency's bid requirements.

2.21 In the event, when GeneSYS submitted its Revise and Confirm bid, the present value of its offer had not increased from its BAFO bid. Moreover, clarifications provided by GeneSYS about its technical solutions and its proposed amendments to the terms of the contract led to a £65 million reduction in the Agency's estimated financial impact of outstanding proposals, issues and omissions (Figure 13). The values that the Agency assigned to commercial issues in GeneSYS's BAFO bid, which collectively amounted to £58 million, were cautious estimates based on the professional judgements of the Agency's advisers. The subsequent reductions (£48 million) reflected revised judgements of the advisers as they obtained a better understanding of GeneSYS's commercial proposals or secured concessions from the bidder (Appendix 2). The Agency placed zero value on the concessions that it made.

The Agency's fallback was to continue with its current arrangements in the short-term

2.22 The procurement team did not prepare a detailed fallback plan in the event that the PPP procurement foundered. The Agency decided to take the associated risk for two reasons. The first was confidence that a deal with one of the bidders was likely even though the team knew that LINK was uncompetitive and knew there was a risk of upward price adjustments by GeneSYS in the later stages of the competition.

2.23 The second reason was that, if the PPP procurement collapsed, the Agency took the view that it could have continued with its then current arrangements until the technological solution behind the public sector comparator could be procured conventionally.

During negotiations with the preferred bidder, the Agency avoided any overall price increase to the deal

2.24 The Agency selected GeneSYS as the preferred bidder in November 2004. The procurement team's preparations for the ensuing negotiations included acquiring extensive knowledge of GeneSYS's cost model and the base costs within it.

2.25 The preferred bidder stage lasted nearly 10 months, which was five months below the average for PFI projects that closed between 2004 and 2006[3]. During this stage, GeneSYS's bid price fell £2 million after allowing for differences between the scope of the Revise and Confirm bid and the negotiated final offer. The major change in scope was the Agency's removal of the optional service relating to the management of its camera masts **(Figure 14)**. There were a number of substantial price movements associated with changes in responsibilities and financing but the net effect was a £2 million reduction in the bid. (Figure 14). The outcome of the Agency's negotiations demonstrates that price rises during the preferred bidder stage of a PPP procurement are not inevitable.

While the case for the NRTS remained positive, the rationale for using the PPP procurement route became more limited

2.26 When opportunities for commercial exploitation of the up-graded infrastructure fell away, the Agency reviewed whether a PPP was the most appropriate procurement route. The Agency's investment decision for a PPP came to rest on:

- creating a long-term relationship with a single contractor that had borrowed money to upgrade the systems and was better placed than the Agency to manage the risks involved;
- paying for services when they are delivered; and
- a cost comparison that showed that the PPP was no more expensive than conventional procurement.

14 GeneSYS's bid fell by £2 million during the preferred bidder stage

Break down of GeneSYS's bid at award of contract	£ millions (2004 prices)	
Unitary charges	242	
Connection maintenance charges	16	
Charges for called off additional works	126	
		384
Break down of GeneSYS's Revise and Confirm bid		
Unitary charges	253	
Connection maintenance charges	27	
Charges for called off additional works	131	
Differences between the bids		
Removal of the Camera Mast Service	(20)	
Cumulative changes to the demand scenarios	(5)	
		386
		(2)
Cost of changes in responsibilities between Revise and Confirm bid and contract award		
GeneSYS's acceptance of responsibility for duct chambers in structures and cross carriageway ducts	6	
Confirmation that responsibility for designated links remains with the Agency	(6)	
GeneSYS's acceptance of responsibility for delays to called off additional works caused by other Agency employed contractors	4	
Other changes in responsibilities	6	
		10
Cost changes between Revise and Confirm bid and contract award		
Base price date moved from April 2004 to December 2004	(6)	
Interest rate lower than assumed in the Revise and Confirm bid	(5)	
Sum of other cost increases	7	
Sum of other cost decreases	(8)	
		(12)
		(2)

Source: Highways Agency

3 Figure 9 in the National Audit Office's report *Improving the PFI tendering process*, (HC 149, Session 2006-2007).

Justification for the PPP shifted from commercial exploitation of telecommunications assets to creating a long-term relationship with a single contractor

2.27 Industry appetite in the commercial opportunities associated with the NRTS fibre optic network was low because of a slowdown in demand and increased transmission capacity of the existing fibre optic cable networks. In addition, demand for mobile phone mast sites was being met by other land owners. By June 2002, the Agency no longer included third party revenue in its business case for the project. Justification for continuing with the PPP rested on achieving a long-term, strategic partnership with the private sector with appropriate risk transfer.

2.28 Between 2001 and 2004, there were several challenges to the PPP procurement route from senior managers within the Agency. On each occasion, the procurement team persuaded managers to accept the route on the basis set out above. From within the Agency, pressure to progress the telecommunications upgrade that was built into the proposed NRTS contract was growing in urgency. This was particularly so after Ministers brought forward a programme to replace the existing 32 police control offices with seven regional control centres, after motorists became trapped on the M11 following a snowfall during January 2003.

The risk adjustments to the PSC resulted in the PPP being marginally less expensive than using conventional procurement

2.29 In deciding whether a PFI based PPP is an appropriate procurement route, guidance recommends that the procuring authority compares the procurement route against a public sector comparator (PSC), providing a conventional procurement is a feasible alternative. Where the authority has a track record of providing similar services and associated cost data exist, the authority should establish a range for the cost of the public sector procurement route, rather than calculate a single point estimate. For the Agency, the NRTS is a one-off, technology based project about which it had limited experience of the risks involved and their associated costs.

2.30 The Agency's PSC modelled the costs of the NRTS project on the basis that the Agency would procure the same services as those proposed in the PPP option, but through direct purchases of the assets and contracting out maintenance services **(Figure 15)**. The Agency's approach comprised two major components:

- an item-by-item pricing of the technical solution; and
- an adjustment based on the Agency's assessment of what a rational PPP contractor would have included in its prices for risks.

Item-by-item pricing

2.31 KHHD used its market knowledge and cost databases to price each item in the models of the Agency's base case and high demand scenarios. The Agency reviewed KHHD's models and inputs, using its own quantity surveying team. This team concluded that the models were well prepared and that the outputs were reasonable.

15 After evaluating GeneSYS's Revise and Confirm bid, the Agency assessed that the bid was, for the first time, lower than the public sector comparator (PSC)

Bid Round	Cost in present value terms/ £ millions (2004 prices)		
	GeneSYS	LINK	Risk adjusted Public Sector Comparator
Invitation to Negotiate[1]	680	910	660[3]
Evaluation after Clarification[1]	690	920	660[3]
Best and Final Offer[2]	490	770	450[3,4]
Revise and Confirm	425	–	435[4]
At contract award	385	–	415[4]

Source: National Audit Office

NOTES

1 These April 2004 priced figures were calculated by inflating April 2003 prices using the Office for National Statistics' Retail Prices Index CHAW (all items).

2 Between the Evaluation after Clarification and the Best and Final Offer, the Agency reduced the scope of works that would be covered by the base service charge.

3 The PSC at Invitation to Negotiate, Evaluation after Clarification and Best and Final Offer included an allowance for non-recoverable VAT, which was not included in the bids.

4 From Best and Final Offer there were minor incompatibilities between the PSC and the bids. To achieve like-for-like comparisons, the Agency adjusted the values of the bids rather than alter the PSC. In the table above, we applied the adjustments to the PSC rather than to the bids. For example, we applied the Agency's £10 million compatibility adjustment at contract award to the PSC which reduced it from £425 million to £415 million.

2.32 Our technical consultants, Mason Communications Ltd (Mason), compared KHHD's pricing of telecommunications items, representing approximately a third of the total price of the public sector comparator, against its own market knowledge. Mason reported that most of the cost inputs that it had sampled were reasonable. It did, however, note that, for bulk order capital cost items, the Agency might have secured discounts that could have reduced the present value cost of the comparator by between £4 million and £14 million. This would have severely reduced the difference between the public sector comparator and the cost of GeneSYS's wining bid.

Adjustment for risk

2.33 Risk models for the public sector comparator emerged from workshops attended by stakeholders in the project from across the Agency. The participants identified and appraised over 200 risks that the project might have encountered. From this list, the procurement team selected the 49 largest risks for further analysis. For each risk, in each demand scenario, the team estimated a range for the likely cost of the risk and specified a peak value. For 47 of the 49 risks, the assigned values were stand alone amounts and so did not identify possible changes to the costs of individual items in the model.

2.34 At contract award, the estimated present value costs of conventional procurements for the base case and high demand scenarios were £280 million and £550 million respectively (2004 prices). The Agency included risk adjustments of £60 million and £105 million respectively. The public sector comparator, at £415 million[4], was the average of the two scenarios, based on the Agency's experience that it tended to complete only half of the programmed projects within the originally envisaged timetable. The risk adjustment in the comparator was therefore just under £85 million (equivalent to 26 per cent of the non-risk adjusted figure) and contributed to the present value of the comparator being £30 million more than GeneSYS's final bid, £385 million (Figure 15).

2.35 We acknowledge that estimating risk relies on experience and judgement. The risk distributions in the final business case did not include the possibility of events turning out better than expected. This meant that the public sector comparator included no allowance at all for the possibility of any outcomes being more favourable than expected. The procurement team also assumed that the risks were independent of one another. The team calculated the expected cost for each of the 49 risks and summed the results together to produce a total risk adjustment (Appendix 4). Without seeing the relationship between risk values and the affected cost items we could not assess the reasonableness of the cumulative risk adjustment.

The Agency reduced the initial upgrade works to make the project affordable

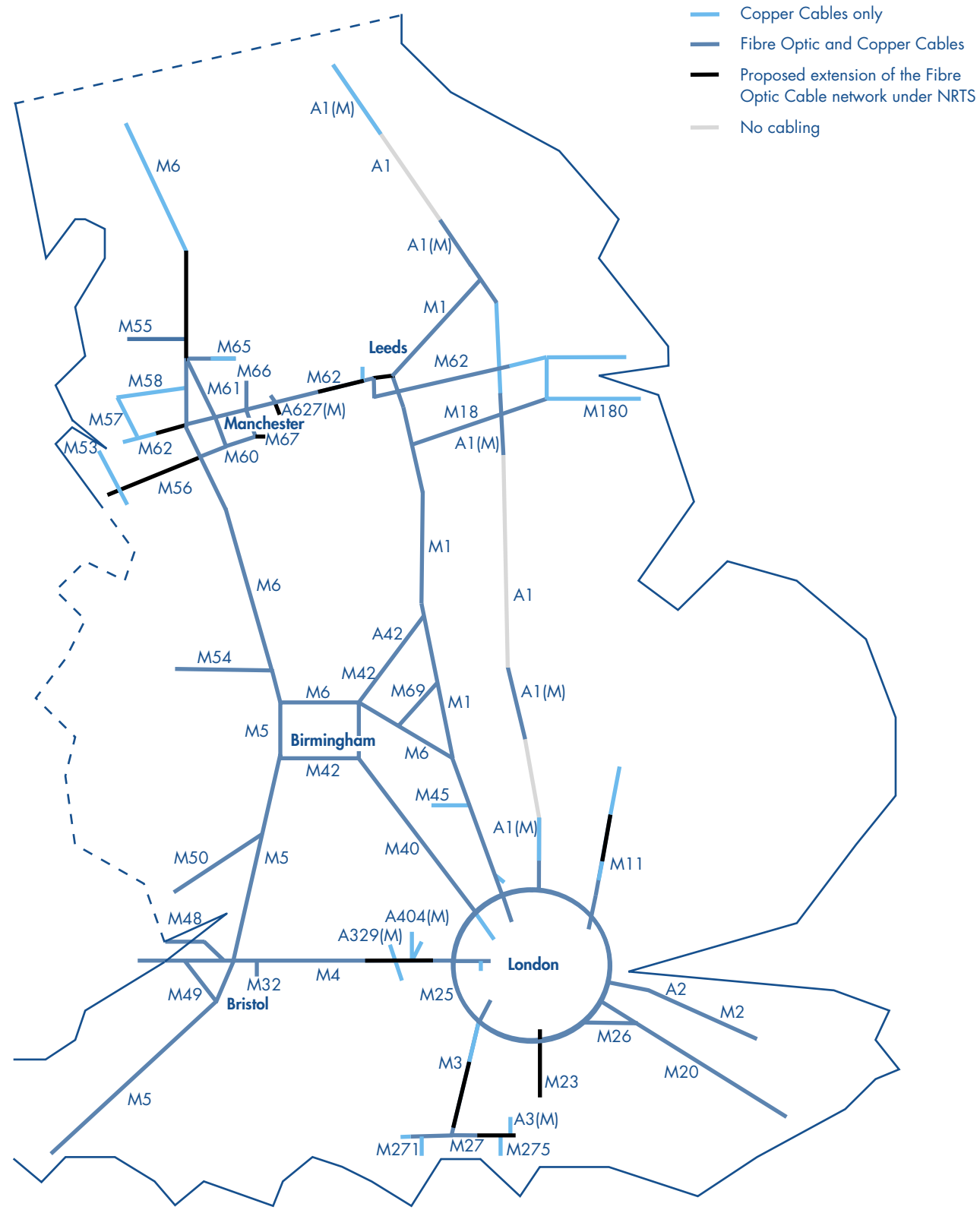
2.36 In August 2003, the Agency became concerned about the affordability of the project and initiated an internal, eight-month review of the scope and justification for the NRTS. During the early stages of the review, the Agency reduced the amount of fibre optic cabling included in the initial upgrade works from 278 kilometres to 110 kilometres. The Agency focused on establishing a high capacity, resilient trunk telecommunications system to carry signals over those lengths of the motorway telecommunications network that together created a core "figure of 8" **(Figures 16 on page 28 and 17 on page 29)**.

2.37 The affordability changes reduced the present value of the expected initial capital investment from about £140 million to £115 million (2004 prices). The consequential reduction in the contractor's debt requirements resulted in a lower unitary charge. The Agency transferred some of the omitted work (Figures 16 and 17) into its programme of uncommitted projects, which, at award of the contract, collectively had a present value of £260 million (2004 prices). While the transfer did not alter the present value of the NRTS project, it has the advantage of removing from the unitary charge, expenditure that in due course might not be needed. If the Agency decides, in the future, that it wants some or all of this wider coverage, it can order the changes through the pre-priced schedule of additional works.

2.38 During the preferred bidder stage, the procurement team examined GeneSYS's prices for both the base case and high demand scenarios by applying the same telecommunications and pricing knowledge used to prepare the public sector comparator. While the team concluded that GeneSYS's cost inputs for the unitary charge and future variations were reasonable, the Agency was not prepared to accept costs that GeneSYS wanted built into the unitary charge that related to future additional works. During the negotiations, GeneSYS agreed to re-assign the disputed costs to prices for future additional works.

4 Using the Government's current discount rate, 3½ per cent, the 2004 present value of the public sector comparator is £470 million (2004 prices) and the 2004 present value of the Agency's payments under the PPP is £450 million (2004 prices) (Figure 8).

16 The initial bid documents required the contractor to increase the fibre optic cable network by 278 kilometres in the first two years of the contract

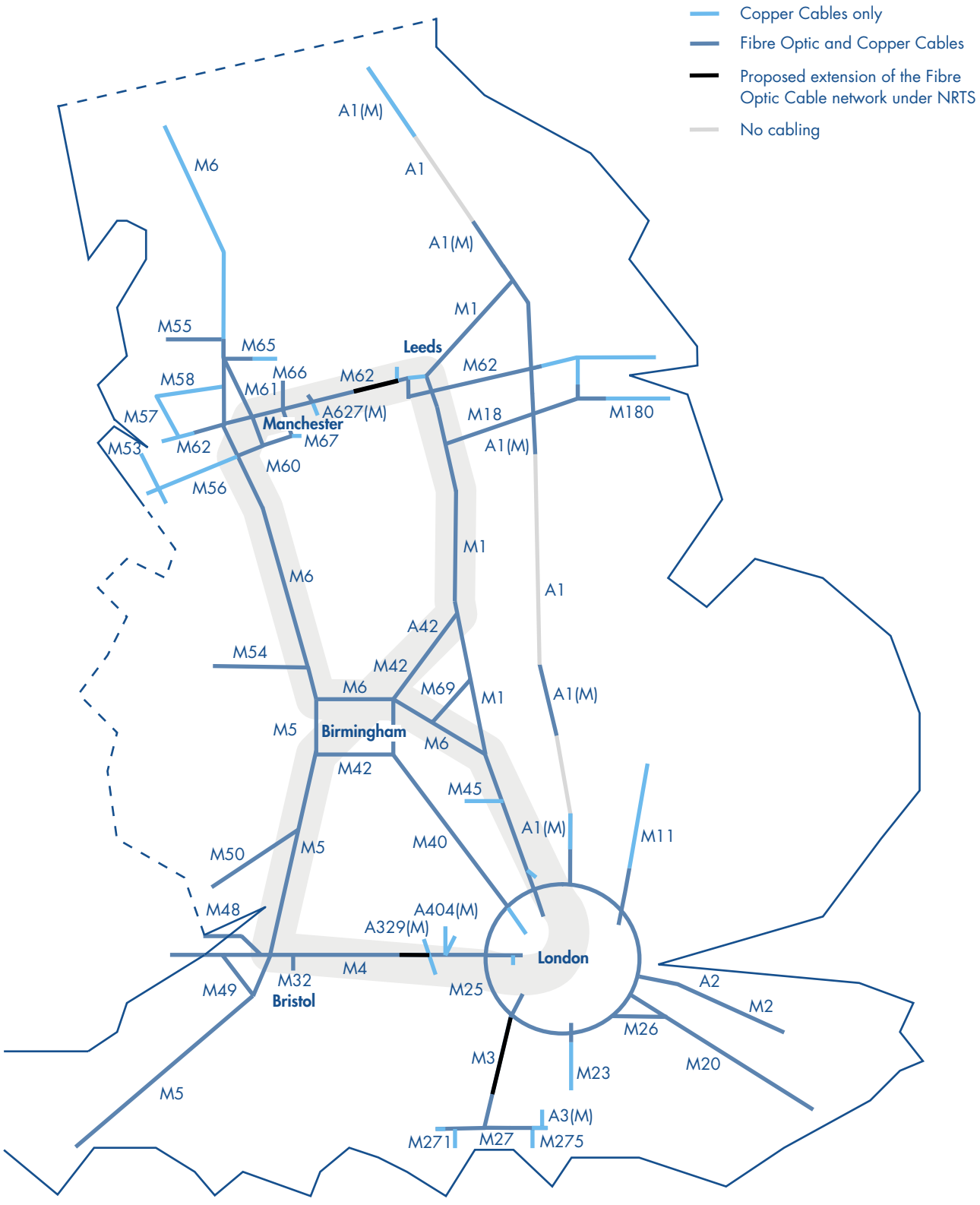


Source: Highways Agency

NOTE

1 Between 1999 and 2003, the length of the Agency's fibre optic network increased from 1,650 kilometres to 2,222 kilometres.

17 After the affordability review, the Agency focused on removing gaps in the core "figure of 8", fibre optic network thereby reducing fibre optic cabling in the first two years of the contract to 110 kilometres



Source: Highways Agency

NOTE

1 Between 2003 and the award of the NRTS contract in September 2005, the Agency installed 168 kilometres of fibre optic cable under its then existing contractual arrangements. Some of this work included lengths omitted from the NRTS project under the affordability review, including lengths along the M3, the M4 and the M62.

PART THREE

The cost of professional advice and the procurement timetable exceeded estimates

The procurement of a PPP contract is a major project in its own right. This part shows that while the Agency insisted on high quality standards it did not foresee the extent to which meeting these standards would affect the procurement's budget and timetable.

3.1 The Agency's procurement of the 10½-year NRTS contract took five years rather than the originally forecast two years (Appendix 5). The external advisers' fees of £15.5 million **(Figure 18)**, were five times the original estimate of £3.1 million.

The project team had to address a number of changes which delayed tendering

3.2 There were a number of policy, operational and other changes during the procurement of the NRTS contract that led to delays:

a In July 2000, the Department for Transport published *"Transport 2010: The 10 Year Plan"*. The published plan meant that the procurement team had to take account of plans for roadside communications at a time when the Agency had no firm strategies in place to meet its new objectives.

b The decision in March 2001 to expand the scope of the project to include: upgrading the telecommunications technology from analogue to digital systems; and maintenance of telecommunication links between the trunk cable network and 14,000 roadside devices.

c Between 2001 and 2004, the procurement team had to respond to challenges from within the Agency about the suitability of the proposed PPP for the NRTS.

d Changes to the telecommunications systems to accommodate a Ministerial decision to bring forward the replacement of 32 police control offices with seven regional control centres and the introduction of the Traffic Officer service.

e Changes to the proposed specification and other documents to reflect the results of the 2003-2004 affordability review.

f In spring 2005, a two-month long intervention in the negotiations by GeneSYS's debt providers.

18 Breakdown of spending on advisers

Adviser	Fees (£ millions)
KPMG (financial and commercial)	3.2
Hyder (technical and project management)	5.4
Herbert Smith (legal)	3.8
Detica (technical)	3.1
Total	**15.5**

Source: The National Audit Office

3.3 We tried to locate papers that explained and quantified the amount of delay and disruption caused by the above events, but found little that sufficiently linked causes and effects. Although the Agency kept detailed records of the hours worked by each member of KHHD's team, the activity descriptions, with few exceptions, were not sufficiently detailed to disaggregate the extra work needed to respond to the above events. We, therefore, cannot judge whether the costs involved were minimised.

Meeting the Agency's demanding quality standards was a major source of delay and additional expenditure on tendering

3.4 During the procurement, the Agency applied demanding quality standards to the production of its bid documents. This work was the major reason for delays and increases in the advisers' costs. Leading members of the KHHD consortium told us that, in their experience of PPP projects, they had not encountered such high standards within the public sector. The Agency's reasons for requiring high quality documents were:

- To reduce the risk of price increases during preferred bidder negotiations;
- To secure greater clarity in the output specification for the upgrading of the network; and
- To enhance certainty of the prices for additional works during the operational phase.

3.5 The frequent revisions of both the procurement's budget and timetable, as cost and time targets were exceeded (Appendix 5), suggest, however, that the Agency and KHHD struggled to quantify the amount of work needed to complete the procurement. KHHD's project manager told us that, during the preparation of the bid documents, the procurement team's forecasts for completion date and procurement cost contained too much optimism about the amount of work needed and so were not as good as they should have been.

The Agency's procurement team benefited from continuity of staffing but budgetary controls were stretched

3.6 Two individuals oversaw the project for the Agency and remained on the team throughout the procurement. This was a strength in the procurement process. While the Agency changed its project and senior managers at least five times during the procurement, the continuity of staffing in the core team resulted in the Agency acquiring a comprehensive knowledge of the project which served it well, particularly in the negotiations with GeneSYS during the preferred bidder stage. Members of KHHD and GeneSYS told us that, while the Agency's team was one of the smallest it had encountered for a procurement of the size and complexity of the NRTS, it was one of the most effective.

3.7 A consequence of the small size of the Agency's team was that it necessitated passing the vast majority of work on the client's side of the procurement over to advisers, including day-to-day responsibility for the management of the procurement. The Agency's ability to manage effectively the cost of KHHD, which earned its fees on an hours worked basis, was limited by the size of the Agency's team, the considerable volume of material prepared by KHHD and the diverse geographical spread of the team and its advisers.

3.8 The Agency planned to manage its advisers by identifying each task and defining the work required by the advisers to complete the task before assigning a budget or commissioning the work. In practice, there were no incentives, such as task performance bonuses/deductions, in KHHD's contract to encourage delivery against budgets. Moreover, for most of the set tasks, the Agency did not in fact seek detailed task descriptions in advance of the assignment. In some cases, the Agency formalised the tasks retrospectively.

PART FOUR

The new services are up and running and benefits are starting to flow

GeneSYS completed the works to upgrade the telecommunications systems essentially on time and is, so far, delivering the contracted services. Value for money of the NRTS contract relies upon the Agency now implementing road management projects that require the improved data transmission capability.

For practical purposes, GeneSYS completed its upgrade of the telecommunications systems on time

4.1 Following award of the contract on 16 September 2005, GeneSYS had two years to complete the upgrade of the Agency's telecommunications systems. The upgrade included laying 110 kilometres of fibre optic cable alongside the M3, M4 and M62 motorways to complete the core network of fibre optic cables. The work also included refurbishing 149 transmission stations with new digital technology equipment. Although GeneSYS still had to complete some non-substantial outstanding works, including the production of some supporting documentation, the Agency accepted that the build phase of the contract was completed on 3 October 2007.

4.2 GeneSYS suffered disruption to many of its activities:

- Environmental planning consents delayed commencement of GeneSYS's cable laying activities particularly along the M3 motorway where it encountered dormice and other protected species. To recover time, the contractor increased resources used on the project, for example through additional working shifts.
- The contractor experienced the loss of existing cable that was stolen from surface troughs. To reduce the risk, it decided to bury the vulnerable cable, at its own cost, rather than re-lay it in the troughs.
- GeneSYS took nine months longer to obtain factory acceptance of its proposed technology. To avoid potential delays to the overall programme, the contractor decided, at its own risk, to roll out the proposed technology while it resolved the technological problems.

4.3 Despite the problems that it encountered, GeneSYS resolved them without bringing any claims against the Agency for additional payment or extensions of time. The contractor complied with its obligations sufficiently well to avoid activating provisions that entitled the Agency to recover damages. The level of its non-compliances never exceeded the second of seven recordable levels which was three levels below the point at which the Agency could levy damages (Appendix 3). In executing the upgrade of the Agency's telecommunications systems, GeneSYS's health and safety record was also good.

There are some teething problems but a good working relationship is being established between the Agency and GeneSYS

4.4 The time that has elapsed since completion of the upgrade has been too short to use performance data to judge the likely outcome of the contract. However, under the contract, when GeneSYS took over responsibility for the Agency's telecommunications services, it had to demonstrate that the reliability and availability of its services were better than the average results recorded over the previous year before migration.

4.5 GeneSYS and the Agency told us that there is a fault reporting problem that needs to be resolved. Some of the Agency's monitoring equipment that GeneSYS incorporated into its systems has been generating reports of faults for the services being monitored, even though in many cases the services are functioning normally. GeneSYS was thus presented with a large volume of fault reports, only some of which were genuinely attributable to GeneSYS's services. Because GeneSYS was being swamped by the volume of such fault reports, subject to £100 per hour deduction, it was at risk of missing genuine faults within its network.

4.6 In view of the fact that the reported faults do not result in any loss of service, the Agency has not, so far, made any deductions. The Agency has agreed, with the contractor, a work programme to reduce each month the level of reported no loss faults. If the contractor does not meet its programme of improvements, the Agency is entitled to levy deductions, though at a rate of £1 per hour per device. The contractor has agreed to resolve fully the problem within 12 months. These arrangements are designed to incentivise the contractor to overcome the problem and to avoid driving it into insolvency for no loss faults. Faults that result in a real loss of service do not receive similar relief.

4.7 The continuity of the Agency's staff and advisers from procurement through the build phase and into the operational phase of the contract has provided the Agency with the ability to act as a knowledgeable client. GeneSYS recognises that the Agency's team understands the contract and this understanding has contributed to a good working relationship. Moreover, GeneSYS is keen to maintain its good relationship with the Agency, to meet the aspirations of the contractor's major shareholder, Fluor Corporation, which wants to expand its client base in the UK beyond Network Rail and London Underground.

Going forward the Agency has a number of ways to protect value for money

4.8 In putting together the contract, the Agency negotiated a range of terms designed to protect value for money during the operational phase. These protections include:

- The schedule of pre-priced additional work to the telecommunications network that the Agency can call-off as and when needed;
- Clauses which allow the Agency to share any reduction in costs due to the application of innovation by the contractor;
- A biannual technology review, to share likely reductions in the price of telecommunications equipment over time;
- Minor variations to the contract that can be rolled into a major variation, saving processing costs;
- A simple payment deduction regime that covers continuous and intermittent faults and is applied whenever a service is unavailable or, when the fault is caused by others, the service is unavailable after the elapse of the agreed remedy period;
- GeneSYS takes the risks on capacity up to the limit of the high demand scenario (the Agency retains the volume risk if its requirements exceed the high demand scenario); and
- GeneSYS takes the risk that the Agency either may not complete its future works on time, or might not be able to provide GeneSYS with access to the roadside on time. To manage its obligations, GeneSYS needs to partner with the Agency in a manner that keeps the contractor informed of the Agency's future works.

Benefit realisation will depend on the programme of projects supported by the NRTS

4.9 The Agency has a programme of projects designed to enhance its management of the motorway network. Some of these are already in operation, such as Variable Message Signs and active traffic management schemes. The functionality of these schemes is being enhanced by the improved capability of the telecommunications systems. For example, through the NRTS, the Agency now has telecommunications services that allow tracking of traffic volumes second-by-second rather than relying on one minute averages.

4.10 Though some applications, such as road monitoring CCTV cameras, are in place already and could operate without the NRTS, the project has provided upgraded levels of performance in terms of image quality and coverage of the road system. For example, the Agency has, during the upgrading of the telecommunications systems, installed more CCTV cameras across the relevant sections of the motorway network. These images can now be accessed by all seven regional control centres rather than from just the local centre. The resilience inherent in the NRTS network design also enhances reliability of the services. Without the NRTS, other projects, such as future, more sophisticated traffic control systems, would have required ad hoc upgrading of the telecommunications systems.

4.11 **Figure 19 on pages 36-39** sets out the state of progress with projects dependent on the NRTS. Many are due to be introduced in 2008 in some form. The projects range for example from the current introduction of Automatic Number Plate Recognition systems to the greater use of digital speed enforcement technology. While no allowance has been made to support any future possible road pricing initiative, the capacity of the NRTS could be expanded to do so.

4.12 It is too early to assess the success of the schemes that rely on the NRTS, and no full assessment can therefore be made of the realisation of benefits associated with the project. The benefits will also depend on the extent to which these schemes are rolled out, which in part is determined by the resources available to the Agency over the life of the contract.

4.13 Currently, the Agency expects benefits from the projects it is taking forward to exceed the costs. This expectation implies that, by enabling these other projects, the NRTS will be realising a net benefit. However, this implication can only be confirmed as the projects involved are rolled out and evaluated. The Agency has told us that it has plans to conduct this evaluation.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Hard shoulder ENDS
JAMES A.McHUGH

19 Projects facilitated by the NRTS

Project/Initiative	Description	Pre-contract operational performance
Motorway Incident Detection and Automatic Signalling	A system which automatically detects slow moving and stationary traffic and provides warning to drivers of an incident ahead. The system also periodically reports traffic data to Regional Control Centres.	Traffic conditions determined using one-minute averages at a limited number of sites.
CCTV cameras	Video images of traffic conditions.	Continuous video link between each camera and the local police control room even when not viewed. Picture quality of analogue signal degraded with increasing transmission distance.
Weight in Motion project	A system that detects the weight of a lorry in motion, records the lorry's number plate, checks the number against a database that records the maximum allowable weight and produces high quality photographs of lorries.	Pre-contract telecommunications systems could not support the high levels of telecommunications traffic generated.
Automatic Number Plate Recognition (ANPR) camera projects	Data from ANPR cameras can be used by the Agency to monitor movements by vehicles, allowing for analysis of the impact of interventions on traffic behaviour. Data can also be used by third parties.	Many of the current ANPR cameras have their data collected manually (requiring a site visit).
Motorway Access Management	Allows the flow of traffic joining a motorway, at peak times, to be regulated to minimise the disruption to traffic flow on motorways. Traffic signals are used on motorway slip roads, which measure traffic flows on the main carriageway and queue lengths on the slip roads.	30 sites have been installed over the last couple of years but in the absence of a high bandwidth network to these sites, telecommunications links were provided using lines leased from public telecoms operators.
Speed Enforcement	Digital Speed Enforcement Cameras capture images of speeding vehicles.	Previously speed enforcement cameras used wet film technology, requiring regular site visits to change films. Wet film cameras were used on the controlled motorway section of the M25.
Active traffic management schemes	Active traffic management enables the Agency to make best use of road space according to traffic conditions and any other events, for example, using the hard shoulder as a running lane during peak periods.	A dedicated network was installed on the M42 but without the level of resilience provided by NRTS.

Performance expected under the NRTS	Benefits	Project timetable
Technical constraint limiting the number of sites lifted. Data collected and analysed on a vehicle by vehicle, real time basis.	Better observation of network performance. Lane by lane incident detection. Permits analysis of speed restriction compliance.	Road trials planned for Spring 2008.
Digital transmission of CCTV images facilitated. Cameras are only connected when they need to be viewed, allowing almost unlimited growth in the number of cameras without increasing the capacity of the network.	A subsidiary project will enable public to view the pictures captured by all cameras on the Agency's network via a website. The Agency is investigating linking temporary road works CCTV back to Regional Control Centres (RCC) to enable the RCCs to direct resources to incidents within road works. The NRTS will allow CCTV footage to be stored and used to analyse the events leading up to incidents and the way in which traffic officers have responded to incidents. Higher quality and more robust CCTV footage creates potential for the Agency to monitor traffic management within motorway road works.	Implemented January 2008.
Constraints on the levels of telecommunications traffic will be alleviated.	More intelligent analysis of the types of vehicles committing offences will be facilitated.	End of 2007-08 with more sites planned 2008-09.
The NRTS will allow data to be collected automatically from future installations.	Network intelligence, e.g. measuring journey times and assessing the impact of traffic management schemes. Law enforcement.	On-going but two major schemes due end of 2007-08.
Programme to install 25 additional sites during 2007-08 and more sites in 2008-09 will use the NRTS. A plan to transfer the original sites onto the NRTS network is also being developed.	Reduces congestion. Improves journey times.	End 2007-08 for next 25 sites.
The NRTS allows the further roll out of the Agency's Digital Enforcement Camera System. Digital images can be instantly transmitted to the relevant enforcement agency.	Improves safety. Ensures compliance with traffic management regimes, enabling their benefits to be delivered.	End 2007-08 for M20 and M25.
The system relies on a large number of fixed CCTV cameras to ensure that the hard shoulder is clear of debris and stranded vehicles. Transmitting these CCTV images requires the levels of bandwidth provided by the NRTS.	Up to 500km of active traffic management could be delivered with the bandwidth provided by the NRTS. Called-off additional works would be needed to provide the local transmission paths from the roadside to the nearest transmission station but beyond the local transmission station sufficient bandwidth exists in the NRTS network.	New West Midlands sections in phases starting end of 2008.

19 Projects facilitated by the NRTS *continued*

Project/Initiative	Description	Pre-contract operational performance
Support for Regional Control Centre disaster recovery plans	Disaster recovery plans are being drawn up for Regional Control Centres, which include a range of scenarios from temporary evacuation of a RCC to the complete loss of a RCC for several months.	Not comparable. Previous plans involved manual systems.
Emergency Roadside Telephony and Inter-RCC Telephony	Emergency Roadside Telephone systems connect road users with Regional Control Centres. Inter-RCC telephony refers to other operational telephony systems used by the Agency for voice communications with traffic officers, neighbouring RCCs and other stakeholders.	The current Emergency Roadside Telephone system only allows calls to be answered from the local Regional Control Centre and has no capacity for onward connection of calls, for example, to a neighbouring RCC or the emergency services.
Next generation of traffic control systems	Traffic control systems are used to set motorway signals and message signs, monitor traffic flows and weather conditions and implement traffic management regimes. The Agency is considering the opportunity presented by the NRTS for a single logical system spanning all RCCs. Such a system would provide a single definitive view of the state of the road network . There is also the potential for roles to be reassigned between RCCs at night time or during a major incident.	
Provision of traffic data to third parties	Traffic data collected by the Agency, including the National Traffic Control Centre (NTCC) in Birmingham, is distributed to public websites and a range of third party organisations who, for example, supply traffic information to satellite navigation systems to inform drivers of traffic delays. Such data could also be shared with researchers.	The NTCC obtained its data about motorway traffic conditions using the Agency's low resilience legacy networks that provided only limited CCTV coverage. Otherwise, the NTCC obtained data from other sources including motorway incident detection and automatic signalling equipment and automatic number plate recognition cameras.
Improving the capability of the Traffic Officer Service	The Agency is currently exploring new ways of delivering and receiving data and video images from traffic officer vehicles attending incidents on the roadside. A number of wireless technical solutions are possible, some of which may use the NRTS network.	
Road Pricing	Network capacity could be increased to support road pricing initiatives, although no allowance has been made for this in the NRTS bandwidth calculations.	
Facilitating future research projects	A wider range of research projects can be trialled with ease and timeliness since easily accessible bandwidth is now provided at the roadside following the implementation of the NRTS.	

Source: Highways Agency

Performance expected under the NRTS	Benefits	Project timetable
Plans for disaster recovery can be easily accommodated following the migration of all circuits onto the new NRTS network, due to its capability for transferring information from anywhere to anywhere.		Interim plans by end 2007-08.
A system integrating Emergency Roadside Telephone systems with other operational telephone systems would use the NRTS to deliver greater resilience and support more flexible working. Such a system could divert calls to a neighbouring RCC in the event of a major failure at one RCC, or to share call loads.		Business Case was approved January 2008. The first RCC Area rollout is planned for 2008-09. Project expected to deliver new systems in 2011.
The NRTS infrastructure allows traffic data to be transferred from motorway locations to the National Traffic Control Centre. New roadside monitoring equipment (motorway incident detection systems and CCTV cameras) and the additional capacity of the NRTS allow more data of better quality to be captured. Improved resilience. The Agency is considering improved and more flexible access to CCTV.	Improved journey times Better informed travellers	Improvements in CCTV expected in 2008-09. Ongoing research. None. n/a.

APPENDIX ONE

Study scope and methodology

1 The objective of this study was to examine the Agency's procurement of the PPP contract for the NRTS. We planned to examine the processes used by the Agency to gain assurance that the deal it was pursuing would be value for money.

2 To scope the study, we:

- identified issues from our published documents: *A Framework for evaluating the implementation of Private Finance Initiative projects: Volumes 1 and 2;* and *Examining the value for money of deals under the Private Finance Initiative*;
- interviewed the Agency's project manager and advisers from Hyder and KPMG; and
- conducted an initial review of the Agency's project files.

3 From the scoping work, we identified a number of issues that we then analysed. We found that the issues logically fell into two high-level, chronologically ordered sets:

- Was there a real need for the new services?
- In procuring the NRTS, did the Agency get a good deal?

Study methodology

4 Having scoped the study through the issue analysis, we collected the evidence that would answer our audit questions through three principal work activities:

- File review;
- Interviews with key parties; and
- External advice about telecommunications technology and the costs of such technology.

5 During the file review, we collected contemporaneous records that informed us about the conduct of the Agency throughout the feasibility study and the procurement. The material readily available to us was not complete. With the Agency's personnel focused on managing the Agency's rights and obligations during the build phase of the contract, there was no one with sufficient time to track down all the material we needed.

6 The information we had included:

- Minutes to Ministers
- Minutes of meetings of the Agency's project board
- Reports from the Gateway reviews
- Bid evaluation reports
- Risk report
- Various versions of the public sector comparator
- GeneSYS's financial model
- The contract documents

7 We also reviewed emails, letters and notes collected by the Agency that had relevance to the issues that we had identified.

8 To obtain first hand accounts of the views that various parties held about the project, we conducted semi-structured interviews with: key advisers to the Agency (KPMG, Herbert Smith, Hyder and Detica); members from the losing bidders (BT and Serco); and GeneSYS.

9 We engaged Mason Communications Ltd to answer the following questions:

On Technology

- In 2005, were there any new or emerging technologies that the Agency should have considered?
- Should the Agency have halted the procurement to consider any known or imminent technological advances that were more likely to meet the Agency's objectives?
- Since 2005, have any new technological advances occurred that could provide a better service?
- What are industry views about the impact of in-vehicle satellite navigation on driver behaviour and does this impact on the future relevance of the NRTS?
- What is the longer-term commercial value of the Agency's telecommunications network?

On costs and risks

- Were the Agency's cost inputs in its public sector comparator reasonable?
- Were the Agency's risk adjustments in its public sector comparator reasonable?

APPENDIX TWO

Changes in the Agency's evaluation of commercial proposals, issues and omissions in GeneSYS's bids

20 Values that the Agency assigned to proposals, issues and ommissions in GeneSYS's bids that, while not in full accord with the Agency's most desired outcome, the Agency was prepared to consider

	The Agency's estimates of the costs of material differences in GeneSYS's bids				Movement in positions on material issues between the Best and Final Offer and the Revise and Confirm offer
Issue	Invitation to Negotiate £ million	Evaluation after Clarification £ million	Best and Final Offer £ million	Revise and Confirm £ million	
Consequential Issues	–	–	5	0	In its Best and Final Offer, GeneSYS submitted an altered version of the proposed contract. The consortium caveated the bid with a statement informing the Agency that the bid did not address issues that were consequential to the alterations. As part of its Revise and Confirm offer, GeneSYS stated that changes likely to affect price or risk allocation had been expressly included in the bids.
Access Regime	No value assigned	–	5	0.5	GeneSYS had wanted the Agency to bear more risk in circumstances where the contractor experienced difficulties gaining access to the telecommunications network. The Agency and GeneSYS agreed to prepare a protocol that would set out broad principles for the contractor's access regime, including provisions covering the contractor's entitlement to relief and compensation when unable to obtain access.
Change in Law	1	1	2.5	0	GeneSYS had proposed extending the definitions of changes in law that would entitle the contractor to compensation for resulting costs. The Agency agreed to some of the changes, noting in these cases that GeneSYS's definition was consistent with the then current version of the Standardisation of PFI Contracts. GeneSYS also agreed to reduce the scope of its demands.
Compensation Events	–	–	5	1	GeneSYS had extended the definition and application of Compensation Events. The Agency agreed to GeneSYS's request that provisions governing Compensation Events cover the full term of the contract. GeneSYS agreed that Compensation Events would not include losses flowing from affected commercial contracts.
Employees	–	–	1	0.5	GeneSYS wanted the Agency to indemnify the contractor in respect of pre-transfer employee claims. GeneSYS also wanted the Agency to warrant supplied employment information. The Agency refused both requests. In response, GeneSYS set out the assumptions that governed its pricing relating to transferred employees.

20 Values that the Agency assigned to proposals, issues and ommissions in GeneSYS's bids that, while not in full accord with the Agency's most desired outcome, the Agency was prepared to consider *continued*

	The Agency's estimates of the costs of material differences in GeneSYS's bids				Movement in positions on material issues between the Best and Final Offer and the Revise and Confirm offer
Issue	Invitation to Negotiate £ million	Evaluation after Clarification £ million	Best and Final Offer £ million	Revise and Confirm £ million	
Force Majeure	No value assigned	0	1	0.5	GeneSYS had inserted a provision that left the Agency liable for the uninsured portion of any remedial works following a force majeure event. GeneSYS agreed to substitute the insertion with an agreement to agree approach.
Indemnity and Liability Limitation	15	15	15	4	GeneSYS had sought material amendments to four types of indemnities that the contractor would have to provide in favour of the Agency. The Agency accepted three of the changes. For the fourth type of indemnity, which covered third party losses, GeneSYS accepted most of the indemnities sought by the Agency. It rejected an indemnity covering reasonably foreseeable, third party consequential losses, where the third party was a party to a contract with the Agency.
Insurance	5	5	4	0	GeneSYS informed the Agency that obtaining firm insurance prices for anything other than relatively short periods had proved difficult. The quoted prices were therefore only indicative. The parties agreed to discuss commercial issues relating to insurance during the preferred bidder stage.
Intellectual Property	2	2	1	1	GeneSYS and the Agency agreed to discuss differences about Intellectual Property Rights during the preferred bidder stage.
Latent Defect/ Information Risk/Assets	–	–	1	1	The Agency agreed to provide GeneSYS with warranties about the type, location and quantity of existing assets. This warranty did not extend to the condition of the assets. The Agency also asked GeneSYS to submit its Revise and Confirm bid on the basis of a set of assumptions about the condition of existing assets rather than wait for GeneSYS to complete further due diligence.
Relief Event	3	3	0.5	0.5	The Agency accepted GeneSYS's extension of the definition of relief events.

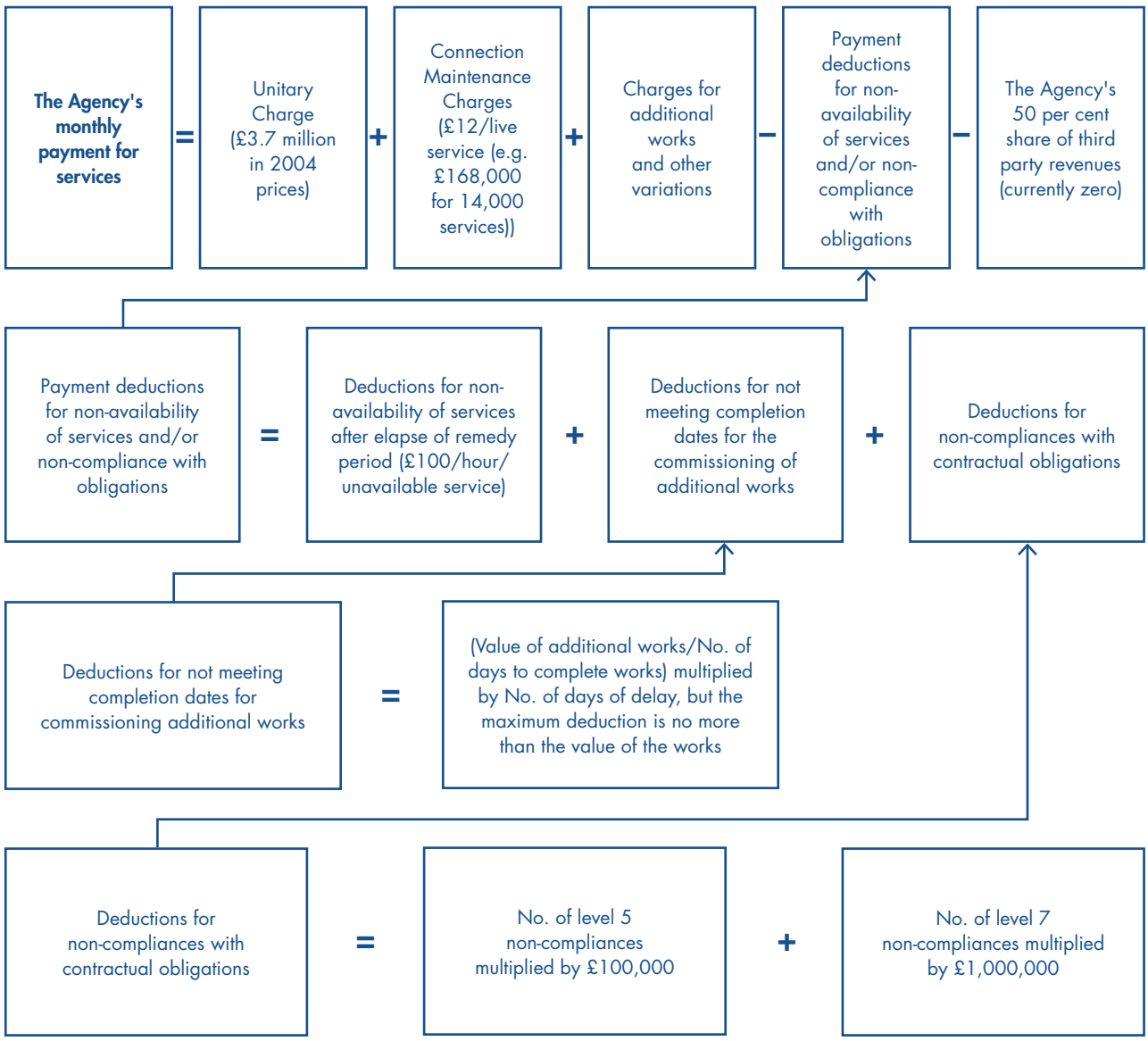
20 Values that the Agency assigned to proposals, issues and ommissions in GeneSYS's bids that, while not in full accord with the Agency's most desired outcome, the Agency was prepared to consider

	The Agency's estimates of the costs of material differences in GeneSYS's bids				Movement in positions on material issues between the Best and Final Offer and the Revise and Confirm offer
Issue	Invitation to Negotiate £ million	Evaluation after Clarification £ million	Best and Final Offer £ million	Revise and Confirm £ million	
Sub-contractors	No value assigned	–	10.5	1	GeneSYS had wanted the provisions that would restrict the contractor's ability to terminate and appoint sub-contractors to apply to only two sub-contractors. GeneSYS agreed that the provisions could apply to an "A-list" of sub-contractors and should the contractor wish to terminate a sub-contact with a listed sub-contractor, the Agency would not unreasonably withhold its acceptance. GeneSYS had not wanted to be constrained to payment periods for its sub-contractors of 30 working days. GeneSYS agreed to the Agency's demand for the inclusion of such a provision.
Termination and handback	8	8	1	0	GeneSYS and the Agency agreed to concede some ground about their respective definitions of termination events. GeneSYS did not concede ground on the calculation of compensation upon termination, which would not be less than the outstanding senior debt when termination was for anything, other than for contractor default. In the case of termination for contractor default, the Agency agreed to drop the valuation through re-tendering if the Treasury agreed.
Variations	10	5	1	0.5	GeneSYS secured amendments to provisions governing the variation mechanisms. The amendments affected: the means by which variations would be funded; the contractor's rights to object to variations if the execution period is judged unreasonable; and recovery of costs incurred in preparing variations that are later cancelled. GeneSYS agreed to drop a limitation on the Agency's right to reject variations proposed by the contractor.
Transparency of Costs	No value assigned	–	2	0	GeneSYS secured changes to the contractor's obligations to provide cost related information. The contractor would not have to provide the Agency with copies of information provided to the contractor's lenders. Also, the Agency agreed to drop its demand for access to sub-contractors' accounts. Under the proposed contract, the Agency would receive breakdowns of costs and profit margins for variations and could compare the costs against those in the cost model or, when the capital cost of the variation exceeded £250,000, could instruct the contractor to put elements of the variation out to tender.
Miscellaneous Issues	1	1	2.5	0	GeneSYS secured an amendment that lifted the obligation to remove redundant cables from the ground where the cables were not in ducts.
Total	**45**	**40**	**58**	**10.5**	

Source: National Audit Office

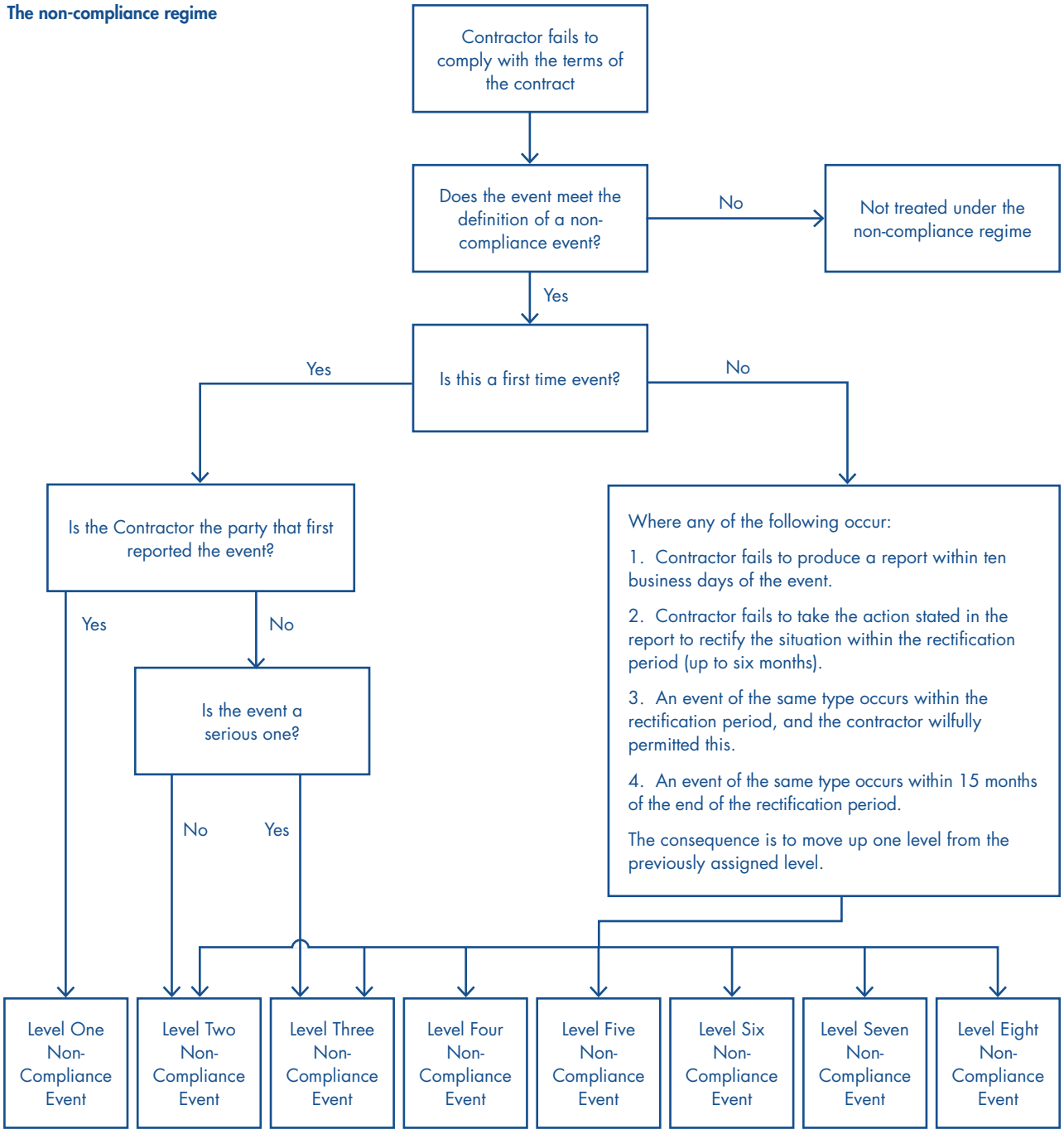
APPENDIX THREE

The payment and performance regimes

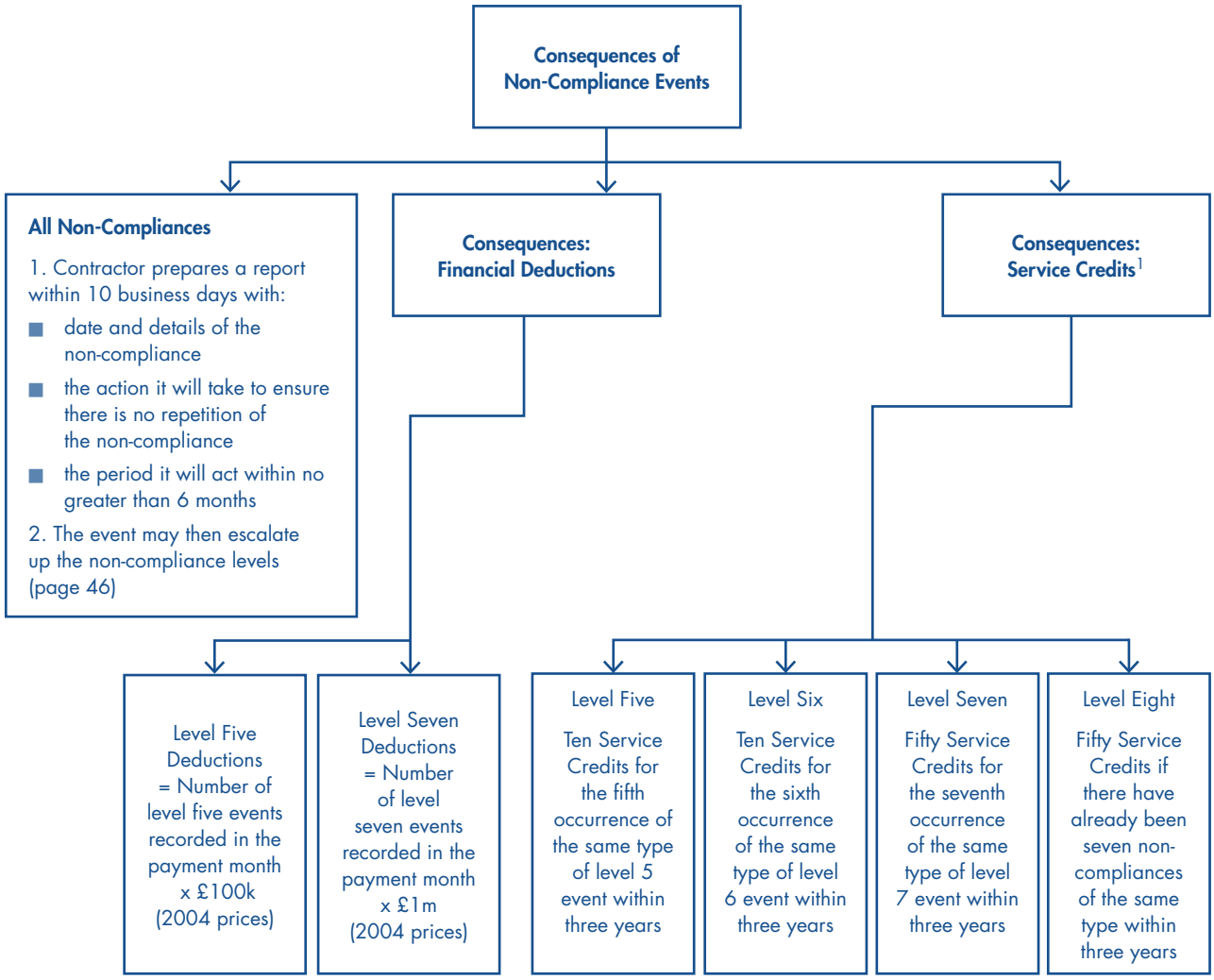


Source: National Audit Office

The non-compliance regime



Source: National Audit Office



Source: National Audit Office

NOTE

1 The contractor's accumulation of service credits over various set periods of time can trigger the Agency's right to initiate termination of the contract for contractor default.

APPENDIX FOUR

Risks included in the Public Sector Comparator

Risks that the Agency identified would be priced and included in a PPP contractor's bid	Expected impact of risk/£	
	High Demand Scenario	Base Case Scenario
Construction Risk		
Cost increases due to condition of the Agency's existing assets	5,531,422	4,425,137
Cost of upgrading and extending the telecommunications network are higher than forecasted	7,533,234	4,971,934
Completing the initial works takes longer than the planned two years	4,113,298	4,113,298
The contractor's loss of potential profits following termination of the contract as a result of a Force Majeure event	127,240	63,620
Sub-contractor default	2,672,037	1,336,019
Industrial action affecting the contractor and/or its sub-contractors	470,787	235,394
The contractor is not ready at the relevant date to take on responsibility for delivering the existing services	1,236,151	1,236,151
The delay in the contractor's readiness to take on responsibility for delivering the existing services can be attributed to other contractors employed by the Agency	733,046	733,046
Interfaces between the contractor and third parties are more difficult than expected	839,783	419,892
Sub-contractors provided incorrect cost estimates for the pre-priced additional works	305,376	0
Responsibility for site and safety costs more than expected	381,720	190,860
Delays encountered in planning approval	190,860	190,860
The Agency causes delays to construction related activities	1,147,375	98,892
Unforeseen ground/site conditions are encountered	2,720,036	1,360,018
The contractor's project management is poorer than expected	3,295,512	1,644,923
Protestor action	1,412,362	704,967
Dealing with environmental damage	917,085	917,085

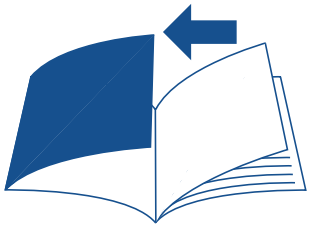
Risks that the Agency identified would be priced and included in a PPP contractor's bid *(continued)*	**Expected impact of risk/£**	
	High Demand Scenario	Base Case Scenario
Design Risk		
Costs associated with an outside body hacking, or attempting to hack into the NRTS systems	190,860	95,430
One, or more, of the designs for aerial masts is found to be deficient	477,149	0
One, or more, of the designs for camera masts is found to be deficient	0	0
One, or more, of the contractor's design submissions is delayed by the design approval process	2,793,638	2,793,638
The contractor fails to translate the Agency's requirements into one, or more, of the designed solutions	1,023,867	337,876
One, or more, of the contractor's designed solutions does not function correctly	2,201,005	2,017,588
A member of the contractor's consortium becomes insolvent	890,679	293,924
Legislative Risk		
The Agency avoids the costs of third party claims by exercising the indemnities provided by the contractor	2,035,838	1,017,919
General changes in law adversely impact on assumptions relied on by the contractor in preparing its prices	1,526,878	503,870
Obsolescence		
The contractor has to upgrade its chosen design to provide the contracted capacity as the Agency's demand for services increases	363,867	181,934
The contractor has to upgrade its assets because the provided technology does not meet contractual requirements	400,254	200,127

Risks that the Agency identified would be priced and included in a PPP contractor's bid *(continued)*	**Expected impact of risk/£**	
	High Demand Scenario	Base Case Scenario
Operating Costs		
Actual costs of maintaining the assets are higher than forecasted	699,819	2,519,349
Actual costs of maintaining the assets are higher than forecasted because of the presence of asbestos	381,720	381,720
Cost of providing the specified services was incorrectly estimated	7,459,040	7,160,679
The contractor is liable for failures in the compatibility between the NRTS systems and applications designed by third parties	267,204	133,602
The cost of repairing damage caused by others to uninsured property for which the contractor is responsible during the course of the contract	381,720	190,860
Performance Risk		
The contractor suffers payment deductions as a consequence of latent defects materialising in new and existing assets	5,801,664	3,807,283
The contractor suffers payment deductions and has to correct performance shortfalls caused by poor build quality	7,195,418	3,597,709
The contractor suffers payment deductions because it is delayed in reaching full service status	1,730,839	1,730,839
The contractor suffers payment deductions because its sub-contractors take longer than estimated to complete ordered additional works	346,671	0
In circumstance where the Agency has provided early and clear notice of its programme of road works, the contractor is unable to meet its assumed efficiency levels for executing its additional works in order to meet the Agency's wider works programme	2,290,317	0
In circumstance where the Agency's programme of road works as been in flux before the start of the notice period for ordering additional works, the contractor is unable to meet its assumed efficiency levels for executing its additional works in order to meet the Agency's wider works programme	7,818,485	0
The contractor has underestimated the performance capability of the Agency's existing fibre optic cables	5,098,483	3,364,999
The contractor has underestimated the performance capability of the Agency's existing copper cables	4,299,310	2,837,544
The contractor suffers payment deductions because the NRTS network is not sufficiently resilient to prevent otherwise avoidable outages	254,480	127,240
The contractor suffers payment deductions because general performance standards are below those required by the Agency	6,380,243	3,190,121
The contractor suffers payment deductions because performance of services to roadside devices connected to the NRTS through ordered additional works is below contracted standards	2,035,838	0
In its management of disruptions to services caused by road works, the contractor is not as efficient as it assumed it would be	1,119,711	559,855

Risks that the Agency identified would be priced and included in a PPP contractor's bid *(continued)*	**Expected impact of risk/£**	
	High Demand Scenario	Base Case Scenario
Regulatory Risk		
The contractor incurs costs in meeting requirements flowing from the introduction of new British and/or international design standards	349,910	115,470
Residual Value Risk		
The contractor has to compensate the Agency for degradation of the NRTS assets beyond that permitted under the contract	1,154,495	577,247
Interface Procurement Risk		
The contractor incurs costs because it has had to correct errors in the scope of the contracts awarded to its sub-contractors	4,453,395	1,781,358
The contractor incurs costs resolving disputes with its sub-contractors	827,059	330,824

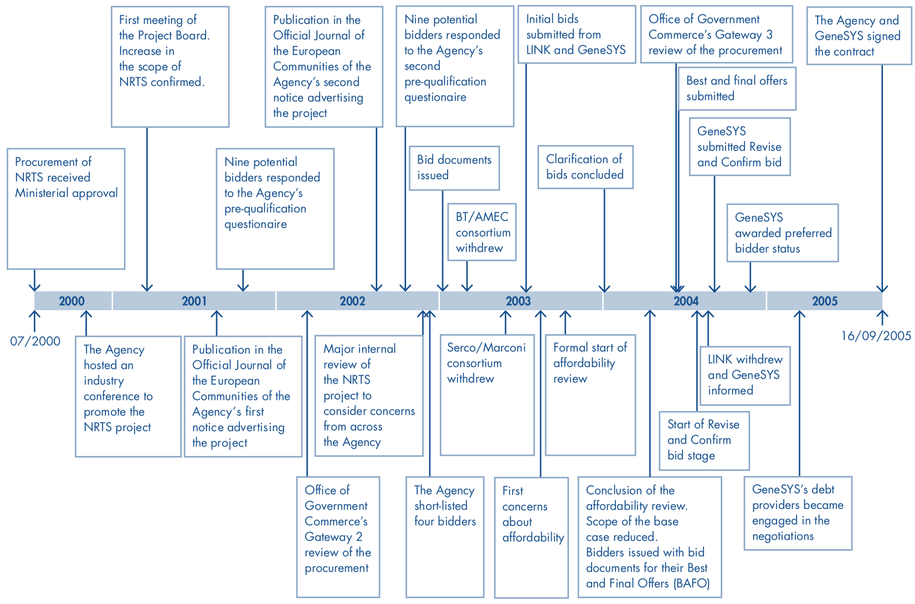
APPENDIX FIVE

Progressive movements in the Agency's budget and timetable for the procurement

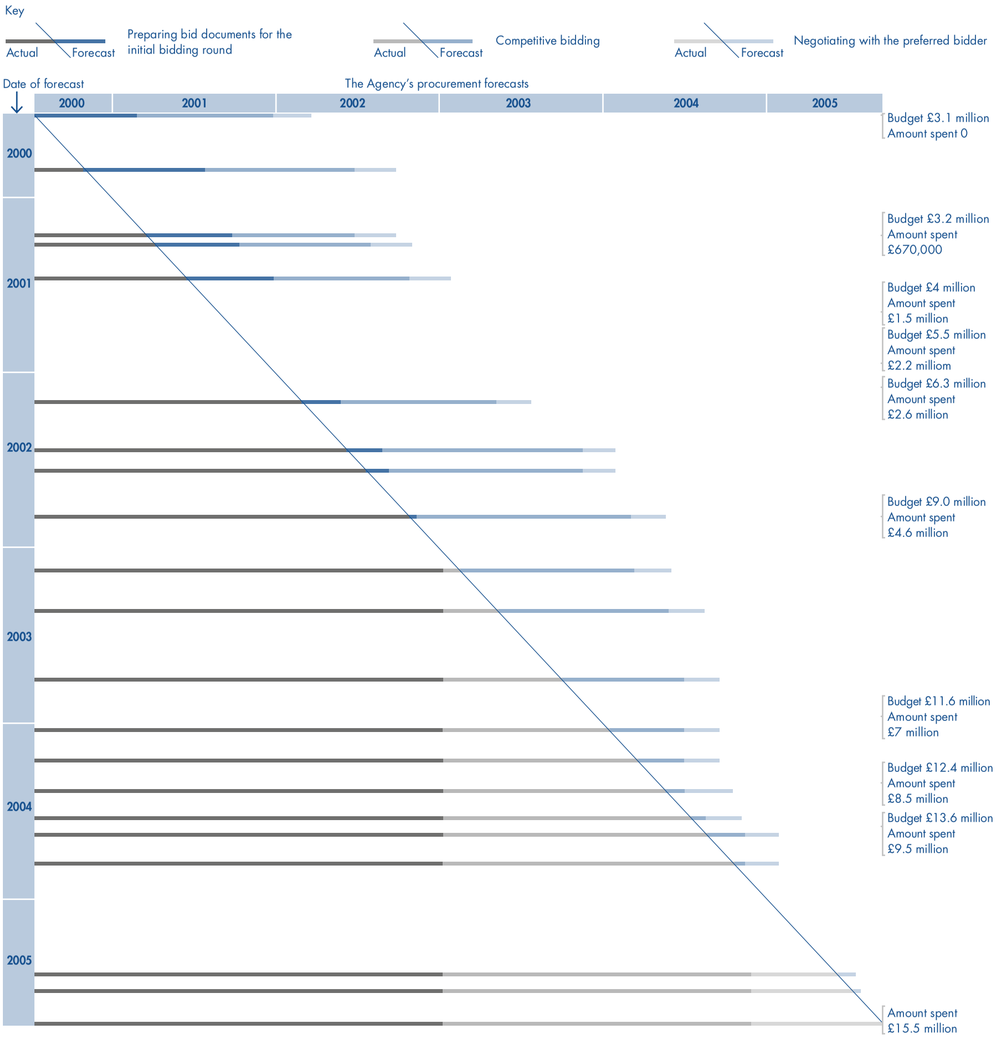


Key events during the procurement of the PPP contract for the NRTS overleaf

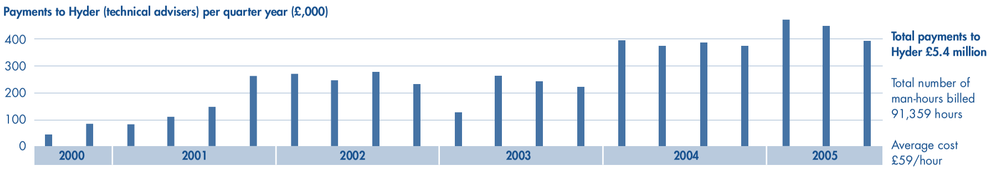
Key events during the procurement of the PPP contract for the NRTS



The procurement timetable progressively increased from 21 months to over five years and the budget increased from £3.1 million to £15.5 million



Payments to Hyder (technical advisers) per quarter year (£,000)

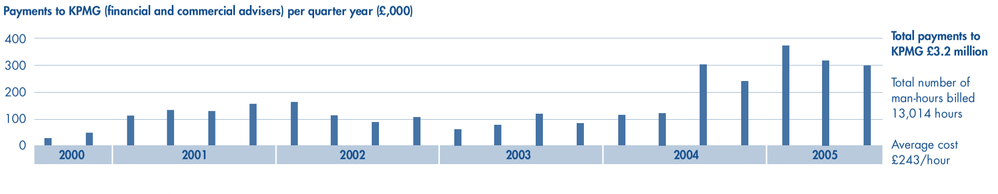


Total payments to Hyder £5.4 million

Total number of man-hours billed 91,359 hours

Average cost £59/hour

Payments to KPMG (financial and commercial advisers) per quarter year (£,000)

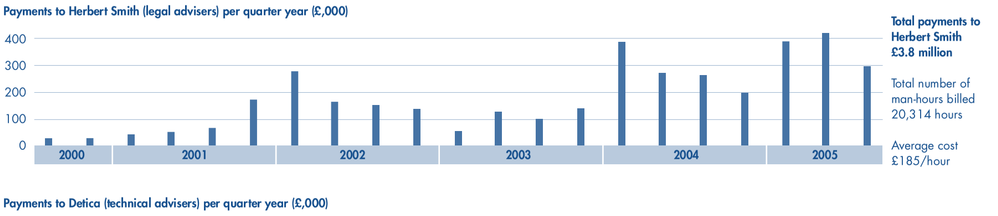


Total payments to KPMG £3.2 million

Total number of man-hours billed 13,014 hours

Average cost £243/hour

Payments to Herbert Smith (legal advisers) per quarter year (£,000)

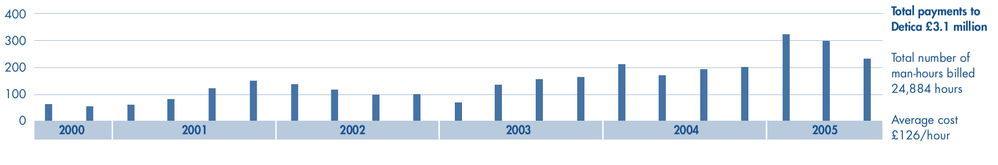


Total payments to Herbert Smith £3.8 million

Total number of man-hours billed 20,314 hours

Average cost £185/hour

Payments to Detica (technical advisers) per quarter year (£,000)

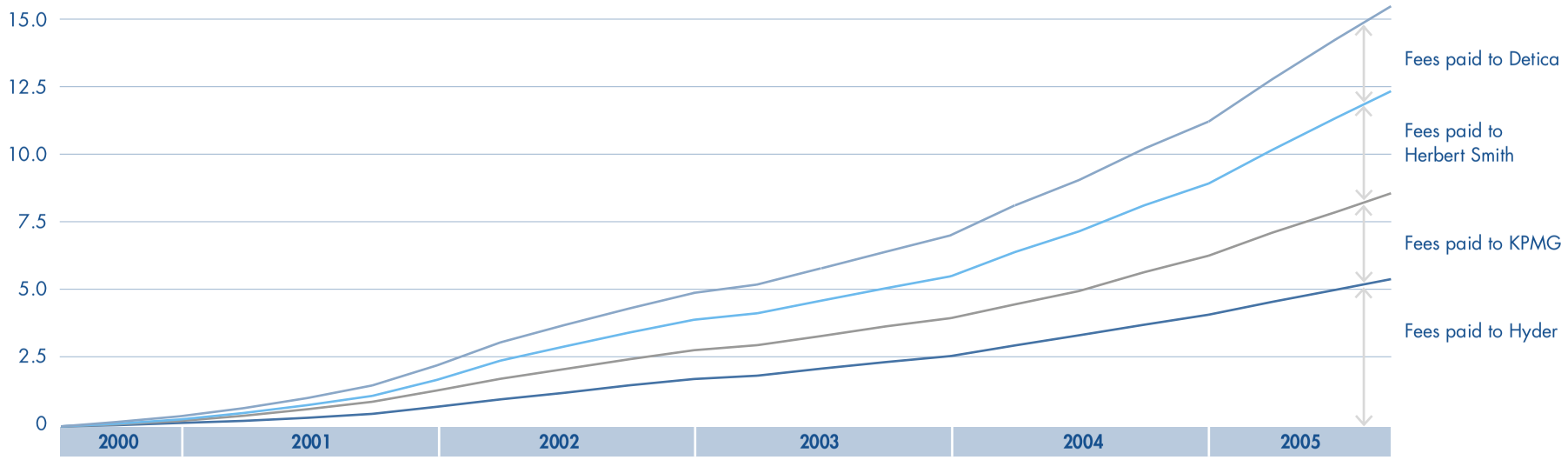


Total payments to Detica £3.1 million

Total number of man-hours billed 24,884 hours

Average cost £126/hour

The cumulative spend on the four advisers (£ million)



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