

Midland Metro - City Centre
Extension & Fleet Replacement

Value for Money Case

October 2009

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1 Introduction

Background

- 1.1 This Value for Money (VfM) Case document has been developed in accordance with the Department for Transport's guidance for Local Authorities seeking Government funding for major transport schemes. It presents the case for the scheme through the demonstration of the likely impacts, both beneficial and non-beneficial, and sets them against the forecast costs for the scheme.
- 1.2 This Case builds on the very strong rationale for the scheme presented in the Strategic Case and sets out the appraisal of the preferred scheme as described in the Strategic Case. It also draws on the information provided in the Delivery and Commercial Case to inform the assumptions and parameters for the appraisal and address the requirements for the Supporting Analyses.

Appraisal Overview

- 1.3 In 1998 the Government's 'New Approach to Appraisal' (NATA)¹ set out the principles to be used in the assessment of all transport schemes, both road and public transport. Central to the approach is that schemes should be measured against the five core Government objectives for transport:
- | Environment - to protect the built and natural environment;
 - | Safety - to improve safety;
 - | Economy - to support sustainable economic activity and deliver good value for money;
 - | Accessibility - to improve access to facilities for those without a car and to reduce severance; and
 - | Integration - to ensure that all decisions are taken in the context of the Government's integrated transport policy and other relevant policies.
- 1.4 The results of the appraisal are summarised in an Appraisal Summary Table (AST). A seven-point² scale 'score' (covering large, moderate and slight impacts, both positive and adverse, as well as neutral impacts) is then given to judge the contribution of a scheme towards each sub-criteria.
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¹ Department for Transport, Environment and the Regions, 1998

² Integration of Land use policy and Other Government policies use a three point scale in accordance with WebTAG.

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Approach to the Assessment

- 1.5 The assessment of the preferred scheme (Do Something) is based upon appraisal of its comparative performance against the Do Minimum, which represents the scenario in the event that investment in the Do Something does not take place.

Do Minimum

- 1.6 The Do Minimum has been defined as:

- | Continued Midland Metro operation on Line 1 at 7.5 tph
- | Ongoing operation with the current tram fleet (until end of operational life)
 - | Half-life refurbishment (2013)
 - | Escalating maintenance costs
- | Like for like tram fleet replacement at end of the operational life (2028) of the current fleet
 - | Associated depot and Line 1 modifications
- | Continued operating practices
 - | e.g. fares policy, revenue risk arrangement
- | Implementation of committed transport and land use schemes

Do Something

- 1.7 The Do Something is as described in Chapter 6 of the Strategic Case. The proposed extension to Midland Metro Line 1 runs for 1.4 kilometres through Birmingham City Centre to New Street Station. It will operate at 10 trams an hour in each direction and a fleet of new trams will be procured to replace the existing fleet in 2014, earlier than would otherwise take place.

Optimising the Benefits of Investment

- 1.8 The Do Something scheme optimises the current Line 1 infrastructure by enhancing capacity and city centre penetration. *pteg* (the body representing the six Passenger Transport Executives which are the driving force behind the development of public transport in the city regions) recently published an Advice Note for promoters considering a light rail scheme (July 2009). The Advice Note summarised the main areas in which promoters should seek to enhance the benefits of their schemes. Through its better use of existing infrastructure, coupled with Centro's parallel investment in Smartcard, Park & Ride and its Transforming Bus Travel initiative the project complies with the main recommendations as shown in Table 1.1.

TABLE 1-1 SCHEME OPTIMISATION ELEMENTS ACHIEVED

Objective	
Transport Integration	✓
Park & Ride	✓
Interchange at Stations	✓
Integration between bus and light rail	✓
Through-ticketing	✓
Priority over road vehicles	✓
Passenger Information	✓
Cycling and Walking	✓

Outline of the Value for Money Case

1.9 The elements that describe the Value for Money Case are set out in seven chapters. These relate to the objectives for transport identified by central Government and the supporting analyses. The chapters cover the following areas:

- | Chapter 2 - Environment
- | Chapter 3 - Safety
- | Chapter 4 - Economy
- | Chapter 5 - Accessibility
- | Chapter 6 - Integration
- | Chapter 7 - Case Summary
- | Chapter 8 - Supporting Analyses

2 Environment

Introduction

- 2.1 The assessment of the environmental impact of the scheme presented in this chapter is based on the Environmental Statements, reported in Centro's Statements of the Case prepared for the Transport and Works Act Public Inquiries. The issues were examined in great detail during the Inquiries.
- 2.2 In general, the scheme has been designed to maximise benefits to the environment and to minimise or mitigate any negative effects. During construction a proactive approach to environmental management will help minimise adverse effects. The Code of Construction Practice (CoCP), which will govern the way the works are constructed, will be adopted to ensure that this objective is met.

Noise and Emissions

Noise

- 2.3 Construction noise will be a key issue during the time that the scheme is constructed. Noise will largely only impact those along the alignment. However, through pursuance of the CoCP the effects will be minimised and the duration of works limited. The mitigation measures contained in the CoCP will be targeted at temporary screening, control of working hours and types of equipment used. These measures are anticipated to mitigate the effects to a satisfactory level.
- 2.4 Once in operation the frequency of the trams and their limited noise level will not greatly impact on the ambient noise levels in the areas through which they pass. On the existing alignment, much of which is in a railway cutting the more frequent services are likely to have an imperceptible impact. Elsewhere, on the City Centre extension and across the wider road network the introduction of Midland Metro and localised impacts on traffic flows due to the transfer to Metro from private car and increased attractiveness of Park and Ride opportunities is likely to have a negligible impact given background noise levels.
- 2.5 A quantification of the impact has been forecast on the basis of WebTAG highway externality values. For the forecast year 2016 the value is negligible.

Air Quality

- 2.6 Midland Metro vehicles do not emit air pollution directly. With the implementation of the scheme the principal impacts upon air quality will arise from:
- | Construction and demolition (dust emissions);
 - | Generation of electricity to power the vehicles; and
 - | Effects on traffic management and traffic movements.
- 2.7 The mitigation of the impacts during construction will be addressed through adherence to the CoCP. In relation to power generation, trams produce low levels of vehicle emissions when compared with buses and the environmental impacts per passenger kilometre are low. The proposed route of the extension runs through Birmingham's air quality management area (AQMA) and will support wider initiatives to achieve significant improvements in air quality along Corporation Street. Given

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the nature of the City Centre extension route, namely the tall buildings along it, air pollution problems can be exacerbated. The introduction of Metro will avoid this being the case. The Inspector's report stated that improvements in the local air quality would be achieved in the City Centre.

- 2.8 Further, reductions in emissions will arise as a consequence of modal shift as trips by Metro result in a reduction in highway kilometres travelled within the corridor. The valuation of the benefit of this highway externality in 2016 is negligible.

Greenhouse Gases

- 2.9 The delivery of the scheme and achievement of modal shift of trips from carbon burning vehicles to Midland Metro (for which the electricity for the trams will be generated in a carbon neutral manner and/or offset) means there will be a reduction in the forecast carbon dioxide emissions from transport. For 2016 this is forecast to be 169 tonnes, and 193 tonnes in 2026. This is quantified within the TEE table.

Landscape, Townscape and Heritage

- 2.10 Potential sources of visual impacts from the scheme broadly relate to three categories:
- | The construction phase would include the temporary impact of material storage areas, site huts, lighting and equipment;
 - | New permanent features such as overhead wiring, new stops and infrastructure features that need to be accommodated; and
 - | The visual impact of the trams operating.
- 2.11 During the construction period any impacts would be temporary and with the measures contained within the CoCP the effects would be minimised.
- 2.12 The primary concern with regard to these environmental criteria relates to the introduction of system infrastructure in central Birmingham. Being an already heavily built-up urban area there will be no effect on landscape. The scheme offers the opportunity to improve the townscape through contributing to integrated investment in high quality public realm.
- 2.13 In order to ensure this opportunity is realised a Design Guide has been produced, in consultation with Birmingham City Council. All new infrastructure will be sensitive to surrounding buildings and where possible support for overhead cabling will be shared with existing street furniture. The scheme also accords with the policies of the Commission for Architecture and the Built Environment (CABE) and English Heritage.
- 2.14 The visual impact of the trams operating is not considered to impact negatively on the area through which the extension passes, or on Line 1 where increased service frequency will be experienced. Rather, increased visibility of the system and the trams is intended to be a positive effect of the scheme and to contribute to the image of Birmingham as a global city with a world class public transport system.
- 2.15 Lastly, given the setting for the scheme and the extensive design process for it, no heritage impacts are anticipated.
- 2.16 Overall impacts are expected to be **neutral**.

Biodiversity and Water Environment

- 2.17 The Line 1 extension will be implemented in an urban area at street-level and as such no biodiversity issues have been identified. The water environment will be protected through standard drainage and water management treatment of surface run-off.
- 2.18 Overall impacts are expected to be **neutral**.

Physical Fitness

- 2.19 As demonstrated by Line 1, light rail encourages modal shift to public transport. This includes trips that access a tram stop by walking or cycling and completing the journey at the destination end in the same way. In this respect, the scheme will contribute to improved health through increased levels of walking and physical fitness. The extension to Line 1 and the increase in tram service frequency would further boost the attractiveness of the system and hence attract more users who previously travelled by car, hence supporting a healthier lifestyle for them.
- 2.20 The greater amount of walking likely to occur outside the City Centre is likely to be somewhat offset by a change within the City Centre. In the City Centre some people may walk further as they switch from taxi to Metro, but conversely others who previously walked in the City Centre, e.g. from Snow Hill station, may now continue on Midland Metro to reach a stop closer to their final destination.
- 2.21 There will also be indirect benefits as reductions in general traffic levels in the City Centre due to modal transfer or complementary measures contribute to circumstances that are more conducive to walking and cycling trips.
- 2.22 Overall impacts are assumed to be **neutral**.

Journey Ambience

- 2.23 Journey ambience is a function of the quality of facilities provided for travellers, the level of travel information disseminated, the cleanliness of services, views from vehicles and overall traveller stress, which includes such factors as safety of travel. In all respects the investment in Midland Metro scores highly, providing a step change in the journey ambience over existing travel modes and with the introduction of the new tram fleet providing an improvement over the existing trams.
- 2.24 With the tram extension into the City Centre the characteristics of superior ride quality compared to buses will be expanded to serve a wider range of trip options. The trams will also offer a considerably improved internal environment (100% low floor) and ambience in comparison to the current buses, as well as compared to the existing trams in respect to greater capacity (increased from around 150 to 200 passengers per tram) and hence reduced crowding at peak periods. (The benefit from reduced crowding has been quantified as a user benefit in the economic appraisal.)
- 2.25 In addition, the tram extension will provide direct service to the City Centre and connections with New Street Station without the need for interchange at Snow Hill Station or being required to rely upon signage.

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- 2.26 Furthermore, the on-street presence of the tram and its associated infrastructure in the City Centre, in contrast to its current 'hidden' Snow Hill location, will provide confidence to users, especially new users and remove potential stress or uncertainty over making travel arrangements. It is also intended that the introduction of the new tram fleet will be complemented by a marketing and reinvigoration programme for the system that will improve signage and the provision of information.
- 2.27 The new trams, improved frequency and improved service to the City Centre will all support an improvement in journey ambience. The performance against this objective is expected to be **large beneficial**.

3 Safety

Introduction

- 3.1 The safety objective is to reduce the loss of life, injuries and damage to property resulting from transport accidents and to improve the personal security of travellers. The two impacts associated within the safety analysis are accidents and personal security.

Accidents

- 3.2 In the past five years pedestrians have made-up nearly half of the casualties from accidents along Corporation Street. This is anticipated to significantly improve following the removal of buses and taxis from the street (as part of the Transforming Bus Travel proposals) and the introduction of trams should not erode this benefit as the nature of their operation will differ from the current characteristics of queuing traffic and pedestrians trying to cross between vehicles. No quantified assessment has been included for this aspect.
- 3.3 In line with WebTAG the impact on the number of accidents on the wider road network has been estimated using forecast changes in the distances travelled and the application of the highway externality rates produced by the National Transport Model. This is quantified within the TEE table.

Security

- 3.4 Ensuring personal security is a major factor in delivering a high quality public transport system. Feelings of insecurity impact disproportionately on particular users and at particular times of day. Women, the elderly and people travelling at night are often adversely affected by the real and perceived dangers they associate with public transport.
- 3.5 Passenger security can be enhanced through the following measures:
- | Provision of CCTV and passenger help points;
 - | Passenger information and good lighting at stops and accesses to stops; and
 - | Staffing on vehicles.
- 3.6 The Line 1 extension has been designed in such a way that it incorporates many of the measures above. Metro has been designed to minimise exposure to risk, especially during the hours of darkness. Stops have been designed to include good walking routes from catchment areas and to provide glazed canopies and side screens (where appropriate), lighting along the platform and real time passenger information systems. The stops also include seating, signing, CCTV and emergency help buttons. Further, each tram will be staffed by a conductor.
- 3.7 Overall the performance against this objective is expected to be **moderately beneficial**.

4 Economy

Introduction

- 4.1 The economic appraisal considers the impacts of the proposed scheme that are monetised, both benefits and costs. The benefits of the scheme are derived from a number of sources:
- | Journey time;
 - | Journey experience (crowding);
 - | Highway externalities (e.g. greenhouse gases, noise, infrastructure);
 - | Revenue; and
 - | Highway user benefits due to mode shift to Midland Metro.
- 4.2 Whilst some of these benefits will be generated by the extension, others are generated by the investment in new trams, i.e. through increased frequency and greater system capacity. In the economic appraisal, the above benefit sources are identified for existing Midland Metro users and for those who change their behaviour to use the system because it has become attractive to them due to the investment in new trams, increased frequency and the extension in the City Centre.
- 4.3 The costs considered for the economic appraisal cover the incremental cost of the Do Something in comparison with the costs for the Do Minimum for capital costs, operations and renewals.

Forecast Midland Metro Demand

- 4.4 The forecasting of the demand response to the implementation of the scheme has been undertaken in a manner consistent with WebTAG (full details on the forecasting approach is set out in Appendix B-1). Table 4.1 presents the estimated demand for the scheme compared with the Do Minimum. Current annual patronage is around 5 million.

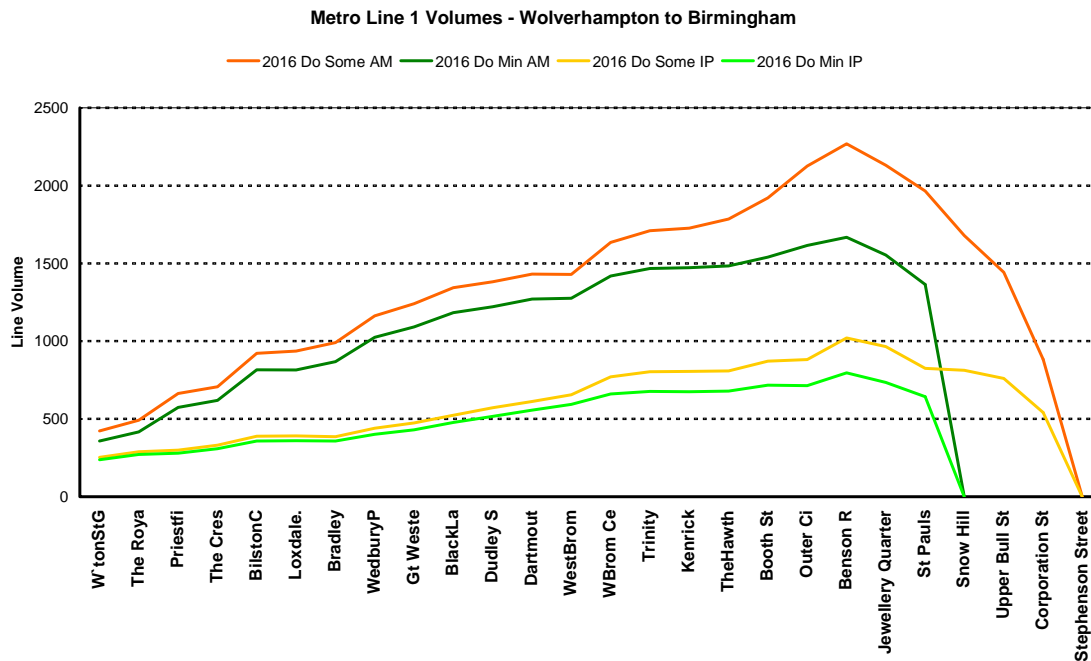
TABLE 4-1 DEMAND FORECASTS

Year	Scenario	Annual Patronage (m)	Additional Demand (DS vs DM)
2016	Do Minimum	5.8	36%
	Do Something	7.9	
2026	Do Minimum	6.7	37%
	Do Something	9.2	

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4.5 The distribution of the additional demand generated in the Do Something is illustrated in Figure 4.1.

FIGURE 4.1 COMPARISON OF LINE FLOW PROFILES



4.6 The frequency improvements are forecast to result in an increase in boarding levels from all stops heading towards Birmingham, particularly in the AM period where this is the most significant direction of travel in terms of volume. The extension of Line 1 into central Birmingham results in increased forecast patronage coming from origins within 6-10 kms of the City Centre, such as West Bromwich, Hawthorns and Handsworth. These are the locations where the existing Metro line struggles to compete with bus and car modes, however the extension to New Street Station gives Metro the advantage of delivering people closer to their ultimate destinations, which results in increased Metro demand coming from these areas.

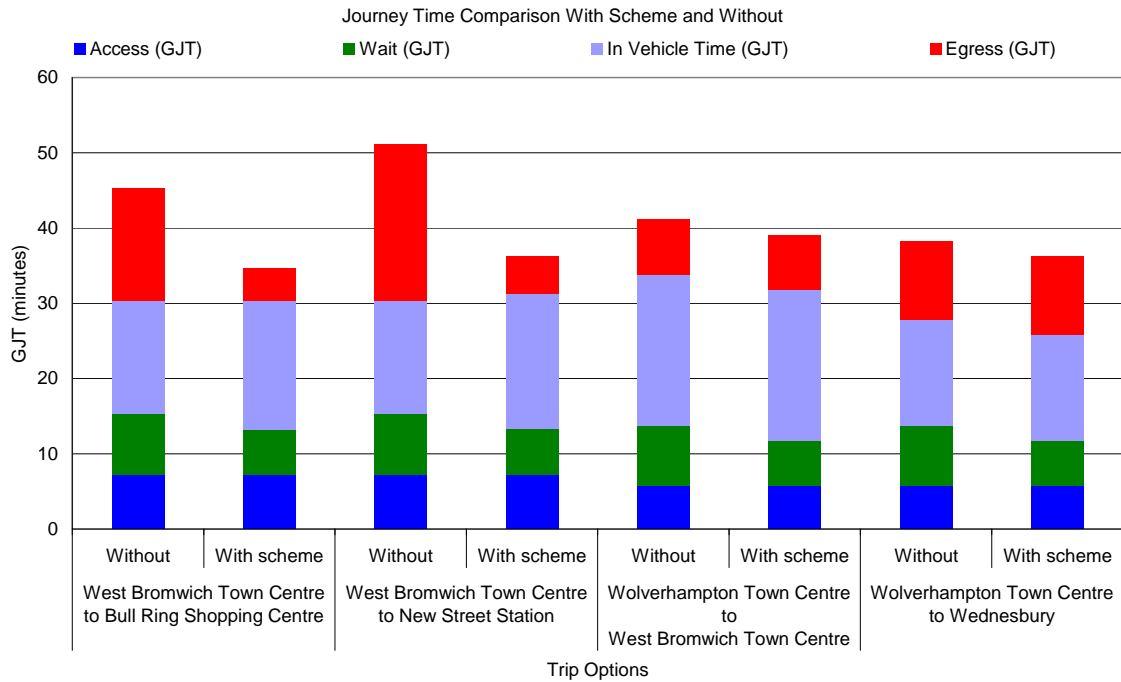
User benefits

Journey time savings

4.7 The scheme will deliver user benefits in the form of journey time savings. These will result from the increase in frequency reducing the average wait time for users and from the City Centre extension providing a quicker means of accessing City Centre destinations compared to walking from Snow Hill Station. These impacts benefit those currently using the tram and will also encourage new users to travel on Midland Metro.

4.8 Figure 4.2 illustrates the improvement in journey times for a selection of common trip patterns. The times illustrated are generalised minutes. These reflect people's preference for the travelling component of making a trip rather than waiting for transport, having to interchange or walking as part of the trip. The walking time element of their trip is weighted as two, as is the waiting time element.

FIGURE 4.2 JOURNEY TIME COMPARISON



4.9 In addition to the above impact, which forms the majority of the user benefits there is a small user benefit resulting from the introduction of new larger trams. The new trams will provide greater capacity (for around 200 passengers compared to around 150 passengers currently) and hence accommodate those potential users who are currently crowded off the system at the moment or those who cannot get on the first tram that arrives at their stop and have to wait for the next one. (The approach to calculating crowding benefits is set out in Appendix B-1.)

4.10 Table 4.2 presents the forecast user benefits for the modelled years of 2016 and 2026.

TABLE 4-2 FORECAST USER BENEFITS IN 2016 AND 2026 (£M 2002 PRICES)

	2016	2026
Travel Time Benefits	3.4	4.9
Crowding Benefits	0.4	0.9

Non User benefits

4.11 The benefits of the scheme extend beyond those who will use the improved and expanded Midland Metro system. By attracting increased demand on to Midland Metro there is forecast to be a transfer of trips from highway. For those who remain on the highway network, they will benefit due to reduced congestion and hence more efficient travel. The travel time saving is forecast by the highway model. The increase in highway benefits reflects both the increased number of car users experiencing the benefit and the increasing value of the benefit due to greater congestion over time.

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- 4.12 The additional impacts, known as highway externalities are calculated based upon the change in highway distance travelled that is forecast. However, given the relatively modest reduction in highway distance travelled the annual monetisation of the externalities is negligible.
- 4.13 Table 4-3 presents the highway benefits.

TABLE 4-3 HIGHWAY BENEFITS

	2016	2026
Highway kms removed	661,864	1,193,358
Highway travel time saving	£1.7m (2002 prices)	£3.1m (2002 prices)
Externalities	negligible	negligible

Revenue

- 4.14 As identified in Table 4.1 the improved timetable and service levels result in increased demand. This increased demand and ridership for Metro will result in increased fare collection.
- 4.15 Revenue estimates have been based on an analysis of revenue take by ticket type in the peak and off-peak periods. Revenue is expected to increase over time due to patronage growth and underlying real fare increases. The scheme is expected to generate £3.1m (2002 prices) additional farebox revenue in 2016 and £4.0m in 2026. (No additional revenue from advertising etc has been considered in the economic appraisal.)

Capital costs

- 4.16 The Delivery and Commercial Case presents full details of the capital cost estimation process. The current estimate reflects the latest scheme design and includes levels of risk determined by a full Quantified Risk Assessment (QRA) process. The identified risks have been assessed and both costs and design managed to minimise potential risk impact. In addition to the QRA process, the provision of increasing levels of design information has been reflected by the levels of estimating certainty applied against the estimate.
- 4.17 Optimism Bias has been applied in accordance with HM Treasury guidelines and the QRA process, and an 18% allowance has been included within the estimate of capital expenditure, whilst 6% is applied to fleet renewal estimates.
- 4.18 The cost estimates are shown in Table 4.4 below, which provides a breakdown of costs by scheme element.

TABLE 4-4 COST SUMMARY AT Q1 2009

Scheme Element	Preparatory Costs (not included in OB value calculation)	Base Scheme Costs	QRA Pmean	Sub Total	OB Value	Total Cost (£m)
City Centre Extension/ Trams	4.7	38.1	4.5	42.6	6.7	54.0
Replacement Tram Fleet	3.4	42.8	1.4	47.6	2.7	50.3
Depot & Other Works	4.1	15.9	1.3	21.2	3.3	24.5
Total	12.3	96.8	7.1	116.2	12.6	128.8

Totals may not sum due to rounding

Renewal costs

- 4.19 The renewal costs for the scheme encompass the costs for both the infrastructure and the trams. For the infrastructure there is no assumed change to the renewal costs for Line 1. However, the section of the extension results in an incremental cost of £21.6m (2002 prices).
- 4.20 With respect to the trams, as discussed in Chapter 6 of the Strategic Case, the current fleet is approaching the end of its operational life. For the purposes of the appraisal therefore the cost of replacing the tram fleet early is partially offset by the cost saving on the maintenance of an aged fleet and its eventual replacement.
- 4.21 The Do Minimum assumes that the existing fleet of 13 operational trams continues to provide a reliable service of 7.5 tph until life expiry in 2028, following a half life refurbishment in the next five years or so (£13.0m, current prices). The existing trams are leased and these costs continue until the leases are terminated at the end of the trams' life (£15.3m in total in current prices).
- 4.22 The trams have proved increasingly expensive to maintain and this is envisaged to continue as many replacement parts are no longer supported by the manufacturers. The annual maintenance is forecast to increase from £1.1m per annum currently in current prices to £1.3m per annum by 2028.
- 4.23 From 2028 a new tram fleet would be introduced (£32.2m, current prices). It is assumed to have an operational life of 30 years (with a mid-life refurbishment) so for the purposes of the appraisal a new fleet is again required in 2057. At the end of the appraisal period 2073 the fleet will require refurbishment. No cost has been included for this, nor has a residual value.
- 4.24 The Do Something assumes that the existing fleet of 13 operational trams is replaced in 2013 with a fleet of 19 trams purchased outright (£47.0m, current prices). The existing tram leases would be terminated and a break fee incurred totalling (£8.4m, current prices). The new trams would be less expensive to maintain (£0.6m pa, current prices) delivering a significant saving between 2013 and 2028. The half life refurbishment in the Do Minimum in the next few years would also be avoided, with it occurring for the new fleet in 2028. A further new fleet of trams would be procured in 2042.

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- 4.25 Table 4.5 sets out the costs identified for the Do Minimum and Do Something assumed fleet maintenance and renewal strategies over the 60 year appraisal period. It also sets out the comparable cost of replacing only 13 trams in 2014 in order to maintain a service frequency of 7.5 tph on Line 1.

TABLE 4-5 COMPARISON OF FLEET COSTS OVER 60 YEARS (£M 2009 PRICES)

	Do Minimum	Like-for-like (13 Trams)	Do Something	Increment (DS-DM)
Lease Cost	15.3	3.9	5.7	-9.7
Fleet Refurbishment	26.0	32.0	38.0	12.0
Termination of Leases	0.0	8.4	8.4	8.4
Total	41.3	44.3	52.1	10.7

- 4.26 Using the assumptions employed, the net difference for the scheme compared with the Do Minimum in 2009 prices is a cost over 60 years of c£10.7m. Whilst the cost of the forthcoming refurbishment is avoided and the ongoing costs of maintenance are significantly lower in the period up to 2028 (thereafter the maintenance costs in the Do Minimum and Do Something are broadly the same), the additional trams increase the replacement and future refurbishment costs, which more than offsets this saving. A fee to terminate the leases of the existing trams before the end of the contract is also incurred.

Operating costs

- 4.27 A comparative operating cost estimate has been prepared for the proposed scheme, using Steer Davies Gleave's tram operating cost model.
- 4.28 The operating cost model has been benchmarked against the 2007 operating cost of £7.1 million in 2007 prices for the existing network, providing a peak service frequency of 7.5 tph. The model uses data provided or calculated for the existing system. This includes the organisation structure and staff numbers provided by Travel Midland Metro and the current data relating to the existing route and timetabled operations. It was assumed that the operator is, currently not making a profit due to revenue not exceeding basic operating costs.
- 4.29 The resulting benchmarked operating cost model was then utilised to develop a comparative operating cost for the proposed City Centre extension and an increase in service frequency to 10 tph.
- 4.30 The following inputs to the model were changed to reflect the extension;
- | Kilometres operated 2.3m per year approximately
 - | Peak service frequency of 6 minutes
 - | End to end journey time of 39 minutes
 - | Fleet Requirement of 19 vehicles, including spares
 - | Operating profit of 7%

- 4.31 The operating cost model produced a cost estimate of £8.7 million including vehicle and systems maintenance costs including labour in 2016 (2009 prices). Table 4-6 presents summary data for the forecast operating cost.

TABLE 4-6 TOTAL OPERATING COST ESTIMATE 2016 (£M 2009 PRICES)

	Do Minimum Costs (£m)	Do Something Costs (£m)	Increment (£m)
Management and Administration	0.3	0.3	0.0
Operations	4.4	5.5	1.2
Maintenance and Engineering	2.3	2.2	-0.1
Profit	0.5	0.6	0.1
Total	7.4	8.7	1.3

Economic Appraisal

- 4.32 As described above the benefits of the scheme have been forecast for the modelled years and the corresponding cost implications estimated. For the economic appraisal the annual values have been converted into cashflow profiles for the life of the appraisal. The software package TUBA has been employed for the derivation of public transport and highway user journey time benefits. The key assumptions for the economic appraisal are:

Programme

- | Construction starts in 2010 with the extension opening in 2014;
- | Modelled forecasts are interpolated between 2016 and 2026 to generate intermediate year forecasts, with no growth assumed beyond 2026; and
- | Build-up profile assumed to be 50%, 75%, and 100% of forecast incremental demand levels in years 2014 to 2016.

Appraisal

- | Appraisal period of 60 years of operation appraisal (i.e. 2014-2073);
- | Social discount rate of 3.5% real per annum for the first 30 years and 3.0% to 60 years; and
- | Results presented as discounted 2002 prices and values.

Cost

- | Costs rebased to 2002 prices and real inflation included post 2014.

Revenue

- | Current fares policy assumed; and
- | Real increase in revenue of 1% (above RPI) assumed up to 2026.

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Benefits

- | WebTAG values of time and growth in value of time assumed; and
- | WebTAG journey purpose splits.

Transport Economic Efficiency (TEE) Results

- 4.33 The results of the economic appraisal demonstrate the positive economic performance of the scheme. Table 4.7 presents the results.
- 4.34 Total capital costs amount to £71m (PV 2002 prices), the majority of which are the costs for the infrastructure and new tram fleet. Journey time benefits are the greatest component of the Present Value of Benefits, but the total is also buoyed as total revenue over the appraisal period is greater than operating costs and renewals.
- 4.35 The BCR of 2.6:1 represents a high Value for Money Case. A full TEE table is presented in Figure 4.3.

TABLE 4-7 ECONOMIC RESULTS

Net costs and benefits		£m PV 2002 market prices
Depot Capital Costs	(a)	(5)
Infrastructure Capital Costs	(b)	(39)
Tram Capital Costs	(c)	(27)
Total Capital Costs	(d) = (a+b+c)	(71)
Infrastructure Renewal Costs	(e)	(8)
Tram Lifecycle Costs	(f)	0
Operating Costs	(g)	(33)
Total O&R Costs	(h) = (e+f+g)	(40)
Midland Metro Travel Time Benefits	(i)	95
Midland Metro Crowding Benefits	(j)	15
Highway Travel Time Benefits	(k)	63
Highway Externalities	(l)	1
Total Benefits	(m) = (i+j+k+l)	173
Farebox Revenue	(n)	77
Indirect Tax	(o)	(11)
Present Value of Benefits (PVB)	(p) = (m+n-h)	210
Present Value of Costs (PVC)	(q) = (d+o)	82
Net Present Value (NPV)	(r) = (p-q)	128
Benefit to Cost Ratio (BCR)	(s) = (p / q)	2.6:1

Totals may not sum due to rounding

Value for Money Case

FIGURE 4.3 ECONOMIC EFFICIENCY OF THE TRANSPORT SYSTEM (TEE)

<i>Figures in 2002 market prices in £000s</i>				
Midland Metro: City Centre Extension & New Trams	TOTAL	PEDESTRIANS	ROAD USERS	MIDLAND METRO
User benefits - Consumers				
Travel Time	125,034	-	38,084	86,950
Vehicle Operating Costs	3,342	-	3,342	-
User Charges	-	-	-	-
During Construction & Maintenance	-	-	-	-
NET CONSUMER IMPACT (1)	128,376		41,426	86,950
User benefits - Business				
Travel Time	28,418	-	20,522	7,896
Vehicle Operating Costs	712	-	712	-
User Charges	-	-	-	-
During Construction & Maintenance	-	-	-	-
Sub Total [2]	29,130		21,234	7,896
Private Sector Provider Impacts				
Revenues	77,088	-	-	77,088
Operating & Renewal Costs	(40,099)	-	-	(40,099)
Investment (Capital) Costs	(70,983)	-	-	(70,983)
Grant/Subsidy	70,983	-	-	70,983
Sub Total (3)	36,990	-	-	36,990
Other Business Impacts				
Private Developer Contribution (4)	-	-	-	-
NET BUSINESS IMPACT (5) = (2)+(3)+(4)	66,119			
TOTAL PVB (6) = (1)+(5)	194,496			
Public Account				
Local Government Funding				
Revenues	-	-	-	-
Operating & Renewal Costs	-	-	-	-
Investment (Capital) Costs	-	-	-	-
Developer and Other Contributions	-	-	-	-
Grant/Subsidy payments	26,264	-	-	26,264
Revenue Transfer	-	-	-	-
NET LOCAL GOVERNMENT IMPACT (7)	26,264			26,264
Central Government Funding				
Revenues	-	-	-	-
Operating & Renewal Costs	-	-	-	-
Investment (Capital) Costs	-	-	-	-
Developer and Other Contributions	-	-	-	-
Grant/Subsidy payments	44,719	-	-	44,719
Indirect tax revenues	11,324	-	544	10,780
NET CENTRAL GOVERNMENT IMPACT (8)	56,043		544	55,499
TOTAL PVC (9) = (7)+(8)	82,307			
Noise (E.I.)	29	-	-	29
Local air quality (E.I.)	60	-	-	60
Greenhouse gases (E.I.)	54	-	-	54
Journey ambience	15,308	-	-	15,308
Accidents	419	-	419	-
Consumers (1)	128,376			
Business Users and Providers (5)	66,119			
Reliability	-	-	-	-
Option values	-	-	-	-
Interchange	-	-	-	-
Present Value of Benefits (PVB)	210,366			
Public Accounts	82,307			
Present Value of Costs (PVC)	82,307			
OVERALL IMPACTS				
Net Present Value (NPV)	128,059			
Benefit to Cost Ratio (BCR)	2.6			

- 4.36 As described in the Strategic Case the investment in the extension to New Street Station and the procurement of a new and expanded fleet of trams is inextricably related due to operability and deliverability issues. However, on the basis of the results of the economic appraisal and broad simplifying assumptions it is possible to disaggregate the costs and benefits between the extension element and the new trams element in order to identify the indicative economic performance of each.

TABLE 4-8 DISAGGREGATION OF ECONOMIC RESULTS

Net costs and benefits		£m PV 2002 market prices	
		Extension	Trams/Depot
Total Capital Costs	(a)	(43)	(28)
Total O&R Costs	(b)	(13)	(27)
User Benefits	(c)	55	55
Non User Benefits	(d)	37	26
Highway Externalities	(e)	0	0
Total Benefits	(f) = (c+d+e)	92	81
<i>Farebox Revenue</i>	(g)	43	34
<i>Indirect Tax</i>	(h)	(6)	(5)
Present Value of Benefits (PVB)	(i) = (f+g-b)	122	88
Present Value of Costs (PVC)	(j) = (a+h)	50	32
Net Present Value (NPV)	(k) = (i-j)	73	55
Benefit to Cost Ratio (BCR)	(l) = (i / j)	2.5:1	2.7:1

Totals may not sum due to rounding

- 4.37 The disaggregation of the economic results identifies both elements of the scheme as achieving BCRs categorised as high Value for Money. The extension element is characterised by higher capital costs and greater revenue (as it generates the higher share of new demand). The fleet aspect of the scheme reflects the higher proportional operating costs and the user benefits due to frequency and crowding benefits.
- 4.38 Overall, the exercise of disaggregating the economic results demonstrates that the extension element delivers a higher level of benefits (PVB) than the new tram fleet element, but has a higher cost (PVC).

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Sensitivity Tests

- 4.39 A range of sensitivity tests has been undertaken to demonstrate the robustness of the scheme under a variety of cost and benefit assumptions.

40% Optimism Bias on Capital Costs

- 4.40 If 40% optimism bias is applied to the capital costs rather than 18% on depot and infrastructure and 6% on tram capital costs, the capital costs increase from £71m (PV 2002 prices) to £88m and the BCR reduces to 2.1:1.

Non User journey time benefits reduced by one-third

- 4.41 If non user journey benefits are reduced by one-third the total benefits fall to £134m (PV 2002 prices) and the BCR decreases to 2.1:1.

'Recession' impact on benefits

- 4.42 To represent the potential downside from the current recession a scenario has been developed to demonstrate the potential impact on the scheme's economic performance. For the scenario it is assumed that:

- | Demand growth is halved between now and 2016, resulting in 2016 demand of 6.5m rather than 7.9m
- | VoT growth is reduced in line with the latest HM Treasury GDP forecasts
- | No real increase in revenue between 2009 and 2014

- 4.43 The impact on the BCR for the scheme is a reduction in the BCR from 2.6:1 to 2.0:1 on the basis of the 'recession' assumptions.

Indirect tax included under PVB (NATA Refresh)

- 4.44 The NATA Refresh proposes that the economic impact of indirect tax should be treated as a dis-benefit to the PVB rather than as currently as a cost to the PVC. This does not affect the Net Present Value, but would increase the BCR from 2.6:1 to 2.8:1.

Conclusion

- 4.45 These sensitivity tests indicate the robustness of the central case BCR, even with 40% optimism bias, only two thirds of the non user journey time benefits or under a recession scenario, the BCR remains above 2:1. With the upside test the BCR approaches 3:1.

Reliability

- 4.46 The impacts the scheme will have are not all captured in the economic appraisal. The reliability improvements have not been quantified; however, Midland Metro currently has a high degree of reliability. With new investment in trams there is scope to build upon Metro's already strong performance.
- 4.47 Within the City Centre segregation of the tram will help to ensure it is not caught in congestion. Priority measures will also be implemented to ensure reliability is ensured with the extension and new trams. The increased frequency and high reliability will allow for a true 'turn up and go' level of service.
- 4.48 The performance against this objective is expected to be **slight beneficial**.

Wider Economic Impacts

- 4.49 The extension of Line 1 lends itself well to supporting wider economic benefits. The reduction in journey times the extension and frequency enhancement will bring will have agglomeration, labour market and imperfect competition impacts.
- 4.50 By reducing journey time between Wolverhampton and Birmingham City Centre the scheme will increase the 'effective density' of the areas in between. This increase in effective density serves to increase the productivity of those working in the area and subsequently increases GVA.
- 4.51 Reduced transport costs due to the extension and increased service frequency will also bring more people into the labour market. Put simply this happens because reduced transport costs effectively increase people's income. With some people equally happy to accept government benefits or to work, marginally higher pay will bring them into the labour market. Moving more people into work not only increases the government's tax take and GVA, but also reduces the cost of support payments by government to those not working.
- 4.52 Better transport will also move people to more productive jobs. Access to a larger job market will allow people more choice in their place of work and subsequently allow them to work in industries where they are more productive.
- 4.53 Lastly, wider economic benefits value the impact of improved competition between businesses resulting from the transport improvement. The improved competition occurs as a result of businesses gaining access to markets from which they were previously excluded bringing more businesses into competition with one another and subsequently providing more efficient services.
- 4.54 CEBR has estimated that the Metro extension will boost regional GVA by £47.2 million per annum by 2026 (2006 prices) and boost employment by nearly 1,300 jobs.
- 4.55 Further, it is likely that the benefits from linking to the Gateway Project at Birmingham New Street Station will be more than additive. By providing significantly improved access to the national transport network the wider economic benefits could be larger than currently estimated.

5 Accessibility

Introduction

- 5.1 The accessibility objective relates to access to facilities, the effects of community severance and social inclusiveness. The extension increases accessibility through providing direct connectivity to opportunities within Birmingham City Centre from areas along Line 1 and through providing guaranteed step-free access for the mobility impaired.

Option Values

- 5.2 Option values are the benefits that accrue to people who will not regularly use Line 1 or the extension to New Street Station, but will benefit from the option to use it at any given time.
- 5.3 The extension will significantly widen the transport choices available in the corridor, by providing a new, high-quality public transport service accessible to a wider number of users and a wider range of destinations, especially persons with limited mobility or travelling with shopping, luggage or small children.
- 5.4 With the extensions serving important shopping and commercial destinations and New Street Station, these aspects can be expected to be of great value.
- 5.5 The overall impact on option values is deemed to be **large beneficial**.

Severance

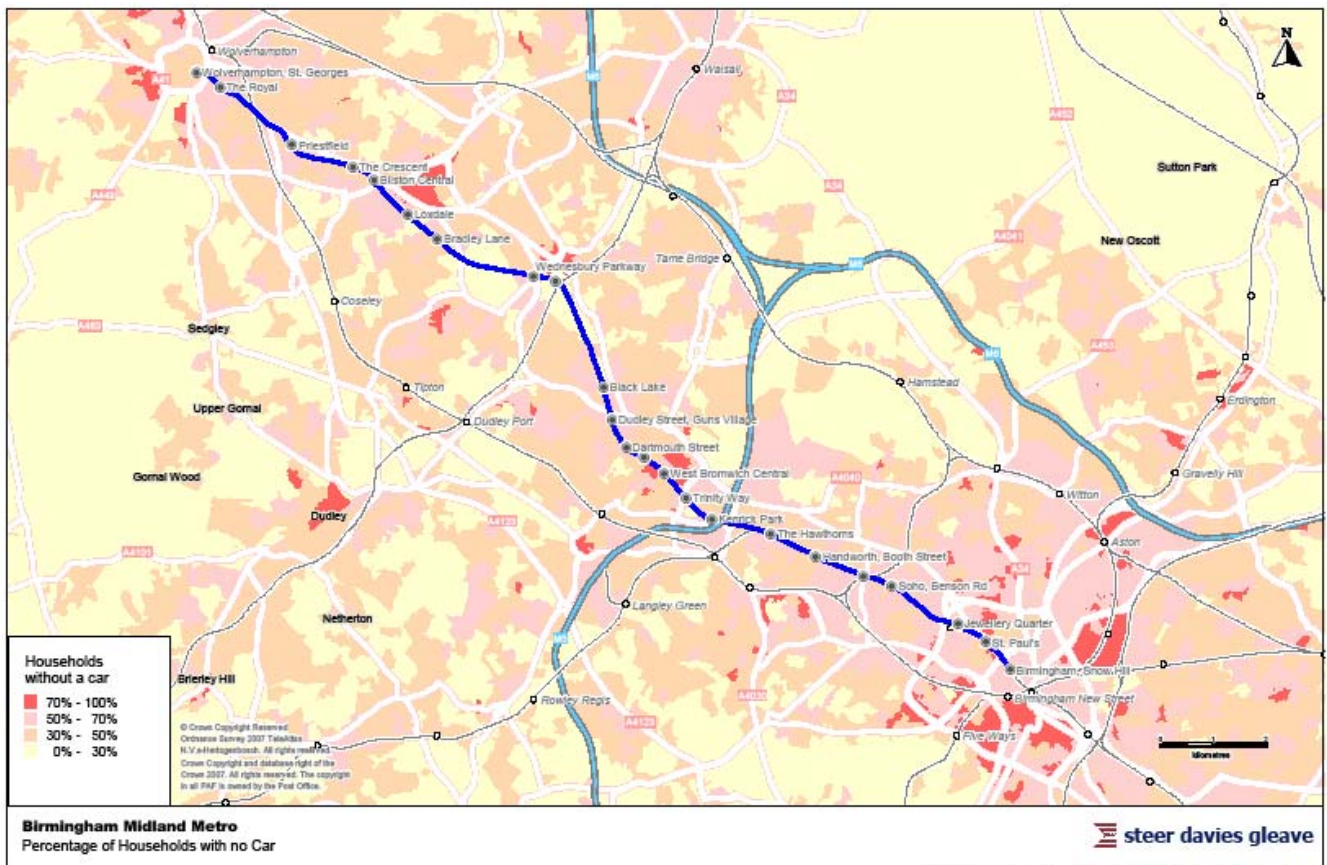
- 5.6 The Midland Metro extension from Snow Hill Station to New Street Station will follow the existing highway and therefore not introduce any additional severance. The impact is **neutral**.

Access to the Transport System

- 5.7 The Line 1 extension will provide a substantially improved transport system and access to local and national rail services. By providing improved connectivity between Snow Hill and Birmingham New Street Stations substantial improvements will be realised by users of the network.
- 5.8 As is indicated in Figure 5.1 there is a high proportion of people who live along the Line 1 corridor who do not own a car. By improving their access to both the City Centre and the national rail network general access to the local and national transport system will see significant improvement.
- 5.9 Overall the performance against this objective is expected to be **large beneficial**.

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FIGURE 5.1 NON CAR OWNERSHIP ALONG MIDLAND METRO LINE 1



6 Integration

Introduction

6.1 Integration considers issues of links between modes of transport, links with land use planning at all levels and the integration with non-transport policies. The need for an integrated approach to transport planning and provision is a central theme of the Government's White Paper 'The Future of Transport' (2004). The White Paper, and subsequent Guidance has focused on the need to promote integration in the following ways:

- | Integration within and between different modes of transport - so that each contributes its full potential and people can interchange easily between them;
- | Integration with land use planning - at national, regional and local level, so that transport and planning work together to support more sustainable travel choices and reduce the need to travel; and
- | Integration with policies for education, health and wealth creation - so that transport helps to make a fairer more inclusive society.

6.2 The scheme performs strongly in providing for an integrated transport network that supports both land use policies and wider city, regional and national policy.

Transport Interchange

Stops and local catchments

6.3 The four new stops proposed as part of the scheme would be located in the following streets to best serve the main attractions in the City Centre as listed below:

- | Snow Hill - will provide interchange with national rail services at Snow Hill station via the new secondary access currently under construction and with the proposed mixed residential and commercial developments at Ludgate Street, Great Charles Street and Lionel Street.
- | Bull Street - links to City Centre office core, the law courts, Children's Hospital, new developments around the Martineau Galleries area and interchange with the 'bus mall'.
- | Corporation Street - part of the core centre for shopping and leisure, including the redeveloped Bull Ring complex.
- | Stephenson Street - adjacent to New Street Station and the future redevelopment of the station and further access to the core shopping area at the Pallasades Shopping Centre.

Links to Other Transport Modes

6.4 The extension will provide many close and high quality links to other modes as described below:

- | National rail - direct links into New Street Station (national and local rail services) from the Stephenson Street terminus stop and into Snow Hill Station (local rail and longer distance services to London Marylebone).

Value for Money Case

- | Bus - easy access in the City Centre linking to the 'bus mall' at Bull Street.
- | Walking - stops located in Bull Street, Corporation Street and Stephenson Street, all at the heart of the City Centre pedestrianisation schemes.
- | Taxi - close links to numerous taxi ranks in the City Centre.
- | Cycling - at various points cycle advisory routes coincide with or cross the route of the extension providing access to stops. Cycle parking will be provided at or in some cases near to stops as part of the City's street furniture and local townscape facilities.

6.5 The scheme has been designed to deliver greatly improved integration and will be **large beneficial**.

Land Use Policy

6.6 As described in Chapter 3 of the Strategic Case there is significant new development that has taken place recently within Birmingham City Centre transforming its character, image and economy. In recent years there has been major redevelopment in Birmingham City Centre and along the proposed Line 1 extension route. The city has been pursuing its goal of becoming a world city within the next few decades and as such has secured significant investment and development to be completed over the coming years. The investments in the City Centre include residential, retail and office developments, all of which will require an expansion of the current transport infrastructure.

6.7 The Line 1 extension will link new developments with existing transport at New Street Station and Snow Hill Station. Through these connections those making use of new retail and office space will have easy and direct access to local, regional and national transport networks. For the developments to be commercially viable in the current economic climate the provision of high quality transport is vital.

6.8 Grade A commercial developments at Colmore Circus and Old Square have been accompanied by developments at Eastside that have taken advantage of a break in the "concrete collar" with the removal of the Masshouse Circus and have enlarged the city core. The Ballymore Development at Snow Hill, currently under construction, is also having a significant effect on its immediate area.

6.9 In addition to these recent and planned developments already mentioned, significant investment is committed for the Birmingham Gateway project to regenerate New Street Station. As well as delivering a 'statement' building for the station itself the project will open up access to the south side and support the development of proposed commercial properties. In addition, the Birmingham New Street Station redevelopment involves the refurbishment of approximately 34,830 sq m of retail floorspace.

6.10 Improved access to the City Centre is needed to support such developments with an improved public transport system that is able to offer, and is perceived as offering, high quality and reliable travel. The extension to Line 1 will have a dual function of being able to transport people to the central area from the surrounding areas and within the central area.

- 6.11 For the City Centre to continue to develop, expand and remain a major attraction for residents and visitors, fast and efficient transport links are required to and from the City Centre core, linking to other transport interchange points. The expansion of Midland Metro into the City Centre will help provide these links.
- 6.12 The extensions are wholly consistent with the region's principal planning objectives and policies, including national and local policies as described in the Strategic Case supporting the Line 1 extension. The overall assessment is **beneficial**.

Other Government Policy

- 6.13 As described in Chapter 7 of the Strategic Case the scheme demonstrates strong integration with national policies in relation to transport, the economy and the environment. They are also consistent with wider Government objectives, particularly with respect to supporting policies in relation to health and physical wellbeing and employment and social opportunities. Therefore overall, the scheme is **beneficial**.

7 Case Summary

Introduction

- 7.1 This section provides a brief summary of the Value for Money Case including the Appraisal Summary Table (AST).

Environment

- 7.2 In the majority of measures, the scheme has a neutral impact on the environment. The exception is a largely beneficial impact on journey ambience, where the new trams offer improved ride quality and capacity, thereby reducing crowding. It is also considered that the on-street presence of the tram will provide confidence to users and remove potential stress of travelling.

Safety

- 7.3 The impact on safety in regards to accidents is neutral. However there will be a moderately beneficial impact on security as the new Metro stops have been designed to improve security (through high quality lighting, emergency help buttons and good walking routes) and vehicles will be staffed.

Economy

- 7.4 The scheme provides high value for money with a BCR of 2.6:1. There are slight beneficial impacts in terms of reliability due to priority measures designed into the scheme. The reduction in journey times due to the scheme will have positive agglomeration, labour market and imperfect competition impacts.

Accessibility

- 7.5 There will be a large beneficial impact on option values as the introduction of the tram will significantly widen the transport choices within the corridor. There will also be a large beneficial impact on access to the transport system as the extension will now provide improved access to Snow Hill and Birmingham New Street stations and to/from areas along Line 1. There will be a neutral impact on severance.

Integration

- 7.6 There are beneficial impacts on integration as the extension will provide direct links to Birmingham New Street and Snow Hill stations, the bus mall on Bull street and integration with cycle facilities. The scheme is consistent with regional planning policy and objective and integrates strongly with national transport policies.

TABLE 7-1 APPRAISAL SUMMARY TABLE

Extension of Midland Metro Line 1 from Snow Hill Station to New Street Station and earlier procurement of a new tram fleet		The proposed extension will run through Birmingham City Centre to New Street Station improving connectivity and accessibility within the city centre and along Line 1. A fleet of new trams will be procured to replace the existing fleet in 2014, earlier than would otherwise take place, allowing an increase in service frequency from 7.5 to 10 tph and an improved travelling experience (including reduced crowding) for passengers.	PVC to Public Accounts £82m	
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE	ASSESSMENT
ENVIRONMENT	Noise	The effects of construction noise will be minimised through the CoCP. Once in operation the limited noise level will not greatly impact on the ambient noise levels in the areas through which the trams pass.	negligible	
	Local Air Quality	No significant emissions from the tram vehicles. Slight reduction in emissions will arise due to modal shift from road to Midland Metro.	negligible	
	Greenhouse Gases	Achievement of modal shift of trips from carbon burning vehicles to Midland Metro means there will be a slight reduction in the forecast carbon dioxide emissions.	2016: -169t CO2 2026: -193t CO2	
	Landscape	As the scheme concerns introduction of system infrastructure in central Birmingham, an already heavily built-up urban area, there will be no effect on landscape.		Neutral
	Townscape	All new infrastructure will be sensitive to surrounding buildings and where possible support for overhead cabling will be shared with existing street furniture.		Neutral
	Heritage of Historic Resources	No heritage impacts are anticipated.		Neutral
	Biodiversity	No biodiversity issues have been identified.		Neutral
	Water Environment	The water environment will be protected by drainage and water management treatment of surface run-off.		Neutral
	Physical Fitness	Where access to the stop is by walking or cycling, additional tram ridership will contribute to improved levels of health and physical fitness. Conversely where the tram replaces walking, physical fitness will decline.		Neutral
	Journey Ambience	The new tram vehicles offer improved ride quality and provide greater capacity (reduced crowding). The on-street presence of the tram in the City Centre will provide confidence to users and remove potential stress.		Large Beneficial
SAFETY	Accidents	The introduction of the tram in the city centre is not anticipated to impact on safety.	£0.4m PV	
	Security	Metro stops have been designed to include good walking routes, high quality lighting, passenger information, CCTV and emergency help buttons. Staffing will be provided on vehicles.		Moderate Beneficial
ECONOMY	Public Accounts	Central Govt PVC: £56m, Local Govt PVC: £26m		PVC £82m
Transport Economic Efficiency	Business Users and Transport Providers	Total revenue over the appraisal period is greater than operating costs and renewals. Users and Transport Providers	BCR is 2.6:1 (High VfM).	PVB £66m
	Consumers	The increase in frequency reduces average wait time for users and the quicker means of accessing City Centre destinations generates user benefits.		PVB £128m
	Reliability	Priority measures will be implemented to ensure reliability is ensured for the extension and new trams. The increased frequency and high reliability will allow for a true turn up and go level of service.		Slight Beneficial
	Wider Economic Impacts	The reduction in journey times the extension will bring will have positive agglomeration, labour market and imperfect competition impacts.	£47.2m p.a. GVA	
ACCESSIBILITY	Option values	The extension will significantly widen the transport choices available in the corridor, by providing a new, high-quality public transport service accessible to a wider number of users and to a wider range of destinations.		Large Beneficial
	Severance	The extension will follow the existing highway and therefore not introduce any additional severance.		Neutral
	Access to the Transport System	The extension will provide an improved transport system and access to local and national rail services and improve connectivity between Snow Hill and Birmingham New Street Stations and to/from areas along Line 1.		Large Beneficial
INTEGRATION	Transport Interchange	The extension will provide direct links to New Street and Snow Hill Stations, the 'bus mall' at Bull Street and cycle parking will be provided at or near to stops.		Large Beneficial
	Land-Use Policy	The extensions are wholly consistent with the region's principal planning objectives and policies.		Beneficial
	Other Government Policies	The scheme demonstrates strong integration with national policies in relation to transport and the economy and environment as well as for health, wellbeing and provision of opportunities.		Beneficial

8 Supporting Analysis

Introduction

8.1 The supporting analyses are intended to highlight the distribution of the benefits and potential negative effects on particular groups of users, non-users, operators and public sector authorities. The issues are categorised under three sections, which are:

- | Distribution and equity;
- | Practicality and public acceptability; and
- | Affordability and financial sustainability.

8.2 This chapter presents the results of the analysis of each section in turn.

Distribution and Equity Analysis

8.3 The distribution and equity analysis examines the spatial and social effects of the scheme.

8.4 As the scheme is an extension of the current Midland Metro Line 1, with the extension being introduced within Birmingham City Centre, the additional benefits gained by those using the line comes with few negative impacts.

8.5 Birmingham City Centre will suffer from additional noise and emissions during the construction period, but once the extension is operational there will be a negligible impact and possible improvements in air quality as people transfer from car and bus to tram. For those living along the existing alignment, the increased tram frequency is considered to have a negligible impact in terms of noise.

8.6 The additional infrastructure required to build and operate the extension will only impact upon the City Centre. Again, the majority of impacts would be felt during construction and therefore would be temporary. As central Birmingham is already a heavily built-up urban area there will be no effect on landscape once constructed. The scheme also offers the opportunity to improve the townscape through contributing to integrated investment in public realm.

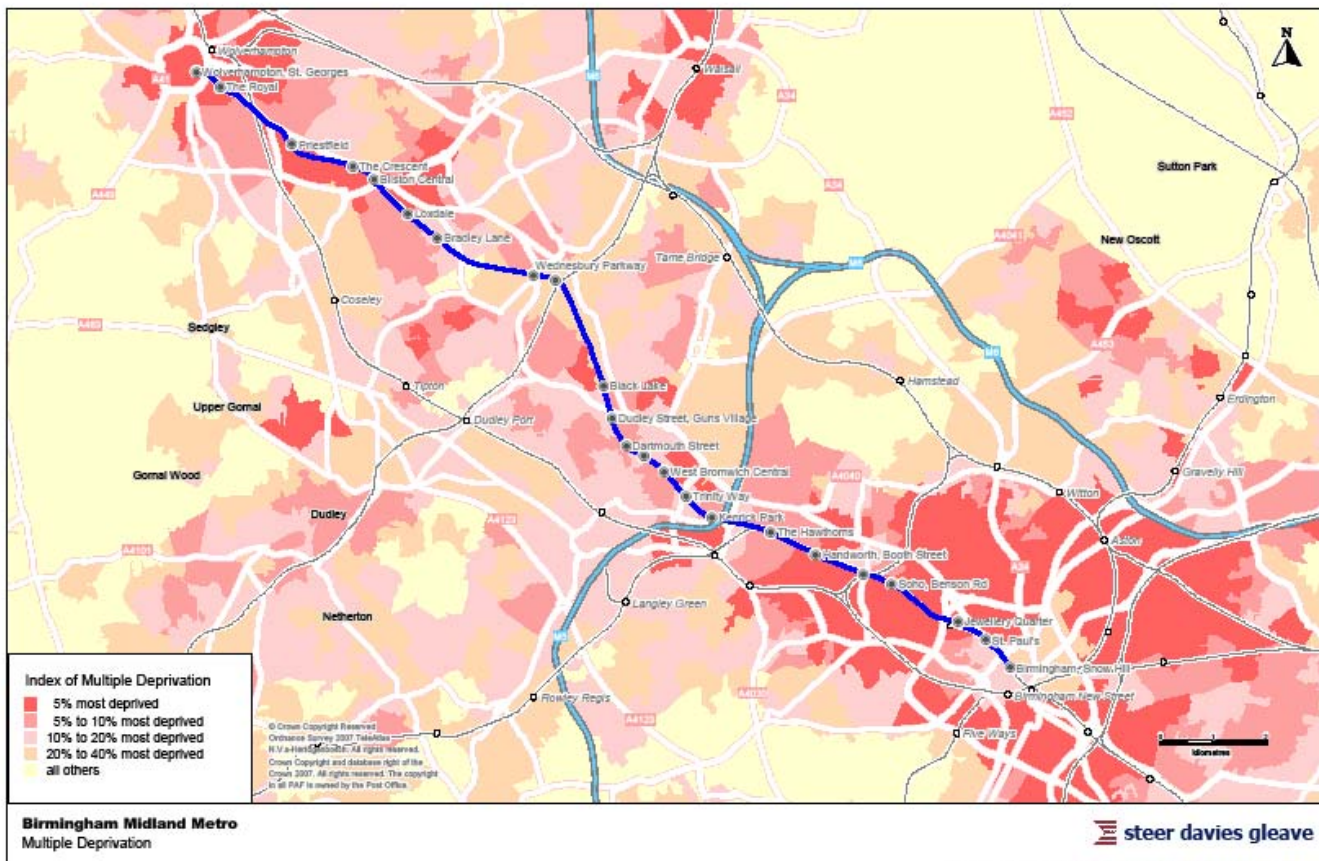
8.7 The visual impact of the trams is considered a positive effect of the scheme, contributing to the image of Birmingham as a global city with a world class public transport system.

8.8 Midland Metro currently provides journey ambience benefits over other travel modes and the introduction of the new tram fleet provides an additional improvement over the existing trams. With the tram extension into the City Centre the characteristics of superior ride quality compared to buses will be expanded to serve a wider range of trip options.

8.9 A high proportion of the most deprived people in the West Midlands live along the corridor of Line 1, particularly towards the southern end of the line. Figure 8.1 illustrates the high degree of deprivation along the line just outside Birmingham.

8.10 In addition to the high level of deprivation along the line many of the users do not own cars, as illustrated previously in Figure 5.1.

FIGURE 8.1 INDEX OF MULTIPLE DEPRIVATION



8.11 The lack of car ownership combined with poor access to the City Centre combines to make a strong case for the Line 1 extension. The provision of extended high quality transport to the City Centre will improve connectivity and increase the opportunity those without cars have to the region’s largest employment centre. The provision of guaranteed step-free access also increases accessibility for the mobility impaired.

8.12 The Line 1 extension will provide a substantially improved transport system and access to local and national rail services. In particular, the additional connectivity to Birmingham New Street Station provides strong benefits to users of the network.

Practicability and Public Acceptability

8.13 This section of the supporting analyses identifies the practicalities of both delivering the scheme (for more details see the Delivery Case) and its forecast benefits. The acceptability to the public is also considered.

Feasibility

8.14 The Line 1 extension has been carefully designed and worked up to a high degree of detail. The scheme builds upon the current tram system which has been in operation since 1999 and is formed of proven technology. Therefore, while the construction of this scheme involves building within a busy city centre, construction feasibility is not considered to be an issue.

Legal Feasibility

- 8.15 The scheme acquired Transport and Works Act powers in 2005. The construction of the lift tower foundations at the Snow Hill stop and the bridge across Great Charles Street has been planned for completion before July 2010. This constitutes a 'material operation' (as defined under section 56 of the Town and Country Planning Act 1990) and so will preserve the TWA planning permissions.

Political Acceptability

- 8.16 Birmingham City Council supports the scheme and has a key involvement in the project at several levels: as local planning authority, local highway authority, landowner and funding contributor. A detailed agreement has been approved by the City Council's Cabinet (13 November 2006), addressing the implementation of the full TWA scheme. This is currently being reviewed and updated for the current scheme.
- 8.17 The benefits of the scheme extend beyond Birmingham and recognising this, neighbouring local authorities have also expressed their support for the proposals. Appendix B4 contains letters of support received to date.

Level of Complexity

- 8.18 The scheme will require coordination of a number of technical areas and given the city centre nature of the extension careful integration of elements will be necessary. The issues which arise from the required works and their coordination will be resolved in line with the Transport Works Act order.

Timescale

- 8.19 Throughout the development stage of the project Centro has maintained a fully detailed working programme /plan for the project implementation as an integral component of the management process. Centro has also developed a detailed construction programme.
- 8.20 Figure 8.2 shows the overall scheme programme. As can be seen, the Line 1 extension is scheduled to begin operation in November 2014.

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FIGURE 8.2 OVERALL SCHEME PROGRAMME

Midland Metro Extension – High Level Programme						
Key Milestones	2009	2010	2011	2012	2013	2014
DfT Conditional Approval	[Bar]					
Issue Tram OJEU	[Bar]					
Issue Tram ITN		[Bar]				
Issue Depot OJEU		[Bar]				
Issue Depot ITN		[Bar]				
DfT Final Approval		[Bar]				
Award Tram & Depot Contracts		[Bar]				
Issue BCC OJEU		[Bar]				
Utilities Diversions		[Bar]	[Bar]			
Issue BCC ITN			[Bar]			
Award BCC Contract				[Bar]		
Complete Depot Works			[Bar]			
First 4 Trams in Line 1 Service			[Bar]			
All New Trams in Line 1 Service					[Bar]	
Complete BCC Extension Works					[Bar]	
Trams in Service Through BCC						[Bar]

Phasing

- 8.21 Early progression of the scheme is sought in order to ensure the benefits are realised as soon as reasonably possible. A postponement of the scheme would impact negatively on the integration of its delivery with the Birmingham New Street Station 'Gateway' scheme and hence be of significant detriment to central Birmingham.
- 8.22 In relation to the construction the works are planned to be carried out in phases in order to minimise disruption. The viaduct that will carry Midland Metro past Snow Hill into the City Centre has already been constructed and works to build the lift tower foundations at Snow Hill and the bridge across Great Charles Street are planned to be completed by July 2010.
- 8.23 The new depot will be built between 2010 and 2012, prior to the delivery of the new fleet in September 2012.
- 8.24 In addition, the diversion of utilities will be carried out whilst the Transforming Bus Travel Scheme (TBT) is being constructed and will be completed in 2012, prior to the commencement of construction of the Line 1 extension.
- 8.25 The construction works of the extension within central Birmingham are also phased to keep impact on the City Centre to a minimum and enable works to proceed around City Centre Christmas period works restrictions. These works will be carried out between the end of 2012 and 2014.

Partitioning

- 8.26 As described in Chapter 5 of the Strategic Case the development of the scheme has involved the consideration of a network of Midland Metro routes and the extension of the City Centre route to Edgbaston. The process of option development however, identified the current scheme (in effect partitioning the previous proposal) as the preferred option. It is therefore believed that further partitioning would not be appropriate and the scheme as developed presents the strongest case.

Complementarities

- 8.27 A scheme of this size inevitably has interdependencies with other schemes. The following key schemes have been identified:
- | Birmingham New Street 'Gateway' station is the terminus point for the extension and close co-ordination between the respective teams to determine pedestrian routing and OHL fixing locations etc is required.
 - | The City Centre extension is dependant upon the implementation of the separate TBT Scheme which diverts buses from the Metro alignment.
 - | Utility diversion works require to be undertaken prior to main works construction and detailed discussions are being held with Birmingham City Council and the bus companies to formalise the intended approach to co-ordination of city centre works

Conflicts

- 8.28 There are no known conflicts.

Political Nature of Proposals

- 8.29 The scheme has local support from Birmingham City Council and is identified in the Regional Funding Allocation.

Public Acceptability

- 8.30 Midland Metro Line 1 opened in 1999 and has an annual patronage of around 5 million. The service takes an estimated 1.2 million car journeys off the roads and the four Park & Ride sites along the line experienced an increase in usage from 74% to 84% in 2007/8 compared with 2006/7. In addition, 14% of passengers using the tram formerly used cars for the same journey and 30% of its passengers had a car available for their journey. This demonstrates the attractiveness of the current system and the significant role Midland Metro plays as part of the wider public transport network. However, the lack of penetration of the city centre means that other modes are selected for journeys to the city centre.
- 8.31 Public consultation on the current scheme has been undertaken and confirmed strong support for the scheme.
- 8.32 Centro recognises the importance of communicating progress to stakeholders and has prepared Stakeholder Communication Plans. The Plans will define how communications with stakeholders and the general public will be managed and will ensure that all those who are, or may be affected by the works are advised in good time of the progress of the works and how they may be affected. In addition, the Plan will also address the communication with stakeholders and the public during the utility diversion works, parts of which will be undertaken in advance of the main works.
- 8.33 The Plan will set out the interfaces between Centro, the contractor and the relevant local authority. The contractor appointed to design and construct the works will have a key role in carrying out communications with stakeholders. Therefore the Plans will be finalised in conjunction with the contractor and will be completed during the negotiation of the contract. The current drafts of the plans can be found in Appendices C14 and C15.

Value for Money Case

Affordability and Financial Sustainability

- 8.34 As well as total scheme benefits outweighing total scheme costs over the appraisal period, it is important for the scheme to break-even on an annual operating basis as well. Therefore, annual revenue at current prices in a given year should exceed annual operating costs in that same year.
- 8.35 Table 8-1 sets out operating costs and revenue forecasts in the opening year and various subsequent years as well as the resultant operating surplus positions.

TABLE 8-1 REVENUE AND OPERATING SURPLUS OUTTURN PRICES

	Year 1	Year 2	Year 3	Year 10	Year 15	Year 20
Additional Operating Costs	1.4	1.5	1.5	1.8	3.5	3.7
Additional Farebox Revenue	1.9	3.0	4.2	6.2	7.3	8.2
Net Cash Flow	0.5	1.5	2.7	4.4	3.8	4.5

- 8.36 Operating costs net of the Do Minimum increase from year 1 to year 14 (2027) as a result of nominal growth. In year 15 (2028) the new trams are brought in in the Do Minimum and as a result the Do Minimum operating costs fall and a step increase occurs in net operating costs. This then continues to increase due to nominal growth from the new higher base. However, net revenue also increases over time as passenger numbers and fares increase and overall, the operating surplus remains positive.

Ten-Year Plan Targets

- 8.37 The Metro Line 1 extension should serve to meet the 10 Year Plan for Transport published in July 2000. In this report the government outlined eight Public Service Agreement Targets. Schemes brought forward should make a contribution towards meeting these targets. As stated on WebTAG, the Department's Public Sector Agreement (PSA) Targets are to:
- | Reduce **road congestion** on the inter-urban network and in large urban areas in England below current levels by 2010 by promoting integrated transport solutions and investing in public transport and the road network;
 - | Increase rail use in Great Britain (measured in passenger kilometres) **from 2000 levels by 50% by 2010**, with investment in infrastructure and capacity, while at the same time securing improvements in punctuality and reliability;
 - | Increase **bus** use in England (measured by the number of passenger journeys) from 2000 levels by 10% by 2010, while at the same time securing improvements in punctuality and reliability;
 - | Double **light rail** use in England (measured by the number of passenger journeys) by 2010 from 2000 levels;
 - | Cut journey times on **London Underground** services by increasing capacity and reducing delays. Specific targets will be agreed with the Mayor after the Public Private Partnership has been established;

- | Improve **air quality** by meeting our National Air Quality Strategy targets for carbon monoxide, lead, nitrogen dioxide, particles, sulphur dioxide, benzene and 1-3 butadiene;
 - | Reduce **greenhouse gas** emissions by 12.5% from 1990 levels, and move towards a 20% reduction in carbon dioxide emissions by 2010; and
 - | Reduce the number of people killed or seriously injured in Great Britain in **road accidents by 40%** by 2010 and the number of children killed or seriously injured by 50%, compared with the average for 1994-98.
- 8.38 In relation to the PSA Targets the Line 1 extension will encourage a reduction in congestion along the entire corridor as people shift modes. By providing a high quality high frequency transport solution along a busy corridor people will have an alternative to their cars between Wolverhampton and Birmingham City Centre.
- 8.39 By linking a large population along the current Line 1 corridor to the national and local rail networks the extension is also forecast to increase rail patronage. The extension also ties in very closely with the committed Birmingham New Street Station regeneration that will help to further realise the ambitions of the station as a regional gateway.
- 8.40 Through the provision of additional high quality transport capacity not only to the national and local rail networks, but also to employment centres in Birmingham City Centre Midland Metro is forecast to see an increase in ridership. With more people taking this improved light rail system to jobs and for inter-change to heavy rail the scheme will help to achieve an increase in light rail ridership.
- 8.41 In addition, this scheme will also improve air quality and reduce greenhouse gas emissions by achieving a forecast shift from car. Reduced bus and taxi traffic along Corporation Street and trams designed to high safety standards are forecast to reduce road accidents.