

**SUPPORTING AND BACKGROUND INFORMATION FOR ECONOMIC CASE**

**1. Modal share**

In 2016 12.6m passengers boarded Supertram, representing an estimated 7% of all persons crossing the traffic count cordons into and out of Sheffield by all modes of transport. Of this total, about 30% are commuters. On roads where it operates, it accounts for 33% of all passengers. Where it doesn't, buses have a lower share than where it does. This shows that the tram therefore supports the use of public transport generally.

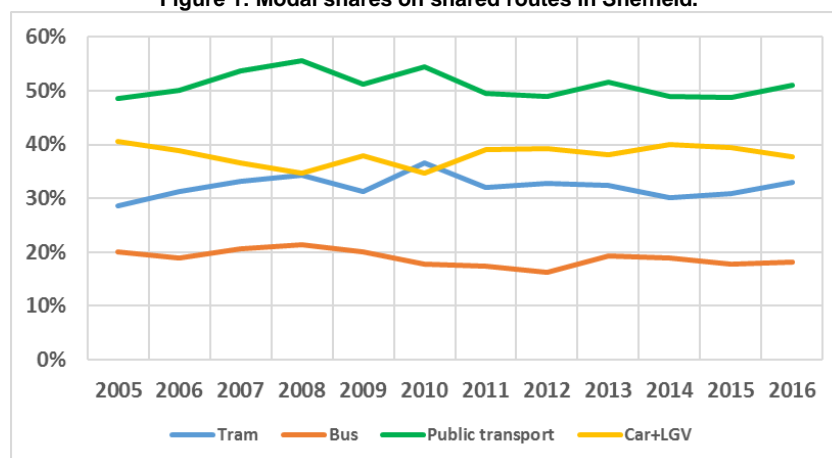
**Table 1: Daily passenger flows and modal shares 2016**

	Roads without trams		Roads with trams		Tram only routes	
<b>Tram</b>	0	0%	47,448	33%	8,570	100%
<b>Bus</b>	129,403	16%	26,126	18%	0	0%
<b>Public transport</b>	<b>129,403</b>	<b>16%</b>	<b>73,574</b>	<b>51%</b>	<b>8,570</b>	<b>100%</b>
<b>Car+LGV</b>	566,407	71%	54,239	38%	0	0%
<b>Cycle &amp; MC</b>	11,438	1%	1,090	1%	0	0%
<b>Pedestrian</b>	86,318	11%	15,133	11%	0	0%
<b>Total</b>	<b>802,136</b>	<b>100%</b>	<b>144,036</b>	<b>100%</b>	<b>8,570</b>	<b>100%</b>

Source: SYPTE

Over time and where there is shared running with buses and car, tram has increased its own market share.

**Figure 1: Modal shares on shared routes in Sheffield.**

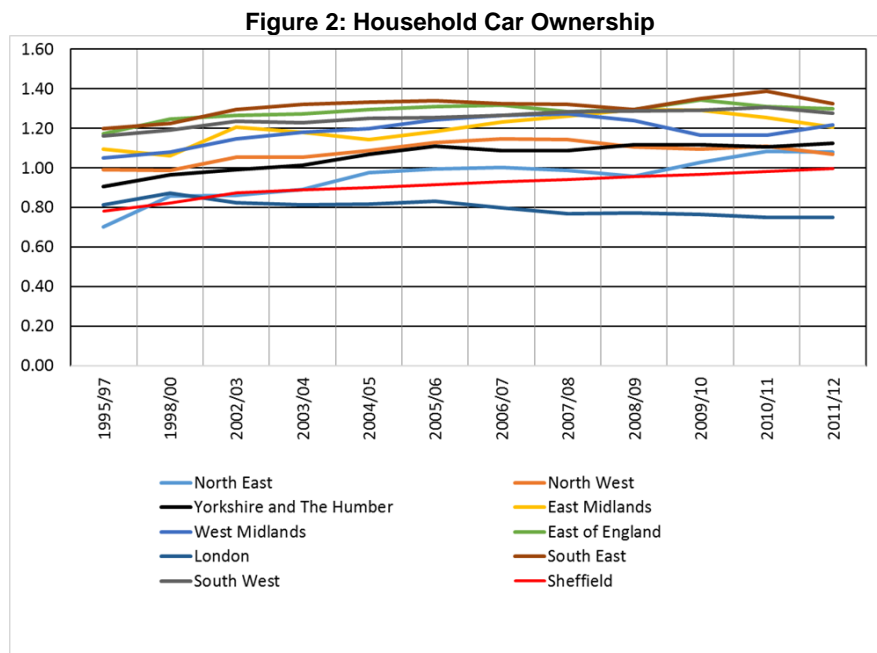


Source: SYPTE

**2. Accessibility**

In 2014 some 238,000 VAT-registered businesses were located within walking distance of the tram – 40% of Sheffield's total. These would be significantly affected if the tram were to be closed without replacement by a comparable bus service, which would be unable to provide the same service quality without substantial upgrading of vehicles (over 40 would be required) and conversion of tramway to busway. A study of the impact of Phase 1 re-railing work shows that of the 1.5m passengers that ceased using the tram during (due to disrupted services) 40% switched to car.

Supertram was originally conceived as a means to restrain car ownership and use in Sheffield. Although household car and van ownership has increased (by 37%) since 1991 the level remains lower than the average for other regions of England outside London. (See Figure 4)



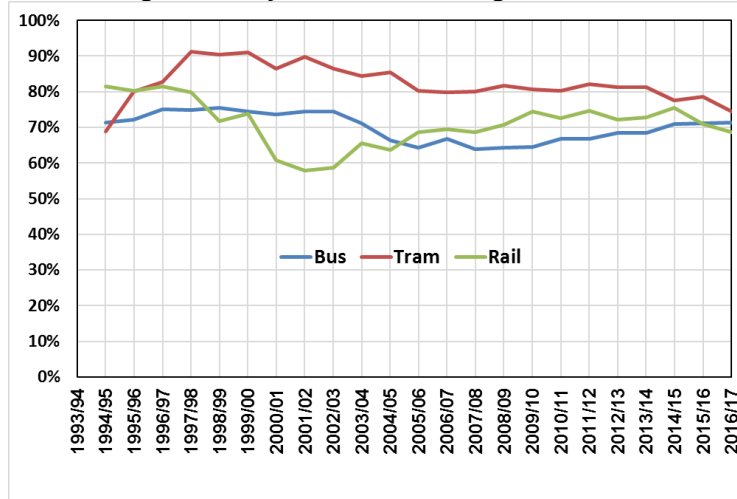
Sources: DfT (NTS) and ONS (Census)

### 3. Punctuality

In a 2009 Mori survey, trams were seen as quicker, more spacious/comfortable, more reliable, cleaner, easier to get on and off and more personally secure than buses – by bus users themselves.

SYPTe survey data shows (Figure 5) that the tram has always been more “reliable” (in terms of percentage of trams arriving at stops within 1 minute of scheduled time) than buses and trains, however they have become noticeably less reliable in recent years, whilst buses and rail (until 2014 at least) have improved their performance, on average since 2007.

**Figure 3: Percentage of surveyed services arriving within 1 minute of schedule**



Source: SYPTe

## 4. Modelling

In 2005 a variable-demand, multi-modal model (SRTM3) was developed (from earlier versions) covering in detail the Sheffield/Rotherham area and in rather less detail the rest of South Yorkshire and with minimal detail, the rest of the country. This model was calibrated and validated to 2008 flows along the Rotherham-Sheffield corridors and used to support the economic case for Bus Rapid Transit (North), Supertram Additional Vehicles and Tram Train as well as for developing transport and environmental policy.

For this bid, the public transport sub-model (SRPTM3) was used to forecast bus, tram and rail patronage in the event of closure. The highway model was not used, although trips in the highway matrix were available from earlier runs.

The generalised costs include the lower perception of in-vehicle time for supertram relative to bus as revealed from stated preference surveys in 2008. That study concluded that given an in-vehicle time factor of 1.0 for bus, Supertram has an in-vehicle time factor of 0.78, and this is implemented in the current version of the model.

Response to changes in generalised costs are calculated using an elasticity model with composite costs calculated for all PT sub-modes to avoid the “new mode” problem:

### 2.2 The Elasticity Model

2.2.1 The elasticity model uses composite cost skims from the VOYAGER PT assignment model and an arc elasticity formula of the form:

$$\text{demand factor} = \exp\left(E \ln\left(\frac{c_2}{c_1}\right)\right)$$

Where

$E$  = elasticity

$c_1$  = composite cost in base (in minutes)

$c_2$  = composite cost in forecast (in minutes)

2.2.2 The model has been built using elasticities from Transport for Greater Manchester (TfGM) research and has the facility to use different elasticities based on the mode of the scheme causing the cost changes and whether the trips are to/from the city centre or elsewhere. The elasticities used are shown in Table 1.

Table 1. Elasticities Used

SUB-MODE	TO/FROM CITY CENTRE	ELSEWHERE
Bus	-2.10	-2.475
Light Rail and BRT	-1.80	-1.05
Heavy Rail	-2.55	-2.25

Source: SYSTRA

## 5. Options and assumptions

### Do Nothing (DN) No Supertram

#### Options being tested in Local Large majors OBC bid:

- **DM1:** Truncate from 2024  
Remove services on purple line, truncate and adjust blue line so it becomes Gleadless to Middlewood
- **DM2:** Half Frequency from 2024  
Remove services on purple line, half frequency on yellow and blue lines to 3tph

#### Options tested in NPIF bid:

- **DM3:** Re-rail at 2019 use elasticity model at 2019 to forecast impact of re-railing against DS
- **DS:** Re-rail and renew assets for operation for 2024

Start from full SRTM3 forecasts at 2015 and 2030 developed for BRT North MSBC.

Develop 2019, 2024 and 2034 assignment models for 3 time periods (morning peak hour 08:00-09:00, average inter peak hour 10:00-16:00, evening peak hour 17:00-18:00)

Interpolate SRTM3 demand forecasts at 2015 and 2030 to produce DS demand forecasts for 2019, 2024 and 2035

Interpolate 2015 and 2030 PT value of time for 2019, 2024 and 2035

Interpolate 2015 and 2030 public transport fares by sub-mode and operator for 2019, 2024 and 2034

Use Elasticity Model to forecast demand impacts of all DN/DM scenarios relative to DS

Annualisation factors calibrated in previous work on Supertram extensions to ensure Supertram boardings equate to 14 million boardings in 2015 (updated to 13 million in 2017)

AM	663
PM	716
IP	3500

SRTM3 is specified in units of 2002 prices throughout

RPI adjustment 2002 to 2010 prices	1.27
RPI January 1st 1987	100
Average RPI 2002	176.2
Average RPI 2010	223.6

Fare growth assumptions agreed with DfT during BRT North MSBC

2008 to 2014 RPI+3% Rail and Supertram, RPI+2% Bus

From 2014 RPI+1% per annum for all modes

Modelling suggests that capacity of bus services running parallel to Supertram is sufficient such that no bus operator response is required, even in the no Supertram test (DN)

## 6. TUBA Outputs (PT only)

### INPUT\_SUMMARY

Run name	SCRMT DM3 Test
DM scheme	SCRMT_DM3
DS scheme	SRTM_DS
Economic parameter file	M:\tp\104264 SCR Modelling\Contract\Elasticity Model\PT_Model_v3\TUBA\economics\economics_1_9_4.txt
Scheme parameter file	M:\tp\104264 SCR Modelling\Contract\Elasticity Model\PT_Model_v3\TUBA\scheme\DM3_DS_PT_60yr.txt
First year of scheme costs	2017
First Appraisal Year	2019
Last Appraisal Year	2053
Modelled years	2019 2024 2035
Time period	Total hours
AM peak	663
PM peak	716
Inter-peak	3500
Total	4879

*Note: All monetary values are in 2010 market prices. All monetary values discounted to 2010 unless otherwise stated*

### DM\_SCHEME\_COSTS

#### Do minimum scheme costs. Undiscounted £000s

Mode	Year	Prep.	Superv.	Constr.	Land	Maint.	Oper.	Grant/Sub.	Dev._Cont
Road	2017	0	0	0	0	0	0	0	0
Road	2018	0	0	0	0	0	0	0	0
Road	2019	0	0	0	0	0	0	0	0
Road	2020	0	0	0	0	0	0	0	0
Road	2021	0	0	0	0	0	0	0	0
Road	2022	0	0	0	0	0	0	0	0
Road	2023	0	0	0	0	0	0	0	0
Road	2024	0	0	0	0	0	0	0	0

### DS\_SCHEME\_COSTS

#### Do something scheme costs. Undiscounted £000s

Mode	Year	Prep.	Superv.	Constr.	Land	Maint.	Oper.	Grant/Sub.	Dev._Cont
Road	2017	0	0	0	0	0	0	0	0
Road	2018	0	0	0	0	0	0	0	0
Road	2019	0	0	0	0	0	0	0	0
Road	2020	0	0	0	0	0	0	0	0
Road	2021	0	0	0	0	0	0	0	0
Road	2022	0	0	0	0	0	0	0	0
Road	2023	0	0	0	0	0	0	0	0
Road	2024	0	0	0	0	0	0	0	0

### PRESENT\_VALUE\_COSTS

#### Scheme investment and operating costs (i.e. excluding grant/subsidy, developer contributions and delays) and differences. £000s.

Mode	Year	DM_scheme_costs	DS_scheme_costs	Difference
Road	2017	0	0	0
Road	2018	0	0	0
Road	2019	0	0	0
Road	2020	0	0	0
Road	2021	0	0	0
Road	2022	0	0	0
Road	2023	0	0	0
Road	2024	0	0	0
Road	Total	0	0	0

**TRIP\_MATRIX\_TOTALS**

**Annualised total trip numbers(thousands)**

Submode	Year	Time period	DO MIN	DO SOM
Bus	2019	AM peak	19946	20281
Bus	2019	PM peak	18493	18817
Bus	2019	Inter-peak	78644	79627
Bus	2019	All	117083	118725
Bus	2024	AM peak	19847	20371
Bus	2024	PM peak	18363	18956
Bus	2024	Inter-peak	78798	80667
Bus	2024	All	117008	119994
Bus	2035	AM peak	20047	20596
Bus	2035	PM peak	18660	19287
Bus	2035	Inter-peak	81082	82988
Bus	2035	All	119789	122870
All	2019	AM peak	19946	20281
All	2019	PM peak	18493	18817
All	2019	Inter-peak	78644	79627
All	2019	All	117083	118725
All	2024	AM peak	19847	20371
All	2024	PM peak	18363	18956
All	2024	Inter-peak	78798	80667
All	2024	All	117008	119994
All	2035	AM peak	20047	20596
All	2035	PM peak	18660	19287
All	2035	Inter-peak	81082	82988
All	2035	All	119789	122870

**DM&DS\_USER\_COSTS**

**Total value of user costs, DM and DS. £000s.**

Mode	Year	DMtot_time	DMtot_charge	DMtot_fuel	DMtot_nofuel	DStot_time	DStot_charge	DStot_fuel	DStot_nofuel
Bus	2019	732598	142607	0	0	736552	144170	0	0
Bus	2024	684824	128089	0	0	691115	130724	0	0
Bus	2035	602393	99574	0	0	607971	101729	0	0

**FUEL\_CONSUMPTION**

**Total fuel consumption, DM and DS. kilounits.**

Submode	Year	Do minimum			Do something		
		Petrol	Diesel	Electric	Petrol	Diesel	Electric
Bus	2019	0	0	0	0	0	0
Bus	2024	0	0	0	0	0	0
Bus	2035	0	0	0	0	0	0
All	2019	0	0	0	0	0	0
All	2024	0	0	0	0	0	0
All	2035	0	0	0	0	0	0
Bus	Total	0	0	0	0	0	0
All	Total	0	0	0	0	0	0

**CO2\_EMISSIONS\_UNTRADED**

		Emissions (tonnes)				cost (£000s, low)			cost (£000s, central)			cost
(£000s, high)		DM	DS	Increase	DM	DS	Increase	DM	DS	Increase		
Submode	Year	DM	DS	Increase	DM	DS	Increase	DM	DS	Increase		
DM	DS	Increase										
Bus	2019	0	0	0	0	0	0	0	0	0	0	0
Bus	2024	0	0	0	0	0	0	0	0	0	0	0
Bus	2035	0	0	0	0	0	0	0	0	0	0	0
All	2019	0	0	0	0	0	0	0	0	0	0	0
All	2020	0	0	0	0	0	0	0	0	0	0	0
All	2021	0	0	0	0	0	0	0	0	0	0	0
All	2022	0	0	0	0	0	0	0	0	0	0	0
All	2023	0	0	0	0	0	0	0	0	0	0	0
All	2024	0	0	0	0	0	0	0	0	0	0	0
All	2025	0	0	0	0	0	0	0	0	0	0	0
All	2026	0	0	0	0	0	0	0	0	0	0	0
All	2027	0	0	0	0	0	0	0	0	0	0	0
All	2028	0	0	0	0	0	0	0	0	0	0	0
All	2029	0	0	0	0	0	0	0	0	0	0	0
All	2030	0	0	0	0	0	0	0	0	0	0	0
All	2031	0	0	0	0	0	0	0	0	0	0	0
All	2032	0	0	0	0	0	0	0	0	0	0	0
All	2033	0	0	0	0	0	0	0	0	0	0	0
All	2034	0	0	0	0	0	0	0	0	0	0	0
All	2035	0	0	0	0	0	0	0	0	0	0	0
All	2036	0	0	0	0	0	0	0	0	0	0	0
All	2037	0	0	0	0	0	0	0	0	0	0	0
All	2038	0	0	0	0	0	0	0	0	0	0	0
All	2039	0	0	0	0	0	0	0	0	0	0	0
All	2040	0	0	0	0	0	0	0	0	0	0	0
All	2041	0	0	0	0	0	0	0	0	0	0	0
All	2042	0	0	0	0	0	0	0	0	0	0	0
All	2043	0	0	0	0	0	0	0	0	0	0	0
All	2044	0	0	0	0	0	0	0	0	0	0	0
All	2045	0	0	0	0	0	0	0	0	0	0	0
All	2046	0	0	0	0	0	0	0	0	0	0	0
All	2047	0	0	0	0	0	0	0	0	0	0	0
All	2048	0	0	0	0	0	0	0	0	0	0	0
All	2049	0	0	0	0	0	0	0	0	0	0	0
All	2050	0	0	0	0	0	0	0	0	0	0	0
All	2051	0	0	0	0	0	0	0	0	0	0	0
All	2052	0	0	0	0	0	0	0	0	0	0	0
All	2053	0	0	0	0	0	0	0	0	0	0	0
Bus	Total	0	0	0	0	0	0	0	0	0	0	0
All	Total	0	0	0	0	0	0	0	0	0	0	0

**CO2\_EMISSIONS\_TRADED**

		Emissions (tonnes)				cost (£000s, low)			cost (£000s, central)			cost
(£000s, high)		DM	DS	Increase	DM	DS	Increase	DM	DS	Increase		
Submode	Year	DM	DS	Increase	DM	DS	Increase	DM	DS	Increase		
DM	DS	Increase										
Bus	2019	0	0	0	0	0	0	0	0	0	0	0
Bus	2024	0	0	0	0	0	0	0	0	0	0	0
Bus	2035	0	0	0	0	0	0	0	0	0	0	0
All	2019	0	0	0	0	0	0	0	0	0	0	0
All	2020	0	0	0	0	0	0	0	0	0	0	0
All	2021	0	0	0	0	0	0	0	0	0	0	0
All	2022	0	0	0	0	0	0	0	0	0	0	0
All	2023	0	0	0	0	0	0	0	0	0	0	0
All	2024	0	0	0	0	0	0	0	0	0	0	0
All	2025	0	0	0	0	0	0	0	0	0	0	0
All	2026	0	0	0	0	0	0	0	0	0	0	0
All	2027	0	0	0	0	0	0	0	0	0	0	0
All	2028	0	0	0	0	0	0	0	0	0	0	0
All	2029	0	0	0	0	0	0	0	0	0	0	0
All	2030	0	0	0	0	0	0	0	0	0	0	0
All	2031	0	0	0	0	0	0	0	0	0	0	0

All	2032	0	0	0	0	0	0	0	0	0	0	0	0
All	2033	0	0	0	0	0	0	0	0	0	0	0	0
All	2034	0	0	0	0	0	0	0	0	0	0	0	0
All	2035	0	0	0	0	0	0	0	0	0	0	0	0
All	2036	0	0	0	0	0	0	0	0	0	0	0	0
All	2037	0	0	0	0	0	0	0	0	0	0	0	0
All	2038	0	0	0	0	0	0	0	0	0	0	0	0
All	2039	0	0	0	0	0	0	0	0	0	0	0	0
All	2040	0	0	0	0	0	0	0	0	0	0	0	0
All	2041	0	0	0	0	0	0	0	0	0	0	0	0
All	2042	0	0	0	0	0	0	0	0	0	0	0	0
All	2043	0	0	0	0	0	0	0	0	0	0	0	0
All	2044	0	0	0	0	0	0	0	0	0	0	0	0
All	2045	0	0	0	0	0	0	0	0	0	0	0	0
All	2046	0	0	0	0	0	0	0	0	0	0	0	0
All	2047	0	0	0	0	0	0	0	0	0	0	0	0
All	2048	0	0	0	0	0	0	0	0	0	0	0	0
All	2049	0	0	0	0	0	0	0	0	0	0	0	0
All	2050	0	0	0	0	0	0	0	0	0	0	0	0
All	2051	0	0	0	0	0	0	0	0	0	0	0	0
All	2052	0	0	0	0	0	0	0	0	0	0	0	0
All	2053	0	0	0	0	0	0	0	0	0	0	0	0
Bus	Total	0	0	0	0	0	0	0	0	0	0	0	0
All	Total	0	0	0	0	0	0	0	0	0	0	0	0

**CO2\_EMISSIONS\_BY\_TIME\_PERIOD\_UNTRADED**

		Emissions (tonnes)			cost (£000s, low)			cost (£000s, central)			cost	
(£000s, high)		DM	DS	Increase	DM	DS	Increase	DM	DS	Increase	DM	
Submode	Year											
DS	Increase											
AM peak	2019	0	0	0	0	0	0	0	0	0	0	0
AM peak	2024	0	0	0	0	0	0	0	0	0	0	0
AM peak	2035	0	0	0	0	0	0	0	0	0	0	0
PM peak	2019	0	0	0	0	0	0	0	0	0	0	0
PM peak	2024	0	0	0	0	0	0	0	0	0	0	0
PM peak	2035	0	0	0	0	0	0	0	0	0	0	0
Inter-peak	2019	0	0	0	0	0	0	0	0	0	0	0
Inter-peak	2024	0	0	0	0	0	0	0	0	0	0	0
Inter-peak	2035	0	0	0	0	0	0	0	0	0	0	0
AM peak	Total	0	0	0	0	0	0	0	0	0	0	0
PM peak	Total	0	0	0	0	0	0	0	0	0	0	0
Inter-peak	Total	0	0	0	0	0	0	0	0	0	0	0

NOTE: The cost of any EU Allowances (EUAs) purchased to cover traded emissions (i.e. emissions from sectors covered by the EU Emissions Trading System) will be reflected in the purchase price of traded sector goods (such as electricity). Since the purchase price is used in the costs considered in transport appraisal, the cost of the relevant EUAs will be included in the cost benefit analysis, "internalising" the costs of emissions from traded sectors.

The CO2 EMISSIONS BY TIME PERIOD TRADED reported in the table below are therefore provided for information purposes only - they are not included in the Economic Efficiency of the Transport System (TEE) table. For further information, please refer to TAG Unit A-3 para. 4.1.5 and 4.2.9

**CO2\_EMISSIONS\_BY\_TIME\_PERIOD\_TRADED**

		Emissions (tonnes)			cost (£000s, low)			cost (£000s, central)			cost	
(£000s, high)		DM	DS	Increase	DM	DS	Increase	DM	DS	Increase	DM	
Submode	Year											
DS	Increase											
AM peak	2019	0	0	0	0	0	0	0	0	0	0	0
AM peak	2024	0	0	0	0	0	0	0	0	0	0	0
AM peak	2035	0	0	0	0	0	0	0	0	0	0	0
PM peak	2019	0	0	0	0	0	0	0	0	0	0	0
PM peak	2024	0	0	0	0	0	0	0	0	0	0	0
PM peak	2035	0	0	0	0	0	0	0	0	0	0	0
Inter-peak	2019	0	0	0	0	0	0	0	0	0	0	0
Inter-peak	2024	0	0	0	0	0	0	0	0	0	0	0
Inter-peak	2035	0	0	0	0	0	0	0	0	0	0	0



AM peak	Total	0	0	0	0	0	0	0	0	0	0	0	0
PM peak	Total	0	0	0	0	0	0	0	0	0	0	0	0
Inter-peak	Total	0	0	0	0	0	0	0	0	0	0	0	0

**MODE**

**User benefits and changes in revenues by mode, all years. £000s.**

Mode	Year	User		Vehicle_Operating_Cost		Operator_Rev		Indirect
		Time	PT_fares_(pri	Fuel	Non_fuel	PT_fares_(pri	Taxes	
Bus	2019	5841	121	0	0	1850	-287	
Bus	2020	6671	98	0	0	2146	-333	
Bus	2021	7453	75	0	0	2419	-376	
Bus	2022	8209	54	0	0	2672	-415	
Bus	2023	8941	34	0	0	2905	-451	
Bus	2024	9649	16	0	0	3118	-484	
Bus	2025	9546	8	0	0	3066	-476	
Bus	2026	9445	0	0	0	3014	-468	
Bus	2027	9348	-7	0	0	2961	-460	
Bus	2028	9252	-14	0	0	2909	-452	
Bus	2029	9159	-20	0	0	2857	-443	
Bus	2030	9068	-25	0	0	2805	-435	
Bus	2031	8971	-31	0	0	2753	-427	
Bus	2032	8876	-36	0	0	2702	-419	
Bus	2033	8783	-40	0	0	2651	-411	
Bus	2034	8684	-45	0	0	2600	-404	
Bus	2035	8595	-48	0	0	2550	-396	
Bus	2036	8477	-47	0	0	2464	-382	
Bus	2037	8362	-45	0	0	2380	-369	
Bus	2038	8249	-44	0	0	2300	-357	
Bus	2039	8138	-42	0	0	2222	-345	
Bus	2040	8036	-41	0	0	2147	-333	
Bus	2041	7935	-39	0	0	2074	-322	
Bus	2042	7837	-38	0	0	2004	-311	
Bus	2043	7740	-37	0	0	1936	-301	
Bus	2044	7645	-36	0	0	1871	-290	
Bus	2045	7550	-34	0	0	1808	-281	
Bus	2046	7457	-33	0	0	1747	-271	
Bus	2047	7395	-32	0	0	1696	-263	
Bus	2048	7334	-31	0	0	1646	-256	
Bus	2049	7274	-30	0	0	1598	-248	
Bus	2050	7214	-30	0	0	1552	-241	
Bus	2051	7154	-29	0	0	1507	-234	
Bus	2052	7091	-28	0	0	1463	-227	
Bus	2053	7028	-27	0	0	1420	-220	
Bus	Total	284407	-503	0	0	79814	-12390	

**SUBMODE**

**User benefits and changes in revenues by submode/vehicle type, modelled years and total. £000s.**

Submode	Year	User		Vehicle_Operating_Cost		Operator_Rev		Indirect
		Time	PT_fares_(pri	Fuel	Non_fuel	PT_fares_(pri	Taxes	
Bus	2019	5841	121	0	0	1850	-287	
Bus	2024	9649	16	0	0	3118	-484	
Bus	2035	8595	-48	0	0	2550	-396	
All	2019	5841	121	0	0	1850	-287	
All	2024	9649	16	0	0	3118	-484	
All	2035	8595	-48	0	0	2550	-396	
Bus	Total	284407	-503	0	0	79814	-12390	
All	Total	284407	-503	0	0	79814	-12390	

**PERSON\_TYPES**

**User benefits and changes in revenues by person type, modelled years and total. £000s.**

Person_type	Year	User		Vehicle_Operating_Cost		Operator_Rev		Indirect
		Time	PT_fares_(pri	Fuel	Non_fuel	PT_fares_(pri	Taxes	
Passenger	2019	5841	121	0	0	1850	-287	
Passenger	2024	9649	16	0	0	3118	-484	
Passenger	2035	8595	-48	0	0	2550	-396	
Passenger	Total	284407	-503	0	0	79814	-12390	

**PURPOSE**

**User benefits and changes in revenues by trip purpose, modelled years and total. £000s.**

Purpose	Year	User	User_Charges	Vehicle_Operating_Cost		Operator_Rev	Indirect
		Time PT_fares_(pri)	Fuel	Non_fuel PT_fares_(pri)	Taxes		
Business	2019	396	6	0	0	49	0
Business	2024	658	-1	0	0	87	0
Business	2035	591	-3	0	0	71	0
Commuting	2019	1140	38	0	0	352	-56
Commuting	2024	1917	-17	0	0	637	-102
Commuting	2035	1731	-22	0	0	522	-83
Other	2019	4305	78	0	0	1448	-231
Other	2024	7074	34	0	0	2395	-382
Other	2035	6273	-24	0	0	1957	-312
Business	Total	19484	-45	0	0	2214	0
Commuting	Total	56970	-457	0	0	16254	-2595
Other	Total	207952	-1	0	0	61345	-9795

**PERIOD**

**User benefits and changes in revenues by time period, modelled years and total. £000s.**

Period	Year	User	User_Charges	Vehicle_Operating_Cost		Operator_Rev	Indirect
		Time PT_fares_(pri)	Fuel	Non_fuel PT_fares_(pri)	Taxes		
AM peak	2019	992	88	0	0	300	-46
AM peak	2024	1463	9	0	0	516	-79
AM peak	2035	1367	8	0	0	443	-68
PM peak	2019	1029	32	0	0	354	-54
PM peak	2024	1968	-81	0	0	758	-116
PM peak	2035	1798	-71	0	0	609	-94
Inter-peak	2019	3819	2	0	0	1196	-187
Inter-peak	2024	6218	88	0	0	1845	-289
Inter-peak	2035	5429	15	0	0	1498	-234
AM peak	Total	44867	483	0	0	13602	-2087
PM peak	Total	58543	-1947	0	0	18917	-2903
Inter-peak	Total	180997	961	0	0	47294	-7400

**NON MONETISED TIME BENEFITS BY TIME SAVING**

**Time benefits (thousands of person hrs) by size of time saving**

Vehicle type	Purpose	Year	< -5 mins	-5 to -2 mins	-2 to 0 mins	0 to 2 mins	2 to 5 mins	> 5 mins
Bus	Business	2019	-1	-1	-1	2	4	26
Bus	Business	2024	-2	-1	-2	2	4	51
Bus	Business	2035	-1	-1	-2	2	4	52
Bus	Business	Total	-46	-39	-76	70	144	1733
Bus	Commuting	2019	-5	-7	-10	13	26	182
Bus	Commuting	2024	-14	-10	-15	15	28	361
Bus	Commuting	2035	-9	-8	-16	15	31	371
Bus	Commuting	Total	-336	-281	-533	519	1042	12339
Bus	Other	2019	-20	-24	-38	53	135	750
Bus	Other	2024	-43	-35	-64	49	107	1503
Bus	Other	2035	-30	-32	-67	52	116	1533
Bus	Other	Total	-1131	-1109	-2249	1803	4032	51073

**MONETISED TIME BENEFITS BY TIME SAVING**

**Time benefits (£000s) by size of time saving**

Vehicle type	Purpose	Year	< -5 mins	-5 to -2 mins	-2 to 0 mins	0 to 2 mins	2 to 5 mins	> 5 mins
Bus	Business	2019	-9	-12	-18	26	55	355
Bus	Business	2024	-25	-17	-28	25	50	652
Bus	Business	2035	-13	-12	-25	22	46	572
Bus	Business	Total	-513	-430	-826	767	1582	18906
Bus	Commuting	2019	-26	-37	-54	76	147	1034
Bus	Commuting	2024	-76	-51	-81	77	149	1899
Bus	Commuting	2035	-39	-34	-71	68	138	1670
Bus	Commuting	Total	-1532	-1278	-2386	2339	4686	55142
Bus	Other	2019	-100	-120	-193	268	678	3772
Bus	Other	2024	-199	-162	-300	228	498	7009
Bus	Other	2035	-121	-126	-269	208	461	6121
Bus	Other	Total	-4560	-4439	-8923	7217	16181	202475

**TOTAL BENEFITS BY TIME SAVING**

**Total benefits (£000s) by size of time saving**

Vehicle type	Purpose	Year	< -5 mins	-5 to -2 mins	-2 to 0 mins	0 to 2 mins	2 to 5 mins	> 5 mins
Bus	Business	2019	-8	-10	-20	23	54	363
Bus	Business	2024	-24	-12	-30	21	47	656
Bus	Business	2035	-12	-10	-27	19	44	574
Bus	Business	Total	-492	-366	-881	668	1513	18998
Bus	Commuting	2019	-20	-23	-62	59	141	1082
Bus	Commuting	2024	-72	-37	-92	54	132	1916
Bus	Commuting	2035	-35	-24	-82	48	123	1679
Bus	Commuting	Total	-1411	-926	-2706	1726	4234	55597
Bus	Other	2019	-78	-57	-246	179	650	3935
Bus	Other	2024	-175	-88	-354	148	442	7135
Bus	Other	2035	-104	-72	-321	136	417	6193
Bus	Other	Total	-3967	-2611	-10515	4910	14794	205340

**NON MONETISED TIME BENEFITS BY DISTANCE**

**Time benefits (thousands of person hrs) by distance**

Vehicle type	Purpose	Year	< 1 kms	1 to 5 kms	5 to 10 kms	10 to 15 kms	15 to 20 kms	20 to 50 kms	50 to 100 kms	>100 kms
Bus	Business	2019	29	0	0	0	0	0	0	0
Bus	Business	2024	51	0	0	0	0	0	0	0
Bus	Business	2035	54	0	0	0	0	0	0	0
Bus	Business	Total	1786	0	0	0	0	0	0	0
Bus	Commuting	2019	201	0	0	0	0	0	0	0
Bus	Commuting	2024	365	0	0	0	0	0	0	0
Bus	Commuting	2035	385	0	0	0	0	0	0	0
Bus	Commuting	Total	12750	0	0	0	0	0	0	0
Bus	Other	2019	856	0	0	0	0	0	0	0
Bus	Other	2024	1517	0	0	0	0	0	0	0
Bus	Other	2035	1571	0	0	0	0	0	0	0
Bus	Other	Total	52417	0	0	0	0	0	0	0

**MONETISED TIME BENEFITS BY DISTANCE**

**Time benefits (£000s) by distance**

Vehicle type	Purpose	Year	< 1 kms	1 to 5 kms	5 to 10 kms	10 to 15 kms	15 to 20 kms	20 to 50 kms	50 to 100 kms	>100 kms
Bus	Business	2019	396	0	0	0	0	0	0	0
Bus	Business	2024	658	0	0	0	0	0	0	0
Bus	Business	2035	591	0	0	0	0	0	0	0
Bus	Business	Total	19484	0	0	0	0	0	0	0
Bus	Commuting	2019	1140	0	0	0	0	0	0	0
Bus	Commuting	2024	1917	0	0	0	0	0	0	0
Bus	Commuting	2035	1731	0	0	0	0	0	0	0
Bus	Commuting	Total	56970	0	0	0	0	0	0	0
Bus	Other	2019	4305	0	0	0	0	0	0	0
Bus	Other	2024	7074	0	0	0	0	0	0	0
Bus	Other	2035	6273	0	0	0	0	0	0	0
Bus	Other	Total	207951	0	0	0	0	0	0	0

**TOTAL BENEFITS BY DISTANCE**

**Total benefits (£000s) by distance**

Vehicle type	Purpose	Year	< 1 kms	1 to 5 kms	5 to 10 kms	10 to 15 kms	15 to 20 kms	20 to 50 kms	50 to 100 kms	>100 kms
Bus	Business	2019	401	0	0	0	0	0	0	0
Bus	Business	2024	656	0	0	0	0	0	0	0
Bus	Business	2035	588	0	0	0	0	0	0	0
Bus	Business	Total	19440	0	0	0	0	0	0	0
Bus	Commuting	2019	1178	0	0	0	0	0	0	0
Bus	Commuting	2024	1900	0	0	0	0	0	0	0
Bus	Commuting	2035	1709	0	0	0	0	0	0	0
Bus	Commuting	Total	56513	0	0	0	0	0	0	0
Bus	Other	2019	4383	0	0	0	0	0	0	0
Bus	Other	2024	7108	0	0	0	0	0	0	0
Bus	Other	2035	6249	0	0	0	0	0	0	0
Bus	Other	Total	207950	0	0	0	0	0	0	0

## SENSITIVITY

### Total user benefits as a percentage of total DM user costs

Mode	Modelled Years		
	2019	2024	2035
Bus	0.68%	1.19%	1.22%

### Economy: Economic Efficiency of the Transport System (TEE)

<u>Consumer - Commuting user benefits</u>	<u>All Modes</u>	<u>Road</u>	<u>Bus</u>		
Travel Time	56970	0	56970		
Vehicle operating costs	0	0	0		
User charges	-457	0	-457		
During Construction & Maintenance		0	0		
<b>NET CONSUMER - COMMUTING BENEFITS</b>	<b>56513</b>	<b>0</b>	<b>56513</b>		
<u>Consumer - Other user benefits</u>	<u>All Modes</u>	<u>Road</u>	<u>Bus</u>		
Travel Time	207952	0	207952		
Vehicle operating costs	0	0	0		
User charges	-1	0	-1		
During Construction & Maintenance	0	0	0		
<b>NET CONSUMER - OTHER BENEFITS</b>	<b>207951</b>	<b>0</b>	<b>207951</b>		
<u>Business</u>	<u>All Modes</u>	<u>Road</u>	<u>Road Freight</u>	<u>Bus</u>	<u>Bus</u>
		<u>Personal</u>		<u>Personal</u>	<u>Freight</u>
Travel Time	19484	0	0	19484	0
Vehicle operating costs	0	0	0	0	0
User charges	-45	0	0	-45	0
During Construction & Maintenance	0	0	0	0	0
<b>Subtotal</b>	<b>19440</b>	<b>0</b>	<b>0</b>	<b>19440</b>	<b>0</b>
<u>Private Sector Provider Impacts</u>	<u>All Modes</u>	<u>Road</u>	<u>Bus</u>		
Revenue	79814	0	79814		
Operating costs	0	0	0		
Investment costs	0	0	0		
Grant/subsidy	0	0	0		
<b>Subtotal</b>	<b>79814</b>	<b>0</b>	<b>79814</b>		
Other business Impacts					
Developer contributions	0	0	0		
<b>NET BUSINESS IMPACT</b>	<b>99254</b>				
<b>TOTAL</b>	<b>363718</b>				
Present Value of Transport Economic Efficiency Benefits (TEE)					

Note: Benefits appear as positive numbers, while costs appear as negative numbers.

Note: All entries are present values discounted to 2010, in 2010 prices

### Public Accounts

Note: The Do Minimum and Do Something capital and operating costs per annum over the project period have not been input to TUBA but, after appropriate deflating and discounting to a 2010 base year were input to the PA table (Appendix 7). The spreadsheet is available on request.

Local Government Funding	All Modes	Road	Bus
Revenue	0	0	0
Operating costs	0	0	0
Investment costs	0	0	0
Developer Contributions	0	0	0
Grant/Subsidy Payments	0	0	0
<b>NET IMPACT</b>	<b>0</b>	<b>0</b>	<b>0</b>

Central Government Funding: Transport	All Modes	Road	Bus
Revenue	0	0	0
Operating costs	0	0	0
Investment costs	0	0	0
Developer Contributions	0	0	0
Grant/Subsidy Payments	0	0	0
NET IMPACT	0	0	0
Central Government Funding: Non-Transport	All Modes	Road	Bus
Indirect Tax Revenues	12390	0	12390
TOTALS			
Broad Transport Budget	0	0	0
Wider Public Finances	12390	0	12390

*Note: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers.*

*Note: All entries are present values discounted to 2010, in 2010 prices*

#### **Analysis of Monetised Costs and Benefits**

Greenhouse Gases	0
Economic Efficiency: Consumer Users (Commuting)	56513
Economic Efficiency: Consumer Users (Other)	207951
Economic Efficiency: Business Users and Providers	99254
Wider Public Finances (Indirect Taxation Revenues)	-12390
Present Value of Benefits (PVB)	351328
Broad Transport Budget	0
Present Value of Costs (PVC)	0
OVERALL IMPACTS	
Net Present Value (NPV)	351328
Benefit to Cost Ratio (BCR)	0.000

*Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.*

#### TUBA Run Information

- calculations completed

#### File Summary

- Scheme File : M:\tp\104264 SCR Modelling\Contract\Elasticity Model\PT\_Model\_v3\TUBA\scheme\DM3\_DS\_PT\_60yr.txt  
 - Economic File : M:\tp\104264 SCR Modelling\Contract\Elasticity Model\PT\_Model\_v3\TUBA\economics\economics\_1\_9\_4.txt  
 - Output File : M:\tp\104264 SCR Modelling\Contract\Elasticity Model\PT\_Model\_v3\TUBA\output\DM3\_DS\_PT\_RPI\_60yr\_194.out  
 Elapsed time :