FFORDD GYSWLLT
DWYRAIN Y BAE
EASTERN BAY LINK

Llywodraeth Cymru
Welsh Government

Eastern Bay Link Road

Economic Assessment

July 2016

dawnus ferrovial agroman CAPITA CASS HAYWARD PARSONS BRINCKERHOFF

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Economic Assessment

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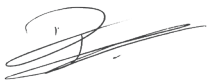
Checker	Dave James		26/07/2016
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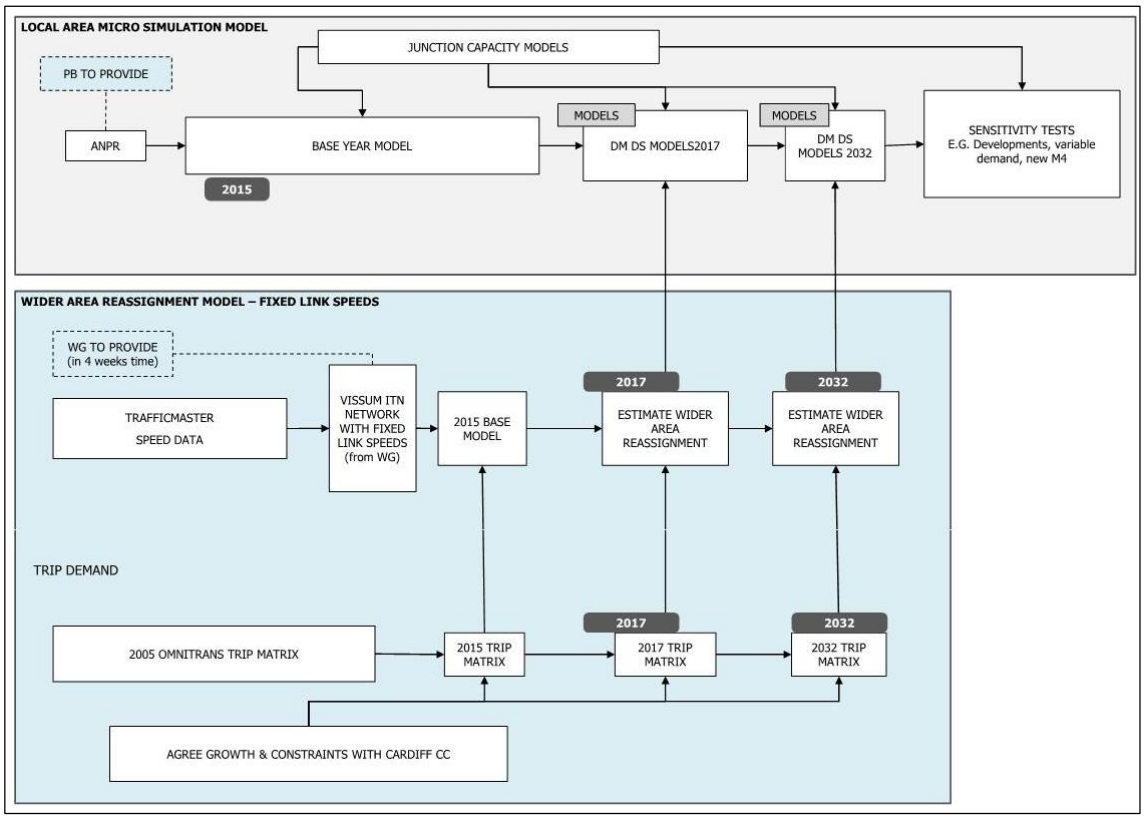
1. Introduction

The Work Programme for key stage three of the Eastern Bay Link Road identified a traffic model structure for the assessment of the Eastern Bay Link Road scheme. This consisted of a micro-simulation model to assess local area reassignment and a wider area model utilising fixed speeds from Trafficmaster Data. Junction capacity models were also identified for the junctions that are likely to experience a change in turning movements as a result of the scheme.

The traffic model structure is shown in Figure 1.1

Figure 1.1 - Traffic Model Structure



An Economic Assessment has been undertaken making use of the traffic modelling results.

1.1 Economic Assessment Overview

In 2003, the Treasury published a revised edition of its Green Book (GB), 'Appraisal and Evaluation in Central Government'. The GB is a best practice guide to carrying out appraisal and evaluation of policies and capital projects. It is used by all central government departments and executive agencies. It aims to make the appraisal process throughout government more consistent and transparent. Welsh Transport Analysis Guidance (WelTAG) provides specific transport scheme guidance for Wales based on the GB. WelTAG often refers to WebTAG, the transport analysis guidance for England, also based on the GB.

The CBA procedure follows the principles of WebTAG which also stresses that the extent, cost and effort of transport appraisal should be relative to the scale of the scheme being appraised.

The GB recognises the need to take account of all the economic, social, environmental and financial impacts of an intervention and uses the term 'economic appraisal' for this process. The GB recommends that options should be appraised using cost benefit analysis, with supplementary techniques to be used for weighing up those costs and benefits that remain unvalued. It defines cost benefit analysis as "analysis which quantifies in monetary terms as many of the costs and benefits of a proposal as feasible, including items for which the market does not provide a satisfactory measure of economic value".

The GB recognises that there may be important impacts that cannot be quantified or monetised. Where that is the case, the GB emphasises the need to take these impacts into account - it does NOT recommend that consideration should be restricted to those impacts that can be valued. Where there are unvalued costs and benefits, the GB recommends that cost effectiveness analysis or multi criteria analysis can help balance unvalued impacts against monetised ones.

The emphasis on quantification in monetary terms is clearly an important issue for the appraisal of transport investment and a CBA is used to compare the monetised benefits of the intervention with the costs of the intervention. The CBA produces the following summary tables:

- Public Accounts Table - presents the costs and revenues for local and central government.
- Transport Economic Efficiency (TEE) Table - a summary of transport benefits to consumers and businesses.
- Analysis of Monetised Costs and Benefits (AMCB) Table - a comparison and analysis of costs and benefits.

As transport investment budgets are constrained, decision-making is based on value for money rather than total benefits. Value for money is measured by the benefit to cost ratio, where

$$Benefit\ to\ Cost\ Ratio\ (BCR) = \frac{Present\ Value\ of\ Benefits\ (PVB)}{Present\ Value\ of\ Costs\ (PVC)}$$

For transport interventions an Appraisal Summary Table (AST) is used to provide decision takers with a concise overview of impacts across the board. Results of the CBA are summarised in the AST.

WelTAG guidance ranks BCRs as follows.

- BCR <1 Poor
- BCR 1 to 1.5 Low
- BCR 1.5 to 2 Medium
- BCR >2 High

The CBA of the proposed scheme has been undertaken in accordance with WelTAG requirements and quantifies costs and benefits of a scheme in monetised terms over a 60 year appraisal period.

Monetised costs include construction costs, land costs, preparation costs and supervision costs adjusted for risk and optimism bias. Indirect tax revenues are also quantified as a cost in the assessment.

Monetised benefits include values of time, vehicle operating costs, accident benefits and greenhouse gas benefits. Benefits are calculated by quantifying the differences between a 'do minimum' (without scheme) scenario and a 'do something' (with scheme) scenario.

The Department for Transport (DfT) software packages TUBA and COBALT were used in the analysis. The CBA uses the market-price unit of account and the indirect tax correction factor used to convert values entered in factor costs is the average rate of indirect taxation in the economy taken from the TAG data book.

The CBA enables a comparison of other government funded schemes in terms of value for money. It should, however, be noted that there may be other costs and benefits that cannot be presented in monetised form. For example, the CBA does not include the economic impacts of reliability, wider impacts or regeneration.

2. Eastern Bay Link Road Traffic Impacts

The traffic impacts of the scheme are detailed in the report *"Eastern Bay Link Road Traffic Forecasting Report January 2016"* and this economic assessment is based on the traffic forecast, travel distances and journey times produced in that report.

The Wider Area Omnitrans Model was not considered to be a suitable tool to extract traffic impacts due to its non compliance with WelTAG as recognised at an early stage of the EBL schemes and identified in the "*Works Programme Report April 2015*." Instead, the Local Area Microsimulation Model was used but as this model does not cover the full area impacted by the scheme, some benefits are excluded from the assessment. As there are no areas that are likely to experience increases in journey times outside of the assessment area, the benefits will be underestimated in the assessment.

The layout of the EBL scheme is shown in Drawing Nos;

- EBL-CAP-0100-MLR-DR-C-0121;
- EBL-CAP-0100-MLR-DR-C-0122;
- EBL-CAP-0100-OWR-SK-C-0166 and;
- EBL-CAP-0100-QGR-SK-C-0165.

3. Public Accounts

WebTAG Public Accounts Sub-Objective describes the distribution of impacts between government and society as a key issue in the justification of government action. Thus, the Department for Transport (DfT) requires an aggregation of costs that highlights the impact of a proposal on public accounts. The 'public accounts' impact is defined as net costs incurred by central or local government bodies (including public sector agencies). It includes investment and operating costs, grant and subsidy and changes in indirect tax and other revenues.

The three main elements of a transportation scheme cost estimate are defined as:

- The base cost;
- Adjustment for risk;
- Adjustment for Optimism Bias;

3.1 Base Cost

The base cost is an estimate of the cost of constructing the project. It is made up of base investment (or capital costs) and base operating costs, including all maintenance costs. The base costs have been estimated at 2016 prices and are shown in Table 3.1.

3.2 Risk and Optimism Bias

Optimism bias is the tendency for appraisers to be *'overly optimistic about key parameters'.* The key parameters can include underestimating timescale and costs, together with over estimating benefits.

Transportation projects are inherently subject to uncertainties. Often the project scope will change during project development due to unknowns at earlier project stages. Consequently, a degree of budget uncertainty exists due to a number of risks which will typically be reduced as the project development progresses and the complete scope of works and known risks, e.g. ground conditions, are better understood. The level of optimism bias is dependent on the stage of the scheme which is defined in WebTAG unit A1.2. Stage 3 has been assumed which is equivalent to Full Approval for a Local Authority Scheme and has an Optimism Bias uplift of 3%.

The scheme costs used in the assessment are shown in Table 3.1

Table 3.1 - Cost Estimate Summary in 2016 Factor Cost Prices (£000)

Base Costs	Investment costs	Construction Cost	£37,067
		Adjustment for construction costs above general inflation rate	£0
		Land Cost	£2,975
		Preparation costs	£2,572
		Supervision costs	£429
		Non traffic related maintenance costs	£0
		Sub total	£43,043
Quantified Risk Assessment		The overall distribution and expected value of Risk for the scheme	£2,249
Optimism bias		Uplift of base and risk costs (3%)	£1,359
		Total	£46,651

It is assumed that the difference in cost of non traffic related maintenance costs with and without the scheme is negligible and has therefore been input as £0.

3.3 Public Accounts Table

The Public Accounts table is used to calculate the Present Value of Cost (PVC) to Public Accounts. WebTAG guidance states that this is the figure which should be used in the Scheme Assessment Report Appraisal Summary Tables.

Costs should be expressed in present year prices to enable a fair and consistent comparison of all government funded projects. The present year used is currently 2010 and all costs should be discounted to the present value year. Discounting is a technique used to compare costs and benefits that occur in different time periods. It is based on the principle known as time preference that people prefer goods and services now rather than later. This preference for goods and services now rather than later applies to both individuals and society.

The DfT software TUBA was used to discount costs to present year values, convert factor costs to market prices and calculate the change in indirect taxation. The costs shown in Table 3.2 were input into TUBA as factor costs and are the Base Costs shown in Table 3.1 uplifted by the risk and optimism bias also shown in Table 3.1. A GDP deflator from the WebTAG databook was input into TUBA so that costs could be converted to the 2010 present value year.

Table 3.2 - TUBA Input Costs (2016 Factor Cost Prices)

	EBL
Construction	£40,174
Land	£3,224
Preparation	£2,788
Supervision	£465

The profile of construction, land, preparation and supervision costs input into TUBA are shown in Table 3.3.

Table 3.3 - TUBA Input Profiles

Year	Construction (%)	Land (%)	Preparation (%)	Supervision (%)
2016	50	50	50	50
2017	50	50	50	50

Indirect taxation is a cost to central government resulting from the following effects:

- Changes in tax revenues from fuel sales;
- Changes in tax revenues from other vehicle operating costs (i.e. oil, tyres, depreciation and maintenance); and
- Tax revenues collected on goods and services due to travel time changes. Due to the value travellers place on their travel time, the travel time change equates to a monetary value. Economic guidance states that "people can be considered as prepared to sacrifice that amount of expenditure on other goods and services in order to save one hour of non-working time". Tax revenue can then be collected on these goods and services.

TUBA has been used to quantify changes in indirect taxation.

The resulting Public Accounts Table is shown in Table 3.4.

Table 3.4 - Public Accounts Table

	All Modes	Road	Bus
Local Government Funding			
• 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
Central Government Funding: Transport			
• Revenue	0	0	0
• Operating costs	0	0	0
• Investment costs	40,121	40,121	0
• Developer Contributions	0	0	0
• Grant/Subsidy Payments	0	0	0
NET IMPACT	40,121	40,121	0
Central Government Funding: Non Transport			
Indirect Tax Revenues	1852	1852	
TOTALS			
Broad Transport Budget	40121	40121	
Wider Public Finances	1852	1852	

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 (£000)

4. Transport Economic Efficiency

4.1 Introduction

The purpose of the Transport Economic Efficiency (TEE) table is to summarise and present transport user benefits. The TEE table presents the net user benefits disaggregated by group (i.e. consumers on the one hand and business on the other) and by impact (time, vehicle operating costs, etc). All the impacts in the TEE table are expressed in money terms. The table aggregates the results for each group to provide the information needed for the Appraisal Summary Table. The TEE table shows the change brought about by the option relative to the do-minimum case.

4.2 Methods and Assumptions

TUBA makes use of an economic parameters file. This file contains default economic parameters such as values of time and vehicle operating costs. Version 1.9.6 and WebTAG Data Book December 2015 were used for this assessment.

Three time periods were covered in the economic assessment;

- AM average hour between 07:00 and 10:00
- IP average hour between 10:00 and 16:00
- PM average hour between 16:00 and 19:00

Five user classes were used in the economic assessment as shown in Table 4.1.

Table 4.1 Economic User Classes

Economic User Class	Vehicle Type	Traffic Model User Class	2017 %	2032 %
1	Car	1	85%	81%
2	LGV Personal		2%	2%
3	LGV Freight		13%	17%
4	OGV1	2	55%	55%
5	OGV2		45%	45%

The proportion of car, OGV1 and OGV2 in 2017 were based on traffic counts undertaken to develop the traffic models used in the study. LGV personal and freight proportions were based on WebTAG databook averages. WebTAG databook was also used to vary the proportions in 2032. Matrices for time, distance and trips for the modelled time periods were extracted from the Local Area Microsimulation traffic model reported in *"Eastern Bay Link Road Traffic Forecasting January 2016"*. Traffic growth after 2017 was assumed to be flat in TUBA.

4.3 Annualisation

TUBA requires that the inputs from the traffic model be expanded up to annual values and has standard economic definitions for the following time periods.

- AM peak period (weekday 0700-1000)
- PM peak period (weekday 1600-1900)
- Inter-peak period (weekday 1000-1600)
- Off-peak period (weekday 1900-0700)
- Weekend

The traffic model used matrices for the following time periods.

- AM peak hour (weekday 0800-0900 peak hour)
- PM peak hour (weekday 1630-1930 peak hour)
- Inter-peak hour (weekday 1000-1600 average hour)

The year can be divided up as follows

- 253 peaked weekdays
- 52 weekends
- 8 bank holidays

with a total of 8760 hours.

To annualise the traffic model inputs, the modelled 90 minute AM peak period is multiplied by 2 to expand to 0700-1000 then 253 to represent peaked weekdays. The modelled 90 minute PM peak period is also multiplied by 2 to expand to 1600-1900 then 253 to represent peaked weekdays. The inter-peak peak period is multiplied by 6 to expand to 1000-1600 then 253 to represent peaked weekdays. This results in 3036 modelled hours out of 8760 annual hours. It is assumed that impacts in the off-peak period, weekends and bank holidays are minimal and are excluded.

4.4 Results

The resulting TEE table is shown in Table 4.2 and the TUBA files themselves are included in Appendix A. It should be noted that accident and carbon emission benefits are excluded from the TEE table as they form part of the safety and environment objectives.

Table 4.2 Economic Efficiency of the Transport System (TEE)

	All modes	Road	Bus
Consumer - Commuting user benefits			
Travel Time	22,209	22,209	0
Vehicle operating costs	1,631	1,631	0
User charges	0	0	0
Construction maintenance delays	0	0	0
NET CONSUMER - COMMUTING BENEFITS	23,839	23,839	0
Consumer - Other user benefits			
Travel Time	32,017	32,017	0
Vehicle operating costs	2,561	2,561	0
User charges	0	0	0
Construction maintenance delays	0	0	0
NET CONSUMER - OTHER BENEFITS	34,578	34,578	0
Business user benefits	All modes	Road Personal	Road Freight
Travel Time	67,302	38,341	28,961
Vehicle operating costs	12,097	3,085	9,012
User charges	0	0	0
Construction maintenance delays	0	0	0
Subtotal	79,400	41,426	37,973
Private Sector Provider Impacts	All modes	Road	Bus
Revenue	0	0	0
Operating costs	0	0	0
Investment costs	0	0	0
Grant/subsidy	0	0	0
Subtotal	0	0	0
Other business Impacts			
Developer contributions	0	0	0
NET BUSINESS IMPACT	79,400		
TOTAL			
Present Value of Transport Economic Efficiency Benefits (TEE)	137,817		

Note: In the TEE table benefits appear as positive numbers, while costs appear as negative numbers.

Note: All entries are present values discounted to 2010, in 2010 prices (£000).

5. Monetised Safety and Environmental Benefits

5.1 Introduction

In addition to the transport economic benefits discussed in Section 4, there are other benefits that can be monetised. These are accident benefits and carbon emission benefits. They are not included in the TEE table as they fall under other objectives but should be taken into account when assessing overall value for money. This section quantifies these additional benefits.

5.2 Accident Benefits

Accident Benefits were quantified using the DfT Programme COBALT.

Where possible, the same assumptions and methods used for the TUBA assessment were adopted. A 60 year appraisal period was used. Growth rates were input assuming linear growth between 2014 and 2017 and flat growth after.

Actual accidents statistics were coded against both links and nodes. Five years worth of statistics were used from 2010 to 2014.

The option was coded into the do something and the relevant default accident rate assigned to each new junction and link.

Table 5.1 shows the cost of accidents at links and junctions (£000). Link and node numbers are shown in Diagram 5.1. Table 5.2 show the number of accidents and number of casualties for the scheme over the 60 appraisal period. The table include accidents at both links and junctions over the modelled network. The accident costs are discounted to 2010 prices and as they are costs, a negative figure represents a benefit. Accidents and casualties are expressed in numbers so a negative figure represents a decrease in accidents or casualties. The COBALT output files are included in Appendix B.

Diagram 5.1 COBALT Link and Junction Node Numbers

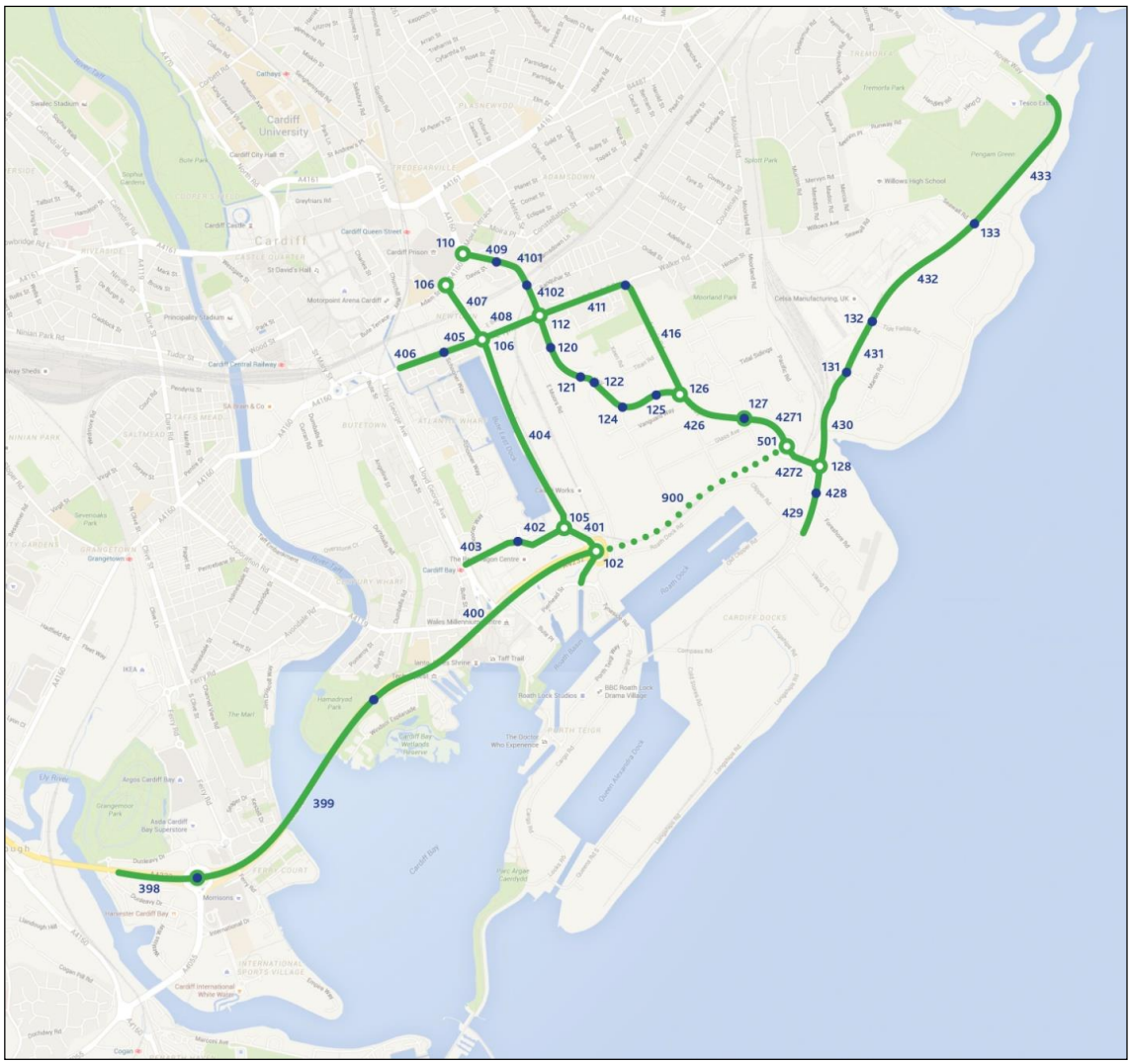


Table 5.1 – Link and Junction Accidents (£000)

Link	DM	DS	Difference
398	0.0	0.0	0.0
399	1,694.4	1,937.2	-242.8
400	1,709.5	1,954.4	-244.9
401	0.0	0.0	0.0
402	451.6	465.3	-13.7
403	371.9	383.2	-11.3
404	545.7	474.4	71.3
405	0.0	0.0	0.0
406	0.0	0.0	0.0
407	2,063.3	2,156.1	-92.8
408	1,710.2	951.5	758.6
409	0.0	0.0	0.0
4101	0.0	0.0	0.0
4102	503.4	462.8	40.7
411	0.0	0.0	0.0
412	0.0	0.0	0.0
413	511.2	404.7	106.5
414	0.0	0.0	0.0
415	0.0	0.0	0.0
416	396.8	1,380.5	-983.8
418	0.0	0.0	0.0
419	0.0	0.0	0.0
420	956.0	312.4	643.5
421	0.0	0.0	0.0
422	0.0	0.0	0.0
423	452.0	152.5	299.5
424	0.0	0.0	0.0
425	0.0	0.0	0.0
426	917.5	421.3	496.2
4271	0.0	0.0	0.0
4272	0.0	0.0	0.0
428	0.0	0.0	0.0
429	0.0	0.0	0.0
430	480.2	613.6	-133.4
431	0.0	0.0	0.0
432	992.9	1,268.8	-275.8
433	1,393.5	1,780.7	-387.1
900	0.0	1,480.4	-1,480.4
Total	**15,150.2**	**16,599.9**	**-1,449.7**

Junction	DM	DS	Difference
102	4,375.8	12,696.4	-8,320.6
105	1,742.5	1,656.7	85.8
106	6,998.4	4,552.2	2,446.2
109	3,068.2	3,038.3	30.0
110	2,704.5	2,694.5	10.1
112	3,685.6	2,023.2	1,662.4
120	1,006.9	606.7	400.2
121	498.7	302.1	196.5
122	0.0	0.0	0.0
124	994.1	610.1	384.0
125	0.0	0.0	0.0
126	0.0	0.0	0.0
127	2,559.1	1,719.0	840.2
128	0.0	0.0	0.0
501	0.0	1,943.1	-1,943.1
Total	**27,633.9**	**31,842.3**	**-4,208.4**

Table 5.1 shows that both link and junction accident costs increase as a result of the scheme. It should however be noted that, as described in Section 2, the modelled area does not cover the whole area of impact of the scheme and traffic volumes in the COBALT network increase as a result of the scheme. The increase in overall traffic results in an increase in overall accidents. In particular the large increase in traffic volumes at Queens Gate junction results in an increase in accident costs although a corresponding decrease may be expected at locations outside of the COBALT network. The new junction at Ocean Way also introduces new conflicting movements and an increase in accident costs.

Table 5.2 Accident Numbers

	DM	DS	Difference
Casualties Fatal (No.)	5.9	6.5	-0.7
Serious (No.)	74.4	82.5	-8.1
Slight (No.)	1,130.3	1,312.6	-182.4

5.3 Carbon Emission Benefits

The Climate Change Act 2008 creates a new approach to managing and responding to climate change in the UK. At the heart of the Act is a legally binding target to reduce the UK's greenhouse gas emissions to at least 80 per cent below 1990 levels by 2050, to be achieved through action at home and abroad. To drive progress towards this target, the Act introduces five year "carbon budgets", which define the emissions pathway to the 2050 target by limiting the total greenhouse gas emissions allowed in each five year period, beginning in 2008. The first three carbon budgets were announced in April 2009, covering the periods 2008–12, 2013–17 and 2018–22. They require emissions reductions of just over 22%, 28% and 34% respectively below 1990 levels, in line with the recommendations of the Committee on Climate Change. In June 2011, the fourth Carbon Budget was announced, amounting to an emissions cut of 50% on 1990 levels over the years 2023-2027. Each sector must play its part in taking action to achieve these budgets. It is therefore important that the impacts of proposed transport interventions on greenhouse gas emissions - whether they are increased or decreased –- are incorporated within the cost benefit analysis.

The analysis follows WebTAG Unit 3.3.5 and is limited to emissions from fuel consumption and electricity generation.

All changes in greenhouse gas emissions are presented in tonnes of carbon dioxide equivalent (tCO2e), split by traded sector and non-traded sector. Traded sectors are those that are included within the EU Emissions Trading System and are primarily emissions associated with electricity generation and energy-intensive industry.

The TUBA appraisal program uses estimated changes in fuel consumption to produce estimates of carbon emissions and the present value of the damages associated with their impacts. Table 5.3 summaries the carbon emissions output from TUBA

Table 5.3 – Carbon Emission

	Emissions (tonnes)			Cost (£000s, medium)		
	DM	DS	Increase	DM	DS	Increase
Untraded						
AM peak	259908	219546	-40362	12089	10211	-1878
PM peak	222787	225444	2656	10359	10482	123
Inter-peak	241619	234725	-6894	11241	10920	-322
Total	**724314**	**679715**	**-44600**	**33689**	**31613**	**-2077**
Traded						
AM peak	376	372	-4	14	14	0
PM peak	421	438	17	16	16	0
Inter-peak	476	481	5	18	18	0
Total	**1273**	**1291**	**18**	**48**	**48**	**0**

6. Analysis of Monetised Costs and Benefits

The Analysis of Monetised Costs and Benefits (AMCB) table summarises all monetised costs and benefits including accident and carbon emission benefits. It presents a Net Present Value (NPV) for each option and a Benefit to Cost Ratio (BCR). These provide a measure of overall value for money. The AMCB table is shown in Table 6.1.

Table 6.1 - Monetised Costs and Benefits

Analysis of Monetised Costs and Benefits	(£000s)
Accidents	-5,658
Greenhouse Gases	848
Economic Efficiency: Consumer Users (Commuting)	23,839
Economic Efficiency: Consumer Users (Other)	34,578
Economic Efficiency: Business Users and Providers	79,400
Wider Public Finances (Indirect Taxation Revenues)	-1,852
Present Value of Benefits (PVB)	**131,155**
Broad Transport Budget	40,121
Present Value of Costs (PVC)	**40,121**
OVERALL IMPACTS	
Net Present Value (NPV)	**91,034**
Benefit to Cost Ratio (BCR)	**2.27**

Note: All entries are present values discounted to 2010, in 2010 prices (£000).

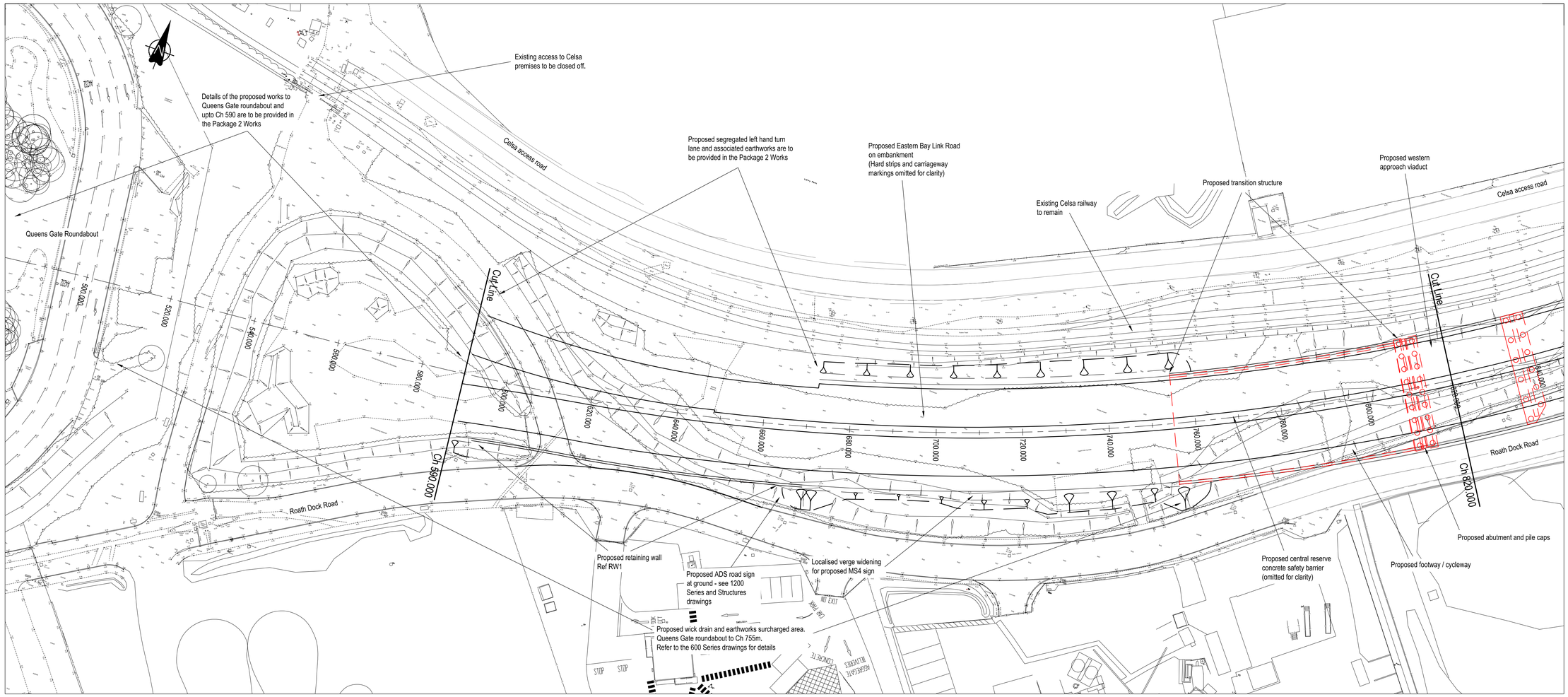
Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where 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.

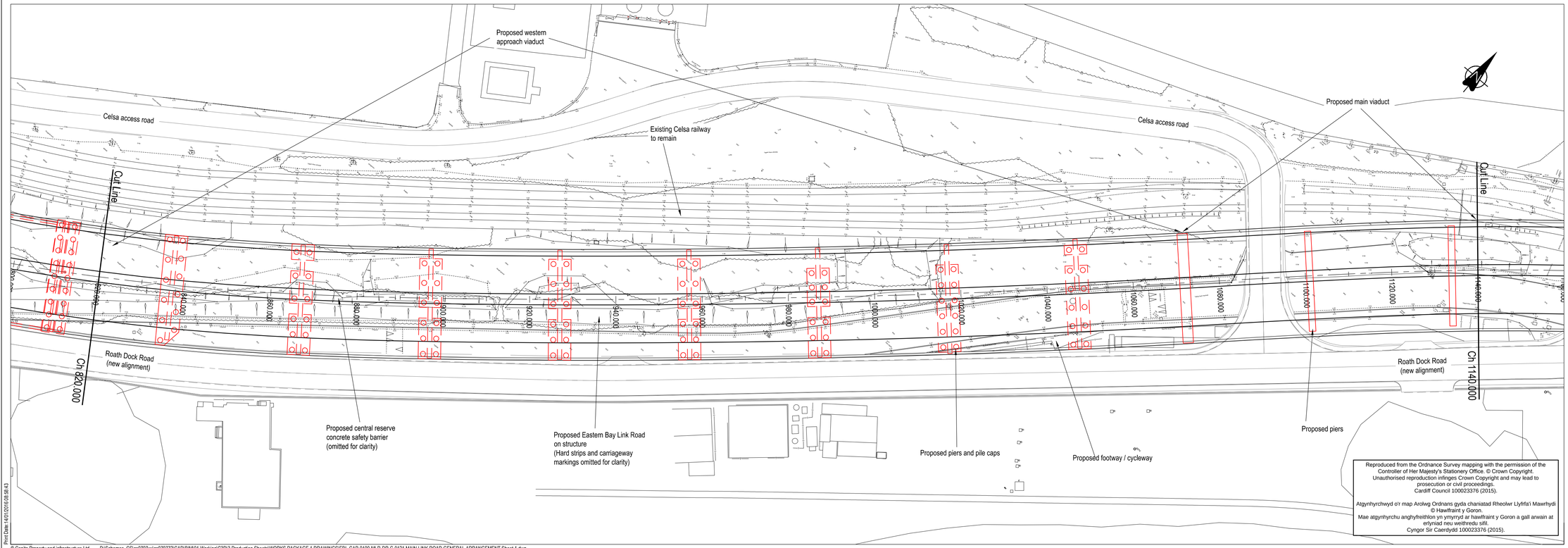
Table 6.1 shows that the resulting NPV is £91.0m and the PVC is £40.1m. The resulting BCR is 2.27. WelTAG guidance ranks BCRs as follows.

- BCR <1 Poor
- BCR 1 to 1.5 Low
- BCR 1.5 to 2 Medium
- BCR >2 High

The scheme would therefore be ranked as having high value for money with a BCR > than 2.

Drawings





NOTES

1. Unless otherwise agreed it should be assumed that the operations within the ABP site are 24/7 and full access should be maintained for the duration of the works, the Contractor must liaise with the various businesses affected and plan the works to ensure that operations are not adversely impacted by the works, traffic management, deliveries, storage of materials or other peripheral activities.
2. The existing ground below the EBL main scheme earthworks embankment between approximate Ch 500 and Ch 755 is to be surcharged to induce settlement prior to mainline construction commencing. The affect of this on Roath Dock Road and Celsa access road is not known. However, it is possible that at the western end of the scheme there will be some settlement of the surrounding land and/or adjacent highway which might necessitate remedial works. extent of works to be agreed.
3. For site clearance details refer to the 200 Series drawings.
4. For fencing details refer to the 300 Series drawings.
5. For road restraint details refer to the 400 Series drawings.
6. For drainage details refer to the 500 Series drawings.
7. For earthworks details refer to the 600 Series drawings.
8. For carriageway construction details refer to the 700 Series drawings.
9. For kerbing and footway details refer to the 1100 Series drawings.
10. For traffic signs and road marking details refer to the 1200 Series drawings.
11. For road lighting details refer to the 1300 and 1400 Series drawings.
12. For details of comms and CCTV refer to the 1500 Series drawings.
13. For details of the proposed structures refer to the 7000 Series drawings.
14. The new Roath Dock Road alignment is shown as constructed as part of the advanced works contract.
15. An advanced works contract has taken place and existing levels have changed. Existing levels shown on this drawing relate to the original DGM levels.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

The site currently provides access to a variety of busy industrial sites that require 24 hour access and generate large volumes of hgv traffic.

Whilst the roads have a lot of the infrastructure associated with a public highway, they are private roads. The Contractor should, when planning their operations (especially traffic management), take into consideration that traffic accessing the businesses within the site might not behave as on a public highway or follow the site speed limits.

The site is within an area of heavy industry and as such there is potential for unknown hazards to be present below ground. the site investigation and various surveys have identified significant below ground infrastructure but the presence of uncharted or unrecorded services or other apparatus should be anticipated.

The Celsa rail line carries frequent loads of hot steel billets. the surface temperature of the rail carriages is approximately 250 deg c

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT

Rev	Drwn	Chkd	Appd	Description	Date

Purpose of Issue (Suitability / Status)

S2 - Issued for Information

Classification

Commercial in Confidence

Client

Welsh Government

Project

Eastern Bay Link

Drawing

Main Link Road
General Arrangement Sheet 1

Scale @ A1	Drawn	Checked	Approved
1:500	AM	GM	DW

Project No.: CS079772

Date: 01-DEC-2015

Drawing Identifier (Project - Originator - Asset - Location- Type - Role - Number): EBL-CAP-0100-MLR-DR-C-0121

BS1192 Compliant revision: P00

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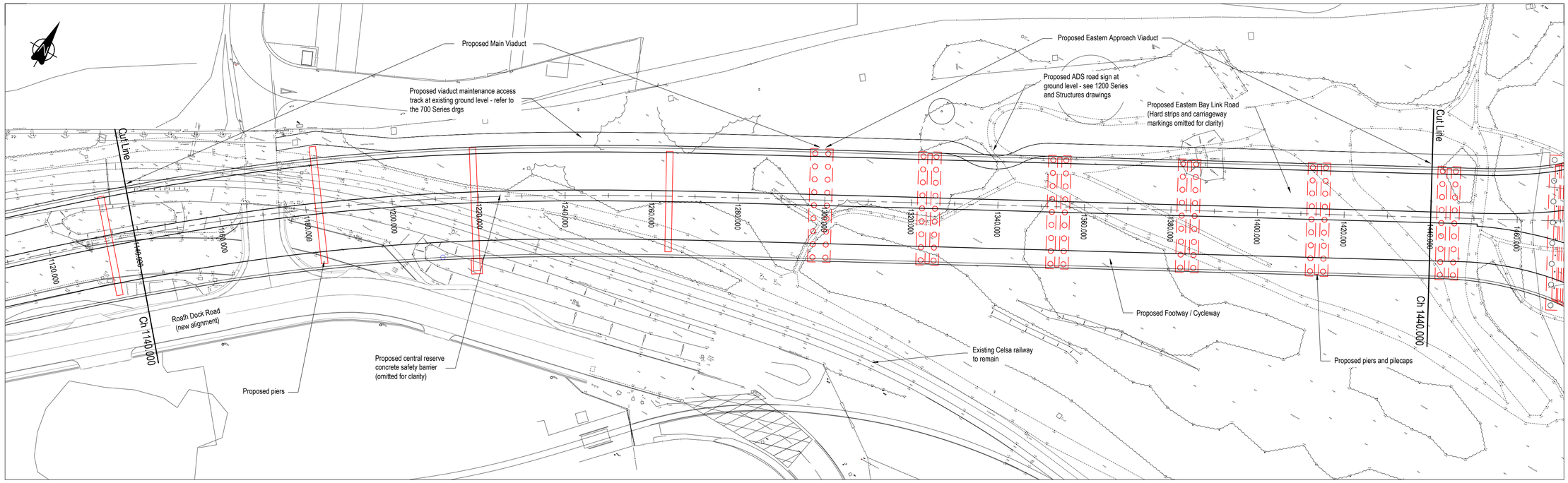
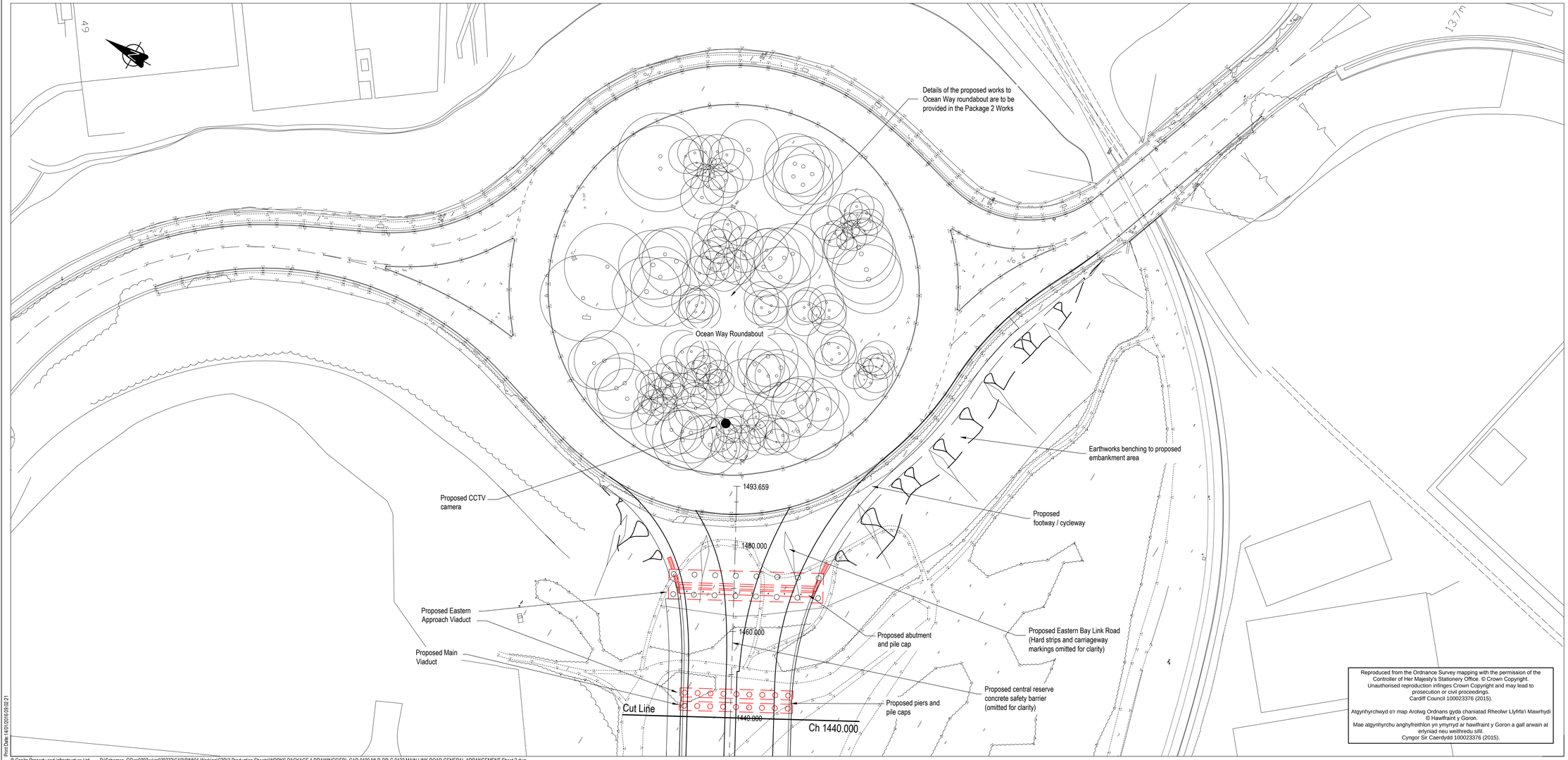
P:\Schemes_CS\cs079\xx\cs079772\CAD\BIM\01 Working\C3D\3 Production Sheets\WORKS PACKAGE 1 DRAWINGS\EBL-CAP-0100-MLR-DR-C-0121 MAIN LINK ROAD GENERAL ARRANGEMENT Sheet 1.dwg

Print Date: 14/01/2016 09:58:43





NOTES

1. Unless otherwise agreed it should be assumed that the operations within the ABP site are 24/7 and full access should be maintained for the duration of the works, the Contractor must liaise with the various businesses affected and plan the works to ensure that operations are not adversely impacted by the works, traffic management, deliveries, storage of materials or other peripheral activities.
2. The existing ground below the EBL main scheme earthworks embankment between approximate Ch 500 and Ch 755 is to be surcharged to induce settlement prior to mainline construction commencing. the affect of this on Roath Dock Road and Celsa access road is not known. However, it is possible that at the western end of the scheme there will be some settlement of the surrounding land and/or adjacent highway which might necessitate remedial works. Extent of works to be agreed.
3. For site clearance details refer to the 200 Series drawings.
4. For fencing details refer to the 300 Series drawings.
5. For road restraint details refer to the 400 Series drawings.
6. For drainage details refer to the 500 Series drawings.
7. For earthworks details refer to the 600 Series drawings.
8. For carriageway construction details refer to the 700 Series drawings.
9. For kerbing and footway details refer to the 1100 Series drawings.
10. For traffic signs and road marking details refer to the 1200 Series drawings.
11. For road lighting details refer to the 1300 and 1400 Series drawings.
12. For comms and CCTV details refer to the 1500 Series drawings.
13. For details of the proposed structures refer to the 7000 Series drawings.
14. The new Roath Dock Road alignment is shown as constructed as part of the advanced works contract.
15. An advanced works contract has taken place and existing levels have changed. Existing levels shown on this drawing relate to the original DGM levels.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

The site currently provides access to a variety of busy industrial sites that require 24 hour access and generate large volumes of hgv traffic.

Whilst the roads have a lot of the infrastructure associated with a public highway, they are private roads. The contractor should, when planning their operations (especially traffic management), take into consideration that traffic accessing the businesses within the site might not behave as on a public highway or follow the site speed limits.

The site is within an area of heavy industry and as such there is potential for unknown hazards to be present below ground. The site investigation and various surveys have identified significant below ground infrastructure but the presence of uncharted or unrecorded services or other apparatus should be anticipated.

The Celsa rail line carries frequent loads of hot steel billets. the surface temperature of the rail carriages is approximately 250 deg c.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT

Rev	Dwn	Chkd	Appd	Description	Date

Purpose of Issue (Suitability / Status)
S2 - Issued for Information

Classification
Commercial in Confidence

Client
Welsh Government

Project
Eastern Bay Link

Drawing
Main Link Road
General Arrangement Sheet 2

Scale @ A1	Drawn	Checked	Approved
1:500	AM	GM	DW

Project No.: CS079772
Date: 01-DEC-2015

Drawing Identifier (BS1192 Compliant)
Project - Originator - Asset - Location - Type - Role - Number: EBL-CAP-0100-MLR-DR-C-0122
revision: P00

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EASTERN BAY LINK

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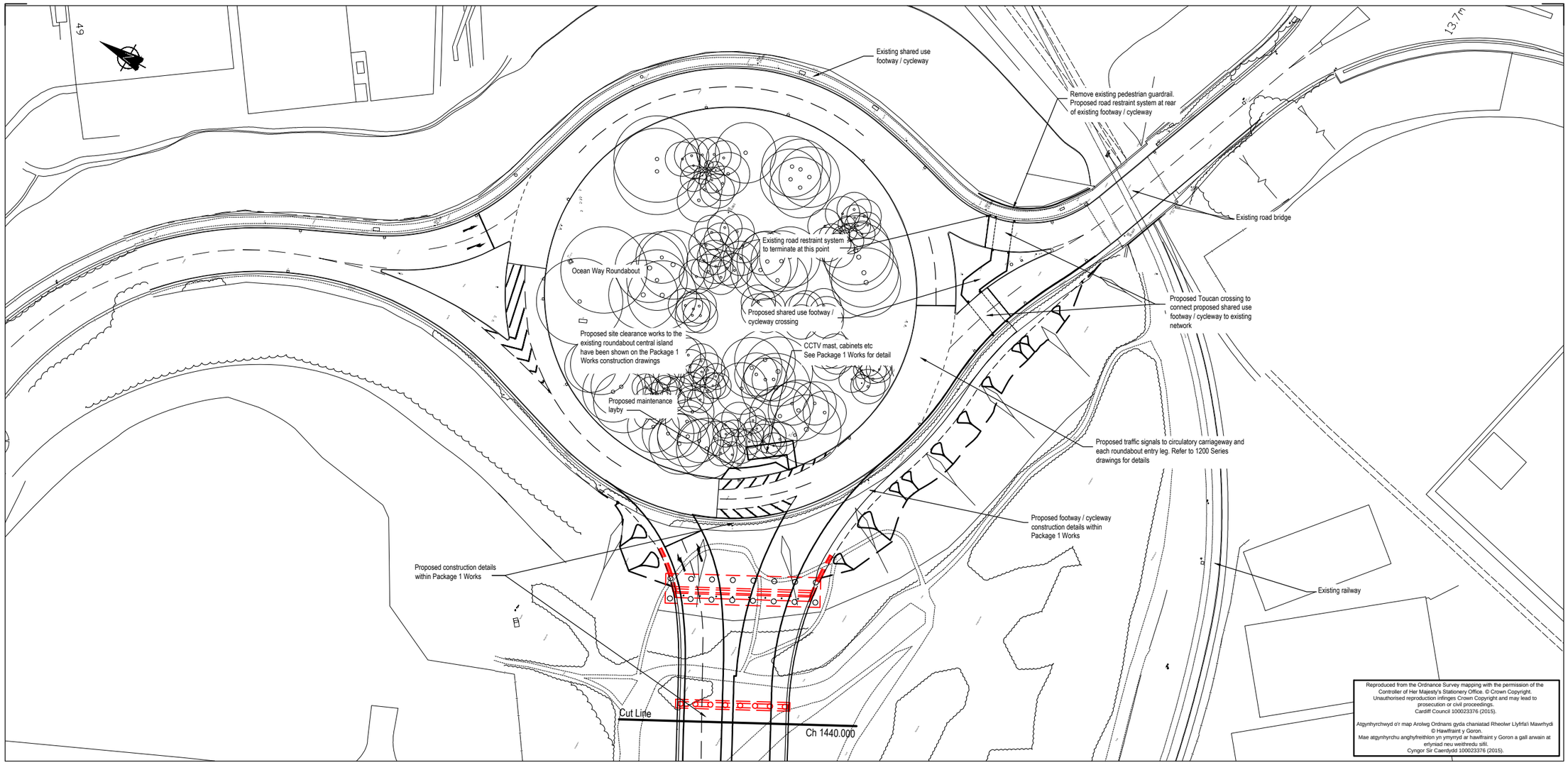

NOTES

1. For site clearance details refer to the 200 Series drawings.
2. For fencing details refer to the 300 Series drawings.
3. For road restraint details refer to the 400 Series drawings.
4. For drainage details refer to the 500 Series drawings.
5. For earthworks details refer to the 600 Series drawings.
6. For carriageway construction details refer to the 700 Series drawings.
7. For kerbing and footway details refer to the 1100 Series drawings.
8. For traffic signs and road marking details refer to the 1200 Series drawings.
9. For road lighting details refer to the 1300 and 1400 Series drawings.
10. For comms and CCTV details refer to the 1500 Series drawings.
11. For details of the proposed structures refer to the 7000 Series drawings.
12. An advanced works contract has taken place and existing levels may have changed. Any existing levels shown on this drawing will relate to the original DGM levels.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

CONSTRUCTION
The roundabout currently provides access to a variety of busy industrial sites that require 24 hour access and generate large volumes of HGV traffic.

MAINTENANCE
As above. Also refer to relevant discipline drawing (kerbing, fencing etc) for further details.

DEMOLITION
As above. Also refer to relevant discipline drawing (kerbing, fencing etc) for further details.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT

Rev	Dwn	Chk'd	App'd	Description	Date

Purpose of Issue (Suitability / Status)
S2 - Issued for Information

Classification
Commercial in Confidence

Client
Welsh Government

Project
Eastern Bay Link

Drawing
Ocean Way Roundabout
Preliminary General Arrangement

Scale @ A1	Drawn	Checked	Approved
1:500	AM	GM	DW

Project No.	Date
CS079772	21-MAR-2016

Drawing Identifier
Project - Originator - Asset - Location - Type - Role - Number
EBL-CAP-0100-OWR-SK-C-0166

BS1192 Compliant revision
P00

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EASTERN BAY LINK

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P:\Schemes_CS\cs079?xx\cs079772\CAD\Sketches\EBL-CAP-0100-OWR-SK-C-0166 OCEAN WAY ROUNDABOUT GENERAL ARRANGEMENT.dwg

Print Date: 20/05/2016 14:01:33

NOTES

1. Unless otherwise agreed it should be assumed that the operations within the ABP site are 24/7 and full access should be maintained for the duration of the works, the Contractor must liaise with the various businesses affected and plan the works to ensure that operations are not adversely impacted by the works, traffic management, deliveries, storage of materials or other peripheral activities.
2. The existing ground below the EBL main scheme earthworks embankment between approximate Ch 500 and Ch 755 is to be surcharged to induce settlement prior to mainline construction commencing. The affect of this on Roath Dock Road and Celsa access road is not known. However, it is possible that at the western end of the scheme there will be some settlement of the surrounding land and/or adjacent highway which might necessitate remedial works. extent of works to be agreed.
3. For site clearance details refer to the 200 Series drawings.
4. For fencing details refer to the 300 Series drawings.
5. For road restraint details refer to the 400 Series drawings.
6. For drainage details refer to the 500 Series drawings.
7. For earthworks details refer to the 600 Series drawings.
8. For carriageway construction details refer to the 700 Series drawings.
9. For kerbing and footway details refer to the 1100 Series drawings.
10. For traffic signs and road marking details refer to the 1200 Series drawings.
11. For road lighting details refer to the 1300 and 1400 Series drawings.
12. For details of Comms and CCTV refer to the 1500 Series drawings.
13. For details of the proposed structures refer to the 7000 Series drawings.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

CONSTRUCTION
The site is within an area of heavy industry and as such there is potential for unknown hazards to be present below ground. the site investigation and various surveys have identified significant below ground infrastructure but the presence of uncharted or unrecorded services or other apparatus should be anticipated.

MAINTENANCE
As above. Also refer to relevant discipline drawing (kerbing, fencing etc) for further details.

DEMOLITION
As above. Also refer to relevant discipline drawing (kerbing, fencing etc) for further details.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT

Proposed segregated left turn lane to connect with existing road
Proposed segregated left turn lane
Existing boundary security fence to remain.
Proposed kerbed traffic island
Proposed retaining wall Exact extent to be confirmed
Roundabout to be signal controlled, Refer to the 1200 Series drawings for details
Final verge width to be confirmed following road restraint assessment
Proposed extension of central reserve into roundabout circulatory carriageway
Localised widening of carriageway due to inclusion of kerbed traffic island
Existing maintenance layby to remain
Proposed traffic island and associated carriageway markings at existing segregated left turn lane to facilitate traffic signal pole
Proposed circulatory carriageway widening within existing roundabout central island
The proposed verge and earthworks slope within the roundabout central island have been shown for information and as a guide only. This arrangement will be reviewed at detailed design stage to take into account the numerous items of infrastructure that are required to be sited at this location
Proposed segregated left turn lane to connect with Package 1 Works proposals
Proposed extension of central reserve into roundabout circulatory carriageway
Proposed maintenance layby. Exact location to be determined following traffic signal layout design
Queens Gate Roundabout
Existing maintenance layby to be removed
Existing traffic signals, control cabinets etc to be removed
Proposed circulatory carriageway widening within existing roundabout central island
Proposed carriageway widening into existing central reserve to provide 3 lane exit off roundabout. Lane 3 hatched out at opening
Revised central reserve arrangement to provide 3 lane entry onto roundabout from Pierhead Street
Existing CCTV camera, mast, control cabinets, rotating plank traffic sign, block paving and telegraph pole to be relocated outside of proposed shared use footway / cycleway or footway realigned to miss existing street furniture
Existing signal controlled pedestrian crossing to be upgraded to a Toucan crossing
Proposed 3.5m wide shared use footway / cycleway
3 lane approach to roundabout
Proposed construction details issued in Package 1 Works proposals
Celsa access road
Roath Dock Road
Cardiff
Weir
Bridge
9.8m
WB
CP 390.000

Rev	Drwn	Chk'd	Appr'd	Description	Date

Purpose of Issue (Suitability / Status)
S2 - Issued for Information

Classification
Commercial in Confidence

Client
Welsh Government

Project
Eastern Bay Link

Drawing
Queens Gate Roundabout
Preliminary General Arrangement

Scale @ A1	Drawn	Checked	Approved
1:500	AM	GM	DW

Project No.: CS079772
Date: 21-MAR-2016

Drawing Identifier
Project - Originator - Asset - Location- Type - Role - Number: EBL-CAP-0100-QGR-SK-C-0165
BS1192 Compliant revision: P00

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P:\Schemes_CS\cs079\xx\cs079772\CAD\Sketches\EBL-CAP-0100-QGR-SK-C-0165 QUEENS GATE ROUNDABOUT GENERAL ARRANGEMENT.dwg
Print Date: 12/05/2016 13:42:25

Appendix A
TUBA Output Files

Transport User Benefit Appraisal TUBA (64-BIT) 1.9.6(1xA)
Program run on Mon Jul 25, 2016 at 09:26:05

TUBA ECONOMICS FILE DIFFERENCES
STANDARD ECONOMICS FILE USED

INPUT_SUMMARY

Run name	Eastern Bay Link Road
DM scheme	DM
DS scheme	DS
Economic parameter file	C:\.paramics\data\EBL\Economic assessment\TUBA\economics_1_9_6.txt
Scheme parameter file	C:\.paramics\data\EBL\Economic assessment\TUBA\SCHEME_FILE_1_9_6.TXT
First year of scheme costs	2016
First Appraisal Year	2017
Last Appraisal Year	2077
Modelled years	2017 2032

Time period	Total hours
AM peak	759
PM peak	759
Inter-peak	1518
Total	3036

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	2016	0	0	0	0	0	0	0	0
Road	2017	0	0	0	0	0	0	0	0
Bus	2016	0	0	0	0	0	0	0	0
Bus	2017	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	2016	1499	250	21601	1734	0	0	0	0
Road	2017	1499	250	21601	1734	0	0	0	0
Bus	2016	0	0	0	0	0	0	0	0
Bus	2017	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	2016	0	20405	20405
Road	2017	0	19715	19715
Bus	2016	0	0	0
Bus	2017	0	0	0
Road	Total	0	40121	40121
Bus	Total	0	0	0

TRIP_MATRIX_TOTALS
Annualised total trip numbers(thousands)

Submode	Year	Time period	DO MIN	DO SOM
Car	2017	AM peak	5442	5370
Car	2017	PM peak	6196	6521
Car	2017	Inter-peak	8391	8557
Car	2017	All	20028	20448
Car	2032	AM peak	5161	5093
Car	2032	PM peak	5876	6185
Car	2032	Inter-peak	7958	8115
Car	2032	All	18995	19393
LGV Personal	2017	AM peak	116	114
LGV Personal	2017	PM peak	132	139
LGV Personal	2017	Inter-peak	179	182
LGV Personal	2017	All	427	436
LGV Personal	2032	AM peak	150	148
LGV Personal	2032	PM peak	170	179
LGV Personal	2032	Inter-peak	231	235
LGV Personal	2032	All	551	562
LGV Freight	2017	AM peak	850	839
LGV Freight	2017	PM peak	968	1019
LGV Freight	2017	Inter-peak	1311	1337
LGV Freight	2017	All	3130	3195
LGV Freight	2032	AM peak	1097	1083
LGV Freight	2032	PM peak	1250	1315
LGV Freight	2032	Inter-peak	1692	1726
LGV Freight	2032	All	4039	4124
OGV1	2017	AM peak	140	129
OGV1	2017	PM peak	94	91
OGV1	2017	Inter-peak	376	375
OGV1	2017	All	611	595
OGV1	2032	AM peak	140	129
OGV1	2032	PM peak	94	91
OGV1	2032	Inter-peak	376	375
OGV1	2032	All	611	595
OGV2	2017	AM peak	112	104
OGV2	2017	PM peak	75	73
OGV2	2017	Inter-peak	302	301
OGV2	2017	All	490	478
OGV2	2032	AM peak	112	104
OGV2	2032	PM peak	75	73
OGV2	2032	Inter-peak	302	301
OGV2	2032	All	490	478
All	2017	AM peak	6661	6557
All	2017	PM peak	7466	7844
All	2017	Inter-peak	10559	10752
All	2017	All	24685	25152
All	2032	AM peak	6660	6557
All	2032	PM peak	7466	7844
All	2032	Inter-peak	10559	10752
All	2032	All	24685	25152

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

Mode	Year	DMtot_time	DMtot_charge	DMtot_fuel	DMtot_nonfuel	DStot_time	DStot_charge	DStot_fuel	DStot_nonfuel
Road	2017	29707	0	4639	4118	28786	0	4539	4090
Road	2032	23180	0	2773	2522	22459	0	2694	2507

FUEL_CONSUMPTION
Total fuel consumption, DM and DS. kilounits.

		Do minimum			Do something		
Submode	Year	Petrol	Diesel	Electric	Petrol	Diesel	Electric
Car	2017	2000	1749	35	2000	1766	36
Car	2032	1282	1231	366	1282	1243	376
LGV Personal	2017	4	92	0	4	91	0
LGV Personal	2032	1	99	0	1	98	0
LGV Freight	2017	30	672	0	29	666	0
LGV Freight	2032	7	728	0	7	722	0
OGV1	2017	0	355	0	0	307	0
OGV1	2032	0	355	0	0	307	0
OGV2	2017	0	581	0	0	501	0
OGV2	2032	0	581	0	0	501	0
All	2017	2033	3449	35	2034	3331	36
All	2032	1290	2995	366	1290	2872	376
Car	Total	81135	78144	19576	81159	78902	20111
LGV Personal	Total	73	5939	0	73	5888	0
LGV Freight	Total	538	43559	0	534	43184	0
OGV1	Total	0	21680	0	0	18711	0
OGV2	Total	0	35448	0	0	30569	0
All	Total	81746	184769	19576	81765	177254	20111

CO2_EMISSIONS_UNTRADED

		Emissions (tonnes)			cost (£000s, low)			cost (£000s, central)			cost (£000s, high)		
Submode	Year	DM	DS	Increase	DM	DS	Increase	DM	DS	Increase	DM	DS	Increase
Car	2017	8790	8834	45	204	205	1	408	410	2	612	615	3
Car	2032	5634	5664	30	113	113	1	226	227	1	339	340	2
LGV Personal	2017	243	241	-2	6	6	-0	11	11	-0	17	17	-0
LGV Personal	2032	242	240	-2	5	5	-0	10	10	-0	15	14	-0
LGV Freight	2017	1781	1766	-15	41	41	-0	83	82	-1	124	123	-1
LGV Freight	2032	1778	1763	-15	36	35	-0	71	71	-1	107	106	-1
OGV1	2017	909	784	-124	21	18	-3	42	36	-6	63	55	-9
OGV1	2032	860	742	-118	17	15	-2	34	30	-5	52	45	-7
OGV2	2017	1486	1281	-204	34	30	-5	69	59	-9	103	89	-14
OGV2	2032	1406	1213	-194	28	24	-4	56	49	-8	85	73	-12
All	2017	13208	12907	-302	306	299	-7	613	599	-14	919	898	-21
All	2018	12693	12396	-297	289	282	-7	578	564	-14	867	846	-20
All	2019	12197	11905	-292	272	266	-7	544	531	-13	817	797	-20
All	2020	11719	11432	-287	256	250	-6	513	500	-13	769	751	-19
All	2021	11480	11192	-288	247	241	-6	494	481	-12	740	722	-19
All	2022	11248	10959	-290	237	231	-6	475	463	-12	712	694	-18
All	2023	11023	10732	-291	228	222	-6	457	445	-12	685	667	-18
All	2024	10804	10512	-292	220	214	-6	440	428	-12	659	641	-18
All	2025	10591	10298	-293	211	206	-6	423	411	-12	634	617	-18
All	2026	10462	10168	-294	205	199	-6	410	398	-12	615	597	-17
All	2027	10336	10041	-295	199	193	-6	397	386	-11	596	579	-17
All	2028	10212	9916	-296	192	187	-6	385	374	-11	577	560	-17
All	2029	10091	9794	-297	186	181	-5	373	362	-11	559	543	-16
All	2030	9973	9675	-298	181	175	-5	361	350	-11	542	525	-16
All	2031	9947	9648	-299	190	184	-6	380	369	-11	570	553	-17
All	2032	9921	9622	-299	199	193	-6	398	386	-12	596	578	-18
All	2033	9886	9587	-299	206	200	-6	413	400	-12	619	600	-19
All	2034	9851	9552	-299	213	207	-6	426	413	-13	639	620	-19
All	2035	9817	9517	-299	219	212	-7	438	425	-13	657	637	-20
All	2036	9817	9517	-299	225	218	-7	450	436	-14	675	655	-21
All	2037	9817	9517	-299	230	223	-7	461	447	-14	691	670	-21
All	2038	9817	9517	-299	235	228	-7	470	456	-14	706	684	-22
All	2039	9817	9517	-299	239	232	-7	479	464	-15	718	696	-22
All	2040	9817	9517	-299	243	236	-7	486	471	-15	729	707	-22
All	2041	9817	9517	-299	246	239	-8	492	477	-15	738	716	-23
All	2042	9817	9517	-299	249	241	-8	497	482	-15	746	723	-23
All	2043	9817	9517	-299	251	243	-8	502	486	-15	752	729	-23
All	2044	9817	9517	-299	252	245	-8	505	490	-15	757	734	-23
All	2045	9817	9517	-299	254	246	-8	508	492	-15	761	738	-23
All	2046	9817	9517	-299	256	248	-8	512	496	-16	768	744	-23
All	2047	9817	9517	-299	258	250	-8	516	500	-16	773	750	-24
All	2048	9817	9517	-299	259	251	-8	519	503	-16	778	754	-24

All	2049	9817	9517	-299	260	253	-8	521	505	-16
781	758	-24								
All	2050	9817	9517	-299	261	253	-8	523	507	-16
784	760	-24								
All	2051	9817	9517	-299	260	252	-8	526	509	-16
791	767	-24								
All	2052	9817	9517	-299	258	250	-8	527	511	-16
796	772	-24								
All	2053	9817	9517	-299	256	248	-8	528	512	-16
800	776	-24								
All	2054	9817	9517	-299	254	246	-8	529	513	-16
804	779	-25								
All	2055	9817	9517	-299	251	243	-8	528	512	-16
806	781	-25								
All	2056	9817	9517	-299	248	240	-8	528	512	-16
807	783	-25								
All	2057	9817	9517	-299	245	237	-7	526	510	-16
808	783	-25								
All	2058	9817	9517	-299	241	234	-7	524	508	-16
807	782	-25								
All	2059	9817	9517	-299	237	230	-7	521	505	-16
805	780	-25								
All	2060	9817	9517	-299	233	226	-7	518	502	-16
802	778	-24								
All	2061	9817	9517	-299	228	221	-7	512	496	-16
795	771	-24								
All	2062	9817	9517	-299	222	216	-7	505	490	-15
788	764	-24								
All	2063	9817	9517	-299	217	210	-7	498	483	-15
780	756	-24								
All	2064	9817	9517	-299	211	205	-6	491	476	-15
771	747	-24								
All	2065	9817	9517	-299	205	199	-6	482	468	-15
760	737	-23								
All	2066	9817	9517	-299	199	193	-6	474	460	-14
749	726	-23								
All	2067	9817	9517	-299	193	187	-6	465	451	-14
737	715	-22								
All	2068	9817	9517	-299	187	181	-6	456	442	-14
724	702	-22								
All	2069	9817	9517	-299	181	175	-6	446	432	-14
711	689	-22								
All	2070	9817	9517	-299	174	169	-5	436	422	-13
697	676	-21								
All	2071	9817	9517	-299	168	163	-5	426	413	-13
683	662	-21								
All	2072	9817	9517	-299	162	157	-5	415	403	-13
669	648	-20								
All	2073	9817	9517	-299	156	151	-5	405	393	-12
654	634	-20								
All	2074	9817	9517	-299	150	145	-5	394	382	-12
639	619	-19								
All	2075	9817	9517	-299	144	140	-4	384	372	-12
624	605	-19								
All	2076	9817	9517	-299	138	134	-4	373	362	-11
608	589	-19								
All	2077	9817	9517	-299	132	128	-4	362	351	-11
592	574	-18								
Car	Total	357958	359848	1889	7834	7876	41	16617	16704	88
25399	25533	134								
LGV Personal	Total	14552	14427	-125	319	316	-3	679	673	-6
1039	1030	-9								
LGV Freight	Total	106727	105808	-919	2339	2319	-20	4981	4938	-43
7622	7557	-66								
OGV1	Total	52567	45370	-7198	1152	994	-158	2450	2115	-336
3749	3236	-513								
OGV2	Total	85952	74123	-11829	1883	1624	-259	4006	3455	-551
6130	5286	-844								
All	Total	617756	599574	-18182	13527	13129	-398	28733	27885	-848
43940	42642	-1298								

CO2_EMISSIONS_TRADED

		Emissions (tonnes)			cost (£000s, low)			cost (£000s, central)			cost (£000s, high)		
Submode	Year	DM	DS	Increase	DM	DS	Increase	DM	DS	Increase	DM	DS	Increase
Car	2017	11	11	0	0	0	0	0	0	0	0	0	0
Car	2032	39	40	1	1	1	0	2	2	0	2	2	0
LGV Personal	2017	0	0	0	0	0	0	0	0	0	0	0	0
LGV Personal	2032	0	0	0	0	0	0	0	0	0	0	0	0
LGV Freight	2017	0	0	0	0	0	0	0	0	0	0	0	0
LGV Freight	2032	0	0	0	0	0	0	0	0	0	0	0	0
OGV1	2017	0	0	0	0	0	0	0	0	0	0	0	0
OGV1	2032	0	0	0	0	0	0	0	0	0	0	0	0
OGV2	2017	0	0	0	0	0	0	0	0	0	0	0	0
OGV2	2032	0	0	0	0	0	0	0	0	0	0	0	0
All	2017	11	11	0	0	0	0	0	0	0	0	0	0
All	2018	14	15	0	0	0	0	0	0	0	0	0	0
All	2019	17	18	0	0	0	0	0	0	0	0	0	0
All	2020	20	20	1	0	0	0	0	0	0	0	1	0
All	2021	25	25	1	0	0	0	0	0	0	1	1	0
All	2022	29	30	1	0	0	0	0	0	0	1	1	0
All	2023	33	34	1	0	0	0	1	1	0	1	1	0
All	2024	36	37	1	0	0	0	1	1	0	1	1	0

All	2025	39	40	1	0	0	0	1	1	0
2	2	0								
All	2026	44	45	1	0	0	0	1	1	0
2	2	0								
All	2027	47	48	1	1	1	0	1	1	0
2	2	0								
All	2028	49	50	1	1	1	0	2	2	0
2	3	0								
All	2029	49	50	1	1	1	0	2	2	0
3	3	0								
All	2030	47	49	1	1	1	0	2	2	0
3	3	0								
All	2031	43	44	1	1	1	0	2	2	0
2	3	0								
All	2032	39	40	1	1	1	0	2	2	0
2	2	0								
All	2033	36	37	1	1	1	0	1	2	0
2	2	0								
All	2034	33	34	1	1	1	0	1	1	0
2	2	0								
All	2035	30	31	1	1	1	0	1	1	0
2	2	0								
All	2036	27	28	1	1	1	0	1	1	0
2	2	0								
All	2037	25	25	1	1	1	0	1	1	0
2	2	0								
All	2038	23	23	1	0	0	0	1	1	0
2	2	0								
All	2039	21	21	1	0	0	0	1	1	0
2	2	0								
All	2040	19	19	1	0	0	0	1	1	0
1	1	0								
All	2041	17	17	0	0	0	0	1	1	0
1	1	0								
All	2042	17	17	0	0	0	0	1	1	0
1	1	0								
All	2043	15	15	0	0	0	0	1	1	0
1	1	0								
All	2044	13	13	0	0	0	0	1	1	0
1	1	0								
All	2045	13	14	0	0	0	0	1	1	0
1	1	0								
All	2046	12	12	0	0	0	0	1	1	0
1	1	0								
All	2047	11	11	0	0	0	0	1	1	0
1	1	0								
All	2048	11	12	0	0	0	0	1	1	0
1	1	0								
All	2049	10	10	0	0	0	0	1	1	0
1	1	0								
All	2050	10	10	0	0	0	0	1	1	0
1	1	0								
All	2051	10	10	0	0	0	0	1	1	0
1	1	0								
All	2052	10	10	0	0	0	0	1	1	0
1	1	0								
All	2053	10	10	0	0	0	0	1	1	0
1	1	0								
All	2054	10	10	0	0	0	0	1	1	0
1	1	0								
All	2055	10	10	0	0	0	0	1	1	0
1	1	0								
All	2056	10	10	0	0	0	0	1	1	0
1	1	0								
All	2057	10	10	0	0	0	0	1	1	0
1	1	0								
All	2058	10	10	0	0	0	0	1	1	0
1	1	0								
All	2059	10	10	0	0	0	0	1	1	0
1	1	0								
All	2060	10	10	0	0	0	0	1	1	0
1	1	0								
All	2061	10	10	0	0	0	0	1	1	0
1	1	0								
All	2062	10	10	0	0	0	0	1	1	0
1	1	0								
All	2063	10	10	0	0	0	0	1	1	0
1	1	0								
All	2064	10	10	0	0	0	0	1	1	0
1	1	0								
All	2065	10	10	0	0	0	0	0	1	0
1	1	0								
All	2066	10	10	0	0	0	0	0	0	0
1	1	0								
All	2067	10	10	0	0	0	0	0	0	0
1	1	0								
All	2068	10	10	0	0	0	0	0	0	0
1	1	0								
All	2069	10	10	0	0	0	0	0	0	0
1	1	0								
All	2070	10	10	0	0	0	0	0	0	0
1	1	0								
All	2071	10	10	0	0	0	0	0	0	0
1	1	0								
All	2072	10	10	0	0	0	0	0	0	0
1	1	0								
All	2073	10	10	0	0	0	0	0	0	0
1	1	0								
All	2074	10	10	0	0	0	0	0	0	0
1	1	0								
All	2075	10	10	0	0	0	0	0	0	0
1	1	0								
All	2076	10	10	0	0	0	0	0	0	0
1	1	0								
All	2077	10	10	0	0	0	0	0	0	0
1	1	0								
Car	Total	1155	1187	32	18	18	0	43	44	1
69	71	2								
LGV Personal	Total	0	0	0	0	0	0	0	0	0
0	0	0								
LGV Freight	Total	0	0	0	0	0	0	0	0	0
0	0	0								

OGV1	Total	0	0	0	0	0	0	0	0	0
0	0	0								
OGV2	Total	0	0	0	0	0	0	0	0	0
0	0	0								
All	Total	1155	1187	32	18	18	0	43	44	1
69	71	2								

CO2_EMISSIONS_BY_TIME_PERIOD_UNTRADED

		Emissions (tonnes)			cost (£000s, low)			cost (£000s, central)			cost (£000s, high)		
Submode	Year	DM	DS	Increase	DM	DS	Increase	DM	DS	Increase	DM	DS	Increase
AM peak	2017	3961	3742	-218	92	87	-5	184	174	-10	276	261	-15
AM peak	2032	2961	2773	-188	59	56	-4	119	111	-8	178	167	-11
PM peak	2017	4208	4239	31	98	98	1	195	197	1	293	295	2
PM peak	2032	3071	3077	6	62	62	0	123	123	0	185	185	0
Inter-peak	2017	5040	4926	-114	117	114	-3	234	229	-5	351	343	-8
Inter-peak	2032	3890	3772	-117	78	76	-2	156	151	-5	234	227	-7
AM peak	Total	184415	172876	-11539	4038	3785	-253	8577	8040	-538	13116	12294	-822
PM peak	Total	191722	192207	485	4198	4208	11	8915	8937	22	13632	13665	33
Inter-peak	Total	241618	234491	-7128	5291	5135	-156	11241	10909	-332	17192	16683	-509

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)		
Submode	Year	DM	DS	Increase	DM	DS	Increase	DM	DS	Increase	DM	DS	Increase
AM peak	2017	3	3	0	0	0	0	0	0	0	0	0	0
AM peak	2032	10	11	0	0	0	0	0	0	0	1	1	0
PM peak	2017	4	4	0	0	0	0	0	0	0	0	0	0
PM peak	2032	13	13	0	0	0	0	1	1	0	1	1	0
Inter-peak	2017	5	5	0	0	0	0	0	0	0	0	0	0
Inter-peak	2032	16	16	0	0	0	0	1	1	0	1	1	0
AM peak	Total	301	315	14	5	5	0	11	12	1	18	19	1
PM peak	Total	379	391	12	6	6	0	14	15	0	23	23	1
Inter-peak	Total	475	481	6	7	7	0	18	18	0	28	29	0

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

Mode	Year	User Time	User_Charges PT_fares_(pri	Vehicle_Operating_Cost Fuel	Non_fuel	Operator_Rev PT_fares_(pri	Indirect Taxes
Road	2017	2923	0	417	166	0	-58
Road	2018	2871	0	399	161	0	-56
Road	2019	2817	0	382	157	0	-55
Road	2020	2765	0	373	152	0	-54
Road	2021	2717	0	366	148	0	-53
Road	2022	2670	0	358	144	0	-51
Road	2023	2624	0	350	140	0	-50
Road	2024	2582	0	342	136	0	-49
Road	2025	2541	0	334	132	0	-48
Road	2026	2501	0	320	128	0	-47
Road	2027	2462	0	308	125	0	-46
Road	2028	2424	0	295	121	0	-45
Road	2029	2387	0	283	118	0	-44
Road	2030	2352	0	272	114	0	-43
Road	2031	2317	0	263	111	0	-41
Road	2032	2282	0	255	108	0	-40
Road	2033	2248	0	246	104	0	-39
Road	2034	2217	0	238	101	0	-38
Road	2035	2185	0	230	97	0	-37
Road	2036	2153	0	223	94	0	-36
Road	2037	2124	0	216	91	0	-35
Road	2038	2095	0	210	88	0	-34
Road	2039	2066	0	203	85	0	-33
Road	2040	2038	0	197	82	0	-32
Road	2041	2011	0	191	79	0	-32
Road	2042	1984	0	185	76	0	-31
Road	2043	1957	0	180	74	0	-30
Road	2044	1931	0	174	71	0	-29
Road	2045	1905	0	169	69	0	-28
Road	2046	1891	0	165	67	0	-28
Road	2047	1875	0	160	65	0	-27
Road	2048	1859	0	156	63	0	-26
Road	2049	1844	0	152	61	0	-26
Road	2050	1828	0	148	59	0	-25
Road	2051	1812	0	145	58	0	-25
Road	2052	1796	0	141	56	0	-24
Road	2053	1779	0	137	54	0	-24
Road	2054	1763	0	134	53	0	-23
Road	2055	1747	0	130	51	0	-23
Road	2056	1732	0	127	50	0	-22
Road	2057	1717	0	124	48	0	-22
Road	2058	1703	0	121	47	0	-21
Road	2059	1690	0	118	46	0	-21
Road	2060	1678	0	115	44	0	-20

Road	2061	1667	0	112	43	0	-20
Road	2062	1656	0	109	42	0	-19
Road	2063	1644	0	106	40	0	-19
Road	2064	1631	0	103	39	0	-18
Road	2065	1619	0	101	38	0	-18
Road	2066	1606	0	98	37	0	-18
Road	2067	1593	0	96	36	0	-17
Road	2068	1581	0	93	35	0	-17
Road	2069	1568	0	91	34	0	-16
Road	2070	1556	0	89	33	0	-16
Road	2071	1543	0	86	32	0	-16
Road	2072	1531	0	84	31	0	-15
Road	2073	1518	0	82	30	0	-15
Road	2074	1506	0	80	29	0	-15
Road	2075	1494	0	78	28	0	-14
Road	2076	1482	0	76	28	0	-14
Road	2077	1470	0	74	27	0	-14
Road	Total	121528	0	11611	4678	0	-1852

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

Submode	Year	User Time	User_Charges PT_fares_(pri	Vehicle_Operating_Cost Fuel	Non_fuel	Operator_Rev PT_fares_(pri	Indirect Taxes
Car	2017	2299	0	260	30	0	9
Car	2032	1688	0	133	17	0	4
LGV Personal	2017	34	0	8	-2	0	-0
LGV Personal	2032	34	0	6	-2	0	-0
LGV Freight	2017	411	0	56	58	0	-3
LGV Freight	2032	419	0	44	45	0	-2
OGV1	2017	99	0	35	31	0	-24
OGV1	2032	78	0	27	19	0	-16
OGV2	2017	80	0	58	49	0	-39
OGV2	2032	63	0	44	29	0	-26
All	2017	2923	0	417	166	0	-58
All	2032	2282	0	255	108	0	-40
Car	Total	90805	0	6316	774	0	205
LGV Personal	Total	1762	0	261	-74	0	-13
LGV Freight	Total	21432	0	1899	1859	0	-94
OGV1	Total	4177	0	1185	830	0	-738
OGV2	Total	3352	0	1950	1289	0	-1213
All	Total	121528	0	11611	4678	0	-1852

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

Person_type	Year	User Time	User_Charges PT_fares_(pri	Vehicle_Operating_Cost Fuel	Non_fuel	Operator_Rev PT_fares_(pri	Indirect Taxes
All	2017	2923	0	417	166	0	-58
All	2032	2282	0	255	108	0	-40
All	Total	121528	0	11611	4678	0	-1852

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

Purpose	Year	User Time	User_Charges PT_fares_(pri	Vehicle_Operating_Cost Fuel	Non_fuel	Operator_Rev PT_fares_(pri	Indirect Taxes
Business	2017	1552	0	194	217	0	-66
Business	2032	1273	0	138	137	0	-44
Commuting	2017	558	0	90	-22	0	1
Commuting	2032	413	0	46	-12	0	0
Other	2017	813	0	133	-29	0	7
Other	2032	597	0	70	-17	0	3
Business	Total	67302	0	6121	5976	0	-2023
Commuting	Total	22209	0	2184	-553	0	23
Other	Total	32017	0	3306	-745	0	148

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

Period	Year	User Time	User_Charges PT_fares_(pri	Vehicle_Operating_Cost Fuel	Non_fuel	Operator_Rev PT_fares_(pri	Indirect Taxes
AM peak	2017	1845	0	185	74	0	-44
AM peak	2032	1441	0	112	47	0	-26
PM peak	2017	614	0	93	20	0	7
PM peak	2032	481	0	54	15	0	1
Inter-peak	2017	465	0	140	71	0	-21
Inter-peak	2032	361	0	89	46	0	-16
AM peak	Total	76733	0	5099	2064	0	-1231
PM peak	Total	25581	0	2496	621	0	92
Inter-peak	Total	19214	0	4016	1992	0	-713

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
Car	Business	2017	-14	-11	-13	4	21	55
Car	Business	2032	-13	-11	-12	4	20	52
Car	Business	Total	-810	-659	-742	251	1209	3198
Car	Commuting	2017	-35	-29	-28	8	40	138
Car	Commuting	2032	-33	-28	-27	7	38	130
Car	Commuting	Total	-2010	-1703	-1637	456	2328	7988
Car	Other	2017	-52	-40	-54	21	98	175
Car	Other	2032	-48	-37	-49	19	90	160
Car	Other	Total	-2959	-2274	-3048	1189	5548	9898
LGV Personal	Business	2017	0	0	0	0	0	0
LGV Personal	Business	2032	0	0	0	0	0	0
LGV Personal	Business	Total	0	0	0	0	0	0
LGV Personal	Commuting	2017	0	0	0	0	0	0
LGV Personal	Commuting	2032	0	0	0	0	0	0
LGV Personal	Commuting	Total	0	0	0	0	0	0
LGV Personal	Other	2017	-2	-2	-2	1	3	9
LGV Personal	Other	2032	-3	-2	-3	1	4	11
LGV Personal	Other	Total	-175	-141	-161	55	264	649
LGV Freight	Business	2017	-14	-11	-13	4	21	51
LGV Freight	Business	2032	-18	-14	-16	6	27	66
LGV Freight	Business	Total	-1053	-852	-969	330	1590	3914
LGV Freight	Commuting	2017	0	0	0	0	0	0
LGV Freight	Commuting	2032	0	0	0	0	0	0
LGV Freight	Commuting	Total	0	0	0	0	0	0
LGV Freight	Other	2017	0	0	0	0	0	0
LGV Freight	Other	2032	0	0	0	0	0	0
LGV Freight	Other	Total	0	0	0	0	0	0
OGV1	Business	2017	-1	-1	-2	1	3	7
OGV1	Business	2032	-1	-1	-2	1	3	7
OGV1	Business	Total	-76	-52	-94	74	207	426
OGV1	Commuting	2017	0	0	0	0	0	0
OGV1	Commuting	2032	0	0	0	0	0	0

OGV1	Commuting	Total	0	0	0	0	0	0
OGV1	Other	2017	0	0	0	0	0	0
OGV1	Other	2032	0	0	0	0	0	0
OGV1	Other	Total	0	0	0	0	0	0
OGV2	Business	2017	-1	-1	-1	1	3	6
OGV2	Business	2032	-1	-1	-1	1	3	6
OGV2	Business	Total	-61	-41	-76	59	166	342
OGV2	Commuting	2017	0	0	0	0	0	0
OGV2	Commuting	2032	0	0	0	0	0	0
OGV2	Commuting	Total	0	0	0	0	0	0
OGV2	Other	2017	0	0	0	0	0	0
OGV2	Other	2032	0	0	0	0	0	0
OGV2	Other	Total	0	0	0	0	0	0

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
Car	Business	2017	-319	-259	-292	99	477	1256
Car	Business	2032	-236	-192	-217	73	354	931
Car	Business	Total	-12702	-10325	-11657	3944	19020	50061
Car	Commuting	2017	-207	-175	-168	47	239	822
Car	Commuting	2032	-153	-130	-125	35	177	608
Car	Commuting	Total	-8232	-6975	-6707	1869	9535	32718
Car	Other	2017	-276	-212	-284	111	517	923
Car	Other	2032	-199	-153	-205	80	373	666
Car	Other	Total	-10716	-8236	-11038	4305	20093	35846
LGV Personal	Business	2017	0	0	0	0	0	0
LGV Personal	Business	2032	0	0	0	0	0	0
LGV Personal	Business	Total	0	0	0	0	0	0
LGV Personal	Commuting	2017	0	0	0	0	0	0
LGV Personal	Commuting	2032	0	0	0	0	0	0
LGV Personal	Commuting	Total	0	0	0	0	0	0
LGV Personal	Other	2017	-12	-10	-11	4	18	45
LGV Personal	Other	2032	-12	-10	-11	4	19	46
LGV Personal	Other	Total	-627	-508	-577	196	947	2331
LGV Freight	Business	2017	-146	-118	-135	46	221	544
LGV Freight	Business	2032	-149	-121	-137	47	225	554
LGV Freight	Business	Total	-7628	-6173	-7022	2387	11518	28350
LGV Freight	Commuting	2017	0	0	0	0	0	0
LGV Freight	Commuting	2032	0	0	0	0	0	0
LGV Freight	Commuting	Total	0	0	0	0	0	0
LGV Freight	Other	2017	0	0	0	0	0	0
LGV Freight	Other	2032	0	0	0	0	0	0
LGV Freight	Other	Total	0	0	0	0	0	0
OGV1	Business	2017	-16	-11	-19	15	43	87
OGV1	Business	2032	-12	-8	-15	12	34	69
OGV1	Business	Total	-656	-445	-814	635	1788	3669
OGV1	Commuting	2017	0	0	0	0	0	0
OGV1	Commuting	2032	0	0	0	0	0	0
OGV1	Commuting	Total	0	0	0	0	0	0
OGV1	Other	2017	0	0	0	0	0	0
OGV1	Other	2032	0	0	0	0	0	0
OGV1	Other	Total	0	0	0	0	0	0
OGV2	Business	2017	-13	-8	-16	12	34	70
OGV2	Business	2032	-10	-7	-12	10	27	55
OGV2	Business	Total	-526	-357	-653	509	1435	2944
OGV2	Commuting	2017	0	0	0	0	0	0
OGV2	Commuting	2032	0	0	0	0	0	0
OGV2	Commuting	Total	0	0	0	0	0	0
OGV2	Other	2017	0	0	0	0	0	0
OGV2	Other	2032	0	0	0	0	0	0
OGV2	Other	Total	0	0	0	0	0	0

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
Car	Business	2017	-345	-278	-307	109	547	1358
Car	Business	2032	-251	-202	-225	79	392	987
Car	Business	Total	-13365	-10793	-12023	4198	20788	52622
Car	Commuting	2017	-226	-185	-189	59	277	891
Car	Commuting	2032	-163	-134	-136	41	197	642
Car	Commuting	Total	-8690	-7209	-7227	2158	10453	34355
Car	Other	2017	-306	-222	-301	120	597	991
Car	Other	2032	-215	-158	-214	84	414	699
Car	Other	Total	-11465	-8462	-11436	4518	22020	37453
LGV Personal	Business	2017	0	0	0	0	0	0
LGV Personal	Business	2032	0	0	0	0	0	0
LGV Personal	Business	Total	0	0	0	0	0	0
LGV Personal	Commuting	2017	0	0	0	0	0	0
LGV Personal	Commuting	2032	0	0	0	0	0	0
LGV Personal	Commuting	Total	0	0	0	0	0	0
LGV Personal	Other	2017	-14	-10	-13	4	22	49
LGV Personal	Other	2032	-13	-10	-12	4	21	49
LGV Personal	Other	Total	-679	-528	-623	218	1071	2490
LGV Freight	Business	2017	-165	-131	-138	53	283	623
LGV Freight	Business	2032	-164	-131	-140	53	273	616
LGV Freight	Business	Total	-8253	-6596	-7120	2636	13549	30974
LGV Freight	Commuting	2017	0	0	0	0	0	0
LGV Freight	Commuting	2032	0	0	0	0	0	0
LGV Freight	Commuting	Total	0	0	0	0	0	0
LGV Freight	Other	2017	0	0	0	0	0	0
LGV Freight	Other	2032	0	0	0	0	0	0
LGV Freight	Other	Total	0	0	0	0	0	0
OGV1	Business	2017	-22	-15	-26	23	82	124
OGV1	Business	2032	-16	-11	-20	17	60	93
OGV1	Business	Total	-833	-566	-1017	879	2976	4753
OGV1	Commuting	2017	0	0	0	0	0	0
OGV1	Commuting	2032	0	0	0	0	0	0
OGV1	Commuting	Total	0	0	0	0	0	0
OGV1	Other	2017	0	0	0	0	0	0
OGV1	Other	2032	0	0	0	0	0	0
OGV1	Other	Total	0	0	0	0	0	0
OGV2	Business	2017	-22	-15	-28	26	98	128
OGV2	Business	2032	-16	-11	-20	19	71	94
OGV2	Business	Total	-809	-554	-1015	915	3382	4671
OGV2	Commuting	2017	0	0	0	0	0	0
OGV2	Commuting	2032	0	0	0	0	0	0
OGV2	Commuting	Total	0	0	0	0	0	0
OGV2	Other	2017	0	0	0	0	0	0
OGV2	Other	2032	0	0	0	0	0	0
OGV2	Other	Total	0	0	0	0	0	0

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
Car	Business	2017	-1	11	33	0	0	0	0	0
Car	Business	2032	-1	10	31	0	0	0	0	0
Car	Business	Total	-82	617	1912	0	0	0	0	0
Car	Commuting	2017	-1	22	73	0	0	0	0	0
Car	Commuting	2032	-1	21	69	0	0	0	0	0
Car	Commuting	Total	-79	1264	4238	0	0	0	0	0
Car	Other	2017	-5	34	119	0	0	0	0	0
Car	Other	2032	-5	31	109	0	0	0	0	0
Car	Other	Total	-289	1928	6715	0	0	0	0	0
LGV Personal	Business	2017	0	0	0	0	0	0	0	0
LGV Personal	Business	2032	0	0	0	0	0	0	0	0
LGV Personal	Business	Total	0	0	0	0	0	0	0	0
LGV Personal	Commuting	2017	0	0	0	0	0	0	0	0
LGV Personal	Commuting	2032	0	0	0	0	0	0	0	0
LGV Personal	Commuting	Total	0	0	0	0	0	0	0	0
LGV Personal	Other	2017	-0	2	5	0	0	0	0	0
LGV Personal	Other	2032	-0	2	7	0	0	0	0	0
LGV Personal	Other	Total	-13	116	388	0	0	0	0	0
LGV Freight	Business	2017	-1	9	31	0	0	0	0	0
LGV Freight	Business	2032	-1	12	40	0	0	0	0	0
LGV Freight	Business	Total	-79	698	2339	0	0	0	0	0
LGV Freight	Commuting	2017	0	0	0	0	0	0	0	0
LGV Freight	Commuting	2032	0	0	0	0	0	0	0	0
LGV Freight	Commuting	Total	0	0	0	0	0	0	0	0
LGV Freight	Other	2017	0	0	0	0	0	0	0	0
LGV Freight	Other	2032	0	0	0	0	0	0	0	0
LGV Freight	Other	Total	0	0	0	0	0	0	0	0
OGV1	Business	2017	2	0	6	0	0	0	0	0
OGV1	Business	2032	2	0	6	0	0	0	0	0
OGV1	Business	Total	106	15	364	0	0	0	0	0
OGV1	Commuting	2017	0	0	0	0	0	0	0	0
OGV1	Commuting	2032	0	0	0	0	0	0	0	0
OGV1	Commuting	Total	0	0	0	0	0	0	0	0
OGV1	Other	2017	0	0	0	0	0	0	0	0
OGV1	Other	2032	0	0	0	0	0	0	0	0
OGV1	Other	Total	0	0	0	0	0	0	0	0
OGV2	Business	2017	1	0	5	0	0	0	0	0
OGV2	Business	2032	1	0	5	0	0	0	0	0
OGV2	Business	Total	85	12	292	0	0	0	0	0
OGV2	Commuting	2017	0	0	0	0	0	0	0	0
OGV2	Commuting	2032	0	0	0	0	0	0	0	0
OGV2	Commuting	Total	0	0	0	0	0	0	0	0
OGV2	Other	2017	0	0	0	0	0	0	0	0
OGV2	Other	2032	0	0	0	0	0	0	0	0
OGV2	Other	Total	0	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
Car	Business	2017	-32	242	751	0	0	0	0	0
Car	Business	2032	-24	180	557	0	0	0	0	0
Car	Business	Total	-1290	9662	29970	0	0	0	0	0
Car	Commuting	2017	-8	130	436	0	0	0	0	0
Car	Commuting	2032	-6	96	323	0	0	0	0	0
Car	Commuting	Total	-324	5176	17357	0	0	0	0	0
Car	Other	2017	-27	180	626	0	0	0	0	0

Car	Other	2032	-19	130	452	0	0	0	0
Car	Other	Total	-1046	6981	24320	0	0	0	0
LGV Personal	Business	2017	0	0	0	0	0	0	0
LGV Personal	Business	2032	0	0	0	0	0	0	0
LGV Personal	Business	Total	0	0	0	0	0	0	0
LGV Personal	Commuting	2017	0	0	0	0	0	0	0
LGV Personal	Commuting	2032	0	0	0	0	0	0	0
LGV Personal	Commuting	Total	0	0	0	0	0	0	0
LGV Personal	Other	2017	-1	8	27	0	0	0	0
LGV Personal	Other	2032	-1	8	27	0	0	0	0
LGV Personal	Other	Total	-47	416	1393	0	0	0	0
LGV Freight	Business	2017	-11	97	325	0	0	0	0
LGV Freight	Business	2032	-11	99	331	0	0	0	0
LGV Freight	Business	Total	-569	5059	16943	0	0	0	0
LGV Freight	Commuting	2017	0	0	0	0	0	0	0
LGV Freight	Commuting	2032	0	0	0	0	0	0	0
LGV Freight	Commuting	Total	0	0	0	0	0	0	0
LGV Freight	Other	2017	0	0	0	0	0	0	0
LGV Freight	Other	2032	0	0	0	0	0	0	0
LGV Freight	Other	Total	0	0	0	0	0	0	0
OGV1	Business	2017	22	3	75	0	0	0	0
OGV1	Business	2032	17	2	59	0	0	0	0
OGV1	Business	Total	911	126	3140	0	0	0	0
OGV1	Commuting	2017	0	0	0	0	0	0	0
OGV1	Commuting	2032	0	0	0	0	0	0	0
OGV1	Commuting	Total	0	0	0	0	0	0	0
OGV1	Other	2017	0	0	0	0	0	0	0
OGV1	Other	2032	0	0	0	0	0	0	0
OGV1	Other	Total	0	0	0	0	0	0	0
OGV2	Business	2017	17	2	60	0	0	0	0
OGV2	Business	2032	14	2	47	0	0	0	0
OGV2	Business	Total	731	101	2519	0	0	0	0
OGV2	Commuting	2017	0	0	0	0	0	0	0
OGV2	Commuting	2032	0	0	0	0	0	0	0
OGV2	Commuting	Total	0	0	0	0	0	0	0
OGV2	Other	2017	0	0	0	0	0	0	0
OGV2	Other	2032	0	0	0	0	0	0	0
OGV2	Other	Total	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
Car	Business	2017	-39	271	853	0	0	0	0	0
Car	Business	2032	-27	195	613	0	0	0	0	0
Car	Business	Total	-1448	10372	32503	0	0	0	0	0
Car	Commuting	2017	-16	166	476	0	0	0	0	0
Car	Commuting	2032	-10	115	341	0	0	0	0	0
Car	Commuting	Total	-520	6061	18298	0	0	0	0	0
Car	Other	2017	-45	238	685	0	0	0	0	0
Car	Other	2032	-29	161	480	0	0	0	0	0
Car	Other	Total	-1502	8434	25697	0	0	0	0	0
LGV Personal	Business	2017	0	0	0	0	0	0	0	0
LGV Personal	Business	2032	0	0	0	0	0	0	0	0
LGV Personal	Business	Total	0	0	0	0	0	0	0	0
LGV Personal	Commuting	2017	0	0	0	0	0	0	0	0
LGV Personal	Commuting	2032	0	0	0	0	0	0	0	0
LGV Personal	Commuting	Total	0	0	0	0	0	0	0	0
LGV Personal	Other	2017	-2	12	29	0	0	0	0	0

LGV Personal	Other	2032	-2	11	29	0	0	0
0	0							
LGV Personal	Other	Total	-80	545	1485	0	0	0
0	0							
LGV Freight	Business	2017	-17	121	421	0	0	0
0	0							
LGV Freight	Business	2032	-15	117	406	0	0	0
0	0							
LGV Freight	Business	Total	-753	5841	20103	0	0	0
0	0							
LGV Freight	Commuting	2017	0	0	0	0	0	0
0	0							
LGV Freight	Commuting	2032	0	0	0	0	0	0
0	0							
LGV Freight	Commuting	Total	0	0	0	0	0	0
0	0							
LGV Freight	Other	2017	0	0	0	0	0	0
0	0							
LGV Freight	Other	2032	0	0	0	0	0	0
0	0							
LGV Freight	Other	Total	0	0	0	0	0	0
0	0							
OGV1	Business	2017	28	3	135	0	0	0
0	0							
OGV1	Business	2032	21	2	100	0	0	0
0	0							
OGV1	Business	Total	1100	123	4969	0	0	0
0	0							
OGV1	Commuting	2017	0	0	0	0	0	0
0	0							
OGV1	Commuting	2032	0	0	0	0	0	0
0	0							
OGV1	Commuting	Total	0	0	0	0	0	0
0	0							
OGV1	Other	2017	0	0	0	0	0	0
0	0							
OGV1	Other	2032	0	0	0	0	0	0
0	0							
OGV1	Other	Total	0	0	0	0	0	0
0	0							
OGV2	Business	2017	27	2	158	0	0	0
0	0							
OGV2	Business	2032	20	1	115	0	0	0
0	0							
OGV2	Business	Total	1022	81	5489	0	0	0
0	0							
OGV2	Commuting	2017	0	0	0	0	0	0
0	0							
OGV2	Commuting	2032	0	0	0	0	0	0
0	0							
OGV2	Commuting	Total	0	0	0	0	0	0
0	0							
OGV2	Other	2017	0	0	0	0	0	0
0	0							
OGV2	Other	2032	0	0	0	0	0	0
0	0							
OGV2	Other	Total	0	0	0	0	0	0
0	0							

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

	Modelled Years	
Mode	2017	2032
Road	9.12%	9.29%

Economy:Economic Efficiency of the Transport System(TEE)

Consumer - Commuting user benefits	All Modes	Road	Bus
Travel Time	22209	22209	0
Vehicle operating costs	1631	1631	0
User charges	0	0	0
During Construction & Maintenance	0	0	0
NET CONSUMER - COMMUTING BENEFITS	23839	23839	0

Consumer - Other user benefits	All Modes	Road	Bus
Travel Time	32017	32017	0
Vehicle operating costs	2561	2561	0
User charges	0	0	0
During Construction & Maintenance	0	0	0
NET CONSUMER - OTHER BENEFITS	34578	34578	0

Business	All Modes	Road Personal	Road Freight	Bus Personal	Bus Freight
Travel Time	67302	38341	28961	0	0
Vehicle operating costs	12097	3085	9012	0	0
User charges	0	0	0	0	0
During Construction & Maintenance	0	0	0	0	0
Subtotal	79400	41426	37973	0	0

Private Sector Provider Impacts			
Revenue	0	0	0
Operating costs	0	0	0
Investment costs	0	0	0
Grant/subsidy	0	0	0
Subtotal	0	0	0

Other business Impacts			
Developer contributions	0	0	0
NET BUSINESS IMPACT	79400		

TOTAL

Present Value of Transport Economic Efficiency Benefits (TEE)	137817

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

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

NET IMPACT	0	0	0

Central Government Funding: Transport	ALL MODES	Road	Bus
Revenue	0	0	0
Operating costs	0	0	0
Investment costs	40121	40121	0
Developer Contributions	0	0	0
Grant/Subsidy Payments	0	0	0
NET IMPACT	40121	40121	0

Central Government Funding: Non-Transport

Indirect Tax Revenues	1852	1852	0

TOTALS

Broad Transport Budget	40121	40121	0
Wider Public Finances	1852	1852	0

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	848
Economic Efficiency: Consumer Users (Commuting)	23839
Economic Efficiency: Consumer Users (Other)	34578
Economic Efficiency: Business Users and Providers	79400
Wider Public Finances (Indirect Taxation Revenues)	-1852
Present Value of Benefits (PVB)	136813
Broad Transport Budget	40121
Present Value of Costs (PVC)	40121
OVERALL IMPACTS	
Net Present Value (NPV)	96692
Benefit to Cost Ratio (BCR)	3.410

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 : C:\.paramics\data\EBL\Economic assessment\TUBA\SCHEME_FILE_1_9_6.TXT
- Economic File : C:\.paramics\data\EBL\Economic assessment\TUBA\economics_1_9_6.txt
- Output File : C:\.paramics\data\EBL\Economic assessment\TUBA\ResultsR4.OUT

Elapsed time : 0hrs 0mins 6sec

Appendix B
COBALT Output Files

```
*************************************************************************
*                                                                       *
*        CCC      OOO     BBBB      AAA            L        TTTTT      *
*       C   C    O   O    B   B    A   A           L          T        *
*       C        O   O    B   B    A   A           L          T        *
*       C        O   O    BBBB     AAAAA    ----   L          T        *
*       C        O   O    B   B    A   A           L          T        *
*       C   C    O   O    B   B    A   A           L          T        *
*        CCC      OOO     BBBB     A   A           LLLLL      T        *
*                                                                       *
*************************************************************************
*                                                                       *
*                                            Version 2013.02            *
*                                                                       *
*      Transport Appraisal and Strategic Modelling (TASM) Division,     *
*                                      Department for Transport,        *
*                                           Great Minster House,        *
*                                            33 Horseferry Road,        *
*                                                       London,         *
*                                                     SW1P 4DR          *
*                                    Email tasm@dft.gsi.gov.uk          *
*                                                                       *
*************************************************************************
```


Written by Roger Himlin

Contents

[Section 1] Summary Statistics

[Section 1.1] Economic Summary

```
    Total Without-Scheme Accident Costs =     42,784.1
       Total With-Scheme Accident Costs =     48,442.2

   Total Accident Benefits Saved by Scheme =     -5,658.1
```

Costs and benefits discounted to 2010 in multiples of a thousand pounds.

[Section 1.2] Accident Summary

```
            Total Without-Scheme Accidents =        887.2
               Total With-Scheme Accidents =      1,022.3

           Total Accidents Saved by Scheme =       -135.1
```

This analysis includes 11 warning(s).
These results should be considered carefully before using.

[Section 1.3] Casualty Summary

```
    Total Without-Scheme Casualties (Fatal) =          5.9
                                    (Serious) =         74.4
                                     (Slight) =      1,130.3
       Total With-Scheme Casualties (Fatal) =          6.5
                                    (Serious) =         82.5
                                     (Slight) =      1,312.6

    Total Casualties Saved by Scheme (Fatal) =         -0.7
                                    (Serious) =         -8.1
                                     (Slight) =       -182.4
```

This analysis includes 11 warning(s).
These results should be considered carefully before using.

[Section 2] Accident Statistics

[Section 2.1] Link Accident Statistics

	Without-Scheme: Number of Accidents				With-Scheme: Number of Accidents				Benefits: Number of Accidents			
Link Name	2017	2032	Total*	Cost*	2017	2032	Total*	Cost*	2017	2032	Total*	Benefit*
398	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
399	0.6	0.4	24.2	1,694.4	0.6	0.5	27.7	1,937.2	-0.1	-0.1	-3.5	-242.8
400	0.6	0.4	24.4	1,709.5	0.6	0.5	27.9	1,954.4	-0.1	-0.1	-3.5	-244.9
401	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
402	0.2	0.1	6.9	451.6	0.2	0.1	7.1	465.3	0.0	0.0	-0.2	-13.7

403	0.1	0.1	6.1	371.9	0.1	0.1	6.3	383.2	0.0	0.0	-0.2	-11.3
404	0.2	0.1	7.8	545.7	0.2	0.1	6.8	474.4	0.0	0.0	1.0	71.3
405	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
406	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
407	0.7	0.5	29.5	2,063.3	0.7	0.5	30.8	2,156.1	0.0	0.0	-1.3	-92.8
408	0.6	0.4	24.4	1,710.2	0.3	0.2	13.6	951.5	0.2	0.2	10.8	758.6
409	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4102	0.2	0.1	8.2	503.4	0.2	0.1	7.6	462.8	0.0	0.0	0.7	40.7
411	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
412	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
413	0.2	0.1	8.4	511.2	0.1	0.1	6.6	404.7	0.0	0.0	1.7	106.5
414	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
415	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
416	0.1	0.1	6.5	396.8	0.5	0.4	22.6	1,380.5	-0.4	-0.3	-16.1	-983.8
418	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
419	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
420	0.3	0.3	15.6	956.0	0.1	0.1	5.1	312.4	0.2	0.2	10.5	643.5
421	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
422	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
423	0.2	0.1	7.4	452.0	0.1	0.0	2.5	152.5	0.1	0.1	4.9	299.5
424	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
425	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
426	0.3	0.3	15.0	917.5	0.2	0.1	6.9	421.3	0.2	0.1	8.1	496.2
4271	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4272	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
428	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
429	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
430	0.2	0.1	7.9	480.2	0.2	0.2	10.0	613.6	0.0	0.0	-2.2	-133.4
431	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
432	0.4	0.3	16.2	992.9	0.5	0.3	20.8	1,268.8	-0.1	-0.1	-4.5	-275.8
433	0.5	0.4	22.8	1,393.5	0.6	0.5	29.1	1,780.7	-0.1	-0.1	-6.3	-387.1
900	0.0	0.0	0.0	0.0	0.5	0.4	21.2	1,480.4	-0.5	-0.4	-21.2	-1,480.4
Total	5.2	3.9	231.4	15,150.2	5.7	4.2	252.5	16,599.9	-0.5	-0.4	-21.2	-1,449.7

Costs and benefits discounted to 2010 in multiples of a thousand pounds.

[Section 2.2] Junction Accident Statistics

	Without-Scheme				With-Scheme				Benefits			
	Number of Accidents		Total		Number of Accidents		Total		Number of Accidents		Total	
Junction Name	2017	2032	Total	Cost	2017	2032	Total	Cost	2017	2032	Total	Benefit
102	1.9	1.8	107.9	4,375.8	5.4	5.2	313.2	12,696.4	-3.5	-3.4	-205.2	-8,320.6
105	0.7	0.7	43.0	1,742.5	0.7	0.7	40.9	1,656.7	0.0	0.0	2.1	85.8
106	3.0	2.9	172.6	6,998.4	1.9	1.9	112.3	4,552.2	1.0	1.0	60.3	2,446.2
109	1.2	1.1	66.8	3,068.2	1.1	1.1	66.2	3,038.3	0.0	0.0	0.7	30.0
110	1.0	1.0	58.5	2,704.5	1.0	1.0	58.2	2,694.5	0.0	0.0	0.2	10.1
112	1.6	1.5	90.9	3,685.6	0.9	0.8	49.9	2,023.2	0.7	0.7	41.0	1,662.4
120	0.4	0.3	21.2	1,006.9	0.2	0.2	12.8	606.7	0.2	0.1	8.4	400.2
121	0.2	0.2	10.5	498.7	0.1	0.1	6.4	302.1	0.1	0.1	4.1	196.5
122	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
124	0.4	0.3	20.9	994.1	0.2	0.2	12.8	610.1	0.1	0.1	8.1	384.0
125	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
126	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
127	1.2	1.0	63.6	2,559.1	0.8	0.7	42.7	1,719.0	0.4	0.3	20.9	840.2
128	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
501	0.0	0.0	0.0	0.0	1.0	0.9	54.5	1,943.1	-1.0	-0.9	-54.5	-1,943.1
Total	11.4	10.9	655.8	27,633.9	13.3	12.8	769.8	31,842.3	-1.9	-1.9	-114.0	-4,208.4

Costs and benefits discounted to 2010 in multiples of a thousand pounds.

[Section 2.3] Combined Link and Junction Accident Statistics

	Without-Scheme				With-Scheme				Benefits			
	Number of Accidents		Total		Number of Accidents		Total		Number of Accidents		Total	
Link Name	2017	2032	Total	Cost	2017	2032	Total	Cost	2017	2032	Total	Benefit
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Costs and benefits discounted to 2010 in multiples of a thousand pounds.

[Section 3] Accident Rates

[Section 3.1] Link Accident Rates

	Accident Rate	
Link Name	2017	2032
398	0.000000	0.000000
399	0.029983	0.021907
400	0.027270	0.019925
401	0.000000	0.000000
402	0.195028	0.148261
403	0.204623	0.154328
404	0.011383	0.008317
405	0.000000	0.000000
406	0.000000	0.000000
407	0.242982	0.177534
408	0.145918	0.106615
409	0.000000	0.000000
4101	0.000000	0.000000
4102	0.555178	0.418719
411	0.000000	0.000000
412	0.000000	0.000000
413	0.294988	0.222482
414	0.000000	0.000000
415	0.000000	0.000000
416	1.755332	1.323881
418	0.000000	0.000000
419	0.000000	0.000000
420	0.209818	0.158246
421	0.000000	0.000000
422	0.000000	0.000000
423	0.299421	0.225825
424	0.000000	0.000000
425	0.000000	0.000000
426	0.126265	0.095230

4271	0.000000	0.000000
4272	0.000000	0.000000
428	0.000000	0.000000
429	0.000000	0.000000
430	0.048888	0.036872
431	0.000000	0.000000
432	0.070910	0.053481
433	0.076641	0.057803
900	0.055547	0.040585

Accident rates are in accidents per million vehicle kilometres.

[Section 3.2] Junction Accident Rates

	---- Coefficient 'a' ---	
Junction Name	* 2017	2032 *
102	0.052452	0.050595
105	0.012898	0.012441
106	0.038576	0.037210
109	0.112062	0.108094
110	0.047110	0.045441
112	0.012938	0.012480
120	0.093118	0.084561
121	0.046201	0.041955
122	0.000000	0.000000
124	0.092213	0.083739
125	0.000000	0.000000
126	0.000000	0.000000
127	0.223273	0.202755
128	0.000000	0.000000
501	0.025295	0.023723

[Section 3.3] Combined Link and Junction Accident Rates

	----- Accident Rate ----	
Link Name	* 2017	2032 *

Accident rates are in accidents per million vehicle kilometres.

[Section 4] Input Data - Scheme File

Scheme Name
EBL

Years Subsection

Current Year	2016
Base Year	2014
Without-Scheme	
Year 1	2017
Year 2	2032
Year 3	2077
Year 4	0
Year 5	0
With-Scheme	
Year 1	2017
Year 2	2032
Year 3	2077
Year 4	0
Year 5	0

Scheme Opening Year 2017

Link Input Section

Link Classification Subsection

Link Name	Road Type	Length (km)	Speed Limit (mph)	Error/Warning Summary (!=Error, #=Warning)
398	10	0.38	70	
399	10	1.23	70	
400	10	1.36	70	
401	10	0.20	30	
402	10	0.24	30	
403	4	0.21	30	
404	10	1.01	50	
405	10	0.19	30	
406	10	0.14	30	
407	10	0.35	50	
408	10	0.33	50	
409	10	0.10	30	
4101	4	0.29	30	
4102	4	0.10	30	
411	4	0.14	30	
412	4	0.04	30	
413	4	0.18	30	
414	4	0.06	30	
415	4	0.06	30	
416	4	0.29	30	
418	4	0.25	30	
419	4	0.19	30	
420	4	0.25	30	
421	4	0.05	30	
422	4	0.10	30	
423	4	0.11	30	
424	4	0.18	30	
425	4	0.12	30	
426	4	0.38	30	
4271	4	0.36	30	
4272	4	0.10	30	
428	4	0.13	30	
429	4	0.08	30	
430	4	0.51	30	
431	4	0.30	30	
432	4	0.71	30	
433	4	0.91	30	
900	10	1.07	50	

Link Flow Subsection

Link Name	Base Year	Without-Scheme Flows	With-Scheme Flows

Name	Flows	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
398	39,575	42,775	42,775	42,775	0	0	48,904	48,904	48,904	0	0
399	39,575	42,775	42,775	42,775	0	0	48,904	48,904	48,904	0	0
400	39,575	42,775	42,775	42,775	0	0	48,904	48,904	48,904	0	0
401	38,027	41,094	41,094	41,094	0	0	39,792	39,792	39,792	0	0
402	11,325	10,679	10,679	10,679	0	0	11,003	11,003	11,003	0	0
403	11,325	10,679	10,679	10,679	0	0	11,003	11,003	11,003	0	0
404	42,740	44,513	44,513	44,513	0	0	38,696	38,696	38,696	0	0
405	18,367	20,896	20,896	20,896	0	0	20,314	20,314	20,314	0	0
406	18,367	20,896	20,896	20,896	0	0	20,314	20,314	20,314	0	0
407	24,249	24,673	24,673	24,673	0	0	25,783	25,783	25,783	0	0
408	33,846	36,402	36,402	36,402	0	0	20,254	20,254	20,254	0	0
409	12,155	11,574	11,574	11,574	0	0	11,028	11,028	11,028	0	0
4101	14,428	15,095	15,095	15,095	0	0	13,875	13,875	13,875	0	0
4102	14,428	15,095	15,095	15,095	0	0	13,875	13,875	13,875	0	0
411	11,886	12,363	12,363	12,363	0	0	9,787	9,787	9,787	0	0
412	11,886	12,363	12,363	12,363	0	0	9,787	9,787	9,787	0	0
413	11,886	12,363	12,363	12,363	0	0	9,787	9,787	9,787	0	0
414	11,886	12,363	12,363	12,363	0	0	9,787	9,787	9,787	0	0
415	11,886	12,363	12,363	12,363	0	0	9,787	9,787	9,787	0	0
416	930	903	903	903	0	0	3,142	3,142	3,142	0	0
418	930	903	903	903	0	0	3,142	3,142	3,142	0	0
419	21,150	21,684	21,684	21,684	0	0	7,098	7,098	7,098	0	0
420	21,091	21,669	21,669	21,669	0	0	7,082	7,082	7,082	0	0
421	21,022	21,578	21,578	21,578	0	0	7,175	7,175	7,175	0	0
422	20,976	21,539	21,539	21,539	0	0	7,266	7,266	7,266	0	0
423	20,976	21,539	21,539	21,539	0	0	7,266	7,266	7,266	0	0
424	20,974	21,517	21,517	21,517	0	0	7,443	7,443	7,443	0	0
425	20,938	21,427	21,427	21,427	0	0	7,642	7,642	7,642	0	0
426	20,921	21,346	21,346	21,346	0	0	9,802	9,802	9,802	0	0
4271	20,209	20,693	20,693	20,693	0	0	10,335	10,335	10,335	0	0
4272	19,462	19,953	19,953	19,953	0	0	25,991	25,991	25,991	0	0
428	5,344	4,914	4,914	4,914	0	0	5,344	5,344	5,344	0	0
429	5,344	4,914	4,914	4,914	0	0	5,344	5,344	5,344	0	0
430	20,664	20,874	20,874	20,874	0	0	26,673	26,673	26,673	0	0
431	20,664	20,874	20,874	20,874	0	0	26,673	26,673	26,673	0	0
432	20,664	20,874	20,874	20,874	0	0	26,673	26,673	26,673	0	0
433	20,664	20,874	20,874	20,874	0	0	26,673	26,673	26,673	0	0
900	0	0	0	0	0	0	23,306	23,306	23,306	0	0

Link Local Accident Rate Subsection

Link Name	Observed Accidents	First Observed Accident Year	Local Severity Split Ratio	Year
398	0,0,0,0,0	2010		
399	1,0,1,1,0	2010		
400	1,0,0,1,1	2010		
401	0,0,0,0,0	2010		
402	0,0,1,0,0	2010		
403	1,0,0,0,0	2010		
404	0,0,0,1,0	2010		
405	0,0,0,0,0	2010		
406	0,0,0,0,0	2010		
407	1,0,1,1,1	2010		
408	0,0,0,3,0	2010		
409	0,0,0,0,0	2010		
4101	0,0,0,0,0	2010		
4102	0,0,0,1,0	2010		
411	0,0,0,0,0	2010		
412	0,0,0,0,0	2010		
413	0,0,0,0,1	2010		
414	0,0,0,0,0	2010		
415	0,0,0,0,0	2010		
416	1,0,0,0,0	2010		
418	0,0,0,0,0	2010		
419	0,0,0,0,0	2010		
420	0,0,2,0,0	2010		
421	0,0,0,0,0	2010		
422	0,0,0,0,0	2010		
423	1,0,0,0,0	2010		
424	0,0,0,0,0	2010		
425	0,0,0,0,0	2010		
426	1,0,1,0,0	2010		
4271	0,0,0,0,0	2010		
4272	0,0,0,0,0	2010		
428	0,0,0,0,0	2010		
429	0,0,0,0,0	2010		
430	0,0,0,1,0	2010		
431	0,0,0,0,0	2010		
432	0,0,0,0,2	2010		
433	0,0,3,0,0	2010		

Junction Input Section

Junction Classification Subsection

Junction Name	Junction Geometry	Highest Carriageway	Highest Standard	Speed Limit (mph)	Error/Warning Summary (!=Error, #=Warning)
102	4	Dual	Major	30	
105	5	Dual	Major	30	
106	4	Single	Major	30	
109	3	Dual	Major	30	
110	3	Dual	Major	30	
112	4	Dual	Major	30	
120	1	Single	Minor	30	#The lower limit of flow for the minor arms in the cross product model was breached while calculating the observed accident rate. Treat with care. #The lower limit of flow for the minor arms in the cross product model was breached. Treat with care.
121	1	Single	Minor	30	#The lower limit of flow for the minor arms in the cross product model was breached while calculating the observed accident rate. Treat with care. #The lower limit of flow for the minor arms in the cross product model was breached. Treat with care.
122	1	Single	Minor	30	#The lower limit of flow for the minor arms in the cross product model was breached while calculating the observed accident rate. Treat with care.
124	1	Single	Minor	30	#The lower limit of flow for the minor arms in the cross product model was breached while calculating the observed accident rate. Treat with care. #The lower limit of flow for the minor arms in the cross product model was breached. Treat with care.
125	0	Single	Minor	30	#The lower limit of flow for the minor arms in the cross product model was breached while calculating the observed accident rate. Treat with care.
126	1	Single	Minor	30	#The lower limit of flow for the minor arms in the cross product model was breached while calculating the observed accident rate. Treat with care.
127	5	Single	Minor	30	#The lower limit of flow for the minor arms in the cross product model was breached while calculating the observed accident rate. Treat with care. #The lower limit of flow for the minor arms in the cross product model was breached. Treat with care.
128	5	Single	Minor	30	
501	7	Dual	Major	50	

Junction Flow Subsection

Base Year Flows

Junction Name	Arm 1 (Major)	Arm 2 (Minor)	Arm 3 (Major)	Arm 4 (Minor)	Arm 5 (Major)	Arm 6 (Minor)
102	19,240	4,190	2,449			
105	17,066	5,706	21,578			
106	9,454	10,071	16,023			
109	11,599	3,645	15,415			
110	12,981	6,718	9,497	10,710		
112	18,807	6,600	1,407	6,179		
120	10,478	303	10,776			
121	10,608	289	10,597			
122	10,425	297	10,709			
124	10,865	295	10,271			
125	10,109	312	10,997			
126	9,953	300	11,115			
127	9,790	192	10,779	165		
128	9,009	2,835	10,848			
501	0	0	0			

Without-Scheme Year Flows

Junction Name	Year	Arm 1 (Major)	Arm 2 (Minor)	Arm 3 (Major)	Arm 4 (Minor)	Arm 5 (Major)	Arm 6 (Minor)
102	1	21,219	4,643	2,319	0	0	0
102	2	21,219	4,643	2,319	0	0	0
102	3	21,219	4,643	2,319	0	0	0
105	1	17,987	4,999	23,239	0	0	0
105	2	17,987	4,999	23,239	0	0	0
105	3	17,987	4,999	23,239	0	0	0
106	1	9,496	11,071	17,940	0	0	0
106	2	9,496	11,071	17,940	0	0	0
106	3	9,496	11,071	17,940	0	0	0
109	1	11,198	3,433	16,810	0	0	0
109	2	11,198	3,433	16,810	0	0	0
109	3	11,198	3,433	16,810	0	0	0
110	1	12,916	5,998	10,239	11,478	0	0
110	2	12,916	5,998	10,239	11,478	0	0
110	3	12,916	5,998	10,239	11,478	0	0
112	1	19,380	7,029	1,276	6,621	0	0
112	2	19,380	7,029	1,276	6,621	0	0
112	3	19,380	7,029	1,276	6,621	0	0
120	1	11,212	289	10,631	0	0	0
120	2	11,212	289	10,631	0	0	0
120	3	11,212	289	10,631	0	0	0
121	1	10,466	286	11,288	0	0	0
121	2	10,466	286	11,288	0	0	0
121	3	10,466	286	11,288	0	0	0
122	1	10,290	259	11,446	0	0	0
122	2	10,290	259	11,446	0	0	0
122	3	10,290	259	11,446	0	0	0
124	1	11,591	259	10,109	0	0	0
124	2	11,591	259	10,109	0	0	0
124	3	11,591	259	10,109	0	0	0
125	1	9,948	324	11,665	0	0	0
125	2	9,948	324	11,665	0	0	0
125	3	9,948	324	11,665	0	0	0
126	1	9,760	283	11,773	0	0	0
126	2	9,760	283	11,773	0	0	0
126	3	9,760	283	11,773	0	0	0
127	1	9,614	236	11,363	174	0	0
127	2	9,614	236	11,363	174	0	0
127	3	9,614	236	11,363	174	0	0
128	1	8,957	2,488	11,418	0	0	0
128	2	8,957	2,488	11,418	0	0	0
128	3	8,957	2,488	11,418	0	0	0
501	1	0	0	0	0	0	0
501	2	0	0	0	0	0	0
501	3	0	0	0	0	0	0

With-Scheme Year Flows

Junction Name	Year	Arm 1 (Major)	Arm 2 (Minor)	Arm 3 (Major)	Arm 4 (Minor)	Arm 5 (Major)	
102	1	9,319	15,953	12,138	4,735	0	0
102	2	9,319	15,953	12,138	4,735	0	0
102	3	9,319	15,953	12,138	4,735	0	0
105	1	18,065	5,132	19,510	0	0	0
105	2	18,065	5,132	19,510	0	0	0
105	3	18,065	5,132	19,510	0	0	0
106	1	6,385	10,810	9,571	0	0	0
106	2	6,385	10,810	9,571	0	0	0
106	3	6,385	10,810	9,571	0	0	0
109	1	12,288	3,266	16,591	0	0	0
109	2	12,288	3,266	16,591	0	0	0
109	3	12,288	3,266	16,591	0	0	0
110	1	13,424	5,656	10,017	11,481	0	0
110	2	13,424	5,656	10,017	11,481	0	0
110	3	13,424	5,656	10,017	11,481	0	0
112	1	11,613	6,326	622	5,054	0	0
112	2	11,613	6,326	622	5,054	0	0
112	3	11,613	6,326	622	5,054	0	0
120	1	3,966	283	3,296	0	0	0
120	2	3,966	283	3,296	0	0	0
120	3	3,966	283	3,296	0	0	0
121	1	3,125	271	4,194	0	0	0
121	2	3,125	271	4,194	0	0	0
121	3	3,125	271	4,194	0	0	0
122	1	2,981	265	4,472	0	0	0
122	2	2,981	265	4,472	0	0	0
122	3	2,981	265	4,472	0	0	0
124	1	4,711	265	2,797	0	0	0
124	2	4,711	265	2,797	0	0	0
124	3	4,711	265	2,797	0	0	0
125	1	2,733	274	4,964	0	0	0
125	2	2,733	274	4,964	0	0	0
125	3	2,733	274	4,964	0	0	0
126	1	2,684	2,280	5,358	0	0	0
126	2	2,684	2,280	5,358	0	0	0
126	3	2,684	2,280	5,358	0	0	0
127	1	4,447	213	5,592	282	0	0
127	2	4,447	213	5,592	282	0	0
127	3	4,447	213	5,592	282	0	0
128	1	12,222	2,877	13,804	0	0	0
128	2	12,222	2,877	13,804	0	0	0

128	3	12,222	2,877	13,804	0	0	0
501	1	11,334	4,785	13,772	0	0	0
501	2	11,334	4,785	13,772	0	0	0
501	3	11,334	4,785	13,772	0	0	0

Junction Local Accident Rate Subsection

Junction Name	Observed Accidents	First Observed Accident Year	Local Severity Split Ratio	Year
102	0,0,0,4,4	2010		
105	0,0,1,1,2	2010		
106	2,2,6,2,0	2010		
109	2,0,1,3,0	2010		
110	2,1,1,1,0	2010		
112	2,2,1,0,2	2010		
120	1,0,0,0,1	2010		
121	0,1,0,0,0	2010		
122	0,0,0,0,0	2010		
124	1,1,0,0,0	2010		
125	0,0,0,0,0	2010		
126	0,0,0,0,0	2010		
127	1,1,0,2,2	2010		
128	0,0,0,0,0	2010		

Link and Junction Combined Input Section

Combined Classification Subsection

Link Name	Road Type	Length (km)	Speed Limit (mph)	Error/Warning Summary (!=Error, #=Warning)

Combined Flow Subsection

Link Name	Base Year Flows	Without-Scheme Flows					With-Scheme Flows				
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5

Combined Local Accident Rate Subsection

Link Name	Observed Accidents	First Observed Accident Year	Local Severity Split Ratio	Year

[Section 5] Input Data - Parameter File

COBALT Parameter File
Version 2,016.10

Cost Base Year
2010

Appraisal Period
60

Discount Rate

Years from Current Year	Discount Rate (%)
30	3.50
75	3.00
125	2.50

Cost per Casualty

Severity	Cost
Fatal	1,635,937
Serious	183,834
Slight	14,172

Cost per Accident

Severity	Insurance Administration	Damage to Property Urban	Rural	Motorway
Fatal	300	7,822	13,267	16,876
Serious	187	4,192	6,048	14,400
Slight	113	2,473	4,009	7,285
Damage	54	2,473	2,644	2,541
		Police Cost Urban	Rural	Motorway
Fatal		16,951	17,407	17,610
Serious		1,872	2,337	2,468
Slight		484	664	554
Damage		484	20	17

Compound Annual Rates of Growth of Accident Values

Range of Years	Rate of Growth (%p.a.)
2010-2011	1.13
2011-2012	0.51
2012-2013	1.52
2013-2014	2.16
2014-2015	1.66
2015-2016	1.69
2016-2017	1.80
2017-2018	1.73
2018-2019	1.64
2019-2020	1.66
2020-2021	1.77
2021-2022	1.78
2022-2023	1.80
2023-2024	1.91
2024-2025	1.93
2025-2026	1.94
2026-2027	1.96
2027-2028	1.98
2028-2029	1.99
2029-2030	2.01
2030-2031	2.02
2031-2032	2.04
2032-2033	2.05
2033-2034	2.16
2034-2035	2.07
2035-2036	2.08
2036-2040	2.09
2040-2045	2.11
2045-2046	2.24
2046-2050	2.14
2050-2055	2.07
2055-2057	2.09
2057-2059	2.19
2059-2060	2.29
2060-2063	2.30

2063-2065	2.20
2065-2070	2.18
2070-2085	2.17
2085-2110	2.18

Number of Damage Only Accidents per PIA

	Urban	Rural	Motorway
Damage	17.7	7.8	7.6

Link Only Accident Proportions
Base Year
2009

Road Type	Speed Limit (mph)	Accident Proportions Fatal	Serious	Slight
1	50	0.019	0.104	0.877
1	60	0.019	0.104	0.877
1	70	0.019	0.104	0.877
1	80	0.019	0.104	0.877
2	50	0.019	0.104	0.877
2	60	0.019	0.104	0.877
2	70	0.019	0.104	0.877
2	80	0.019	0.104	0.877
3	50	0.019	0.104	0.877
3	60	0.019	0.104	0.877
3	70	0.019	0.104	0.877
3	80	0.019	0.104	0.877
4	30	0.014	0.145	0.841
4	40	0.014	0.145	0.841
4	50	0.046	0.206	0.748
4	60	0.046	0.206	0.748
4	70	0.046	0.206	0.748
4	80	0.046	0.206	0.748
5	30	0.014	0.145	0.841
5	40	0.014	0.145	0.841
5	50	0.046	0.206	0.748
5	60	0.046	0.206	0.748
5	70	0.046	0.206	0.748
5	80	0.046	0.206	0.748
6	30	0.014	0.145	0.841
6	40	0.014	0.145	0.841
6	50	0.046	0.206	0.748
6	60	0.046	0.206	0.748
6	70	0.046	0.206	0.748
6	80	0.046	0.206	0.748
7	30	0.014	0.145	0.841
7	40	0.014	0.145	0.841
7	50	0.046	0.206	0.748
7	60	0.046	0.206	0.748
7	70	0.046	0.206	0.748
7	80	0.046	0.206	0.748
8	30	0.014	0.145	0.841
8	40	0.014	0.145	0.841
8	50	0.046	0.206	0.748
8	60	0.046	0.206	0.748
8	70	0.046	0.206	0.748
8	80	0.046	0.206	0.748
9	30	0.010	0.145	0.846
9	40	0.010	0.145	0.846
9	50	0.026	0.193	0.780
9	60	0.026	0.193	0.780
9	70	0.026	0.193	0.780
9	80	0.026	0.193	0.780
10	30	0.017	0.135	0.849
10	40	0.017	0.135	0.849
10	50	0.028	0.135	0.837
10	60	0.028	0.135	0.837
10	70	0.028	0.135	0.837
10	80	0.028	0.135	0.837
11	30	0.017	0.135	0.849
11	40	0.017	0.135	0.849
11	50	0.028	0.135	0.837
11	60	0.028	0.135	0.837
11	70	0.028	0.135	0.837
11	80	0.028	0.135	0.837
12	30	0.017	0.135	0.849
12	40	0.017	0.135	0.849
12	50	0.028	0.135	0.837
12	60	0.028	0.135	0.837
12	70	0.028	0.135	0.837
12	80	0.028	0.135	0.837
13	30	0.017	0.135	0.849
13	40	0.017	0.135	0.849
13	50	0.028	0.135	0.837
13	60	0.028	0.135	0.837
13	70	0.028	0.135	0.837
13	80	0.028	0.135	0.837
14	30	0.017	0.135	0.849
14	40	0.017	0.135	0.849
14	50	0.028	0.135	0.837
14	60	0.028	0.135	0.837
14	70	0.028	0.135	0.837
14	80	0.028	0.135	0.837
15	30	0.017	0.135	0.849
15	40	0.017	0.135	0.849
15	50	0.028	0.135	0.837
15	60	0.028	0.135	0.837
15	70	0.028	0.135	0.837
15	80	0.028	0.135	0.837

Link and Junction Combined Accident Proportions
Base Year
2009

Road Type	Speed Limit (mph)	Accident Proportions Fatal	Serious	Slight
1	50	0.018	0.101	0.882
1	60	0.018	0.101	0.882
1	70	0.018	0.101	0.882
1	80	0.018	0.101	0.882
2	50	0.018	0.101	0.882
2	60	0.018	0.101	0.882
2	70	0.018	0.101	0.882
2	80	0.018	0.101	0.882
3	50	0.018	0.101	0.882

3	60	0.018	0.101	0.882
3	70	0.018	0.101	0.882
3	80	0.018	0.101	0.882
4	30	0.008	0.122	0.869
4	40	0.008	0.122	0.869
4	50	0.034	0.187	0.779
4	60	0.034	0.187	0.779
4	70	0.034	0.187	0.779
4	80	0.034	0.187	0.779
5	30	0.008	0.122	0.869
5	40	0.008	0.122	0.869
5	50	0.034	0.187	0.779
5	60	0.034	0.187	0.779
5	70	0.034	0.187	0.779
5	80	0.034	0.187	0.779
6	30	0.008	0.122	0.869
6	40	0.008	0.122	0.869
6	50	0.034	0.187	0.779
6	60	0.034	0.187	0.779
6	70	0.034	0.187	0.779
6	80	0.034	0.187	0.779
7	30	0.008	0.122	0.869
7	40	0.008	0.122	0.869
7	50	0.034	0.187	0.779
7	60	0.034	0.187	0.779
7	70	0.034	0.187	0.779
7	80	0.034	0.187	0.779
8	30	0.008	0.122	0.869
8	40	0.008	0.122	0.869
8	50	0.034	0.187	0.779
8	60	0.034	0.187	0.779
8	70	0.034	0.187	0.779
8	80	0.034	0.187	0.779
9	30	0.007	0.126	0.867
9	40	0.007	0.126	0.867
9	50	0.024	0.187	0.789
9	60	0.024	0.187	0.789
9	70	0.024	0.187	0.789
9	80	0.024	0.187	0.789
10	30	0.009	0.104	0.887
10	40	0.009	0.104	0.887
10	50	0.023	0.127	0.850
10	60	0.023	0.127	0.850
10	70	0.023	0.127	0.850
10	80	0.023	0.127	0.850
11	30	0.009	0.104	0.887
11	40	0.009	0.104	0.887
11	50	0.023	0.127	0.850
11	60	0.023	0.127	0.850
11	70	0.023	0.127	0.850
11	80	0.023	0.127	0.850
12	30	0.009	0.104	0.887
12	40	0.009	0.104	0.887
12	50	0.023	0.127	0.850
12	60	0.023	0.127	0.850
12	70	0.023	0.127	0.850
12	80	0.023	0.127	0.850
13	30	0.009	0.104	0.887
13	40	0.009	0.104	0.887
13	50	0.023	0.127	0.850
13	60	0.023	0.127	0.850
13	70	0.023	0.127	0.850
13	80	0.023	0.127	0.850
14	30	0.009	0.104	0.887
14	40	0.009	0.104	0.887
14	50	0.023	0.127	0.850
14	60	0.023	0.127	0.850
14	70	0.023	0.127	0.850
14	80	0.023	0.127	0.850
15	30	0.009	0.104	0.887
15	40	0.009	0.104	0.887
15	50	0.023	0.127	0.850
15	60	0.023	0.127	0.850
15	70	0.023	0.127	0.850
15	80	0.023	0.127	0.850

Junction Only Accident Proportions
Base Year
2000

Road Type	Speed Limit (mph)	Accident Proportions Fatal	Serious	Slight
1	50	0.024	0.188	0.787
1	60	0.024	0.188	0.787
1	70	0.024	0.188	0.787
1	80	0.024	0.188	0.787
2	30	0.007	0.124	0.869
2	40	0.007	0.124	0.869
3	50	0.024	0.188	0.787
3	60	0.024	0.188	0.787
3	70	0.024	0.188	0.787
3	80	0.024	0.188	0.787
4	30	0.007	0.124	0.869
4	40	0.007	0.124	0.869
5	50	0.027	0.206	0.766
5	60	0.027	0.206	0.766
5	70	0.027	0.206	0.766
5	80	0.027	0.206	0.766
6	30	0.006	0.116	0.878
6	40	0.006	0.116	0.878
7	50	0.027	0.206	0.766
7	60	0.027	0.206	0.766
7	70	0.027	0.206	0.766
7	80	0.027	0.206	0.766
8	30	0.006	0.116	0.878
8	40	0.006	0.116	0.878
9	50	0.027	0.206	0.766
9	60	0.027	0.206	0.766
9	70	0.027	0.206	0.766
9	80	0.027	0.206	0.766
10	30	0.006	0.116	0.878
10	40	0.006	0.116	0.878
11	50	0.027	0.206	0.766
11	60	0.027	0.206	0.766

11	70	0.027	0.206	0.766
11	80	0.027	0.206	0.766
12	30	0.006	0.116	0.878
12	40	0.006	0.116	0.878
13	50	0.024	0.188	0.787
13	60	0.024	0.188	0.787
13	70	0.024	0.188	0.787
13	80	0.024	0.188	0.787
14	30	0.007	0.124	0.869
14	40	0.007	0.124	0.869
15	50	0.024	0.188	0.787
15	60	0.024	0.188	0.787
15	70	0.024	0.188	0.787
15	80	0.024	0.188	0.787
16	30	0.007	0.124	0.869
16	40	0.007	0.124	0.869
17	50	0.027	0.206	0.766
17	60	0.027	0.206	0.766
17	70	0.027	0.206	0.766
17	80	0.027	0.206	0.766
18	30	0.006	0.116	0.878
18	40	0.006	0.116	0.878
19	50	0.027	0.206	0.766
19	60	0.027	0.206	0.766
19	70	0.027	0.206	0.766
19	80	0.027	0.206	0.766
20	30	0.006	0.116	0.878
20	40	0.006	0.116	0.878
21	50	0.027	0.206	0.766
21	60	0.027	0.206	0.766
21	70	0.027	0.206	0.766
21	80	0.027	0.206	0.766
22	30	0.006	0.116	0.878
22	40	0.006	0.116	0.878
23	50	0.027	0.206	0.766
23	60	0.027	0.206	0.766
23	70	0.027	0.206	0.766
23	80	0.027	0.206	0.766
24	30	0.006	0.116	0.878
24	40	0.006	0.116	0.878
25	50	0.024	0.188	0.787
25	60	0.024	0.188	0.787
25	70	0.024	0.188	0.787
25	80	0.024	0.188	0.787
26	30	0.007	0.124	0.869
26	40	0.007	0.124	0.869
27	50	0.024	0.188	0.787
27	60	0.024	0.188	0.787
27	70	0.024	0.188	0.787
27	80	0.024	0.188	0.787
28	30	0.007	0.124	0.869
28	40	0.007	0.124	0.869
29	50	0.027	0.206	0.766
29	60	0.027	0.206	0.766
29	70	0.027	0.206	0.766
29	80	0.027	0.206	0.766
30	30	0.006	0.116	0.878
30	40	0.006	0.116	0.878
31	50	0.027	0.206	0.766
31	60	0.027	0.206	0.766
31	70	0.027	0.206	0.766
31	80	0.027	0.206	0.766
32	30	0.006	0.116	0.878
32	40	0.006	0.116	0.878
33	50	0.027	0.206	0.766
33	60	0.027	0.206	0.766
33	70	0.027	0.206	0.766
33	80	0.027	0.206	0.766
34	30	0.006	0.116	0.878
34	40	0.006	0.116	0.878
35	50	0.027	0.206	0.766
35	60	0.027	0.206	0.766
35	70	0.027	0.206	0.766
35	80	0.027	0.206	0.766
36	30	0.006	0.116	0.878
36	40	0.006	0.116	0.878
37	50	0.009	0.117	0.874
37	60	0.009	0.117	0.874
37	70	0.009	0.117	0.874
37	80	0.009	0.117	0.874
38	30	0.006	0.107	0.887
38	40	0.006	0.107	0.887
39	50	0.009	0.117	0.874
39	60	0.009	0.117	0.874
39	70	0.009	0.117	0.874
39	80	0.009	0.117	0.874
40	30	0.006	0.107	0.887
40	40	0.006	0.107	0.887
41	50	0.009	0.115	0.876
41	60	0.009	0.115	0.876
41	70	0.009	0.115	0.876
41	80	0.009	0.115	0.876
42	30	0.006	0.107	0.887
42	40	0.006	0.107	0.887
43	50	0.009	0.115	0.876
43	60	0.009	0.115	0.876
43	70	0.009	0.115	0.876
43	80	0.009	0.115	0.876
44	30	0.006	0.107	0.887
44	40	0.006	0.107	0.887
45	50	0.009	0.115	0.876
45	60	0.009	0.115	0.876
45	70	0.009	0.115	0.876
45	80	0.009	0.115	0.876
46	30	0.006	0.107	0.887
46	40	0.006	0.107	0.887
47	50	0.009	0.115	0.876
47	60	0.009	0.115	0.876
47	70	0.009	0.115	0.876
47	80	0.009	0.115	0.876
48	30	0.006	0.107	0.887
48	40	0.006	0.107	0.887
49	50	0.006	0.091	0.903

49	60	0.006	0.091	0.903
49	70	0.006	0.091	0.903
49	80	0.006	0.091	0.903
50	30	0.003	0.075	0.923
50	40	0.003	0.075	0.923
51	50	0.006	0.091	0.903
51	60	0.006	0.091	0.903
51	70	0.006	0.091	0.903
51	80	0.006	0.091	0.903
52	30	0.003	0.075	0.923
52	40	0.003	0.075	0.923
53	50	0.006	0.091	0.903
53	60	0.006	0.091	0.903
53	70	0.006	0.091	0.903
53	80	0.006	0.091	0.903
54	30	0.003	0.075	0.923
54	40	0.003	0.075	0.923
55	50	0.006	0.091	0.903
55	60	0.006	0.091	0.903
55	70	0.006	0.091	0.903
55	80	0.006	0.091	0.903
56	30	0.003	0.075	0.923
56	40	0.003	0.075	0.923
57	50	0.006	0.091	0.903
57	60	0.006	0.091	0.903
57	70	0.006	0.091	0.903
57	80	0.006	0.091	0.903
58	30	0.003	0.075	0.923
58	40	0.003	0.075	0.923
59	50	0.006	0.091	0.903
59	60	0.006	0.091	0.903
59	70	0.006	0.091	0.903
59	80	0.006	0.091	0.903
60	30	0.003	0.075	0.923
60	40	0.003	0.075	0.923
61	50	0.006	0.091	0.903
61	60	0.006	0.091	0.903
61	70	0.006	0.091	0.903
61	80	0.006	0.091	0.903
62	30	0.003	0.075	0.923
62	40	0.003	0.075	0.923
63	50	0.006	0.091	0.903
63	60	0.006	0.091	0.903
63	70	0.006	0.091	0.903
63	80	0.006	0.091	0.903
64	30	0.003	0.075	0.923
64	40	0.003	0.075	0.923
65	50	0.006	0.091	0.903
65	60	0.006	0.091	0.903
65	70	0.006	0.091	0.903
65	80	0.006	0.091	0.903
66	30	0.003	0.075	0.923
66	40	0.003	0.075	0.923
67	50	0.006	0.091	0.903
67	60	0.006	0.091	0.903
67	70	0.006	0.091	0.903
67	80	0.006	0.091	0.903
68	30	0.003	0.075	0.923
68	40	0.003	0.075	0.923
69	50	0.006	0.091	0.903
69	60	0.006	0.091	0.903
69	70	0.006	0.091	0.903
69	80	0.006	0.091	0.903
70	30	0.003	0.075	0.923
70	40	0.003	0.075	0.923
71	50	0.006	0.091	0.903
71	60	0.006	0.091	0.903
71	70	0.006	0.091	0.903
71	80	0.006	0.091	0.903
72	30	0.003	0.075	0.923
72	40	0.003	0.075	0.923
73	50	0.006	0.091	0.903
73	60	0.006	0.091	0.903
73	70	0.006	0.091	0.903
73	80	0.006	0.091	0.903
74	30	0.003	0.087	0.910
74	40	0.003	0.087	0.910
75	50	0.006	0.091	0.903
75	60	0.006	0.091	0.903
75	70	0.006	0.091	0.903
75	80	0.006	0.091	0.903
76	30	0.003	0.087	0.910
76	40	0.003	0.087	0.910
77	50	0.006	0.091	0.903
77	60	0.006	0.091	0.903
77	70	0.006	0.091	0.903
77	80	0.006	0.091	0.903
78	30	0.003	0.087	0.910
78	40	0.003	0.087	0.910
79	50	0.006	0.091	0.903
79	60	0.006	0.091	0.903
79	70	0.006	0.091	0.903
79	80	0.006	0.091	0.903
80	30	0.003	0.087	0.910
80	40	0.003	0.087	0.910
81	50	0.006	0.091	0.903
81	60	0.006	0.091	0.903
81	70	0.006	0.091	0.903
81	80	0.006	0.091	0.903
82	30	0.003	0.087	0.910
82	40	0.003	0.087	0.910
83	50	0.006	0.091	0.903
83	60	0.006	0.091	0.903
83	70	0.006	0.091	0.903
83	80	0.006	0.091	0.903
84	30	0.003	0.087	0.910
84	40	0.003	0.087	0.910
85	50	0.004	0.062	0.934
85	60	0.004	0.062	0.934
85	70	0.004	0.062	0.934
85	80	0.004	0.062	0.934
86	30	0.003	0.064	0.933
86	40	0.003	0.064	0.933

87	50	0.004	0.062	0.934
87	60	0.004	0.062	0.934
87	70	0.004	0.062	0.934
87	80	0.004	0.062	0.934
88	30	0.003	0.064	0.933
88	40	0.003	0.064	0.933
89	50	0.004	0.062	0.934
89	60	0.004	0.062	0.934
89	70	0.004	0.062	0.934
89	80	0.004	0.062	0.934
90	30	0.003	0.064	0.933
90	40	0.003	0.064	0.933
91	50	0.004	0.062	0.934
91	60	0.004	0.062	0.934
91	70	0.004	0.062	0.934
91	80	0.004	0.062	0.934
92	30	0.003	0.064	0.933
92	40	0.003	0.064	0.933
93	50	0.004	0.062	0.934
93	60	0.004	0.062	0.934
93	70	0.004	0.062	0.934
93	80	0.004	0.062	0.934
94	30	0.003	0.064	0.933
94	40	0.003	0.064	0.933
95	50	0.004	0.062	0.934
95	60	0.004	0.062	0.934
95	70	0.004	0.062	0.934
95	80	0.004	0.062	0.934
96	30	0.003	0.064	0.933
96	40	0.003	0.064	0.933

Link Only Accident Rates and Change Factors
Base Year
2009

Road Type	Speed Limit (mph)	Accident Rate	Beta Factor
1	50	0.063	0.956
1	60	0.063	0.956
1	70	0.063	0.956
2	50	0.063	0.956
2	60	0.063	0.956
2	70	0.063	0.956
3	50	0.075	0.956
3	60	0.075	0.956
3	70	0.075	0.956
4	30	0.175	0.964
4	40	0.175	0.964
4	50	0.143	0.958
4	60	0.143	0.958
4	70	0.143	0.958
4	80	0.143	0.958
5	30	0.175	0.964
5	40	0.175	0.964
5	50	0.143	0.958
5	60	0.143	0.958
5	70	0.143	0.958
5	80	0.143	0.958
6	30	0.206	0.964
6	40	0.206	0.964
6	50	0.082	0.958
6	60	0.082	0.958
6	70	0.082	0.958
6	80	0.082	0.958
7	30	0.206	0.964
7	40	0.206	0.964
7	50	0.082	0.958
7	60	0.082	0.958
7	70	0.082	0.958
7	80	0.082	0.958
8	30	0.206	0.964
8	40	0.206	0.964
8	50	0.143	0.958
8	60	0.143	0.958
8	70	0.143	0.958
8	80	0.143	0.958
9	30	0.195	0.957
9	40	0.195	0.957
9	50	0.163	0.935
9	60	0.163	0.935
9	70	0.163	0.935
9	80	0.163	0.935
10	30	0.148	0.965
10	40	0.148	0.965
10	50	0.077	0.960
10	60	0.077	0.960
10	70	0.077	0.960
10	80	0.077	0.960
11	30	0.154	0.965
11	40	0.154	0.965
11	50	0.059	0.960
11	60	0.059	0.960
11	70	0.059	0.960
11	80	0.059	0.960
12	30	0.154	0.965
12	40	0.154	0.965
12	50	0.077	0.960
12	60	0.077	0.960
12	70	0.077	0.960
12	80	0.077	0.960
13	30	0.184	0.949
13	40	0.184	0.949
13	50	0.101	0.956
13	60	0.101	0.956
13	70	0.101	0.956
13	80	0.101	0.956
14	30	0.184	0.949
14	40	0.184	0.949
14	50	0.101	0.956
14	60	0.101	0.956
14	70	0.101	0.956
14	80	0.101	0.956
15	30	0.184	0.949
15	40	0.184	0.949

15	50	0.101	0.956
15	60	0.101	0.956
15	70	0.101	0.956
15	80	0.101	0.956

Link and Junction Combined Accident Rates and Change Factors
Base Year
2009

Road Type	Speed Limit (mph)	Accident Rate	Beta Factor
1	50	0.080	0.956
1	60	0.080	0.956
1	70	0.080	0.956
2	50	0.067	0.956
2	60	0.067	0.956
2	70	0.067	0.956
3	50	0.079	0.956
3	60	0.079	0.956
3	70	0.079	0.956
4	30	0.532	0.959
4	40	0.532	0.959
4	50	0.244	0.955
4	60	0.244	0.955
4	70	0.244	0.955
4	80	0.244	0.955
5	30	0.532	0.959
5	40	0.532	0.959
5	50	0.244	0.955
5	60	0.244	0.955
5	70	0.244	0.955
5	80	0.244	0.955
6	30	0.863	0.959
6	40	0.863	0.959
6	50	0.163	0.955
6	60	0.163	0.955
6	70	0.163	0.955
6	80	0.163	0.955
7	30	0.863	0.959
7	40	0.863	0.959
7	50	0.163	0.955
7	60	0.163	0.955
7	70	0.163	0.955
7	80	0.163	0.955
8	30	0.863	0.959
8	40	0.863	0.959
8	50	0.244	0.955
8	60	0.244	0.955
8	70	0.244	0.955
8	80	0.244	0.955
9	30	0.559	0.951
9	40	0.559	0.951
9	50	0.233	0.933
9	60	0.233	0.933
9	70	0.233	0.933
9	80	0.233	0.933
10	30	0.553	0.967
10	40	0.553	0.967
10	50	0.107	0.956
10	60	0.107	0.956
10	70	0.107	0.956
10	80	0.107	0.956
11	30	0.599	0.967
11	40	0.599	0.967
11	50	0.072	0.956
11	60	0.072	0.956
11	70	0.072	0.956
11	80	0.072	0.956
12	30	0.599	0.967
12	40	0.599	0.967
12	50	0.107	0.956
12	60	0.107	0.956
12	70	0.107	0.956
12	80	0.107	0.956
13	30	0.620	0.951
13	40	0.620	0.951
13	50	0.123	0.946
13	60	0.123	0.946
13	70	0.123	0.946
13	80	0.123	0.946
14	30	0.620	0.951
14	40	0.620	0.951
14	50	0.123	0.946
14	60	0.123	0.946
14	70	0.123	0.946
14	80	0.123	0.946
15	30	0.620	0.951
15	40	0.620	0.951
15	50	0.123	0.946
15	60	0.123	0.946
15	70	0.123	0.946
15	80	0.123	0.946

Link Only and Link and Junction Combined Accident Beta Factor Changes over Time

Range of Years	Change to Beta Factor
2004-2019	1.000
2020-2029	0.500
2030-2039	0.250
2040-2153	0.000

Link Only Casualty Rates
Base Year
2009

Road Type	Speed Limit (mph)	Casualties per P.I.A. Fatal	Serious	Slight
1	50	0.021	0.129	1.464
1	60	0.021	0.129	1.464
1	70	0.021	0.129	1.464
2	50	0.021	0.129	1.464
2	60	0.021	0.129	1.464
2	70	0.021	0.129	1.464
3	50	0.021	0.129	1.464
3	60	0.021	0.129	1.464
3	70	0.021	0.129	1.464

4	30	0.015	0.162	1.154
4	40	0.015	0.162	1.154
4	50	0.052	0.274	1.251
4	60	0.052	0.274	1.251
4	70	0.052	0.274	1.251
4	80	0.052	0.274	1.251
5	30	0.015	0.162	1.154
5	40	0.015	0.162	1.154
5	50	0.052	0.274	1.251
5	60	0.052	0.274	1.251
5	70	0.052	0.274	1.251
5	80	0.052	0.274	1.251
6	30	0.015	0.162	1.154
6	40	0.015	0.162	1.154
6	50	0.052	0.274	1.251
6	60	0.052	0.274	1.251
6	70	0.052	0.274	1.251
6	80	0.052	0.274	1.251
7	30	0.015	0.162	1.154
7	40	0.015	0.162	1.154
7	50	0.052	0.274	1.251
7	60	0.052	0.274	1.251
7	70	0.052	0.274	1.251
7	80	0.052	0.274	1.251
8	30	0.015	0.162	1.154
8	40	0.015	0.162	1.154
8	50	0.052	0.274	1.251
8	60	0.052	0.274	1.251
8	70	0.052	0.274	1.251
8	80	0.052	0.274	1.251
9	30	0.010	0.156	1.071
9	40	0.010	0.156	1.071
9	50	0.028	0.230	1.178
9	60	0.028	0.230	1.178
9	70	0.028	0.230	1.178
9	80	0.028	0.230	1.178
10	30	0.018	0.148	1.183
10	40	0.018	0.148	1.183
10	50	0.031	0.161	1.328
10	60	0.031	0.161	1.328
10	70	0.031	0.161	1.328
10	80	0.031	0.161	1.328
11	30	0.018	0.148	1.183
11	40	0.018	0.148	1.183
11	50	0.031	0.161	1.328
11	60	0.031	0.161	1.328
11	70	0.031	0.161	1.328
11	80	0.031	0.161	1.328
12	30	0.018	0.148	1.183
12	40	0.018	0.148	1.183
12	50	0.031	0.161	1.328
12	60	0.031	0.161	1.328
12	70	0.031	0.161	1.328
12	80	0.031	0.161	1.328
13	30	0.018	0.148	1.183
13	40	0.018	0.148	1.183
13	50	0.031	0.161	1.328
13	60	0.031	0.161	1.328
13	70	0.031	0.161	1.328
13	80	0.031	0.161	1.328
14	30	0.018	0.148	1.183
14	40	0.018	0.148	1.183
14	50	0.031	0.161	1.328
14	60	0.031	0.161	1.328
14	70	0.031	0.161	1.328
14	80	0.031	0.161	1.328
15	30	0.018	0.148	1.183
15	40	0.018	0.148	1.183
15	50	0.031	0.161	1.328
15	60	0.031	0.161	1.328
15	70	0.031	0.161	1.328
15	80	0.031	0.161	1.328

Link and Junction Combined Casualty Rates
Base Year
2009

Road Type	Speed Limit (mph)	Casualties per P.I.A. Fatal	Serious	Slight
1	50	0.020	0.123	1.455
1	60	0.020	0.123	1.455
1	70	0.020	0.123	1.455
2	50	0.020	0.123	1.455
2	60	0.020	0.123	1.455
2	70	0.020	0.123	1.455
3	50	0.020	0.123	1.455
3	60	0.020	0.123	1.455
3	70	0.020	0.123	1.455
4	30	0.009	0.132	1.176
4	40	0.009	0.132	1.176
4	50	0.038	0.238	1.300
4	60	0.038	0.238	1.300
4	70	0.038	0.238	1.300
4	80	0.038	0.238	1.300
5	30	0.009	0.132	1.176
5	40	0.009	0.132	1.176
5	50	0.038	0.238	1.300
5	60	0.038	0.238	1.300
5	70	0.038	0.238	1.300
5	80	0.038	0.238	1.300
6	30	0.009	0.132	1.176
6	40	0.009	0.132	1.176
6	50	0.038	0.238	1.300
6	60	0.038	0.238	1.300
6	70	0.038	0.238	1.300
6	80	0.038	0.238	1.300
7	30	0.009	0.132	1.176
7	40	0.009	0.132	1.176
7	50	0.038	0.238	1.300
7	60	0.038	0.238	1.300
7	70	0.038	0.238	1.300
7	80	0.038	0.238	1.300
8	30	0.009	0.132	1.176
8	40	0.009	0.132	1.176

8	50	0.038	0.238	1.300
8	60	0.038	0.238	1.300
8	70	0.038	0.238	1.300
8	80	0.038	0.238	1.300
9	30	0.007	0.134	1.132
9	40	0.007	0.134	1.132
9	50	0.026	0.222	1.218
9	60	0.026	0.222	1.218
9	70	0.026	0.222	1.218
9	80	0.026	0.222	1.218
10	30	0.009	0.112	1.238
10	40	0.009	0.112	1.238
10	50	0.025	0.151	1.297
10	60	0.025	0.151	1.297
10	70	0.025	0.151	1.297
10	80	0.025	0.151	1.297
11	30	0.009	0.112	1.238
11	40	0.009	0.112	1.238
11	50	0.025	0.151	1.297
11	60	0.025	0.151	1.297
11	70	0.025	0.151	1.297
11	80	0.025	0.151	1.297
12	30	0.009	0.112	1.238
12	40	0.009	0.112	1.238
12	50	0.025	0.151	1.297
12	60	0.025	0.151	1.297
12	70	0.025	0.151	1.297
12	80	0.025	0.151	1.297
13	30	0.009	0.112	1.238
13	40	0.009	0.112	1.238
13	50	0.025	0.151	1.297
13	60	0.025	0.151	1.297
13	70	0.025	0.151	1.297
13	80	0.025	0.151	1.297
14	30	0.009	0.112	1.238
14	40	0.009	0.112	1.238
14	50	0.025	0.151	1.297
14	60	0.025	0.151	1.297
14	70	0.025	0.151	1.297
14	80	0.025	0.151	1.297
15	30	0.009	0.112	1.238
15	40	0.009	0.112	1.238
15	50	0.025	0.151	1.297
15	60	0.025	0.151	1.297
15	70	0.025	0.151	1.297
15	80	0.025	0.151	1.297

Link Only Casualty Change Factors
Base Year
2009

Road Type	Speed Limit (mph)	Beta Factor Fatal	Serious	Slight
1	50	0.978	0.979	1.002
1	60	0.978	0.979	1.002
1	70	0.978	0.979	1.002
2	50	0.978	0.979	1.002
2	60	0.978	0.979	1.002
2	70	0.978	0.979	1.002
3	50	0.978	0.979	1.002
3	60	0.978	0.979	1.002
3	70	0.978	0.979	1.002
4	30	0.971	0.995	1.001
4	40	0.971	0.995	1.001
4	50	0.979	0.983	1.002
4	60	0.979	0.983	1.002
4	70	0.979	0.983	1.002
4	80	0.979	0.983	1.002
5	30	0.971	0.995	1.001
5	40	0.971	0.995	1.001
5	50	0.979	0.983	1.002
5	60	0.979	0.983	1.002
5	70	0.979	0.983	1.002
5	80	0.979	0.983	1.002
6	30	0.971	0.995	1.001
6	40	0.971	0.995	1.001
6	50	0.979	0.983	1.002
6	60	0.979	0.983	1.002
6	70	0.979	0.983	1.002
6	80	0.979	0.983	1.002
7	30	0.971	0.995	1.001
7	40	0.971	0.995	1.001
7	50	0.979	0.983	1.002
7	60	0.979	0.983	1.002
7	70	0.979	0.983	1.002
7	80	0.979	0.983	1.002
8	30	0.971	0.995	1.001
8	40	0.971	0.995	1.001
8	50	0.979	0.983	1.002
8	60	0.979	0.983	1.002
8	70	0.979	0.983	1.002
8	80	0.979	0.983	1.002
9	30	0.985	0.997	1.001
9	40	0.985	0.997	1.001
9	50	0.987	0.989	0.998
9	60	0.987	0.989	0.998
9	70	0.987	0.989	0.998
9	80	0.987	0.989	0.998
10	30	0.998	0.990	1.002
10	40	0.998	0.990	1.002
10	50	0.984	0.985	0.998
10	60	0.984	0.985	0.998
10	70	0.984	0.985	0.998
10	80	0.984	0.985	0.998
11	30	0.998	0.990	1.002
11	40	0.998	0.990	1.002
11	50	0.984	0.985	0.998
11	60	0.984	0.985	0.998
11	70	0.984	0.985	0.998
11	80	0.984	0.985	0.998
12	30	0.998	0.990	1.002
12	40	0.998	0.990	1.002
12	50	0.984	0.985	0.998
12	60	0.984	0.985	0.998

12	70	0.984	0.985	0.998
12	80	0.984	0.985	0.998
13	30	0.998	0.990	1.002
13	40	0.998	0.990	1.002
13	50	0.984	0.985	0.998
13	60	0.984	0.985	0.998
13	70	0.984	0.985	0.998
13	80	0.984	0.985	0.998
14	30	0.998	0.990	1.002
14	40	0.998	0.990	1.002
14	50	0.984	0.985	0.998
14	60	0.984	0.985	0.998
14	70	0.984	0.985	0.998
14	80	0.984	0.985	0.998
15	30	0.998	0.990	1.002
15	40	0.998	0.990	1.002
15	50	0.984	0.985	0.998
15	60	0.984	0.985	0.998
15	70	0.984	0.985	0.998
15	80	0.984	0.985	0.998

Link and Junction Combined Casualty Change Factors

Base Year

2009

Road Type	Speed Limit (mph)	Beta Factor Fatal	Serious	Slight
1	50	0.978	0.979	1.002
1	60	0.978	0.979	1.002
1	70	0.978	0.979	1.002
2	50	0.978	0.979	1.002
2	60	0.978	0.979	1.002
2	70	0.978	0.979	1.002
3	50	0.978	0.979	1.002
3	60	0.978	0.979	1.002
3	70	0.978	0.979	1.002
4	30	0.971	0.995	1.001
4	40	0.971	0.995	1.001
4	50	0.979	0.983	1.002
4	60	0.979	0.983	1.002
4	70	0.979	0.983	1.002
4	80	0.979	0.983	1.002
5	30	0.971	0.995	1.001
5	40	0.971	0.995	1.001
5	50	0.979	0.983	1.002
5	60	0.979	0.983	1.002
5	70	0.979	0.983	1.002
5	80	0.979	0.983	1.002
6	30	0.971	0.995	1.001
6	40	0.971	0.995	1.001
6	50	0.979	0.983	1.002
6	60	0.979	0.983	1.002
6	70	0.979	0.983	1.002
6	80	0.979	0.983	1.002
7	30	0.971	0.995	1.001
7	40	0.971	0.995	1.001
7	50	0.979	0.983	1.002
7	60	0.979	0.983	1.002
7	70	0.979	0.983	1.002
7	80	0.979	0.983	1.002
8	30	0.971	0.995	1.001
8	40	0.971	0.995	1.001
8	50	0.979	0.983	1.002
8	60	0.979	0.983	1.002
8	70	0.979	0.983	1.002
8	80	0.979	0.983	1.002
9	30	0.985	0.997	1.001
9	40	0.985	0.997	1.001
9	50	0.987	0.989	0.998
9	60	0.987	0.989	0.998
9	70	0.987	0.989	0.998
9	80	0.987	0.989	0.998
10	30	0.998	0.990	1.002
10	40	0.998	0.990	1.002
10	50	0.984	0.985	0.998
10	60	0.984	0.985	0.998
10	70	0.984	0.985	0.998
10	80	0.984	0.985	0.998
11	30	0.998	0.990	1.002
11	40	0.998	0.990	1.002
11	50	0.984	0.985	0.998
11	60	0.984	0.985	0.998
11	70	0.984	0.985	0.998
11	80	0.984	0.985	0.998
12	30	0.998	0.990	1.002
12	40	0.998	0.990	1.002
12	50	0.984	0.985	0.998
12	60	0.984	0.985	0.998
12	70	0.984	0.985	0.998
12	80	0.984	0.985	0.998
13	30	0.998	0.990	1.002
13	40	0.998	0.990	1.002
13	50	0.984	0.985	0.998
13	60	0.984	0.985	0.998
13	70	0.984	0.985	0.998
13	80	0.984	0.985	0.998
14	30	0.998	0.990	1.002
14	40	0.998	0.990	1.002
14	50	0.984	0.985	0.998
14	60	0.984	0.985	0.998
14	70	0.984	0.985	0.998
14	80	0.984	0.985	0.998
15	30	0.998	0.990	1.002
15	40	0.998	0.990	1.002
15	50	0.984	0.985	0.998
15	60	0.984	0.985	0.998
15	70	0.984	0.985	0.998
15	80	0.984	0.985	0.998

Link Only and Link and Junction Combined Casualty Beta Factor Changes over Time

Range of Years	Change to Beta Factor
1995-2019	1.000
2020-2144	0.000

Junction Only Accident Parameters
Base Year
1997

Junction Type	Speed Limit (mph)	Coefficient 'a'	Power 'b'	Arms	Highest Link (S/D)	Formula Type
1	50	0.195	0.460	3	S	C
1	60	0.195	0.460	3	S	C
1	70	0.195	0.460	3	S	C
1	80	0.195	0.460	3	S	C
2	20	0.195	0.460	3	S	C
2	30	0.195	0.460	3	S	C
2	40	0.195	0.460	3	S	C
3	50	0.195	0.460	3	D	C
3	60	0.195	0.460	3	D	C
3	70	0.195	0.460	3	D	C
3	80	0.195	0.460	3	D	C
4	20	0.195	0.460	3	D	C
4	30	0.195	0.460	3	D	C
4	40	0.195	0.460	3	D	C
5	50	0.361	0.440	4	S	I
5	60	0.361	0.440	4	S	I
5	70	0.361	0.440	4	S	I
5	80	0.361	0.440	4	S	I
6	20	0.361	0.440	4	S	I
6	30	0.361	0.440	4	S	I
6	40	0.361	0.440	4	S	I
7	50	0.240	0.710	4	D	C
7	60	0.240	0.710	4	D	C
7	70	0.240	0.710	4	D	C
7	80	0.240	0.710	4	D	C
8	20	0.240	0.710	4	D	C
8	30	0.240	0.710	4	D	C
8	40	0.240	0.710	4	D	C
9	50	0.361	0.440	5	S	I
9	60	0.361	0.440	5	S	I
9	70	0.361	0.440	5	S	I
9	80	0.361	0.440	5	S	I
10	20	0.361	0.440	5	S	I
10	30	0.361	0.440	5	S	I
10	40	0.361	0.440	5	S	I
11	50	0.361	0.440	5	D	I
11	60	0.361	0.440	5	D	I
11	70	0.361	0.440	5	D	I
11	80	0.361	0.440	5	D	I
12	20	0.361	0.440	5	D	I
12	30	0.361	0.440	5	D	I
12	40	0.361	0.440	5	D	I
13	50	0.195	0.460	3	S	C
13	60	0.195	0.460	3	S	C
13	70	0.195	0.460	3	S	C
13	80	0.195	0.460	3	S	C
14	20	0.195	0.460	3	S	C
14	30	0.195	0.460	3	S	C
14	40	0.195	0.460	3	S	C
15	50	0.195	0.460	3	D	C
15	60	0.195	0.460	3	D	C
15	70	0.195	0.460	3	D	C
15	80	0.195	0.460	3	D	C
16	20	0.195	0.460	3	D	C
16	30	0.195	0.460	3	D	C
16	40	0.195	0.460	3	D	C
17	50	0.361	0.440	4	S	I
17	60	0.361	0.440	4	S	I
17	70	0.361	0.440	4	S	I
17	80	0.361	0.440	4	S	I
18	20	0.361	0.440	4	S	I
18	30	0.361	0.440	4	S	I
18	40	0.361	0.440	4	S	I
19	50	0.240	0.710	4	D	C
19	60	0.240	0.710	4	D	C
19	70	0.240	0.710	4	D	C
19	80	0.240	0.710	4	D	C
20	20	0.240	0.710	4	D	C
20	30	0.240	0.710	4	D	C
20	40	0.240	0.710	4	D	C
21	50	0.361	0.440	5	S	I
21	60	0.361	0.440	5	S	I
21	70	0.361	0.440	5	S	I
21	80	0.361	0.440	5	S	I
22	20	0.361	0.440	5	S	I
22	30	0.361	0.440	5	S	I
22	40	0.361	0.440	5	S	I
23	50	0.361	0.440	5	D	I
23	60	0.361	0.440	5	D	I
23	70	0.361	0.440	5	D	I
23	80	0.361	0.440	5	D	I
24	20	0.361	0.440	5	D	I
24	30	0.361	0.440	5	D	I
24	40	0.361	0.440	5	D	I
25	50	0.195	0.460	3	S	C
25	60	0.195	0.460	3	S	C
25	70	0.195	0.460	3	S	C
25	80	0.195	0.460	3	S	C
26	20	0.195	0.460	3	S	C
26	30	0.195	0.460	3	S	C
26	40	0.195	0.460	3	S	C
27	50	0.195	0.460	3	D	C
27	60	0.195	0.460	3	D	C
27	70	0.195	0.460	3	D	C
27	80	0.195	0.460	3	D	C
28	20	0.195	0.460	3	D	C
28	30	0.195	0.460	3	D	C
28	40	0.195	0.460	3	D	C
29	50	0.361	0.440	4	S	I
29	60	0.361	0.440	4	S	I
29	70	0.361	0.440	4	S	I
29	80	0.361	0.440	4	S	I
30	20	0.361	0.440	4	S	I
30	30	0.361	0.440	4	S	I
30	40	0.361	0.440	4	S	I
31	50	0.240	0.710	4	D	C
31	60	0.240	0.710	4	D	C
31	70	0.240	0.710	4	D	C

31	80	0.240	0.710	4	D	C
32	20	0.240	0.710	4	D	C
32	30	0.240	0.710	4	D	C
32	40	0.240	0.710	4	D	C
33	50	0.361	0.440	5	S	I
33	60	0.361	0.440	5	S	I
33	70	0.361	0.440	5	S	I
33	80	0.361	0.440	5	S	I
34	20	0.361	0.440	5	S	I
34	30	0.361	0.440	5	S	I
34	40	0.361	0.440	5	S	I
35	50	0.361	0.440	5	D	I
35	60	0.361	0.440	5	D	I
35	70	0.361	0.440	5	D	I
35	80	0.361	0.440	5	D	I
36	20	0.361	0.440	5	D	I
36	30	0.361	0.440	5	D	I
36	40	0.361	0.440	5	D	I
37	50	0.223	0.610	3	S	I
37	60	0.223	0.610	3	S	I
37	70	0.223	0.610	3	S	I
37	80	0.223	0.610	3	S	I
38	20	0.223	0.610	3	S	I
38	30	0.223	0.610	3	S	I
38	40	0.223	0.610	3	S	I
39	50	0.494	0.420	3	D	C
39	60	0.494	0.420	3	D	C
39	70	0.494	0.420	3	D	C
39	80	0.494	0.420	3	D	C
40	20	0.291	0.510	3	D	C
40	30	0.291	0.510	3	D	C
40	40	0.291	0.510	3	D	C
41	50	1.378	0.200	4	S	C
41	60	1.378	0.200	4	S	C
41	70	1.378	0.200	4	S	C
41	80	1.378	0.200	4	S	C
42	20	1.378	0.200	4	S	C
42	30	1.378	0.200	4	S	C
42	40	1.378	0.200	4	S	C
43	50	0.494	0.420	4	D	C
43	60	0.494	0.420	4	D	C
43	70	0.494	0.420	4	D	C
43	80	0.494	0.420	4	D	C
44	20	0.291	0.510	4	D	C
44	30	0.291	0.510	4	D	C
44	40	0.291	0.510	4	D	C
45	50	0.254	0.620	5	S	I
45	60	0.254	0.620	5	S	I
45	70	0.254	0.620	5	S	I
45	80	0.254	0.620	5	S	I
46	20	0.254	0.620	5	S	I
46	30	0.254	0.620	5	S	I
46	40	0.254	0.620	5	S	I
47	50	0.238	0.850	5	D	I
47	60	0.238	0.850	5	D	I
47	70	0.238	0.850	5	D	I
47	80	0.238	0.850	5	D	I
48	20	0.160	0.970	5	D	I
48	30	0.160	0.970	5	D	I
48	40	0.160	0.970	5	D	I
49	50	0.033	0.760	3	S	C
49	60	0.033	0.760	3	S	C
49	70	0.033	0.760	3	S	C
49	80	0.033	0.760	3	S	C
50	20	0.033	0.760	3	S	C
50	30	0.033	0.760	3	S	C
50	40	0.033	0.760	3	S	C
51	50	0.033	0.760	3	D	C
51	60	0.033	0.760	3	D	C
51	70	0.033	0.760	3	D	C
51	80	0.033	0.760	3	D	C
52	20	0.033	0.760	3	D	C
52	30	0.033	0.760	3	D	C
52	40	0.033	0.760	3	D	C
53	50	0.024	0.890	4	S	C
53	60	0.024	0.890	4	S	C
53	70	0.024	0.890	4	S	C
53	80	0.024	0.890	4	S	C
54	20	0.048	0.740	4	S	C
54	30	0.048	0.740	4	S	C
54	40	0.048	0.740	4	S	C
55	50	0.063	0.690	4	D	C
55	60	0.063	0.690	4	D	C
55	70	0.063	0.690	4	D	C
55	80	0.063	0.690	4	D	C
56	20	0.022	0.850	4	D	C
56	30	0.022	0.850	4	D	C
56	40	0.022	0.850	4	D	C
57	50	0.007	1.770	5	S	I
57	60	0.007	1.770	5	S	I
57	70	0.007	1.770	5	S	I
57	80	0.007	1.770	5	S	I
58	20	0.014	1.530	5	S	I
58	30	0.014	1.530	5	S	I
58	40	0.014	1.530	5	S	I
59	50	0.019	1.420	5	D	I
59	60	0.019	1.420	5	D	I
59	70	0.019	1.420	5	D	I
59	80	0.019	1.420	5	D	I
60	20	0.006	1.730	5	D	I
60	30	0.006	1.730	5	D	I
60	40	0.006	1.730	5	D	I
61	50	0.033	0.760	3	S	C
61	60	0.033	0.760	3	S	C
61	70	0.033	0.760	3	S	C
61	80	0.033	0.760	3	S	C
62	20	0.033	0.760	3	S	C
62	30	0.033	0.760	3	S	C
62	40	0.033	0.760	3	S	C
63	50	0.033	0.760	3	D	C
63	60	0.033	0.760	3	D	C
63	70	0.033	0.760	3	D	C
63	80	0.033	0.760	3	D	C

64	20	0.033	0.760	3	D	C
64	30	0.033	0.760	3	D	C
64	40	0.033	0.760	3	D	C
65	50	0.101	0.660	4	S	C
65	60	0.101	0.660	4	S	C
65	70	0.101	0.660	4	S	C
65	80	0.101	0.660	4	S	C
66	20	0.263	0.540	4	S	C
66	30	0.263	0.540	4	S	C
66	40	0.263	0.540	4	S	C
67	50	0.101	0.660	4	D	C
67	60	0.101	0.660	4	D	C
67	70	0.101	0.660	4	D	C
67	80	0.101	0.660	4	D	C
68	20	0.263	0.540	4	D	C
68	30	0.263	0.540	4	D	C
68	40	0.263	0.540	4	D	C
69	50	0.044	1.280	5	S	I
69	60	0.044	1.280	5	S	I
69	70	0.044	1.280	5	S	I
69	80	0.044	1.280	5	S	I
70	20	0.095	1.140	5	S	I
70	30	0.095	1.140	5	S	I
70	40	0.095	1.140	5	S	I
71	50	0.044	1.280	5	D	I
71	60	0.044	1.280	5	D	I
71	70	0.044	1.280	5	D	I
71	80	0.044	1.280	5	D	I
72	20	0.095	1.140	5	D	I
72	30	0.095	1.140	5	D	I
72	40	0.095	1.140	5	D	I
73	50	0.012	1.040	3	S	C
73	60	0.012	1.040	3	S	C
73	70	0.012	1.040	3	S	C
73	80	0.012	1.040	3	S	C
74	20	0.012	1.040	3	S	C
74	30	0.012	1.040	3	S	C
74	40	0.012	1.040	3	S	C
75	50	0.012	1.040	3	D	C
75	60	0.012	1.040	3	D	C
75	70	0.012	1.040	3	D	C
75	80	0.012	1.040	3	D	C
76	20	0.012	1.040	3	D	C
76	30	0.012	1.040	3	D	C
76	40	0.012	1.040	3	D	C
77	50	0.070	0.640	4	S	C
77	60	0.070	0.640	4	S	C
77	70	0.070	0.640	4	S	C
77	80	0.070	0.640	4	S	C
78	20	0.070	0.640	4	S	C
78	30	0.070	0.640	4	S	C
78	40	0.070	0.640	4	S	C
79	50	0.070	0.640	4	D	C
79	60	0.070	0.640	4	D	C
79	70	0.070	0.640	4	D	C
79	80	0.070	0.640	4	D	C
80	20	0.070	0.640	4	D	C
80	30	0.070	0.640	4	D	C
80	40	0.070	0.640	4	D	C
81	50	0.013	1.470	5	S	I
81	60	0.013	1.470	5	S	I
81	70	0.013	1.470	5	S	I
81	80	0.013	1.470	5	S	I
82	20	0.013	1.470	5	S	I
82	30	0.013	1.470	5	S	I
82	40	0.013	1.470	5	S	I
83	50	0.013	1.470	5	D	I
83	60	0.013	1.470	5	D	I
83	70	0.013	1.470	5	D	I
83	80	0.013	1.470	5	D	I
84	20	0.013	1.470	5	D	I
84	30	0.013	1.470	5	D	I
84	40	0.013	1.470	5	D	I
85	50	0.033	0.760	3	S	C
85	60	0.033	0.760	3	S	C
85	70	0.033	0.760	3	S	C
85	80	0.033	0.760	3	S	C
86	20	0.033	0.760	3	S	C
86	30	0.033	0.760	3	S	C
86	40	0.033	0.760	3	S	C
87	50	0.033	0.760	3	D	C
87	60	0.033	0.760	3	D	C
87	70	0.033	0.760	3	D	C
87	80	0.033	0.760	3	D	C
88	20	0.033	0.760	3	D	C
88	30	0.033	0.760	3	D	C
88	40	0.033	0.760	3	D	C
89	50	0.024	0.890	4	S	C
89	60	0.024	0.890	4	S	C
89	70	0.024	0.890	4	S	C
89	80	0.024	0.890	4	S	C
90	20	0.048	0.740	4	S	C
90	30	0.048	0.740	4	S	C
90	40	0.048	0.740	4	S	C
91	50	0.063	0.690	4	D	C
91	60	0.063	0.690	4	D	C
91	70	0.063	0.690	4	D	C
91	80	0.063	0.690	4	D	C
92	20	0.022	0.850	4	D	C
92	30	0.022	0.850	4	D	C
92	40	0.022	0.850	4	D	C
93	50	0.007	1.770	5	S	I
93	60	0.007	1.770	5	S	I
93	70	0.007	1.770	5	S	I
93	80	0.007	1.770	5	S	I
94	20	0.014	1.530	5	S	I
94	30	0.014	1.530	5	S	I
94	40	0.014	1.530	5	S	I
95	50	0.019	1.420	5	D	I
95	60	0.019	1.420	5	D	I
95	70	0.019	1.420	5	D	I
95	80	0.019	1.420	5	D	I
96	20	0.006	1.730	5	D	I

96	30	0.006	1.730	5	D	I
96	40	0.006	1.730	5	D	I

Junction Only Accident Change Factors
Base Year
2000

Classification	Speed Limit (mph)	Beta Factor
Major	20	0.991
Major	30	0.991
Major	40	0.991
Major	50	0.984
Major	60	0.984
Major	70	0.984
Major	80	0.984
Minor	20	0.976
Minor	30	0.976
Minor	40	0.976
Minor	50	0.996
Minor	60	0.996
Minor	70	0.996
Minor	80	0.996

Junction Only Accident Beta Factor Changes over Time

Range of Years	Change to Beta Factor
1995-2010	1.000
2011-2020	0.500
2021-2030	0.250
2031-2144	0.000

Junction Only Casualty Rates
Base Year
2000

Road Type	Casualties per P.I.A.		
	Fatal	Serious	Slight
1	0.0265	0.2413	1.355
2	0.0075	0.1350	1.144
3	0.0265	0.2413	1.355
4	0.0075	0.1350	1.144
5	0.0295	0.2793	1.459
6	0.0062	0.1292	1.244
7	0.0295	0.2793	1.459
8	0.0062	0.1292	1.244
9	0.0295	0.2793	1.459
10	0.0062	0.1292	1.244
11	0.0295	0.2793	1.459
12	0.0062	0.1292	1.244
13	0.0265	0.2413	1.355
14	0.0075	0.1350	1.144
15	0.0265	0.2413	1.355
16	0.0075	0.1350	1.144
17	0.0295	0.2793	1.459
18	0.0062	0.1292	1.244
19	0.0295	0.2793	1.459
20	0.0062	0.1292	1.244
21	0.0295	0.2793	1.459
22	0.0062	0.1292	1.244
23	0.0295	0.2793	1.459
24	0.0062	0.1292	1.244
25	0.0265	0.2413	1.355
26	0.0075	0.1350	1.144
27	0.0265	0.2413	1.355
28	0.0075	0.1350	1.144
29	0.0295	0.2793	1.459
30	0.0062	0.1292	1.244
31	0.0295	0.2793	1.459
32	0.0062	0.1292	1.244
33	0.0295	0.2793	1.459
34	0.0062	0.1292	1.244
35	0.0295	0.2793	1.459
36	0.0062	0.1292	1.244
37	0.0092	0.1631	1.444
38	0.0064	0.1157	1.214
39	0.0092	0.1631	1.444
40	0.0064	0.1157	1.214
41	0.0095	0.1423	1.467
42	0.0061	0.1177	1.253
43	0.0095	0.1423	1.467
44	0.0061	0.1177	1.253
45	0.0095	0.1423	1.467
46	0.0061	0.1177	1.253
47	0.0095	0.1423	1.467
48	0.0061	0.1177	1.253
49	0.0060	0.1019	1.214
50	0.0027	0.0806	1.163
51	0.0060	0.1019	1.214
52	0.0027	0.0806	1.163
53	0.0060	0.1019	1.214
54	0.0027	0.0806	1.163
55	0.0060	0.1019	1.214
56	0.0027	0.0806	1.163
57	0.0060	0.1019	1.214
58	0.0027	0.0806	1.163
59	0.0060	0.1019	1.214
60	0.0027	0.0806	1.163
61	0.0060	0.1019	1.214
62	0.0027	0.0806	1.163
63	0.0060	0.1019	1.214
64	0.0027	0.0806	1.163
65	0.0060	0.1019	1.214
66	0.0027	0.0806	1.163
67	0.0060	0.1019	1.214
68	0.0027	0.0806	1.163
69	0.0060	0.1019	1.214
70	0.0027	0.0806	1.163
71	0.0060	0.1019	1.214
72	0.0027	0.0806	1.163
73	0.0060	0.1019	1.214
74	0.0028	0.0965	1.182
75	0.0060	0.1019	1.214
76	0.0028	0.0965	1.182
77	0.0060	0.1019	1.214
78	0.0028	0.0965	1.182

79	0.0060	0.1019	1.214
80	0.0028	0.0965	1.182
81	0.0060	0.1019	1.214
82	0.0028	0.0965	1.182
83	0.0060	0.1019	1.214
84	0.0028	0.0965	1.182
85	0.0039	0.0703	1.258
86	0.0031	0.0705	1.221
87	0.0039	0.0703	1.258
88	0.0031	0.0705	1.221
89	0.0039	0.0703	1.258
90	0.0031	0.0705	1.221
91	0.0039	0.0703	1.258
92	0.0031	0.0705	1.221
93	0.0039	0.0703	1.258
94	0.0031	0.0705	1.221
95	0.0039	0.0703	1.258
96	0.0031	0.0705	1.221

Junction Only Casualty Change Factors
Base Year
2000

Classification	Speed Limit (mph)	Beta Factor Fatal	Serious	Slight
Major	20	0.949	0.962	1.010
Major	30	0.949	0.962	1.010
Major	40	0.949	0.962	1.010
Major	50	0.961	0.959	1.011
Major	60	0.961	0.959	1.011
Major	70	0.961	0.959	1.011
Major	80	0.961	0.959	1.011
Minor	20	0.968	0.958	1.006
Minor	30	0.968	0.958	1.006
Minor	40	0.968	0.958	1.006
Minor	50	0.976	0.972	1.011
Minor	60	0.976	0.972	1.011
Minor	70	0.976	0.972	1.011
Minor	80	0.976	0.972	1.011

Junction Only Casualty Beta Factor Changes over Time

Range of Years	Change to Beta Factor
1995-2010	1.000
2011-2144	0.000

FFORDD GYSWLLT
DWYRAIN Y BAE
EASTERN BAY LINK

Llywodraeth Cymru
Welsh Government

dawnus ferrovial agroman CAPITA CASS HAYWARD PARSONS BRINCKERHOFF