## 1 Introduction

1.1 A number of sensitivity tests were undertaken and reported in the Transport Assessment to examine the robustness of the G2 Surface Access Strategy in 2030 to alternative scenarios. One of those sensitivity tests was to examine the impact of increasing fuel costs by 20% to reflect potentially higher motoring costs (see Sections 6.4 and 15.6 of the TA). The outcome of those higher fuel cost sensitivity tests indicated relatively small changes in both the base and G2 cases, showing that the G2 Surface Access Strategy is robust to a 20% increase in fuel costs.

1.2 Since the publication of the TA, WebTAG guidance on fuel related vehicle operating costs has been updated (in July 2008). This note describes analysis of the July 2008 updates to the WebTAG guidance, and determines whether the updated fuel related vehicle operating cost assumptions affect the impacts of the G2 development as reported in the Transport Assessment.

## 2 Additional Information since the TA

2.1 WebTAG guidance on fuel related vehicle operating costs was updated in July 2008, to incorporate the Department for Business, Enterprise and Regulatory Reform's (BERR) updated central fuel price forecasts. This replaces the October 2006 guidance used to develop the Transport Assessment forecasts. The changes between the October 2006 and July 2008 guidance are as follows:

- change in fuel resource costs; and
- change in fuel duty.

2.2 The actual changes in fuel related vehicle operating costs are a combination of three factors: fuel price; vehicle efficiency and fleet composition. Each of these components will be discussed below to understand how they combine.

## 3 Fuel Price

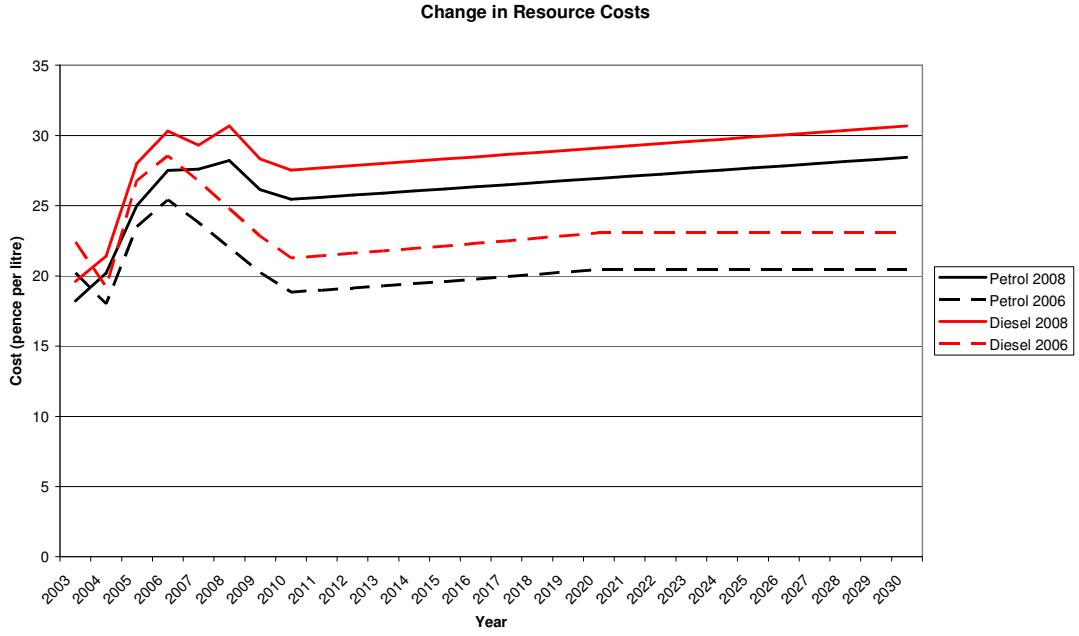
3.1 Fuel price is made up of the resource cost of fuel, fuel duty and VAT. WebTAG (July 2008) has updated the resource cost of fuel assumptions and its projected growth into the future, as well as fuel duty assumptions.

***Resource cost***

3.2 The resource cost of fuel makes up about 33% of the total market price of fuel. Figure 1 below shows the change in the resource cost over time for petrol and diesel in the WebTAG 2006 and WebTAG 2008 assumptions. It can be seen that the WebTAG 2008 assumptions forecast the same general trend in the resource cost of fuel as the 2006 assumptions. The main differences are between the years 2006 and 2011 where the 2008 assumptions forecast a much smaller decrease in the resource cost of fuel; and between 2020 and 2030 where the 2008 assumptions forecast a continuing increase in the resource cost of fuel.

3.3 In 2030, the 2008 assumptions about the resource cost of fuel are about 39% higher for petrol and 32% higher for diesel compared with the 2006 assumptions. Given that the resource cost only accounts for about one third of the market fuel price, all other factors being equal, this will contribute to a 13% increase in petrol price, and an 11% increase in diesel price between the 2006 and 2008 WebTAG assumptions.

**Figure 1: Change in Resource Cost of Fuel Assumptions**

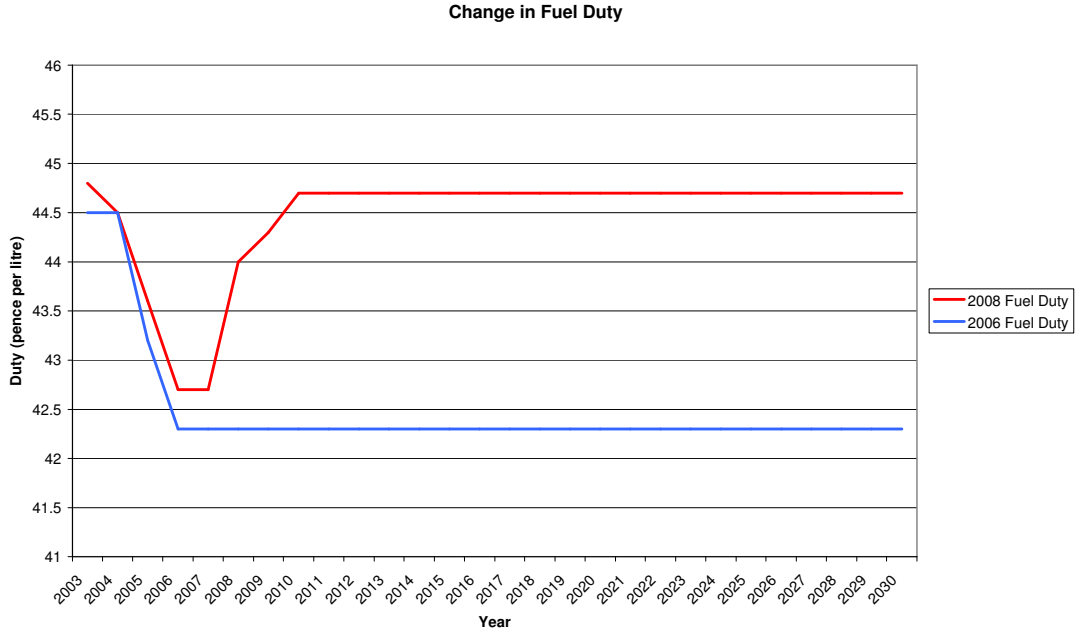



***Fuel duty***

3.4 Fuel duty accounts for the majority of the total market price of fuel; about 52%. Figure 2 shows that fuel duty is assumed to remain constant after 2010 in the WebTAG 2008 assumptions. This is similar to the WebTAG 2006 assumptions where fuel duty is assumed to remain constant after 2006, though at a slightly lower level.

3.5 By 2030, the 2008 assumptions on fuel duty are about 6% higher for petrol and diesel compared with the 2006 assumptions. Given that fuel duty accounts for just over half of the market fuel price, and all other factors being equal, this will contribute to a 3% increase in fuel prices between the 2006 and 2008 WebTAG assumptions.

**Figure 2: Change in Fuel Duty Assumptions**




***VAT***

3.6 VAT is assumed to stay at 17.5%; this has not changed between the WebTAG 2006 and 2008 assumptions.

3.7 Taking all three components of fuel price together, the 2008 WebTAG guidance in terms of fuel price is about 16% higher for petrol vehicles and about 15% higher for diesel vehicles in 2030 than the 2006 WebTAG guidance.

***Comparison of WebTAG guidance (2008) and fuel prices at the pump***

3.8 As fuel prices have been particularly unstable over the last year, it is useful to compare the updated WebTAG guidance (July 2008) fuel prices with month by month national average fuel prices at the pump*. Figure 3 shows this comparison in year 2002 prices.

3.9 It can be seen that the actual national average pump price for petrol was at or below WebTAG guidance until April 2008, at which point it increased to about 8% higher than WebTAG guidance in June and July 2008. Petrol pump prices have fallen in August and September 2008 (they were about 2% higher than WebTAG guidance), and have continued to do so in October 2008.

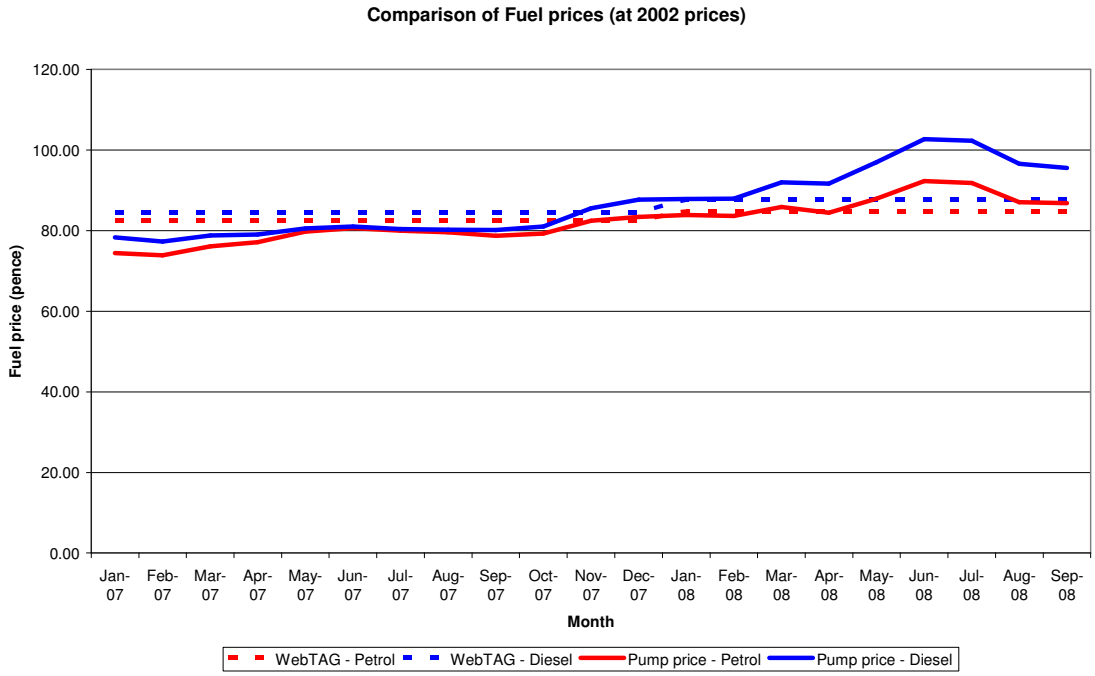
3.10 The actual national average pump price for diesel has acted in a similar way to petrol prices; the national average diesel pump price was at or below WebTAG guidance until February 2008, at which point it increased to about 17% higher than WebTAG guidance in June and July 2008. Diesel pump prices have not fallen back as quickly as petrol prices in August and September 2008 (they were about 10% higher than WebTAG guidance in September), though they are continuing to fall in October 2008.

3.11 The spike in national average fuel prices, and hence the differential between WebTAG guidance and actual fuel prices, during the summer of 2008 can be explained by changing oil prices. The WebTAG 2008 guidance is based on BERR's updated central fuel price forecasts, which predict that during 2008, oil prices will stay below $80 a

* National average fuel price data taken from www.theaa.com/motoring_advice/fuel/

barrel. However, oil prices reached an all-time high of $147 a barrel in July 2008. Oil prices are now (in October 2008) below $80 a barrel.

**Figure 3: Comparison of Actual and WebTAG Guidance Fuel Prices**




## 4 Vehicle Efficiency

4.1 Changes in vehicle efficiency result in changes in vehicle operating costs. The forecasts in WebTAG imply that there will be increases in vehicle efficiency until 2020, at which point it is assumed that engine efficiency levels will stay constant. This increase in engine efficiency is forecast to be fairly linear for diesel cars across the years, but is forecast to be slower until 2010 for petrol cars, at which point it increases until 2020. LGVs and HGVs are forecast to have vehicle efficiency improvements until 2010. Table 1 below shows the per annum percentage changes in vehicle efficiency assumptions, expressed in terms of reduction in fuel consumption (note that these assumptions have not been updated between WebTAG 2006 and 2008). .

**Table 1 : Forecast Vehicle Fuel Efficiency Improvements (reduction if fuel consumption (%pa)) in WebTAG 2006 and 2008**

| Range of Years | Petrol | Diesel | LGV | HGV |
|---|---|---|---|---|
| 2004 – 2005 | -0.76 | -1.21 | -1.78 | 0 |
| 2005 – 2010 | -0.85 | -1.22 | -1.49 | -1.23 |
| 2010 – 2015 | -1.22 | -1.2 | 0 | 0 |
| 2015 – 2020 | -1.48 | -1.24 | 0 | 0 |

4.2 The vehicle efficiency improvements largely off-set the increases in fuel prices over time. For example, using the 2008 WebTAG assumptions, by 2030 the forecast price of petrol will have increased by 16% from 2003. Vehicle efficiency is forecast to improve by 18% for petrol cars from 2003 to 2030. Therefore, the vehicle operating costs of a petrol car are forecast to decrease by 2% between 2003 and 2030. In the case of

HGVs, using the 2008 WebTAG assumptions, by 2030 the forecast price of diesel will have increased by about 17% from 2003. Vehicle efficiency is forecast to improve for HGVs by 6% from 2003 to 2030. Therefore, the vehicle operating cost of an HGV is forecast to increase by only 10% between 2003 and 2030.

## 5 Vehicle Fleet Composition

5.1 Changes in the car vehicle fleet composition also has an impact on vehicle operating costs, due to the differences in fuel price and vehicle efficiency changes for petrol and diesel vehicles outlined above. In the future, it is forecast that there will be an increase in the proportion of the car fleet that are diesel vehicles (43% from 2025 onwards), with a corresponding decrease in petrol vehicles. These car vehicle fleet composition assumptions have not been updated in the WebTAG 2008 assumptions.

## 6 Conclusions

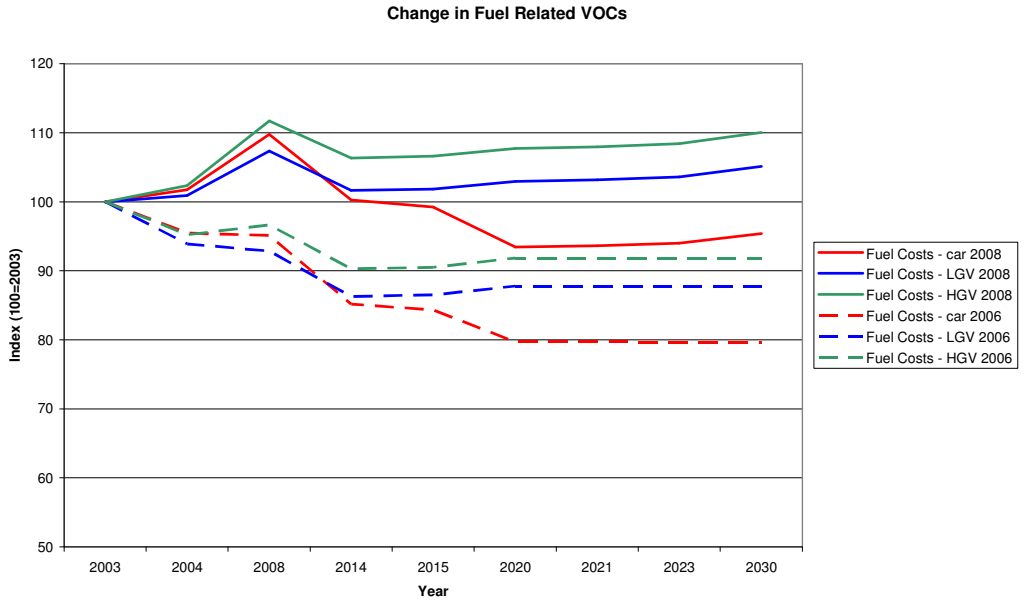
6.1 Table 2 and Figure 4 compare the differences between the WebTAG(October 2006) and WebTAG(July 2008) assumptions in terms of an economic indicator of overall fuel related vehicle operating costs. This takes into account all of the fuel cost, vehicle efficiency and vehicle fleet composition factors described above.

6.2 It can be seen that the July 2008 WebTAG assumptions result in about 18% higher fuel related vehicle operating costs than the October 2006 WebTAG assumptions for cars, LGVs and HGVs in the years 2015, 2020 and 2030. This 18% increase in fuel related vehicle operating costs is within the range already tested in the TA; a 20% higher fuel cost sensitivity test in 2030. Therefore, it is concluded that the equivalent of the July 2008 update to WebTAG guidance has already been tested in the TA.

**Table 2: Comparison of Economic Indices of Fuel Related Operating Costs**

| | Year | | | |
|---|---|---|---|---|
| **Items** | **2003** | **2015** | **2020** | **2030** |
| *WebTAG (Oct 06)* | | | | |
| Fuel Costs – Car | 100 | 84 | 80 | 80 |
| Fuel Costs – LGV | 100 | 87 | 88 | 88 |
| Fuel Costs – HGV | 100 | 91 | 92 | 92 |
| *WebTAG (July 08)* | | | | |
| Fuel Costs – Car | 100 | 99 | 93 | 95 |
| Fuel Costs – LGV | 100 | 102 | 103 | 105 |
| Fuel Costs – HGV | 100 | 107 | 108 | 110 |

**Figure 4: Change in Fuel related Operating Costs**




6.3 The results of the 20% higher fuel cost sensitivity tests in 2030 (reported in Sections 6.4 and 15.6 of the TA) are summarised below.

6.4 Table 3 (composed from Tables 94 and 199 of the TA), which provide statistics from EERHAM for the 2030 base and G2 cases, show the change in forecast vehicle-kms travelled over the East of England network, the M11 between Junction 4 and 14, and along the M25 from Junction 25 to 29 as a result of increasing the fuel cost by 20% in 2030.

6.5 The change in vehicle-kms over the East of England network is approximately a 1% reduction in the morning and evening peaks, and about a 1.5% reduction in vehicle-kms in the inter-peak.

6.6 The changes in vehicle-kms along the M11 and the M25 show marginally larger reductions than over the East of England network as a whole, with between 1.9% and 3.8% reduction on the M11 and between 1.4% and 2.0% reduction on the M25. These changes are equivalent to around one year's forecast growth.

6.7 The reduction in vehicle distance travelled may at first seem low given such a difference in fuel cost. However, with the increase in value of time to 2030, fuel costs relative to total travel costs reduce by about 50% (depending on time of trip and trip purpose) over the 2003 to 2030 period. Therefore, the effect of a 20% increase in fuel costs in 2030 would not be the same impact as it would be in the base year. Another contributory factor is the level of congestion forecast in 2030 resulting in some suppressed traffic, which would, in part, be released to replace an element of that traffic priced off the network due to higher fuel costs. This is reflected in the greater sensitivity during the inter-peak period.

6.8 On the M11 flows in the G2 case are forecast to reduce by a maximum of 150 vehicles with a 20% increase in fuel costs. On the A120 the change in the G2 case immediately east of the Airport is only some 100 vehicles whilst on the section west of Bishop's Stortford there is no notable change. Consequently, it can be argued that the Surface Access Strategy is robust to relatively significant changes in the forecasts of fuel prices (or costs).

**Table 3: Vehicle-kms (000) Sensitivity Test 20% Fuel Cost Increase – 2030 (Base Case and G2, M11 D4M)**

| | | 2030 Base Case | | | 2030 G2 + SAS | | |
|---|---|---|---|---|---|---|---|
| | | Base case | 20% Fuel Cost Increase | % Change | G2 + SAS | 20% Fuel Cost Increase | % Change |
| East of England Network | Morning Peak | 12,063 | 11,964 | -0.8 | 12,175 | 12,075 | -0.8 |
| | Inter-peak | 9,471 | 9,320 | -1.6 | 9,556 | 9,419 | -1.5 |
| | Evening Peak | 12,398 | 12,289 | -0.9 | 12,460 | 12,353 | -0.9 |
| M11 Jn4 – 14 | Morning Peak | 733 | 714 | -2.5 | 767 | 752 | -1.9 |
| | Inter-peak | 674 | 648 | -3.8 | 706 | 682 | -3.2 |
| | Evening Peak | 743 | 724 | -2.6 | 765 | 746 | -2.4 |
| M25 Jn25–29 | Morning Peak | 375 | 370 | -1.4 | 379 | 372 | -1.6 |
| | Inter-peak | 336 | 330 | -2.0 | 339 | 333 | -1.7 |
| | Evening Peak | 395 | 388 | -1.7 | 395 | 391 | -1.5 |