Title: M25 J7-10 Controlled Motorway **IA No:** DfT00140 **Lead department or agency:** Highways Agency **Other departments or agencies:** None	**Impact Assessment (IA)** **Date:** 17/02/2012 **Stage:** Final **Source of intervention:** Domestic **Type of measure:** Secondary legislation **Contact for enquiries**: Hugh Maxwell (HA), hugh.maxwell@highways.gsi.gov.uk

Summary: Intervention and Options

RPC: GREEN

Cost of Preferred (or more likely) Option				
Total Net Present Value	**Business Net Present Value**	**Net cost to business per year** (EANCB on 2009 prices)	**In scope of One-In, One-Out?**	**Measure qualifies as**
£71.6m	£15.7m	£-0.9m	Yes	Zero Net Cost

What is the problem under consideration? Why is government intervention necessary?

Traffic flows on the M25 between Junctions 7 and 10 are approaching capacity, resulting in congestion and an increased accident rate. The congestion reduces the efficiency of movement of people and goods to the detriment of business productivity and the economic and social activities of individuals. If these problems are to be alleviated, then some form of intervention is required. The intervention needs to be undertaken by government since the motorway is owned, operated and maintained by the government through the Highways Agency (HA) and Department for Transport (DfT). The intervention forms part of the DfT's programme of major improvements to the trunk road network.

What are the policy objectives and the intended effects?

The objective is to reduce the cost of congestion to business and individuals and thereby encourage economic activity and improve social well being. The intended effect is to reduce the variability in journey times caused by congestion. In particular, the intention is to reduce the likelihood of slow moving traffic and queues on the motorway, thereby making journey times less variable and more predictable or "reliable". A secondary effect is a reduction in accidents on the motorway.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

The existing situation or "Do Nothing" is a dual four lane motorway (D4M).

Option 1: The preferred intervention is a system called Controlled Motorway. Controlled Motorway involves the use of variable speed limits of 60, 50 and 40 mph to reduce the incidence of slow moving and queuing traffic. A Variable Mandatory Speed Limit (VMSL) is therefore required as part of the Controlled Motorway system. Secondary legislation in the form of regulations made under Section 17 of the Road Traffic Regulation Act 1984 would be required in order to implement VMSL. .

Will the policy be reviewed? It will be reviewed. **If applicable, set review date:** 06/2017

Does implementation go beyond minimum EU requirements?			N/A			
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	**Micro** Yes	**< 20** Yes	**Small** Yes	**Medium** Yes	**Large** Yes	
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** 0		**Non-traded:** -0.0001	

I have read the Impact Assessment and I am satisfied that (a) it represents a fair and reasonable view of the expected costs, benefits and impact of the policy, and (b) that the benefits justify the costs.

Signed by the responsible Minister: Mike Penning Date: 17/02/2012

Summary: Analysis & Evidence

Policy Option 1

Description: M25 Junctions 7-10 Controlled Motorway

FULL ECONOMIC ASSESSMENT

Price Base Year 2010	PV Base Year 2011	Time Period Years 30	Net Benefit (Present Value (PV)) (£m)		
			Low: N/A	**High:** N/A	**Best Estimate:** £71.6m

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A		N/A	**N/A**
High	N/A		N/A	**N/A**
Best Estimate	£30.7m		£0.5m	**£38.9m**

Description and scale of key monetised costs by 'main affected groups'

Breakdown of 'Total Cost' in 2010 prices, discounted to 2011 Present Value Year.

Govt. (Public Accounts): Installation: £29.4m

Govt. (Public Accounts): Operation and Maintenance: £5.1m

Govt. (Public Accounts): Renewal: £4.1m

Road Users (Economy): Reduction in Transport Economic Efficiency during Construction: £0.3m

Other key non-monetised costs by 'main affected groups'

None

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A		N/A	**N/A**
High	N/A		N/A	**N/A**
Best Estimate	£0m		£6.0m	**£110.5m**

Description and scale of key monetised benefits by 'main affected groups'

Breakdown of 'Total Benefit' in 2010 prices, discounted to 2011 Present Value Year.

Road Users (Economy): Improvement in Journey Time Reliability: £37.2m (including incident related delay)

Road Users (Society): Reduction in Accidents: £73.3m

Other key non-monetised benefits by 'main affected groups'

None.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

The vast majority of the estimated benefits are based upon post opening evaluation of the M25 Controlled Motorway scheme currently operating between Junctions 10 and 16. This includes the effect of Controlled Motorway on both journey time variability and accident rates.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: £0m	**Benefits:** £0.9m	**Net:** £-0.9m	Yes	Zero net cost

Evidence Base (for summary sheets)

1. Problem under Consideration

The M25 is the London orbital motorway completed in 1986. The road is of vital importance to economic and social activity in the UK, particularly in the south-east. It is estimated that one million vehicles per day now use the road.

The section of the M25 between Junctions 7 and 10 lies in the south-west quadrant and connects with the M23 at Junction 7 and the A3 at Junction 10. The road was built as a dual three lane carriageway, then widened to dual four lanes in 1999. The motorway has become increasingly congested since the widening was completed. Two-way daily traffic flows exceed 150,000 vehicles on all links between Junctions 7 and 10. These flow levels are at least 15% higher than the Congestion Reference Flow (CRF) of around 130,000 vehicles per day. The CRF represents the daily flow level at which a road is likely to be congested during peak hours.

2. Rationale for Intervention

The M25 motorway between Junctions 7 and 10 is very heavily trafficked in relation to the available traffic capacity. As such, the carriageways in both directions are prone to breakdowns in traffic flow, and the risk of flow breakdown will increase as traffic continues to grow in the future.

A breakdown in traffic flow is where traffic slows unexpectedly or stops on the motorway. Because these events cause delays and occur randomly, it can be difficult for road users to accurately predict the time required to negotiate the motorway and hence the time required for a trip. The result is that road users can either be late, or arrive unnecessarily early (thereby not using their time to best advantage). These effects are detrimental to business productivity and the economic and social activities of individuals.

If the predictability or “reliability” of journey times is to be improved, then some form of intervention is required. Furthermore, the intervention needs to be undertaken by government since the motorway is owned, operated and maintained by the government through the Highways Agency (HA) and Department for Transport (DfT). The intervention will be delivered by the HA.

3. Policy Objective

The Department for Transport’s Business Plan 2011-15 set out a vision for a transport system that is an engine for economic growth and one that is also greener and safer and improves quality of life in our communities. By improving the links that help to move goods and people around, the Department can help to build the balanced, dynamic and low-carbon economy that is essential for future prosperity.

The primary objective of the DfT’s programme of trunk road improvements is to reduce the cost of congestion to business and individuals and thereby encourage economic activity and improve social well being. The Controlled Motorway scheme will contribute to this by improving journey time reliability on the M25 between Junctions 7 and 10. In particular, the intention is to make journey times more predictable or “reliable”. A secondary objective is to reduce accidents on the motorway. Accidents have a cost to business and society in terms of personal injury and damage to property etc, but also in relation to the congestion they cause and the effect that this has on journey time reliability.

4. Description of Options

4.1 Do Nothing Baseline ie Existing

The Do-Nothing Baseline, or existing situation, is a dual four lane carriageway to motorway standard (D4M) with the MIDAS system (Motorway Incident Detection and Automatic Settings). MIDAS is a system comprising of inductive loops buried in the carriageway surface which detect the presence of stationary or slow moving traffic. This information is transmitted to computers which will then provide written warnings and advisory speed limits upstream of the congestion event. The warnings are provided via variable message signs which are mounted on cantilevered mast arms above the carriageway. The advisory speed limits are provided via variable matrix signs which are mounted on gantries that straddle the carriageway. The purpose of the system is to minimise the risk of collisions between fast moving upstream traffic and the slow moving or stationary traffic detected by the loops.

4.2 Option 1 (Preferred): Controlled Motorway

The existing MIDAS system described above is the simplest application of motorway control technology. It is solely a safety feature designed to protect queues by providing a warning of their presence to upstream traffic. The next level of control is a system called Controlled Motorway (CM). This system includes MIDAS to protect against queues, but also uses Variable Mandatory Speed Limits (VMSL) to assist in preventing the development of queues. This improves the predictability or “reliability” of journey times and also reduces accidents.

Although Controlled Motorway can be described as the “preferred” option for the M25 J7-10, there is not in fact any alternative option available for improving journey time reliability alone. This is because other measures which would improve reliability, such as widening of the carriageway or Managed Motorway, are primarily intended to increase the traffic capacity of the road. Given the current level of traffic flow and congestion, the policy objectives do not include increasing traffic capacity. Therefore these other measures are not appropriate options for addressing the identified objective of improving reliability.

The operation of the MIDAS component of CM is described above in paragraph 4.1. Like MIDAS, CM uses the same carriageway loops to detect vehicles and also sets speed limits on variable message signs. The difference is that CM also sets speed limits at higher speeds when information on traffic density from the loops indicates that ‘bunching’ may be occurring. It does not therefore wait until a queue develops. Instead, CM sets variable mandatory speed limits of 60mph and 50mph to reduce bunching and thereby reduce the likelihood of a queue occurring. However, if traffic still becomes slow moving or stationary then, like MIDAS, it will set a 40mph limit. The only difference in these circumstances is that the 40mph limit is a mandatory limit rather than the advisory limit used by MIDAS.

In more detail, the CM system uses VMSL to slow down upstream traffic. This reduces the likelihood of it ‘catching up’ with a pocket of slower moving traffic and causing traffic density to reach a level at which flow breakdown occurs. Whilst the reduction in speed limit increases journey times upstream of the high density region, these are cancelled out by journey time savings arising from a reduced incidence of flow breakdown and associated queuing. Indeed, the evaluation of existing CM operation elsewhere on the M25 has shown that the net effect on average journey times is neutral, but that the range or variation in journey times is reduced, thereby improving reliability. This is measured in the assessment process by predicting changes in the standard deviation of journey times of trips using the Controlled Motorway as part of their route.

It should be noted that CM is already installed on the adjacent section of the M25 between Junctions 10 and 16. There are also proposals for its introduction between Junctions 16 and 23, thereby providing continuous coverage from Junction 7 to Junction 23 should all the proposals be implemented.

A secondary benefit of CM is a reduction in accidents and the associated queues, thereby reducing queuing delays and further improving reliability. The reduction in accidents which has been observed in conjuction with CM is believed to be the result of imposing lower mandatory speed limits and requiring drivers to stay in lane.

In order for CM to be successful, it is essential that the variable speed limits which form part of the system are complied with. This requires the speed limits to be mandatory and secondary legislation is required to allow mandatory variable speed limits to operate.

It should be noted that the mandatory speed limit signs used as part of CM are matrix signs which can display either 40, 50, 60 or the national speed limit sign. Being a mandatory sign, they are required to have a red outer ring in order to comply with the traffic signs regulations. They are also required to be displayed over each lane. Advisory signs used for MIDAS are also matrix signs, but do not have the red ring, nor is it a requirement to display them over every lane (though HA standards require this for carriageways of four or more lanes, making gantries a necessity).

Enforcement of the VMSL is planned to be carried out using a combination of gantry-mounted speed enforcement cameras and traditional enforcement by the Police. The Highways Agency Digital Enforcement Camera System (HADECS) will be used to automatically monitor compliance with VMSL.

5. Details of Costs and Benefits

5.1 Do Nothing Baseline ie Existing

The “Do-Nothing” represents the baseline against which the proposed Controlled Motorway is assessed.

5.2 Option 1 (Preferred): Controlled Motorway

The impacts of the Controlled Motorway, including costs and monetised benefits, have been appraised using the Department for Transport’s (DfT) WebTAG (Web-based Transport Analysis Guidance) which is based upon HM Treasury Green Book principles. WebTAG identifies a wide range of possible impacts that transport schemes can have and prescribes detailed methodologies for quantifying these impacts and monetising them wherever possible. The range of impacts which must be considered come under the three main headings of Economy, Environment and Society which are then subdivided into sub-impacts such as journey times, reliability, noise, air quality, landscape, greenhouse gas emissions and accidents etc. Scheme promoters are required to assess all these impacts using the prescribed methodologies (links to the relevant sections of WebTAG are provided below) and to summarise the results of the analysis in an Appraisal Summary Table (AST). The AST forms a summary of the economic case for a scheme and is used by Highways Investment Board to inform all decisions relating to the selection of a preferred scheme option and the decision to ultimately invest in that option. The Controlled Motorway scheme has been subject to these processes.

Because WebTAG relates to transport schemes generally, there is a second tier of more detailed appraisal guidance which relates specifically to trunk road schemes. For Controlled Motorway schemes, this guidance is contained in the Highways Agency’s Interim Advice Note (IAN) ‘Appraisal of Technology Schemes’. In particular, the IAN provides supplementary appraisal guidance in relation to how the various impacts identified in WebTAG should be assessed for different types of traffic technology schemes, including CCTV, MIDAS, CM or combinations thereof.

With regard to the nature of the traffic effects of CM on the scheme section, it was mentioned in the description of the preferred option that CM does not change average journey times. This is because traffic flows are not changed by CM and the increases and decreases in vehicle speeds arising from the use of VMSL tend to cancel each other out. The traffic effects are therefore confined to the effect of VMSL on reducing the variability of average speeds and hence the variability of journey times. In addition, there is a secondary impact of a reduction in accidents which in turn reduces the delays and journey time variability associated with such incidents.

Because CM does not affect average journey times and hence traffic demand or routing, its introduction on an existing unmodified carriageway does not require the development of a traffic model to quantify these effects. Instead, it is sufficient to base the traffic flows used in the assessment upon the current traffic flows and to adjust these to take account of traffic growth between now and future years. In this case however, zero traffic growth has been assumed from the current year within the assessments. This is because the section of the M25 in question is already operating at capacity during the peak periods when the controlled motorway would be operating. To apply average daily growth forecasts to current year flows from the DfT’s National Transport Model would therefore overstate future traffic levels on the scheme section during peak periods. This would in turn result in an overestimate of the journey time reliability and accident benefits.

Because zero traffic growth has been assumed, there are no forecasts of future year traffic levels. Without alternative forecasts, it is not possible to produce Low and High estimates of the benefits. Instead, the current traffic flows have been used to derive only a Best Estimate of the benefits. This has been done by inputting the current flows to the appraisal methodology for the CM scheme as prescribed in the HA IAN Appraisal of Technology Schemes. The appraisal methodology for each of the various impacts is described further below in the sub sections detailing the costs and benefits of the proposed scheme.

DfT appraisals following WebTAG guidance result in a single "Best Estimate" of construction costs which includes a Risk Allowance (based upon a Quantified Risk Assessment) and Optimism Bias. The estimate and risk assessment is refined (and the level of Optimism Bias reduced) as the scheme progresses towards implementation and design work allows more accurate quantification of the costs. At the end of each scheme stage, the net present value and benefit cost ratio of the scheme are recalculated on the basis of the latest scheme costs before a decision is made by the Highways Investment Board to proceed to the next stage.The current Stage 3 (final) estimate is based upon a final Risk Allowance of 17% and Optimism Bias of 3%.

It should be noted that the standard appraisal period for transport schemes is 60 years. However, in the case of CM schemes, the useful life of the assets is 30 years and so 30 years is the assumed appraisal period.

WebTAG and the HA's IAN require that the costs and benefits of transport projects are valued at 2002 prices and discounted to 2002. However, for the purpose of this Impact Assessment these have been converted to 2010 prices (representing a recent year for which HM Treasury GDP deflator factors are available) and discounted to a present value year of 2011.

Monetised Costs

All Controlled Motorway schemes have the following types of financial costs. All costs are incurred by government

- TRANSITION: Cost of Installation;
- RECURRING: Cost of Enforcement of VMSL;
- RECURRING: Cost of Maintenance and Operation;
- RECURRING: Cost of Renewing electronic equipment after 15 years.

In terms of non-financial costs, Controlled Motorway schemes are appraised in terms of a range of potential impacts as set out in WebTAG and the HA's IAN Appraisal of Technology Schemes. As mentioned in 5.2, the impacts which must be considered come under the three main headings of Economy, Environment and Society which are each then subdivided into a number of sub-impacts. Those sub-impacts which are relevant to Controlled Motorway schemes are limited to journey times, journey time reliability and accidents.

The proposed scheme has only one impact which results in a non-financial cost. In particular, there is a cost to Transport Economic Efficiency (journey times and vehicle operating costs) during construction. This is described below.

Transition: Installation Costs

The overall installation cost for Controlled Motorway on the M25 J7 to J10 is **£30.4m** (2010 Constant Market Prices – Undiscounted). This includes Preparation, Supervision and Works costs. Preparation costs cover expenditure on the scheme design and preparation of tender documentation. Supervision costs cover the cost of the HA's design agent supervising the contract on behalf of the HA. Works expenditure is the cost of materials and labour for constructing the scheme.

The current capital cost of installing the Controlled Motorway scheme is derived through a standardised cost estimation process designed and undertaken by the Highways Agency. The designer supplies details of the scheme to the Highways Agency Commercial Team who apply standard rates and return the cost estimate to the designers. This estimation process is refined as the scheme preparation process proceeds. The current estimate was prepared at Works Commitment stage and is the final most accurate estimate produced.

Recurring: Enforcement Costs

The average annual enforcement cost is £15,000 or **£0.0m** over 30 years (2010 Constant Market Prices – Undiscounted). This cost relates to an administration charge paid by the HA to cover the costs incurred by the Home Office in processing fixed penalty notices or prosecuting offenders.

Recurring: Maintenance and Operating Costs

The average annual maintenance and operating costs are **£0.3m** over 30 years (2010 Constant Market Prices – Undiscounted). These include the costs associated with the maintenance of gantries, signs, loops and cabinets, plus specialist IT hardware and software.

Recurring: Renewal Costs

The average annual renewal cost of **£0.2m** over 30 years (2010 Constant Market Prices – Undiscounted), is based on replacing all electrical equipment at expiry of a 15 year operational life.

Transition: Transport Economic Efficiency Costs during Installation

The cost of disbenefits to transport economic efficiency during installation is **£0.3m** (2010 Constant Market Prices – Undiscounted). These costs are primarily the result of the time lost by road users due to traffic delays caused by the roadworks necessary to construct the scheme. The costs were calculated using WebTAG values of time for different types of vehicles and trip purposes, which are then multiplied by the number of additional hours of delay which are incurred during the roadworks (when a lower 50 mph speed limit will be in operation).

The WebTAG values of time per vehicle depend upon vehicle type, the trip purpose of the occupants, the number of occupants and the time of travel. The value of time also increases over time in line with GDP growth. However, the value of time for the average vehicle in 2011 at 2010 market prices is £14.80 per hour. More details can be found at Department for Transport - Transport Analysis Guidance - WebTAG - Documents - Guidance documents - expert

Non-Monetised Costs

The proposed scheme has no unmonetised costs.

Monetised Benefits

The proposed scheme has the following monetised benefits:

- RECURRING: Benefits to Journey Time Reliability through a reduction in day to day journey time variability;
- RECURRING: Benefits to Road Safety through a reduction in accidents;

Reducing accidents leads to the following additional benefits:

- RECURRING: A reduction in incident related journey time variability as a result of fewer accidents;
- RECURRING: A reduction in delay as a result of reducing the time spent queuing at an accident site.

Recurring: Journey Time Reliability Benefit

The average annual journey time reliability benefit is **£2.0m** over 30 years (2010 Constant Market Prices – Undiscounted). This benefit comprises of the following elements:

- Reductions in Journey Time Variability: £1.6m
- Reductions in Incident Related Delay: £0.4m

The reductions in journey time variability arise as a result of making journey times on the scheme section more uniform (day to day variability) and reducing accidents (incident related variability). In particular, congestion, flow breakdown and accidents generate significant variability in journey times which makes them less predictable or “reliable”. The reduction in incident related delay is the result of fewer accidents.

The information required to calculate the benefits is extracted from the traffic model in the form of the numbers of trips per day using the scheme section, the length of these trips and which routes they use. The information is extracted for various future modelled years for both the with and without scheme scenarios. It is then entered into a DfT sponsored computer program called INcident Cost benefit Analysis (INCA) which calculates the change in standard deviation of the average journey time for each route at different times of the day. The calculations are undertaken for both the with and without scheme scenarios and repeated for each year of the 30 year appraisal period. A monetary valuation is attached to the changes in standard deviation which are then multiplied by the number of vehicles on each route. A reduction in standard deviation (or “variability”) is a benefit and an increase is a disbenefit.

The WebTAG value for the standard deviation of journey time in minutes is equal to 80% of the WebTAG values of time. The value of time per vehicle depends upon vehicle type, trip purpose of the occupants, the number of occupants and the time of travel. The value of time also increases over time in line with GDP growth. However, the value of time for the average vehicle in 2011 at 2010 market prices is £14.80 per hour. More details can be found at Department for Transport - Transport Analysis Guidance - WebTAG - Documents - Guidance documents - expert

INCA is also used to calculate the reductions in incident related delay. INCA does this by using the traffic flow inputs and traffic capacity of the carriageways to calculate the total queuing delay generated by accidents in both the with and without scheme scenarios on the scheme section. The user supplies the with and without scheme accident rates. A reduction of 15% is used for Controlled Motorway schemes.

Recurring: Road Safety Benefit

The average annual road safety benefit is **£4.0m** over 30 years (2010 Constant Market Prices – Undiscounted). The benefit arises as a result of a reduction in the accident rate (accidents per million vehicle kilometres) on the scheme section following deployment of the Controlled Motorway system.

It is assumed that Controlled Motorway schemes reduce the existing accident rate by 15%. This figure is recommended in the draft IAN “Appraisal of Technology Schemes”, which is in turn based upon the before and after evaluation of the existing Controlled Motorway scheme between J15 to 16 of the M25. The reduction is believed to be the result of a number of factors (a) imposing mandatory rather than just advisory speed limits in the event of incidents and congestion (b) a requirement for drivers to stay in lane when the speed limits are in operation (c) the presence of speed enforcement cameras which discourages speeding even when reduced speed limits are not in operation.

The information required to calculate road safety benefits is extracted from the traffic model in the form of the physical characteristics of the scheme section (e.g. link lengths and carriageway standard) and the daily traffic flows on links and junctions within it. The traffic flow information is extracted for various future modelled years, but does not differ between the with and without scheme scenarios. In addition, the numbers of existing accidents at links and junctions within the scheme section are obtained from police records and accident rates are calculated for the with and without scheme scenarios (accidents per million vehicle kilometres travelled). All the data is then entered into a DfT sponsored computer program called COst Benefit Analysis (COBA) which calculates the number of accidents on the scheme section for the with and without scheme scenarios in each year of the 30 year appraisal period. COBA then attaches a monetary valuation to accidents (the DfT value of preventing an accident) and sums the total accident costs on the scheme section. The difference in accident costs between the with and without scheme scenarios is the accident benefit of the scheme.

WebTAG values of accidents vary by road and junction type and increase over time in line with forecast growth in GDP. However, the value of a motorway accident in 2011 with the average number and severity of casualties is £91,885 in 2010 market prices. More details of the values and how they are calculated can be found at Department for Transport - Transport Analysis Guidance - WebTAG - Documents - Guidance documents - expert

Non-Monetised Benefits

The proposed scheme has no unmonetised benefits.

6. Rationale and Evidence for Proportional Approach

The proposed scheme is at an advanced stage. A Level 5 Analysis has therefore been undertaken in which all the impacts have been quantified and, where possible, monetised. The analysis has been undertaken in accordance with the full requirements of WebTAG. In particular, all the potential impacts identified in WebTAG have been quantified and all of these have been assessed using the methodologies prescribed therein.

7. Risks and Assumptions

In accordance with WebTAG, a Quantified Risk Assessment has been undertaken in relation to risks affecting the costs of construction and a Risk Allowance is included in the scheme estimate. Optimism Bias has also been included.

In terms of the magnitude of the benefits, these are primarily dependent upon the results of the post opening project evaluation of the existing M25 Controlled Motorway scheme (Junctions 10-16). The degree of success achieved therefore depends upon the extent to which the results are repeated on this adjoining section of road.

An implicit assumption is that road based travel will continue to have the same level of importance for the full 30 years of the appraisal period. Whilst this seems likely, there is much less certainty as to whether Controlled Motorway will continue in its present form for this length of time. However, since it is likely that any changes will be the result of innovation from experience or developments in technology, these can be expected to reduce the operating/maintenance costs and/or increase the benefits.

8. Direct Costs and Benefits to Business (One-In, One-Out Approach)

The One-in, One-out (OIOO) rule means that no new primary or secondary UK legislation which imposes costs on business can be brought “In” without the identification of existing regulations with an equivalent value that can be removed, or taken “Out”. The deployment of VMSL requires secondary legislation and is therefore in scope for purposes of OIOO.

The proposed controlled motorway imposes no direct costs on business. Its net impact on business is to increase business productivity by improving journey time reliability and road safety for business users of the proposed scheme. It is therefore an “In” regulation with “Zero net cost” to business.

The computer programs INCA and COBA do not disaggregate the journey time reliability and accident benefits between business and non-business users. However, an estimate of the proportion of the benefits received by business users is 45%. This has been calculated by assuming a national average mix of vehicle types and trip purposes.

The total benefits to business users over 30 years are as follows (in 2009 market prices, discounted to 2010 at 3.5% for years 0-30 and 3% thereafter). It should be noted that only the journey time reliability benefits are considered to be direct benefits to business. The accident benefits are considered to be indirect (second round) benefits and are not included in either the Business NPV on Page 1 of the IA, or as benefits within the Business Assessment on Page 2.

- Journey Time Reliability £15.7m
- Accidents £31.0m

The equivalent annual values are as follows;

- Journey Time Reliability £0.9m
- Accidents £1.7m

9. Wider Impacts

Consideration has been given to the list of potential impacts set out on Pages 16-18 of the IA Toolkit. A number of these are relevant to transport schemes and are recognised as potential impacts of transport schemes in WebTAG. This includes the economic impact on consumers and businesses, safety, crime, greenhouse gases, air quality, landscape, water environment and noise. Where these impacts are non-neutral, they are discussed in Section 5 above.

The potential impact of the proposed scheme upon the justice system and equalities issues are described below. The remaining potential impacts identified in the IA Toolkit are not relevant to the proposed scheme and can be considered as neutral. This includes health, education, waste management and human rights.

9.1 Justice System

In Controlled Motorway schemes, the enforcement of VMSL will use the Highways Agency Digital Enforcement Camera System (HADECS). The digital photographs are transmitted electronically to a Police Fixed Penalty Office (FPO), where the offending drivers are identified and appropriate action taken. The complete process impacts on the Highways Agency, the Police, the Crown Prosecution Service (CPS) and HM Courts Service. However, experience has shown that a relatively small number of offenders will have to be processed through the Magistrates' Courts.

The resources required to support the enforcement process are the subject of an agreement between the four parties concerned (Managed Motorway National Enforcement Strategic Agreement, December 2009). The intention of the agreement is to ensure that enforcement of controlled motorway will have minimal impact on the normal procedures of the Police, CPS and Courts. To maximise efficiency, ensure consistency and minimise financial impact it is proposed to identify key Police Forces, CPS offices and Magistrates Courts in each of the seven Highways Agency Regions and to process enforcement cases centrally on a regional basis.

9.2 Equalities

The Controlled Motorway scheme would not introduce any additional regulatory restrictions on the use of the motorway over and above those pertaining to the existing use. As such there are no specific impacts in terms of the public sector duties towards disability, gender (including gender identity), race, pregnancy and maternity, religion or belief, age, sexual orientation and discrimination in relation to marriage and civil partnership. Furthermore, whilst the use of motorways is restricted to certain categories of driver, based on tested ability to operate a vehicle, there is no additional or lesser restriction for the use of a controlled motorway and, as such, the effect in terms of furthering equality aims has been assessed as neutral.

10. Recommendation, Implementation and Review

10.1 Proposed Solution

The proposed scheme involves the implementation of Controlled Motorway between Junctions 7-10 of the M25.

The purpose of a Controlled Motorway is to reduce the incidence of flow breakdown by using Variable Mandatory Speed Limits (VMSL) of 60, 50 and 40 mph to reduce the likelihood of faster moving upstream traffic "catching up" with a pocket of slower moving traffic and causing traffic density in this region to reach a level where flow breakdown occurs. By reducing the incidence of flow breakdown, there is less variation in journey times which means that journey times become more predictable or "reliable".

In order for Controlled Motorway to be successful, it is essential that the variable speed limits which form part of the system are complied with. This requires the speed limits to be mandatory and this in turn requires secondary legislation.

Enforcement of the VMSL is planned to be carried out using a combination of gantry-mounted speed enforcement cameras and traditional enforcement by the Police. The Highways Agency Digital Enforcement Camera System (HADECS) will be used to automatically monitor VMSL.

A summary of the costs and benefits of the proposed scheme is provided in Table 1 below, The costs and benefits cover a 30 year appraisal period from 2012. In accordance with the Treasury Green Book, the discount rate is 3.5% per year for 30 years from 2011 to 2031 inclusive.

Table 1 – Summary of 30 year Costs and Benefits (2010 Market Prices, Discounted to 2011)

Type of Cost (A)	**Cost (£m)**	**Type of Benefit (B)**	**Benefit (£m)**
Installation	29.4	Journey Time Reliability	29.5
Operation and Maintenance	5.1	Incident Related Delay	7.7
Renewal	4.1	Accidents	73.3
Delays during Installation (TEE)	0.3		
ALL (TOTAL A)	**£38.9**	**ALL (TOTAL B)**	**£110.5**

Net Present Value (B-A)	**£71.6m**
Benefit Cost Ratio (B/A)	**2.84**

10.2 Implementation Plan

The major element of the work involves the installation and removal of gantries in order to ensure adequate and regular spacing between signals displaying the variable mandatory speed limits. The work is due to be completed and operational before the start of the Olympic Games at the end of July 2012.

10.3 Post Implementation Review (Evaluation)

The Post Implementation Review Plan is attached as Annex 1.

Annex 1: Post Implementation Review (PIR) Plan

A PIR should be undertaken, usually three to five years after implementation of the policy, but exceptionally a longer period may be more appropriate. If the policy is subject to a sunset clause, the review should be carried out sufficiently early that any renewal or amendment to legislation can be enacted before the expiry date. A PIR should examine the extent to which the implemented regulations have achieved their objectives, assess their costs and benefits and identify whether they are having any unintended consequences. Please set out the PIR Plan as detailed below. If there is no plan to do a PIR please provide reasons below.

Basis of the review: [The basis of the review could be statutory (forming part of the legislation), i.e. a sunset clause or a duty to review , or there could be a political commitment to review (PIR)];

A review of the project performance will be undertaken in accordance with the Highways Agency's Post Opening Project Evaluation (POPE) process. This involves a formal evaluation of the project one year and five years after opening. More information on POPE can be found on the HA web site at: Highways Agency - Post Opening Project Evaluation (POPE)

Review objective: [Is it intended as a proportionate check that regulation is operating as expected to tackle the problem of concern?; or as a wider exploration of the policy approach taken?; or as a link from policy objective to outcome?]

The objectives of the POPE review are to evaluate whether the predicted outcomes were realised and to identify any lessons learned as part of a continual improvement process.

Review approach and rationale: [e.g. describe here the review approach (in-depth evaluation, scope review of monitoring data, scan of stakeholder views, etc.) and the rationale that made choosing such an approach]

The approach to the review is as prescribed in the Highways Agency's POPE Methodology Handbook. It comprises:

- Before and after comparison of traffic flows, speeds and accidents;
- Assessment against scheme objectives;
- Comparison of predicted costs and benefits vs. outturn costs and benefits;
- Evaluation of the NATA objectives, as detailed in the AST, using POPE+ toolkit

Baseline: [The current (baseline) position against which the change introduced by the legislation can be measured]

Existing situation without scheme.

Success criteria: [Criteria showing achievement of the policy objectives as set out in the final impact assessment; criteria for modifying or replacing the policy if it does not achieve its objectives]

Accuracy of predicted accident reductions, journey time reliability improvements and outturn costs.

Monitoring information arrangements: [Provide further details of the planned/existing arrangements in place that will allow a systematic collection systematic collection of monitoring information for future policy review]

As prescribed in the Highways Agency's POPE Methodology Handbook. Existing arrangements for the collection of data relating to traffic flows, speeds and accidents will enable the systematic collection of monitoring information.

Reasons for not planning a review: [If there is no plan to do a PIR please provide reasons here]

Not Applicable.