

# TMA Permit Scheme Cost Benefit Analysis

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**PROJECT NUMBER:** Slough CBA

## Introduction

CH2M Hill has been commissioned by Slough Borough Council to produce a business case for a proposed works on highway permit scheme. This is in an attempt to try to reduce the disruption imposed on the road network caused by works on the highway impacting on traffic. Included as part of this business case is the required economic appraisal, which is the main topic of this note.

The technical note will present an overview of the scheme, any associated costs, the approach taken towards producing the economic appraisal, including highlighting any survey data used, the results of the economic appraisal and a summary. The note is structured into sections, as follows:

- Introduction
- Scheme Definition
- Scheme Costs
- Methodology
- Economic Assumptions
- Economic Appraisal
- Sensitivity Testing
- Summary and Conclusions

## Scheme Definition

Included within this section are descriptions of the various scheme options and sub-options proposed. There have been three categories of options under consideration, which extended to:

- Permit Scheme Options;
- Permit Scheme Type Options; and
- Permit Scheme Coverage Options.

Contained within each of the three categories are a number of sub-options, as included in Table 1:

*Table 1: Scheme Options*

Permit Scheme Options	Permit Scheme Type Options	Permit Scheme Coverage Options
Option 1: Do-Nothing	Option 1: Single Permit Scheme	Option 1: 100% Scheme
Option 2: Introduce Permit Scheme and Fees	Option 2: Joint Permit Scheme	Option 2: Major Roads and Traffic Sensitive Network
	Option 3: Common Permit Scheme	Option 3: Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads

A description of the scheme sub-options is provided below, with the sub-option under each category selected as preferred by Slough Borough Council highlighted and taken forward for the economic appraisal.

## Permit Scheme Options

### **Option 1: Do-Nothing**

The utility companies continue to undertake works impacting on the road network as currently, without the introduction of a permit scheme and fees. Utility companies continue to notify works under the New Roads and Street Works Act (NRSWA) and the local highways authority contractor follows the same process on a voluntary basis. The local highway authority uses the powers in NRSWA to co-ordinate works impacting on the highway.

### **Option 2: Introduce Permit Scheme and Fees**

The highway authority introduces a permit scheme within which utility companies and the local highway authority contractor can only undertake works impacting on the road network subject to approval and, for utility companies, payment of the required permit fee. This is the preferred option of Slough Borough Council.

## Permit Scheme Type Options

### **Option 1: Single Permit Scheme**

Only the roads for which the highway authority is responsible will be subject to the permit scheme. It will be operated in isolation to similar schemes implemented by bordering/neighbouring authorities.

### **Option 2: Joint Permit Scheme**

A single authority administers the scheme on behalf of a collective of highway authorities.

### **Option 3: Common Permit Scheme**

The highway authorities in a given area/region operate under a permit scheme which has a common set of rules across the included authorities. Each authority would operate their scheme independently. This is the preferred option of Slough Borough Council.

## Permit Scheme Coverage Options

### **Option 1: 100% Scheme**

Permits are required for all of the streets within Slough Borough and a permit charge would be applied to all utility company permits submitted.

### **Option 2: Major Roads and Traffic Sensitive Network**

Permits are required for all of the streets within Slough Borough, although the highway authority would only apply charges to streets considered to be major roads and traffic sensitive.

### **Option 3: Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads**

Permits are required for all of the streets within Slough Borough, although the highway authority would only apply charges to streets considered to be major roads and traffic sensitive, plus major activities on minor roads. Effectively, 100% of Slough's road network would be covered but the scheme would target the activities of most disruption.

In the economic appraisal, only the Coverage Option 3: Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads scheme will be tested. Assessing all of the scheme variants is beyond the scope of the work, with a common permit scheme approach having already been determined as the most appropriate system and Coverage Option 3 being the scheme put forward for progression by Slough Borough Council.

Therefore, the two scenarios are as follows:

- Reference Case: Do-Nothing
- Scenario 1 (Option 3): Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads

The 'Do-Nothing' reference case is the scenario against which the other is compared against as a core scenario. A number of sensitivity tests will be carried out against the core scenario in the section titled "Sensitivity Testing".

## Scheme Costs

The costs of the core scenario are provided in this section. These include setup and operating costs. Estimated revenue streams from the permit scheme are also provided. It is assumed that there will be not be any additional costs in the reference case.

Table 2 presents the estimated setup costs in 2014 prices, which are assumed to be the same under each of the core scenario options. All risk and optimism bias adjustments are also presented against the relevant capital item. The costs are all incurred by Slough Borough Council.

*Table 2: Permit Scheme Setup Costs (2014 Prices)*

Item	Base Cost	Risk	Optimism Bias	Total
NRSWA System Upgrades and Licenses	£25,000	£5,000	£3,750	£33,750
SBC ICT Support with System Upgrades	£25,000	£5,000	£3,750	£33,750
Additional SBC Permanent Staff	£25,000	£0	£0	£25,000
Equipment (e.g. office desks, computers, handheld devices)	£15,000	£3,000	£2,250	£20,250
Permit Scheme Training & Development	£20,000	£4,000	£3,000	£27,000
<b>Total</b>	<b>£110,000</b>	<b>£17,000</b>	<b>£12,750</b>	<b>£139,750</b>

*Risk is applied at 20%; Optimism Bias at 15%.*

*Consultancy fees and business case development costs have been removed from the costs.*

The scheme requires additional annual operating expenditure. This is provided in Table 3 for both Slough Borough Council and the aggregate of all utilities companies affected, in 2014 prices.

*Table 3: Scenario 1 (Option 3) –Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads Annual Operating Expenditure (2014 Prices)*

Item	Utility Companies	Slough Borough Council	Total
Cost for Processing Invoices	£199,120	£0	£199,120
Permit Handling Costs	£199,120	£0	£199,120
Permit Scheme Cost	£0	£484,720	£484,720
Permit Fees	£190,520	£0	£190,520
<b>Total</b>	<b>£588,760</b>	<b>£484,720</b>	<b>£1,073,480</b>

Renewal costs have not been estimated for the scheme. It is likely that were these to be included they would cover items such as software upgrades and equipment renewal. However, the cost of these items should be minimal, particularly in comparison to operating costs and should not significantly impact on the outcome of the economic appraisal.

The revenue received by Slough Borough Council corresponds to the permit fees paid by the utility companies and amounts to £190,520 (2014 prices). Consistent with Table 3, the revenue for the reference case is expected to be zero.

All costs have been provided by Slough Borough Council. The treatment of costs in the economic appraisal is discussed in the following “*Methodology*” section, included within this note.

## Methodology

Provided in this section is the method used to produce the economic appraisal, excluding economic assumptions, which are presented in the “*Economic Assumptions*” section.

## Overview

The methodology employed for the economic appraisal has been designed to be consistent with the following guidance on assessing the impact of works on the highway:

- Guidance Document 1 - ‘Assessing the Extent of Street Works and Monitoring the Effectiveness of Section 74 in Reducing Disruption: Third Annual Report – April 2003 to March 2004, Volume 3 – Estimation of the Costs of Delay from Utilities’ Street Works’ (July 2004)
- Guidance Document 2 - ‘Traffic Management Act 2004: Permit Schemes Decision Making and Development (Draft Amended Extract Executive Summary) – Annex C’
- QUADRO Guidance
- WebTAG (August 2010)

Drawing upon the above guidance, the DfT’s delay calculation software – QUADRO - was used to assist in deriving the benefits of the various scenarios. This required survey data relevant to the borough of Wokingham for inclusion within the software package.

Costs were included for comparison against the benefits and the economic appraisal was conducted to be consistent with the above guidance documents. Considering this, this section of the note is divided into the following sections:

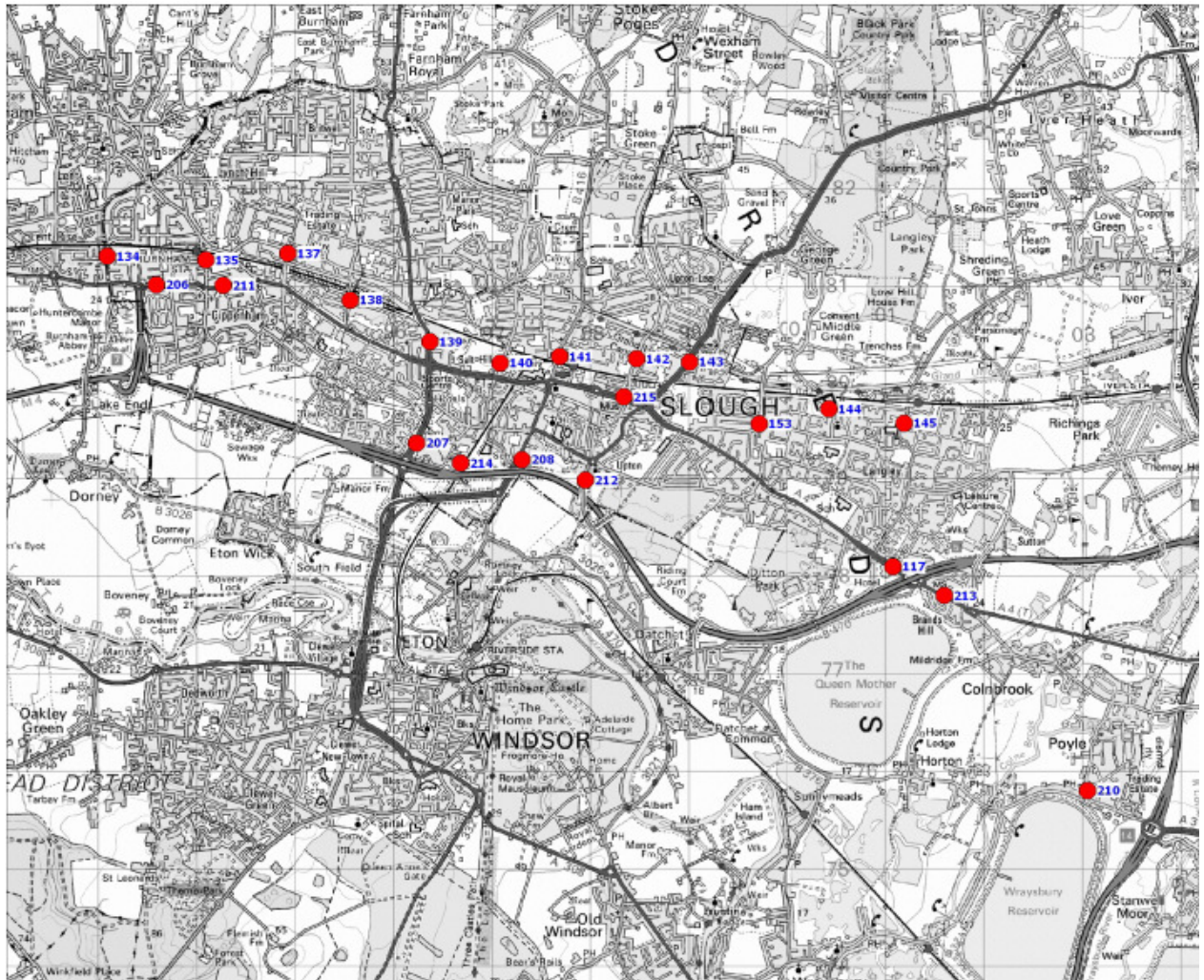
- Overview
- Survey Data
- QUADRO Modelling
- Treatment of Costs

## Survey Data

CH2M Hill requested traffic flow data from Slough Borough Council for inclusion in the QUADRO modelling. Automated Traffic Count (ATC) data has been provided with eight permanent ATC sites (2011 data) and 20 ATC sites from the Slough Speed Limit Review (September 2009). The traffic flow data has been factored to 2014 using the National Trip End Model (NTEM) forecasts.

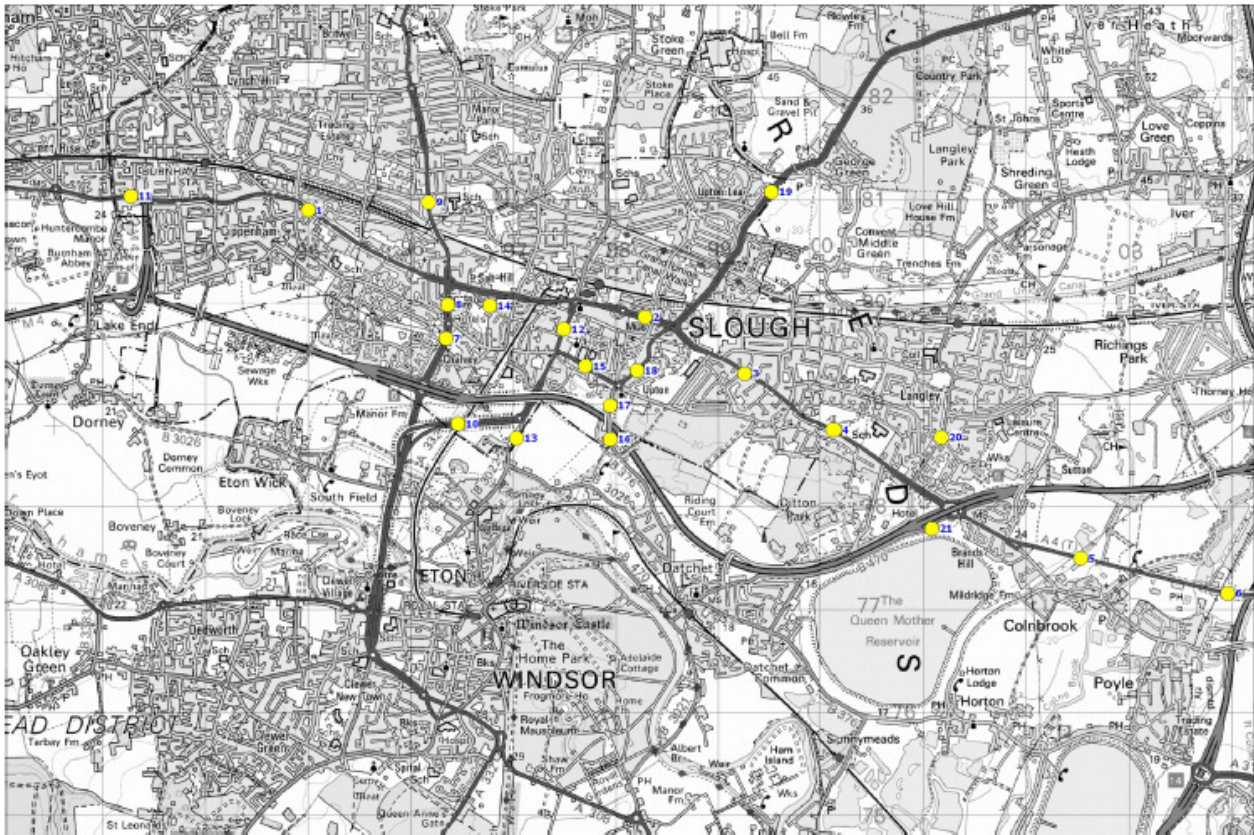
The location of this data is presented in Figures 1 and 2 and demonstrates that the survey data covers a large area of the borough in the areas most likely to be affected by works on the highway.

Figure 1: Slough Borough Council Survey Data (permanent ATCs)



Note – includes sites 137, 138, 141, 142, 144, 153, 207 212 only.

Figure 2: Slough Borough Council Survey Data (Slough Speed Limit Review ATCs)



Note – excluding site 15

A description of how the data was used is provided under the QUADRO Modelling section.

## QUADRO Modelling

The DfT's QUADRO software was used in order to determine the impact on traffic resulting from works on the highway. This involved producing a set of congestion costs per day for the works for different road standards according to reinstatement category, which is used as a proxy for traffic flow and capacity and is discussed in more detail in Guidance Document 1.

The rates were produced to reflect the average cost per works across the borough or in other words, the typical impact on the road network. This meant that the AADT data obtained and used in QUADRO covered A-roads, B-roads and also other roads, such as unclassified, across the Slough Borough.

In addition to the AADT data the profile of traffic in terms of the proportion of HGVs and hourly variations in flow was also included in QUADRO using the ACC/MCC data to obtain an average flow and tidal profile (direction to/from town centre).

The AADT data was then averaged for A-roads, B-roads and other roads to provide a typical flow on the three standards of roads in various towns. It should be noted that single and dual carriageways were assessed as separate categories given the different traffic flows and impact of any utility works. The road conditions associated with each standard of road in the different towns also needed to be determined, which was simplified using some general rules as provided in Table 4 for each road category and dependent upon whether each item of input was needed based on previous inputs, e.g. coding within a Small Town

requires different inputs to Urban roads. Given the anticipated location of most of the utility works, all roads were coded as impacting on roads in Small Towns or Urban areas.

Using simplified rules was felt to be appropriate for the study because the impact of the permit scheme is being captured at a borough level and not for an individual link. Hence, the impact of works is likely to converge around a mean which is attempted to be replicated in Table 4.

Table 4: Simplified QUADRO Input Rules

QUADRO Criteria	A-Road	B-Road	Other
Town Type	Urban or Small Town	Urban or Small Town	Urban or Small Town
Road Class	Urban Road, Non-Central, Single or Dual-Carriageway (Urban Only)	Urban Road, Non-Central, Single or Dual-Carriageway (Urban Only)	Urban Road, Non-Central, Single or Dual-Carriageway (Urban Only)
Accident Type	Older Single 2-lane A Road	Other Single 2-lane Road	Other Single 2-lane Road
Road Length	Average of AADT Flow Sites	Average of AADT Flow Sites	Average of AADT Flow Sites
Carriageway Width	10m (Urban); 7.3m (Small Town)	7.3m	7.3m
Hilliness	Average of AADT Flow Sites	Average of AADT Flow Sites	Average of AADT Flow Sites
Development	70% (Urban); 60% (Small Town)	70% (Urban); 60% (Small Town)	70% (Urban); 60% (Small Town)
Frequency of Major Intersections	0 (Urban Only)	0 (Urban Only)	0 (Urban Only)
Observed Speed	0 (Urban Only)	0 (Urban Only)	0 (Urban Only)
Observed Flow	0 (Urban Only)	0 (Urban Only)	0 (Urban Only)
% 30mph	Average of AADT Flow Sites (Small Town Only)	Average of AADT Flow Sites (Small Town Only)	Average of AADT Flow Sites (Small Town Only)
Maximum Speed	Average of AADT Flow Sites (Small Town Only)	Average of AADT Flow Sites (Small Town Only)	Average of AADT Flow Sites (Small Town Only)

Consistent with Guidance Document 1, four different lengths of highway works were used to provide a range of rates for each road category across Slough Borough, which were:

- 10M Shuttle Working

- 20M Shuttle Working
- 50M Shuttle Working
- 100M Shuttle Working

The works were coded in QUADRO as being within the centre of the affected road length and the length of the site was again taken from Guidance Document 1.

Instead of assuming a diversion route, the maximum delay allowed for in QUADRO was capped at 20 minutes, consistent with Guidance Document 1.

After obtaining a set of rates across the road categories by town and works length, the values were aggregated into rates by reinstatement category using the reinstatement category AADT flow categories in Table 5:

*Table 5: Reinstatement Category AADT Flows*

Reinstatement Category	Rural AADT Flow	Urban AADT Flow
0	32,000	40,000
1	16,000	24,000
2	12,000	16,000
3	8,000	10,000
4	4,000	6,000

The daily rates derived against each reinstatement category are provided in Table 6:

*Table 6: Daily Reinstatement Category Rates*

Reinstatement Category	10M Shuttle Working	20M Shuttle Working	50M Shuttle Working	100M Shuttle Working
0	£335	£353	£376	£480
1	£9,919	£12,751	£21,298	£39,568
2	£870	£1,199	£2,410	£4,555
3	£284	£333	£476	£707
4	£242	£283	£406	£603

Comparing the rates in Table 6 with those derived in the guidance detailed above and reproduced in Table 7, it is clear that the rates for reinstatement categories 2, 3 and 4 are generally within the ranges presented in Guidance Document 1. The rates for reinstatement category 0 are significantly lower given that the traffic survey data used and road classification is predominantly dual carriageway and so the impact of works is reduced. The rates for reinstatement category 1 are significantly higher given that the traffic survey data used and road classification is single carriageway with high traffic flows and so any works will have an impact on delays. Given that the majority of works undertaken fall within the reinstatement categories 2, 3 and 4 (as shown in Table 7) it is deemed that the appraisal provides a robust assessment.

*Table 7: Guidance Document 1 – Average Daily Reinstatement Category Rates*

Reinstatement Category	10M Shuttle Working	20M Shuttle Working	50M Shuttle Working	100M Shuttle Working
0	£13,750	-	£14,000	£14,150
1	£8,425	-	£10,525	£12,625
2	£2,530	-	£3,625	£4,800
3	£583	-	£753	£955
4	£268	-	£348	£445



Slough Borough Council provided data on the number of utility and highway works which occur in an average year, which was aggregated into an amount per reinstatement category as displayed in Table 8:

*Table 8: Annual Works Undertaken*

Reinstatement Category	Annual Utility Works Undertaken	Annual Highway Works Undertaken
0	113	44
1	862	302
2	647	181
3	1281	331
4	7053	1275

Note – not including remedial / cancelled works

The amount of works undertaken by size of works site by utility companies was assumed using the proportions taken from Guidance Document 1. The proportions are presented in Table 9:

*Table 9: Proportion of Utility Works*

Reinstatement Category	Proportion of Notices			
	10M Shuttle Working	20M Shuttle Working	50M Shuttle Working	100M Shuttle Working
0	0.43	0.14	0.14	0.29
1	0.78	0.08	0.05	0.10
2	0.84	0.05	0.04	0.06
3	0.88	0.05	0.02	0.05
4	0.87	0.05	0.03	0.05

Combining the numbers of works with the proportions of works undertaken and the rates provided in QUADRO, an estimate of congestion costs per annum in Slough was produced. This cost amounted to £48m in 2014 prices.

Estimations of the amount of works reduced through the implementation of the permits system were then calculated through the use of evidence gathered as part of the first year review of the Kent Permit Scheme introduced in 2010. The amount of works reductions is presented in Table 10 and has been used in the economic appraisal for this study.

Highway works rates have not been specifically modelled but are assumed as part of an uplift to the utility works reductions.

*Table 10: Annual Works Reductions*

Scenario	Utility Works Reduction	Highway Works Reduction
Scenario 1: Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads	4.41%	0.01%

Applying the reductions in works undertaken to the cost to the traffic network presented a benefit per annum against which the costs of the scheme could be compared against. The benefit per annum is £3.5m in 2014 prices.

## Treatment of Costs

Costs and revenues have been included in the appraisal as provided in the “*Scheme Costs*” section above. The only costs included are those impacting on the transport system. Hence, costs to utility companies are not included but the revenue from the utility companies to Slough Borough Council from permit fees has been, as has all expenditure by the council.

## Economic Assumptions

The vast majority of economic assumptions included within the appraisal relate to the modelling undertaken using QUADRO. These values are far too extensive to be reproduced in this technical note but are available to view within the QUADRO Guidance Manual accompanying the software. Instead this section will focus on further treatment to estimations from QUADRO, the treatment of costs and also general economic assumptions using the following sub-sections:

- General Economic Assumptions
- QUADRO Estimations
- Treatment of Costs

Due to the functionality in QUADRO to provide values consistent with WebTAG guidance, the assumptions list is fairly short within this technical note.

## General Economic Assumptions

The following summarises the general assumptions made in the appraisal:

- The scheme is anticipated to open in 2014 (Slough Borough Council).
- The appraisal year is 2014 (CH2M Hill).
- The appraisal period is 25 years (Guidance Documents 1 and 2).
- All costs and benefits have been discounted to 2010 present values, using a discount rate of 3.5% (WebTAG).
- A market price adjustment has been applied to capital costs and revenues at 1.209 (WebTAG; Guidance Documents 1 and 2).

## QUADRO Estimations

The latest version of QUADRO is not currently updated to reflect August 2012 revisions to WebTAG. Therefore, all QUADRO estimates have been adjusted from 2002 discounted present values to 2010 discounted present values using the following adjustments:

- RPI –  $223.6 (2010) / 176.2 (2002)$  (WebTAG; Office for National Statistics; QUADRO Guidance; CH2M Hill)
- Discounting –  $1.035^8$  (eight years discounting removed) (WebTAG; QUADRO Guidance; CH2M Hill)

Revenue has been assumed to grow at 1% above background inflation annually (CH2M Hill)

Each street work is assumed to last for an average of 3.2 days and therefore a reduction in a single street work undertaken represents approximately just over three days less impact on the network. This is taken from evidence provided from a recent study in neighbouring Bracknell Forest Council, which allowed for an average duration of works on the highway to be calculated using works durations and numbers of works data. (CH2M Hill; Bracknell Forest Council).

Reliability has been included in the appraisal as a 20% uplift on time savings benefits (Guidance Documents 1 and 2)

## Treatment of Costs

The following assumptions have been made with regards to treatment of costs:

- Costs have been converted from 2013 (2014 prices not available) prices to 2010 prices using RPI of 250.1 (2013) and 223.6 (2010) (Office for National Statistics; WebTAG)
- Costs have been assumed to grow at 1% above background inflation annually (CH2M Hill)
- Risk and Optimism Bias has been applied to capital expenditure at 20% and 15%, respectively (Guidance Documents 1 and 2).
- Revenue received by local authorities is assumed to be reinvested into the borough and is therefore offset in the economic appraisal as a capital item without any risk or optimism bias (CH2M Hill).

## Economic Appraisal

Included within this section of the report are the results of the economic appraisal for the core scenario, including the required Economic Efficiency of the Transport System (TEE); Public Accounts (PA); and Analysis of Monetised Costs and Benefits (AMCB) tables.

Table 11 presents the headline summary of the results for each scenario in 2010 discounted present values:

*Table 11: Headline Appraisal Results (£m's, 2010 discounted present values)*

Scenario	PVB	PVC	NPV	BCR
Scenario 1: Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads	£72.4	£6.9	£65.4	10.4

Tables 12 to 14 presents the economic appraisal tables for Scenario 1: Major Schemes and Traffic Sensitive Network plus Major Activities on Minor Roads in 2010 discounted present values:

Table 12: Scenario 1: Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads TEE  
Table (£m's, 2010 discounted present values)

Economic Efficiency of the Transport System (TEE)						
<b>Consumers - Commuting</b>						
<b>User Benefits</b>	<b>All Modes</b>	<b>Road</b>	<b>Bus &amp; Coach</b>	<b>Rail</b>	<b>Other</b>	
	<b>Total</b>	<b>Private Cars &amp; LGVs</b>	<b>Passengers</b>	<b>Passengers</b>		
Travel Time	£8.6	£6.0	£2.6	£0.0	£0.0	
Vehicle Operating Costs	£0.3	£0.3	£0.0	£0.0	£0.0	
User Charges	£0.0	£0.0	£0.0	£0.0	£0.0	
During Construction & Maintenance	£0.0	£0.0	£0.0	£0.0	£0.0	
<b>Net Consumer Benefits</b>	<b>£8.9</b> (1a)	<b>£6.3</b>	<b>£2.6</b>	<b>£0.0</b>	<b>£0.0</b>	
<b>Consumers - Other</b>						
<b>User Benefits</b>	<b>All Modes</b>	<b>Road</b>	<b>Bus &amp; Coach</b>	<b>Rail</b>	<b>Other</b>	
	<b>Total</b>	<b>Private Cars &amp; LGVs</b>	<b>Passengers</b>	<b>Passengers</b>		
Travel Time	£30.1	£21.6	£8.5	£0.0	£0.0	
Vehicle Operating Costs	£1.0	£1.0	£0.0	£0.0	£0.0	
User Charges	£0.0	£0.0	£0.0	£0.0	£0.0	
During Construction & Maintenance	£0.0	£0.0	£0.0	£0.0	£0.0	
<b>Net Consumer Benefits</b>	<b>£31.1</b> (1b)	<b>£22.6</b>	<b>£8.5</b>	<b>£0.0</b>	<b>£0.0</b>	
<b>Business</b>						
<b>User Benefits</b>	<b>All Modes</b>	<b>Road</b>	<b>Bus &amp; Coach</b>	<b>Rail</b>	<b>Other</b>	
	<b>Total</b>	<b>Goods</b>	<b>Business Cars</b>	<b>Passengers</b>	<b>Passengers</b>	<b>Freight</b>
		<b>Vehicles</b>	<b>&amp; LGVs</b>	<b>Passengers</b>	<b>Passengers</b>	<b>Freight</b>
Travel Time	£27.7	£10.2	£14.0	£3.6	£0.0	£0.0
Vehicle Operating Costs	£1.8	£1.6	£0.2	£0.0	£0.0	£0.0
User Charges	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0
During Construction & Maintenance	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0
<b>Subtotal</b>	<b>£29.6</b> (2)	<b>£11.8</b>	<b>£14.1</b>	<b>£3.6</b>	<b>£0.0</b>	<b>£0.0</b>
<b>Private Sector Provider Impacts</b>						
Revenue	£0.0			Passengers	Passengers	Freight
Operating Costs	£1.1			£0.0	£0.0	£0.0
Investment Costs	£0.0			£1.1	£0.0	£0.0
Grant/Subsidy	£0.0			£0.0	£0.0	£0.0
<b>Subtotal</b>	<b>£1.1</b> (3)			<b>£1.1</b>	<b>£0.0</b>	<b>£0.0</b>
<b>Other Business Impacts</b>						
Developer Contributions	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0
<b>Net Business Impacts</b>	<b>£0.0</b> (4)	<b>£0.0</b>	<b>£0.0</b>	<b>£0.0</b>	<b>£0.0</b>	<b>£0.0</b>
<b>Total</b>						
<b>Present Value of Transport Economic Efficiency Benefits (TEE)</b>	<b>£70.8</b> (6) = (1a) + (1b) + (5)					

Note: Benefits all appear as positive numbers, while costs appear as negative numbers  
All entries are discounted present values, in 2010 prices and values

Table 13: Scenario 1: Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads: PA Table (£m's, 2010 discounted present values)

Public Accounts	All Modes	Road	Bus & Coach	Rail	Other
<b>Local Government Funding</b>	<b>Total</b>	<b>Infrastructure</b>			
Revenue	-£3.60	-£3.6			£0.0
Operating Costs	£6.80	£6.8			£0.0
Investment Costs	£3.74	£3.7	£0.0	£0.0	£0.0
Developer and Other Contributions	£0.00	£0.0	£0.0	£0.0	£0.0
Grant/Subsidy Payments	£0.00	£0.0	£0.0	£0.0	£0.0
<b>Net Impact</b>	<b>£6.94 (7)</b>	<b>£6.9</b>	<b>£0.0</b>	<b>£0.0</b>	<b>£0.0</b>
<b>Central Government Funding: Transport</b>					
Revenue	£0.00	£0.0			£0.0
Operating Costs	£0.00	£0.0			£0.0
Investment Costs	£0.00	£0.0	£0.0	£0.0	£0.0
Developer and Other Contributions	£0.00	£0.0	£0.0	£0.0	£0.0
Grant/Subsidy Payments	£0.00	£0.0	£0.0	£0.0	£0.0
<b>Net Impact</b>	<b>£0.00 (8)</b>	<b>£0.0</b>	<b>£0.0</b>	<b>£0.0</b>	<b>£0.0</b>
<b>Central Government Funding: Non-Transport</b>					
Indirect Tax Revenues	-£0.58 (9)	-£0.6	£0.0	£0.0	£0.0
<b>Totals</b>					
<b>Broad Transport Budget</b>	<b>£6.94 (10) = (7) + (8)</b>				
<b>Wider Public Finances</b>	<b>-£0.58 (11) = (9)</b>				

Note: Costs appear as positive numbers, while revenues and developer and other contributions appear as negative numbers  
All entries are in discounted present values, in 2010 prices and values

Table 14: Scenario 1: Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads: AMCB Table (£m's, 2010 discounted present values)

Analysis of Monetised Costs and Benefits		
Noise	0.00	(12)
Local Air Quality	0.00	(13)
Greenhouse Gases	0.16	(14)
Journey Ambience	0.00	(15)
Accidents	0.84	(16)
Economic Efficiency: Consumer Users (Commuting)	8.91	(1a)
Economic Efficiency: Consumer Users (Other)	31.13	(1b)
Economic Efficiency: Consumer Users (Business Users and Providers)	30.72	(5)
Wider Public Finances (Indirect Taxation Revenues)	0.58	-(11) sign reversed from PA table
Option Values	0.00	(17)
<b>Present Value of Benefits (See Notes) (PVB)</b>	<b>72.35</b>	$PVB = (12) + (13) + (14) + (15) + (16) + (1a) + (1b) + (5) + -(11) + (17)$
<b>Broad Transport Budgets</b>	<b>6.94</b>	(10)
<b>Present Value of Costs (See Notes) (PVC)</b>	<b>6.94</b>	$PVC = (10)$
<b>Overall Impacts</b>		
<b>Net Present Value (NPV)</b>	<b>65.41</b>	$NPV = PVB - PVC$
<b>Benefit to Cost Ratio (BCR)</b>	<b>10.42</b>	$BCR = PVB/PVC$

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.

The results of the economic appraisal for Scenario 1 indicate a BCR of 10.4, which demonstrates very high value for money under DfT categorisation. Very high value for money refers to a BCR of 4.0 or greater (WebTAG).

## Sensitivity Testing

A number of sensitivity tests have been applied to the core scenario in order to assess how robust the economic case is for each scenario. The list is summarised in Table 15:

Table 15: Sensitivity Test Description

Test	Name	Impact
1	Scenario 1: 5% Works Reduction	Reduction in works undertaken is increased from 4.41% to 5.0%
2	Scenario 1: 3% Works Reduction	Reduction in works undertaken is decreased from 4.41% to 3.0%
3	Scenario 1: 2% Works Reduction	Reduction in works undertaken is decreased from 4.41% to 2.0%
4	Scenario 1: Reliability Benefits Excluded	20% reliability benefits uplift excluded

Test	Name	Impact
5	Scenario 1: 75% Highway Works Duration	3.2 days average works length reduced by 25%
6	Scenario 1: 50% Highway Works Duration	3.2 days average works length reduced by 50%
7	Scenario 1: 25% Highway Works Duration	3.2 days average works length reduced by 75%
8	Scenario 1: 50% QUADRO Rates	QUADRO output values reduced by 50%
9	Scenario 1: Include Utility Company Costs	Costs to utility companies included
10	Scenario 1: Exclude Council Revenue Offset	Capital investment offset to council revenue is removed
11	Scenario 1: 10% Increase in Capital Costs	Capital costs are increased by 10%
12	Scenario 1: 10% Increase in Operating Costs	Operating costs are increased by 10%

The headline results of each of the tests are provided in Table 16:

*Table 16: Sensitivity Test Results (£m's, 2010 discounted present values)*

Sensitivity Test	PVB	PVC	NPV	BCR
C1: Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads	£72.4	£6.9	£65.4	10.4
ST1: Scenario 1: 5% Works Reduction	£81.0	£6.9	£74.1	11.7
ST2: Scenario 1: 3% Works Reduction	£48.8	£6.9	£41.8	7.0
ST3: Scenario 1: 2% Works Reduction	£32.6	£6.9	£25.6	4.7
ST4: Scenario 1: Reliability Benefits Excluded	£61.3	£6.9	£54.3	8.8
ST5: Scenario 1: 75% Highway Works Duration	£54.3	£6.9	£47.3	7.8
ST6: Scenario 1: 50% Highway Works Duration	£36.2	£6.9	£29.2	5.2
ST7: Scenario 1: 25% Highway Works Duration	£18.1	£6.9	£11.1	2.6
ST8: Scenario 1: 50% QUADRO Rates	£36.2	£6.9	£29.2	5.2
ST9: Scenario 1: Include Utility Company Costs	£64.1	£6.9	£57.1	9.2
ST10: Scenario1: Exclude Council Revenue Offset	£72.4	£2.3	£70.0	30.9
ST11: Scenario 1: 10% Increase in Capital Costs	£72.4	£7.0	£65.4	10.4
ST12: Scenario 1: 10% Increase in Operating Costs	£72.4	£7.6	£64.7	9.5

It is clear from Table 16 that the scenario is generally robust, with the value for money case dropping from very high ( $\geq 4.0$ ) to high ( $\geq 2.0$ ) for test 7. The majority of sensitivity tests therefore offer a BCR of very high with only one scenario offering a high rating.

Finally, including the utility company costs produces a lower PVB due to assuming that this is a developer contribution in the TEE table rather than in the PA table, wherein it would be a positive figure rather than the more appropriate negative.

## Summary and Conclusions

CH2M Hill has been commissioned by Slough Borough Council to produce a business case for works on the highway permit scheme proposed for introduction across the borough. A requirement of part of this work is an economic appraisal of the preferred scheme option outlined in this technical note.

The economic appraisal has drawn upon existing guidance available specifically for this type of scheme and has also used WebTAG. Considering these items, the DfT's queue modelling software QUADRO has been used to produce the benefits of the scheme with all costs having been provided by Slough Borough Council.

In terms of the economic appraisal, Scenario 1: Major Roads and Traffic Sensitive Network plus Major Activities on Minor Roads offers a strong case in value for money terms with a BCR of 10.4. This is expressed as a very high value for money case.

Sensitivity testing has been undertaken to demonstrate the robustness of the case for the core scenario, with the economic case being rated as high to very high in all but one of the sensitivity tests and thereby offering a robust case.

Therefore, it is recommended from the economic appraisal that considering the costs and the benefits, that Slough Borough Council continue to progress with the permit scheme.