



**Department of the Environment, Transport and the Regions**

**MULTI-MODAL STUDY  
A453 NOTTINGHAM TO M1 JUNCTION 24**

**WORKING PAPER No 22**

**Appraisal methodology – a Summary  
And Development of combined Options**

**October 2001**

**REVISION RECORD**

<b><u>Revision</u></b>	<b><u>Date</u></b>	<b><u>Originator</u></b>	<b><u>Checked</u></b>	<b><u>Approved</u></b>
1 <sup>st</sup> Draft	03-10-01	JHB	PBW	PBW
Revision 1	11-12-01	JHB	PBW	PBW
Revision 2	25.01.02	JHB	PBW	PBW

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## **DEVELOPMENT AND APPRAISAL OF SCHEMES - METHODOLOGY**

### **1 INTRODUCTION**

This Paper covers the work on schemes from the stage of Initial Options identified, to the full appraisal needed for the study to identify a preferred option(s) in a robust way. Part One looks at the process of developing the appraisals alongside the development and testing of the Options using the transportation model. Part Two records the development of combined Options from the Initial Options under Strategies developed from Working Paper 17 and shown at the Wider Reference Group Seminar on 26<sup>th</sup> September 2001.

The starting point is the 'Long List' of schemes recorded on the Scheme Position Statement and described by the A3 Scheme Summary sheets. The list has been assembled from all relevant schemes and plans by transport authorities and companies operating in the area, and from suggestions arising from the Study consultations and Study team.

The end result will be complete appraisals for the Option or Options put forward with the Study conclusions.

The work involves moving from over 150 individual schemes to one or several preferred Options by an iterative process of appraisal, testing, and aggregating and reviewing schemes, and is illustrated by diagram 1 on page 9

In principle schemes remain under consideration in groups or as components within Option packages unless and until the appraisals give a supportable and objective indication that they should be discarded.

However, there are practical limitations on the amount of testing and appraisal, and an important objective is to produce conclusions that are manageable and not over complex. The guidance for Multi Modal Studies (GOMMMS) acknowledges that this process involves making objective judgements on the attributes of schemes or Options. When items are to be discarded using judgement, they are to be accompanied by supporting reasons.

## **2 PRELIMINARY ACTIONS**

To ensure that individual schemes are considered properly a check is made on what each one means i.e. its identity, and how it can be allocated to strategies. In some cases this is not immediately apparent and alternative views are possible:

Scheme definition	Consideration and record of how the original description of each scheme on the Long List of schemes is interpreted, to enable proper representation in the transportation model quantification and appraisal.
Allocation confidence	Sort Long List into groups by level of confidence with which they can be allocated to strategies – to identify difficult allocations.

Both of these items are taken as being part of the detail of the process and are not proposed for presentation in Study Papers or elsewhere unless individually requested. They are fully recorded in the detailed scheme files.

The allocation leading to the specification of the Initial Options has been reported in Working Paper 17, but the detail of individual schemes is held within the A3 Scheme Summary Sheets and subsequent appraisal documents.

## **3 SCHEME APPRAISAL LEVELS**

Volume 2 of GOMMMS section 4.2.1, requires appraisals to be sufficient to compare options and inform decisions on strategies/plans. It also suggests that not all schemes need appraisal to the same level of detail.

All schemes have some impact on transport, people, and the environment, but some impacts will be so minor as to be insignificant in the overall context.

It has therefore been possible to reduce and structure the work of appraising all the schemes and Options. Three levels of detail of appraisal have been devised, to be applied progressively, corresponding to features already in the Study:

LEVEL 1      The A3 Scheme Summary sheets already produced as part of this Study, supported with reasoning if necessary (Appendix 1)

The scheme summary sheets consists of :

a small scale map to locate the scheme,

a short description and background of the scheme

a basic appraisal table

LEVEL 2 The Appraisal Summary Table, with supporting Environmental Appraisal Forms and additional reasoning if necessary (Appendix 2):

a small scale map (but larger than Level 1) showing the location and general form of the scheme

the Appraisal Summary Table

tables of more detailed aspects of impact

LEVEL 3 Detailed investigation of individual attributes of selected schemes :

larger scale scheme plans

appraisal worksheets from GOMMMS

supporting calculations and data

GOMMMS advises that the Appraisal Summary table (AST) is a central feature and should be applied to all Options, but by implication, not necessarily to all individual schemes.

Level 1 is a coarser appraisal than the AST. It takes a common sense look at the schemes and provides 3 indicators:

- An overall appraisal rating
- Ratings of each of the main impacts in GOMMMS
- A guide on whether the scheme needs appraising in greater depth

Many schemes on examination do not need to be investigated in greater depth, but are being reviewed each time they are included in an Option for testing.

Level 2 is based on the AST, which allows the use of numeric assessment techniques for quantifiable impacts such as noise and matrix methods for others. Both methods require forecast data for traffic, numbers of people, etc. At the first stage the data has to be estimated from prior knowledge. Subsequent stages can use output data from the transport model.

The GOMMMS guidance and NATA (New Approach to Transport Appraisal) breaks down the impacts into further sub divisions, enabling a more detailed appraisal table to be prepared.

The appraisal at level 2 consists of completion of the AST and Environmental Appraisal Forms using matrix evaluation or rudimentary calculations as appropriate. Many schemes need not be individually appraised at any greater depth than this unless or until they are reviewed within 'live' Options.

Level 3 is also based on the AST, but takes investigations, using the GOMMMS worksheets, as far as necessary to be able to properly compare Options in the later stages of the Study. It is anticipated that level 3 will apply to virtually all the Options packages following the Initial Tests and that individual schemes within them may have some aspects for appraisal at this level.

Applying the 3 level approach splits the Long List of schemes into categories for appraisal.

The initial split for Schemes appraised no further than:

level 1:	70 (including suspended schemes)
level 2:	50
level 3:	23

Each scheme and its progress through the level of appraisal is shown on the Scheme Position Statement. The numbers shown are rounded to reflect the flexibility of the Study to add or remove schemes up to a late stage.

## **4 CARRYING OUT A FULL GOMMMS APPRAISAL**

### **4.1 Introduction**

The following paragraphs summarise what is involved. The detailed guidance in GOMMMS is followed for a complete appraisal. Examples and further summary follows in the appendices to this Paper.

Schemes are appraised initially before testing in the Transport Model, then re-appraised as part of the iterative process with extra information from the model test output for schemes carried forward within 'live' Options.

Some data, particularly on economics and assignments, will not be available for appraisals at the first stage.

Section 3.5.6 of GOMMMS requires individual schemes to be appraised for one forecast year early in the study period. Section 2.2.34 (Vol. 1) suggests forecasts for more than one year.

### **4.2 Appraisal Headings**

The appraisal headings are Chapters of the GOMMMS guidance manual as follows:

Chapter 4: Environmental Impact

lists categories of impact: noise, vibration, local air quality, greenhouse gases, landscape, townscape, biodiversity, heritage, water environment, physical fitness, journey ambience.

Detailed assessment requires calculations of levels of impact using specific guidance and methods, and matrix evaluation. GOMMMS Volume 2 contains specific guidance.

Chapter 5 Safety and security

Safety requires a road safety cost based assessment, referring to the established COBA (Cost Benefit Analysis) method.

Public transport safety assessment is under Department of Transport Section 56 guidelines for buses and SRA Planning Criteria (OPRAF 1999).

Security assessment is by matrix using GOMMMS worksheet and table 5.1

Chapter 6      Economy

This assesses the costs and benefits of the aspects of Options that are capable of monetary assessment. The method used is TUBA (Transport User Benefit Assessment), to be carried out separately alongside the appraisal of other aspects of Options. It requires a variety of data, and best seen by referring to the Transport Economic Efficiency table in Appendix 3.

Chapter 7      Accessibility has subsections for option values, severance, and access to transport.

- Option values is the value to the user of having a choice of transport facilities, and is matrix based using numbers of people affected and the impact of the facility on the available mode choice.
- Severance is assessed by impact on pedestrian movements, matrix based.
- Access to transport requires calculations of the number of car owners and non car owners, together with availability of transport facilities and the impact of the scheme, as a matrix.

Chapter 8      Integration

- Concerns interchanges between transport modes, and the fit with Land Use policies and Other Government policies.
- Passenger and freight interchange requires numbers of users or movements, and numbers and quality of interchange facilities to be identified, and assessed using formulae.
- The policy impacts are assessed using matrices.

## 5 FINAL APPRAISAL OF OPTIONS

In the final stages of Option development the contribution of each component scheme is brought together into one overall appraisal via a unifying table:

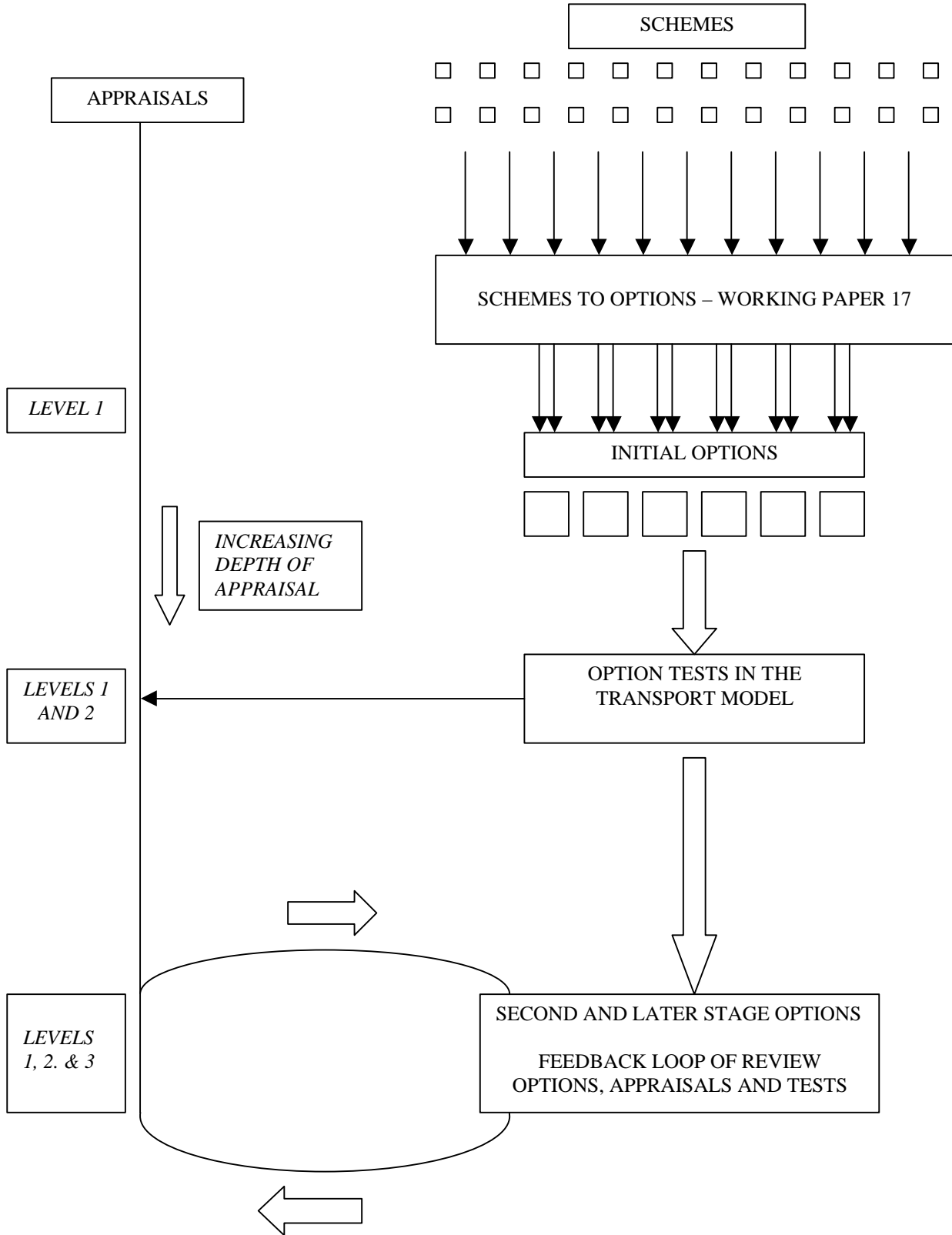
<b>OPTION: _____</b>	
<b>SCHEME</b>	<b>SCHEME APPRAISAL</b>
Scheme a) b) d) g) etc.	Qualitative Summary from scheme a) Appraisal Summary Table Ditto scheme b) Etc
<b>OVERALL OPTION APPRAISAL</b>	Overall qualitative appraisal summary

The function of the above table is to assist the summarising of the qualitative comments.

The matrix based scores have to be considered individually. They are not shown in the table above. Opposing scores are not traded off, but are reviewed within the wider perspective of the corresponding scores from all the schemes in the Option, before concluding a single score or rating for the whole Option.

The quantitative appraisal column is also not shown in the table. Quantitative appraisals for each scheme AST are listed and aggregated numerically into a single longer list of figures from which the final commentary on the Options is drawn.

DIAGRAM 1 Option development and parallel appraisal



**Level 1: Scheme Summary Table**

**Appendix 1**

<b>Scheme Title</b>	East Midlands Parkway Station	
<b>Earliest Completion Date:</b>		<b>Cost:</b>

Objective	Sub-Objective	Comment	Assessment
ENVIRONMENT	Infrastructure Impact		
	Travel/Movement Impact		
SAFETY	Reduction of Accidents		
	Personal Security		
ECONOMY	Journey/Travel Costs		
	Cost		
	Fundability		
ACCESSIBILITY	Regeneration		
	Access to Transport		
	Mode Choice		
INTEGRATION	Severance		
	Transport Interchange		
	Land-Use Policy		
REGIONAL ISSUES	Local Transport Policy		
	Government Policy		
	Regional Problems		
LOCAL ISSUES	Regional Objectives		
	Equity		
	Local Problems		
	Local Objectives		
	Equity		

<b>Relationships:</b>	A453	<b>Mutually excluded schemes:</b>	<b>Mutually included schemes:</b>
	M1 Strategy	<b>Non-compatible elements:</b>	<b>Compatible elements:</b>

*Scheme Progression:*

*Included in strategy matrices*

*Rejected*

*Comments*



**Appraisal Summary Table**

**APPENDIX 2**

Option	Description	Problems	Present value cost to Government £M
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OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise			
	Local Air Quality			
	Greenhouse Gases			
	Landscape			
	Townscape			
	Heritage of Historic Resources			
	Biodiversity			
	Water Environment			
	Physical Fitness			
	Journey Ambience			
SAFETY	Accidents			
	Security			
ECONOMY	Transport Economic Efficiency			
	Reliability			
	Wider Economic Impacts			
ACCESSIBILITY	Option Values			
	Severance			
	Access to the Transport System			
INTEGRATION	Transport Interchange			
	Land-Use Policy			
	Other Government Policies			

<b>Final Summary</b>
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**Detailed (level 3) appraisal using the Guidance for Multi-Modal Studies  
- Methods and examples**

**APPENDIX 3**

(Adaptation of document presented to OATMSG on 10<sup>th</sup> October 2001)

**1. Background**

- 1.1 The Government's 5 objectives and the 21 sub-objectives are shown on the Appraisal Summary Table - AST and form the top of an appraisal tree.
- 1.2 The detailed appraisal of the sub-objectives provides data input to the Appraisal Summary Table.
- 1.3 This paper gives a summary explanation of how the GOMMMS guidance tackles the appraisal of each sub objective.
- 1.4 A summary of the method for each sub objective is given below, with worked examples.

**2. Noise**

- 2.1 Noise is assessed as numbers of properties receiving increased or decreased noise levels. Noise levels can be calculated by zones or by individual roads, railways etc. using standard DETR manuals. For this Study the latter is appropriate.
- 2.2 Noise contours are produced and the nos. of properties in bands of noise levels are counted A sample calculation follows:

**Sample Noise Calculation Do Min 2021**

**Section:** A50 Ring Road

**Year:** 2021 am peak

**Location:** Silverdale, The Downs

Flow rate = 5835 v/h

Average speed = 96 kph

HGVs = 16.23 %

1. Basic Noise Level

$L_{10} = 80.0$  dBA

2. Correction for % HGVs and Mean Traffic Speed

Dual with 96 kph and 16.23 % HGVs

Chart 4 correction factor = + 4.4 dB(A)

Corrected Level = 84.4 dB(A)

3. Gradient Correction = +1.0 dB(A)

Corrected Level = 85.4 dB(A)

4. Road Surface Correction = -1 dB(A)

Corrected Level = 84.4 dB(A)

5. Obstructions

Shortest Horizontal Distance = 35m

Height relative to source = 0.5m

Corrections

	Correction	Corrected Level
Distance Chart 7	-4.5 dB(A)	79.9 dB(A)
Ground Absorption Chart 8	-6 dB(A)	73.9 dB(A)
Barrier Chart 9	0 dB(A)	73.9 dB(A)

Therefore Predicted Noise Level at Clifton Lane = **73.9 dB(A)**

These noise levels can then be used to plot noise contours on to the relevant mapping and the total number of households in each band can be calculated. This can then be compared to with the Do Minimum scheme to calculate the number of houses that experience a positive or negative change in noise levels. Such numbers are recorded in the Appraisal Summary Table.

### **3 Local Air Quality**

- 3.1 As with noise, zonal or individual calculation can be assessed, and the latter is appropriate for this Study, where the main changes in local air quality result from dominant sources, mainly main roads. However, the system of local air quality management introduced with the Environment Act 1995 and managed by the Local Authorities also needs to be taken into account. This looks at local area pollution levels.
- 3.2 Assessment of local air quality from individual sources involves the calculation of pollution level of the source e.g. a traffic stream, from parameters of flow, composition, and speed. The impact of the pollution is stated as the number of properties experiencing a calculated level of PM10 and NO<sub>2</sub> pollutants. A whole Option is broken down into links of consistent characteristics, and a calculation is performed for each one. A sample calculation follows:

**Local Air Quality - Sample Calculation**

**Localised Air Quality – Do Minimum 2021 AM Peak**

To examine the impact a new scheme will have upon the surrounding area, an air quality assessment is required. This calculation estimates the concentration of PM10 and NO2 at specific locations. A route is split into continuous sections of similar characteristics (traffic speed and flows etc.).

**Section:** NTU to Farnborough Road

**Year:** 2021

**Receptor Distance from Road:** 33m + 3.5m = 36.5

- Using Figure A1.1 (DMRB, Vol. 11, Sec. 3)<sup>1</sup> find the **contribution to pollution concentration** for PM10 and NOx.

$$PM_{10} = 1.215 \text{ (per 1000 light duty 1996 vehicles @ 100 km/h)}$$

- NOx = 50.61 (per 1000 light duty 1996 vehicles @ 100 km/h)

- From existing data and model,

**Annual average traffic flow** = 2887 vehicles/hour

**Percentage of heavy goods vehicles** = 13.92 %

$$HGVs = 401.87 \text{ v/h}$$

$$LDVs = 2485.13 \text{ v/h}$$

**Average speed through section** = 60 kph

- Find **'Effective light duty vehicles in 1996 @ 100 km/h'** using Figure A1.2 and Table A1.7.

$$PM_{10} = 2485.87 \times 0.95 \times 0.16 = 377.85$$

$$NOx = 2485.87 \times 0.67 \times 0.11 = 183.21$$

- Find **'Effective heavy duty vehicles in 1996 @ 100 km/h'** using Figure A1.5 and Table A1.8.

$$PM_{10} = 401.87 \times 1.16 \times 1.58 = 736.55$$

$$NOx = 401.87 \times 0.97 \times 2.86 = 1114.87$$

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<sup>1</sup> All tables and figures used in the calculation are shown in the Design Manual for Roads and Bridges, Vol. 11, Section 3.

6. Calculate '**Total effective flow**'

$$PM_{10} = 377.85 + 736.55 = 1114.4$$

$$NO_x = 183.21 + 1114.87 = 1298.08$$

7. Divide total effective flow by 1000 and multiply by the concentration contribution from each section (step 1) to obtain the **annual mean traffic derived concentrations** of  $PM_{10}$  and  $NO_x$ . For routes with multiple sections the mean traffic derived concentrations can be added together to obtain the overall values of  $PM_{10}$  and  $NO_x$ .

$$PM_{10} = 1114.4 \div 1000 \times 1.215 = 1.35$$

$$NO_x = 1298.08 \div 1000 \times 50.61 = 65.70$$

8. By adding **mean background concentration** to the annual mean traffic contribution (step 6) and using the year correction factor the corresponding value of the **annual mean  $NO_2$**  is obtained from the value of  $NO_x$ .

$$\begin{aligned} NO_x &= 65.70 + ((38 - 19) \times 0.24 + 19) \\ &= 89.26 \end{aligned}$$

$$\begin{aligned} NO_2 &= 37.36 \\ \text{Limit} &= 40 \end{aligned}$$

$$\begin{aligned} 99.8\% \text{ hrs} &= 142.38 \\ \text{Limit} &= 200 \\ \text{Hrs} > 200 &= 0 \text{ hrs} \\ \text{Limit} &= 18 \text{ hrs} \end{aligned}$$

9. Add the **mean background concentration** to the annual mean traffic contribution of  $PM_{10}$  (step 6) and using the year correction factor from Table A1.10.

$$\begin{aligned} PM_{10} \text{ (Annual Mean)} &= 1.35 + (0.33 \times 20 \times (0.24 + 2)) \\ &= 16.28 \end{aligned}$$

$$\text{Limit} = 40$$

90<sup>th</sup> percentile equivalent to 35 exceedences per year

$$\begin{aligned} 90\% \text{ days} &= 29.10 \\ \text{Limit} &= 50 \\ \text{Days} > 50 &= 0 \text{ days} \\ \text{Limit} &= 35 \text{ days} \end{aligned}$$

#### 4. Greenhouse Gases

This is to be assessed by applying emission rates from GOMMMS and DMRB to total vehicle kilometres of different categories of road or rail traffic. A sample calculation follows:

**Greenhouse Gases - A Sample Calculation**

To assess the impact a scheme has on the regional air quality and overall air pollution it is necessary to predict the total emission expected and compare it with recent data to ascertain any changes. As in the local air quality assessment, a route is split into multiple sections where traffic conditions are fairly homogeneous (speed and flow).

<b>Section:</b>	NTU to Farnborough Road
<b>Year:</b>	Base Year 2000
<b>Length of Section:</b>	0.701 km
<b>Total Traffic Flow:</b>	6999617 vehicles/year
<b>Heavy Duty Traffic Flow:</b>	1399923.4 vehicles/year <sup>2</sup>
<b>Light Duty Traffic Flow:</b>	5599693.6 vehicles/year
<b>Average Traffic Speed:</b>	60km/h

1. Find '**Effective light duty vehicles in 1996 @ 100 km/h**' using Figure A1.2 and Table A1.7 (DMRB, Vol. 13, Sec. 3)<sup>3</sup>.

$$\text{CO}_2 = 4479754.88 \text{ vehicles/year}$$

2. Find '**Effective heavy duty vehicles in 1996 @ 100 km/h**' using Figure A1.5 and Table A1.8.

$$\text{CO}_2 = 4844014.95 \text{ vehicles/year}$$

3. Calculate '**Total effective flow.**'

$$\text{CO}_2 = 447954.88 + 4844014.95 = 5291969.83 \text{ vehicles/year}$$

4. Calculate the '**total annual vehicle kilometres travelled on the section.**'

$$5291969.83 \text{ vehicles/year} \times 0.701 \text{ km} = 3709670.85 \text{ vehicle km/year}$$

5. Calculate the annual '**emissions from the traffic on the section,**' using Table A2.1.

$$3709670.85 \times 163 = 604676348.7 \text{ g/year}$$

NB, This result may be converted into kilograms per year by dividing by 1000 or into tonnes per year by dividing by 1000000.

6. For routes with multiple sections, each annual emission value can be added together to find the overall effect of the proposal. These results can then be compared with the Do Minimum to find a percentage change in emissions. This percentage change is recorded in the Appraisal Summary Table.

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A value of 20% HGV's has been assumed, as definitive values are currently unavailable from the model.

<sup>3</sup> All tables and figures used in the calculation are shown in the Design Manual for Roads and Bridges, Volume 13, Section 3.

## 5. Landscape

- 5.1 This is a qualitative method working through a sequential analysis of the existing landscape characteristics, noting features, pattern, tranquillity, cultural, land cover, scale, importance, and rarity.
- 5.2 The Scheme or Option will be considered against this background, considering impact, substitutability, and mitigation. The assessment scores on a seven point scale from large adverse to large beneficial, applied in Worksheet 5.1. No worked example is given for this or the following sub-objectives.

When assessing the landscape it is important to consider the characteristics of a region and how they are perceived. Features such as fields, woodlands and stone walls can form local distinctiveness to areas. Any significant changes to these characteristics need to be taken into account when assessing the impact of a proposal on the landscape. As landscape is a mix of physical features and patterns, the level of detail required when appraising schemes will depend upon the size and purpose of each individual scheme.

### Worksheet 5.1 Environment – Landscape

Features	Description	Scale it matters	Rarity	Importance	Substitutability	Impact	Additional Mitigation
Pattern							
Tranquillity							
Cultural							
Landcover							
Summary of Character							

Reference Source(s):      Summary assessment score:      Qualitative comments:

## 6. Townscape

Appraisal is similar to that for Landscape. The townscape is analysed in respect of features, layout, density and mix, appearance, human interaction, cultural contribution, scale, rarity, importance, substitutability, impact, and mitigation. The assessment is on a seven point scale in the same way as for Landscape.

When assessing the impact a scheme may have upon the townscape it is important to consider the social and physical characteristics and the way in which those characteristics are perceived. The approach for townscape assessment does not specify a minimum settlement size and it is perceivable for a village to have townscape impacts.

**Worksheet 6.1: Townscape**

Features	Description	Scale it matters	Rarity	Importance	Substitutability	Changes in Do minimum	Impact	Additional mitigation
Layout								
Density and mix								
Scale								
Appearance								
Human Interaction								
Cultural								
Land use								
Summary of character								

Reference Source(s):

Summary Assessment Score:

Qualitative comments:

**7 Heritage**

- 7.1 This covers buildings or complexes with architectural or historical significance, parks and gardens, ancient monuments and the like.
- 7.2 It follows the approach for landscape and townscape, using a qualitative analysis of features, form, survival, condition, complexity, context, period, scale, rarity, significance, impact, mitigation. A seven or four point assessment is made depending on the amount of information available.

**8. Biodiversity**

This is based on advice from English Nature, in turn based on DMRB. It examines areas, with reference to English Nature’s Area profiles, designated sites, attribute/feature, importance, trend, substitutability, impact, and mitigation. There is a seven point rating.

**Table 8.1 Guidance on describing the conservation value of features**

Value	Criteria	Examples
Very high	High importance and rarity, international scale and limited potential for substitution.	Internationally designated sites
High	High importance and rarity, national scale, or regional scale with limited potential for substitution.	Nationally designated sites  Regionally important sites with limited potential for substitution
Medium	High or medium importance and rarity, local or regional scale, and limited potential for substitution.	Regionally important sites with potential for substitution  Locally designated sites
Lower	Low or medium importance and rarity local scale	Undesignated sites of some local biodiversity and earth heritage interest
Negligible	Very low importance and rarity, local scale	Other sites with little or no local biodiversity and earth heritage interest

**Worksheet 8.2: Biodiversity**

**Scheme/Option:**

Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Magnitude of impact	Assessment score

Reference Source(s):

Summary Assessment Score:

Qualitative Comments:

**9. Water Features**

A review of the scheme is required in order to determine the size of the affected area, the water features in this area, potential impacts and the scale of which they are significant. A zone of influence can be determined. The proposal of a new car park for example would have a zone of influence of the area that could be exposed to an increased flood risk. Indicators such as quality, scale and rarity should be recorded in the Worksheet.

The value of the water environment can be assessed by identifying and analysing its attributes. A table in GOMMMS provides guidance for determining the importance of each attribute and is used in conjunction with a Worksheet.

**Table 9.1: Guidance for determining impact magnitude**

Magnitude	Criteria	Example
<b>Major</b>	Results in loss of attribute	-loss of EC designated Salmonid fishery -change in GQA grade of river - compromise employment source -increased flood risk - pollution of potable source of abstraction
<b>Moderate</b>	Results in impact on integrity of attribute or loss of part of attribute	- loss in productivity of a fishery -contribution of a significant proportion of the effluent into river but insufficient to change its GQA grade -reduction in economic value of the feature
<b>Minor</b>	Results in minor impact on attribute	-measurable changes in attribute, but of limited size and/or proportion
<b>Negligible</b>	Results in an impact on attribute but of insufficient magnitude to affect the use	-discharges to watercourse but no significant loss in quality or biodiversity -no significant impact on the economic value of the feature -no increase in flood risk

**Table 9.2: Criteria for determining the significance of proposed scheme**

Magnitude of potential impact	Importance of attribute			
	Very high	High	Medium	Low
Major	Very significant	Highly significant	Significant	Low significance
Moderate	Highly significant	Significant	Low significance	Insignificant
Minor	Significant	Low significance	Insignificant	Insignificant
Negligible	Low significance	Insignificant	Insignificant	Insignificant

**Overall assessment score**

An overall assessment score can be produced on the seven-point scale and entered in the AST. The qualitative box in the AST should state whether features found in the water environment are typical and summarise the overall effect of the proposal on the water feature

**Worksheet 9.1: Water Environment**

Description of study area/ summary of potential impacts	Feature	Attributes/ Services	Quality	Scale	Rarity	Substitutability	Importance	Magnitude	Significance
<b>Study Area:</b>									
<b>Potential Impacts:</b>									

Reference Source(s):

Summary Assessment Score:

Qualitative Comments:

**10. Physical Fitness**

This stems from the Government Transport White Paper, which identifies an objective to encourage physical fitness by reducing reliance on private cars and making it easier to walk or cycle. It concerns walking or cycling only, and estimates the nos. of people making journeys lasting more than 30mins. on foot or by cycle under the Scheme or Option.

**Worksheet 10.1: Physical Fitness**

Activity Duration Per Day	Change in Number of People	
	Pedestrians	Cyclists
Less than 30 minutes		
Greater than 30 minutes		

Reference Source(s):

Summary Assessment Score:

Qualitative Comments:

## 11. Journey Ambience

Ambience is measured by traveller care, view, and stress, assessing cleanliness, facilities, information, environment, frustration, fear of accidents, route uncertainty. A seven point scale is used, considering the degree of change and the nos. of people affected.

### Worksheet 11.1: Journey Ambience

Factor	Sub-factor	Better	Neutral	Worse
Traveller Care	Cleanliness			
	Facilities			
	Information			
	Environment			
Traveller' Views				
Traveller Stress	Frustration			
	Fear of potential accidents			
	Route uncertainty			

Reference Source(s):

Summary Assessment Score:

Qualitative Comments:

## 12. Accidents sub objective

Accidents are appraised by applying rates from national accident statistics to road traffic using the COBA method from DMRB. The traffic flows from the transport model are converted to annual flows and then vehicle kilometres for links in the networks under appraisal. Accidents are allocated a cost depending on the severity of personal injury incurred: slight, serious, or fatal. The sums are aggregated over a 30 year period and on the same price base and discounting basis as the economic assessment, of which they ultimately form a part.

## 13. Security

This examines the characteristics of journeys affecting personal safety and security, and produces a matrix rating which together with an estimate of overall numbers of people affected by the change gives the overall assessment.

**Table 13.1: Security Indicators for Public Transport Passengers**

<b>Security Indicator</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>
Site perimeters, entrances and exits	Unmarked or poorly marked site perimeters, exits etc. Use of solid walls or similar.	Attention to boundary and exit marking, but otherwise unfavourable use of materials.	Clearly marked site perimeters/exits. Use of open fencing rather than solid walls.
Formal surveillance	No CCTV system in place. Design discourages staff surveillance and isolates passengers.	CCTV system in place, but number, location of system not optimal. Poor design which discourages staff surveillance.	Effective CCTV system in place. Design to encourage staff surveillance and group passengers.
Informal surveillance	Poor use of materials (fencing etc) and design. Poor visibility from site surrounds. Very isolated from retailers or other human activity.	Unfavourable use of materials (fencing etc) but reasonable proximity of retailers or other activity.	Positive use of materials (fencing etc) and design to encourage open visibility from site surrounds. Encouragement or proximity of retailers or other activity.
Landscaping	Landscaping features (design, plants etc) inhibits visibility and encourages intruders.	Evidence of some positive use of landscaping features (design, plants etc), but more measures needed to contribute to visibility and deter intruders.	Positive use of landscaping features (design, plants etc) to contribute to visibility and deter intruders.
Lighting and visibility	Poor design including recesses, pillars, obstructions etc which hinder camera/monitor view. Poor or no lighting in passenger areas at night when facility open. No or poor lighting on any signing, information or help points.	Design includes some recesses but not problematical to camera/monitor view. Lighting in passenger areas at some, but not all times when facility open. Lighting not to daylight standard. Attention to lighting on signing, information and help points.	Good design to avoid recesses and facilitate camera/monitor view. Lighting to daylight standard in passenger areas when facility open. Attention to lighting on signing, information and help points.
Emergency call	No or very poor provision of emergency phones, help points and public telephones. Little provision or information on emergency help procedures.	Basic provision of emergency phones, help points and public telephones. Improvements to these and on emergency help procedures needed.	Good provision of emergency phones, help points, public telephones and information on emergency help procedure.

**Worksheet13.1: Assessment of Security Sub-objective**

<b>Security Indicator</b>	<b>Relative importance (High/Medium/Low)</b>	<b>Without strategy (Poor/Moderate/High)</b>	<b>With strategy (Poor/Moderate/High)</b>
Site perimeters, entrances and exits			
Formal surveillance			
Informal surveillance			
Landscaping			
Lighting and visibility			
Emergency call			

Approximate numbers of users affected Overall assessment of impact on Security sub-objective (slight/moderate/large positive/negative or neutral)

#### 14. Transport Economic Efficiency

This is primarily concerned with transport cost/benefit analysis. The TUBA method will be used. TUBA is a part-automated process of summing up all the costs and benefits for all the regular modes of transport, on a common price basis and rate of discounting over future years. Individual components are shown on the Transport Economic Efficiency Table below.

<b>Worksheet 14.1 Economy: Economic Efficiency of the Transport System (TEE)</b>						
<b>Impact</b>	TOTAL Present Value 1994 prices and values					
<b>User benefits</b>						
Personal travel			Car	Bus and coach	Rail	Other
Travel time						
Vehicle operating costs						
User charges						
<b>NET IMPACT</b>		(1)				
Freight			Road freight		Rail freight	Other
Travel time						
Vehicle operating costs						
User charges						
<b>NET IMPACT</b>		(2)				
<b>Private Sector Provider Impacts</b>				Bus and coach	Rail	Other
Revenue						
Operating costs		(a)				
Investment costs		(b)				
Grant/subsidy						
<b>NET IMPACTS</b>		(3)				
<b>Public Sector Provider Impacts</b>			Road infrastructure			Other
Revenue						
Operating costs		(c)				
Investment costs		(d)				
<b>NET IMPACTS</b>		(4)				
<b>Other Government Impacts</b>			Road infrastructure	Bus and coach	Rail	Other
Grant/subsidy payments		(e)				
Indirect tax revenues						
<b>NET IMPACTS</b>		(5)				
<b>TOTAL</b>						
Net Present Value, NPV		(6)=(1)+(2)+(3)+(4)+(5)				
Present Value of Costs, PVC		(7)=(a)+(b)+(c)+(d)				
Present Value of Cost to Government		(8)=(4) +(e)				
Benefit/Cost Ratio, BCR		(9)=[(6)-(7)]/-(7)				
Value/Cost to Gov't Ratio, VCGR		(10)=(6)/-(8)				

## 15. Reliability

The journey time reliability for both passenger and freight movements is assessed using a simple ratio of the Scheme or Option flows and congestion reference flows of road traffic on key links in the network, representing time lost in congestion. It assumes a correlation between highly loaded roads and the unpredictability of journey times. GOMMMS advises that the method can provide only broad indications.

### Worksheet 15.1: Reliability

#### 1 The stress based approach to the assessment of reliability impacts of road proposals

- 1.1 This approach is based on the change in 'stress' (within the range 75% to 125%) as a result of the proposal, combined with the numbers of vehicles affected. Where a proposal provides a new route, the approach takes account of improvements in reliability for those remaining on the old route as well as those transferring to the new. This approach is very similar to that taken in assessing time saving and vehicle operating cost benefits. Thus, proposals providing modest improvements for large volumes of traffic may be more highly rated than those providing large improvements for small volumes.
- 1.2 To take account of possible 'bottleneck' effects, where the effect of one link or junction operating close to capacity affects the reliability of an extended length of road, the method focuses on those key links/junctions, rather than the whole length of road.
  - Values in excess of 3 million will usually be assessed as *Large* (*Beneficial* if the value is positive, *Adverse* if it is negative) - these will be high flow routes with moderate or large differences in stress, or moderate flow routes with large differences in stress;
  - Values between 1 and 3 million will usually be assessed as *Moderate* - these will be high flow routes with small or moderate differences in stress, moderate flow routes with moderate differences in stress, or low flow routes with moderate or large differences in stress. Values used are: Over 3 million: Large, 1-3 million: moderate, 200,000-1 million: slight, less than 200,000: neutral

	Old Route (i)	New Route (ii)
Do minimum stress (a)		not applicable
Do something stress (b)		
Difference in stress (c=a-b, restricting a and b to the range 75% - 125%)		
Do something AADT flow (d)		
Overall impacts (e=c*d)		
Overall assessment (e(i) +e(ii)):		

**Note: Where a new road route is provided, the Quantitative column should contain values a(i) and b(ii). Where no new road route is provided, use values a(i) and b(i).**

Reference sources:

Assessment scores:

## 16. Wider Economic Impacts

The wider impacts are about the scope for economic regeneration of run-down areas. Certain specific criteria closely linking Schemes or Options to the area for regeneration are required. They are not met within the area of influence of this Study.

## 17. Access to the transport system

Access is rated by calculation of a percentage of people without access to a private car and living more than 5 minutes walk from the nearest public transport stop. It has to be qualified by considering the quality of the public transport in question.

Access to the transport system is strongly influenced by the two key variables introduced at the start of this section, i.e. access to a private car and proximity to a public transport service.

In order to combine these within an indicator of access to the transport system across the Study Area, an 'access to the transport system' index should be created, as follows:

where  $A_i$  is the access to the transport system index for zone  $i$  of the Study Area;  
 $P_{NCA,i}$  is the resident population of zone  $i$  who do not have access to a Car and do not live within 250m of a daytime hourly public transport service;  
 $P_i$  is the total resident population of zone  $i$ .  
 $A_i$  is therefore the percentage of the population of zone  $i$  who have access to a car or live within 250 m of a daytime hourly public transport service. Similarly, for the Study Area as a whole:

where  $A$  is the access to the transport system index for the Study

Calculation of the Access to the transport system Score, given the access to the transport system indexes for the do-minimum case,  $A^0$ , and the do-something,  $A^1$ , should then follow the scale shown in the table below:

**Table 17.1: Scoring Scale for the 'Access to the Transport System' Sub-objective**

Proportionate change in access index, $(A^1 - A^0)/A^0$	Score
+21% or greater	Large beneficial
+6% to +20%	Moderate beneficial
+2% to +5%	Slight beneficial
-1% to +1%	Neutral
-2% to -5%	Slight adverse
-6% to -20%	Moderate adverse
-21% or greater	Large adverse

### 18. Option values

This estimates the value of having a choice of transport. For this Study the GOMMMs method is a broad indicator of the numbers of people gaining or losing a choice of transport, rated on a four point scale.

<b>Qualitative procedure for assessing option values</b>		
Qualitative scores should relate to the size of the resident community given options to travel by the strategy, according to the following scale:		
<b>Community</b>	<b>Service Withdrawn</b>	<b>Service Added</b>
≥2000 people	Strong adverse	Strong beneficial
500-1999 people	Moderate adverse	Moderate beneficial
1-499 people	Slight adverse	Slight beneficial
0 people	Neutral	Neutral

Where more than one community is affected the total number of resident individuals should be added together (with a negative sign attached to communities losing their service).  
 'Ghost' services not providing reasonable opportunities for return travel on all days of the week should not be treated as services for these purposes. Withdrawal of rail services replaced by bus should be counted as a withdrawal of service, given the lower level of accessibility offered to significant groups of users.

### 19. Severance

GOMMMS considers severance or deterrence to pedestrian movements by vehicular traffic. The method requires assessment of segments of the Study area on a seven point scale:

- estimate the level of severance for the Do-Minimum case;
- estimate the level of severance for the Do-Something;
- by comparison of the level of severance for the Do-Minimum and do-something cases, estimate the change in severance (reductions and increases)
- The table below provides guidance (for example, where the Do-Minimum severance is moderate and the do-something severance is slight a 'slight positive' score should be recorded); and
- estimate the numbers of people likely to be affected by changes in severance.

**Table 19.1: Assessment of Change in Severance**

<b>Do Minimum Severance Scoring</b>	<b>Do Something Severance Scoring</b>			
	None	Slight	Moderate	Severe
None	None	Slight negative	Moderate negative	Large negative
Slight	Slight positive	None	Slight negative	Moderate negative
Moderate	Moderate positive	Slight positive	None	Slight negative
Severe	Large positive	Moderate positive	Slight positive	None

It will usually be appropriate to assess severance at a number of locations across a network. An overall assessment for the option should then be based on the following guidelines (in each case, the assessment is *beneficial* if severance is reduced, *adverse* if severance is increased):

Where significant numbers of cyclists and/or equestrians are affected, a comment should be made in the Qualitative section of the AST, indicating whether the impact of severance is more or less severe than for pedestrians.

## 20. Transport Interchange

The value of an interchange facility in the Study network is estimated by rating the main desirable qualities on a three point scale and the numbers of users. The GOMMMS worksheet at the end of this document illustrates the method.

<b>Passenger Indicator</b>	<b>Poor standard</b>	<b>Moderate standard</b>	<b>High standard</b>
Waiting environment	Old, uninviting, uncomfortable, non-existent or poorly-lit waiting room.	Some comfortable waiting rooms, but improvement or upgrades still needed.	New, inviting and comfortable well-lit waiting room.
Level of Facilities	Terminal old and needing upgrade. No or very poor buffet. No other facilities available.	Some good facilities, but others needing replacement or upgrade.	Modern terminal, good buffet and/or other facilities available.
Level of Information	No announcements, partial timetables, absence of automatic displays or information office.	Full timetables and announcements, no automatic displays or information office. Information level could be improved.	Frequent announcements, full timetables, automatic displays, information office.
Visible staff presence	No visible staff presence for most of the time the terminal is open.	Staff presence visible at some times terminal is open.	Staff presence visible at all times terminal is open.
Physical linkage for next stage of journey	Physical linkage impossible without use of more than one bridge or subway. Need to change to a physically separate terminal.	Physical linkage possible with use of a single bridge or subway. No need to change to a physically separate terminal.	Physical linkage possible without use of bridge, subway or changing to a physically separate terminal.
Reliability of connection	Timetable largely uncoordinated. High risk of missing connections.	Some timetable co-ordination but still a moderate risk of missing connections.	Timetable co-ordinated or guaranteed either within or between modes to minimise risk of missing connections.

An overall assessment of passenger interchange impact can then be made, taking into account the approximate numbers of passengers affected, given the following guidelines.

- The overall assessment is likely to be neutral if increases on some interchange indicators are generally balanced by decreases on other interchange indicators.
- For the following categories, if the shift is generally to the right of Worksheet 20.1 the assessment would be beneficial and the assessment would be adverse for a shift to the left:

- the overall assessment is likely to be slight where changes on a small number of indicators is a shift between adjacent columns or the total number of passengers affected is low (less than 500 per day, say);
- the overall assessment is likely to be large where changes on most or all indicators is a shift of more than one column or the total number of passengers affected is high (greater than 10000 say); and
- the overall assessment is likely to be moderate where a change on most indicators is a shift between adjacent columns.

**Worksheet 20.1: Integration – Freight Interchange**

<b>Freight Indicator</b>	<b>Without strategy (Poor/Moderate/High)</b>	<b>With strategy (Poor/Moderate/High)</b>
Reliability (at the interchange facilities only)		
Level of facilities for freight users		
Freight transfer		
Timetabling, connections, co-ordination		
Level of information for freight users		
Freight security at the interchange		

Approximate numbers of users affected:

## 21. Integration of Land Use and Other Government Policies

The guidance requires a qualitative consideration of how many components of Schemes or Options are in sympathy with Land Use Policies or the Policies of other Government departments relevant to the Study area and how significant they are, as indicated on the worksheet.

**Worksheet 21.1: Other Government Policies**

<b>Government Department</b>	<b>Policies Helped</b>	<b>Policies Hindered</b>

Reference Source(s):

**Worksheet 21.2: Integration – Land-Use Policy**

	<b>Land-Use Policies or Proposals</b>
Local	
Regional	
National	

Reference Source(s):

## **PART 2 DEVELOPMENT OF COMBINED OPTIONS**

### **1 Introduction - Sorting of schemes in the draft Options prior to selecting preferred Option: steps in the process**

- Selection of the schemes making up the essential components of Options capable of recommendation
- Removal of schemes with little contribution to Option from mainstream to secondary category of schemes generally supporting the Option but not necessary to the achievement of the Study objectives.
- Removal of schemes with long lead times that cannot contribute within the forecasting period (if applicable)
- Consideration of case for taking Option packages out of the running.

**Note:** The following tables show the allocation of all schemes from the Long List – except for those as suspended, amalgamated, or rejected in Working Paper 25.

### **2. The draft Option tables**

- The tables list in the left column the schemes in the draft Options, and in the right column those excluded together with comments on the exclusion relating to the selection process in section 1. above.

### **3. The next steps**

- The combined draft Options are selectively tested to assist with the next stage of Option development: the draft preferred Option or Options.

**Draft COMBINED OPTION - Max. Public Transport and Management**

<b>Scheme List omitting those with little contribution to A453 corridor</b>	
<p>Rail schemes</p> <p><i>Major schemes</i></p> <p>B3 Trent PSB Upgrade(intermediate and major schemes)</p> <p>B13/15 Nottingham Station Redevelopment</p> <p>B17 P &amp; R Station and service Gedling – Nottingham</p> <p><i>Services only</i></p> <p>B6 Nottingham-Parkway service</p> <p>B8 Improved Nottingham-Derby service</p> <p><i>Other measures</i></p> <p>B2 Replacement rolling stock (central Trains)</p> <p>B5 Car parking at local stations</p> <p>B7 Local Park &amp; Ride at Parkway Station</p> <p>B9,11 Station upgrades to modern facilities Standards, inc. real-time information</p> <p>B14 Multi mode smartcard ticketing</p>	<p>Rail omissions</p> <p>B4,12,19,20 New Stations and services – South Notts Rail network.</p> <p>S. Notts rail network schemes have little contribution to A453 corridor except for Gedling station which would help operation of Nottingham Station including possibly ‘parking’ trains of the MML inter City services in addition to attracting journeys between the A453 Corridor and Gedling area.</p> <p>B26 Rail Park &amp; Ride at M1 motorway at Trowell Park &amp; Ride sites B7 and D24 would attract the major P&amp;R potential of the motorway affecting the A453 corridor.</p> <p>B27 South of Kegworth to EM Airport link Independent light rail or bus services are superior .</p>
<p>Light Rail schemes</p> <p><i>Works</i></p> <p>C2 Extension to Clifton</p> <p>C4 NET extension to Beeston</p> <p>C13 Clifton South Park &amp; Ride</p> <p>C17 NET extension to A52 Bardills with P&amp;R</p> <p>C3 NET/Bus/Rail interchanges (Clifton only)</p>	<p>Light Rail omissions</p> <p>C9,10,15 Extensions to Gamston, Edwalton with P&amp;R site. The Edwalton line is seen by NET as serving West Bridgford housing areas, and not extending to P&amp;R near the A606/A52 junction. Some A453 traffic would be attracted to an A606 P&amp;R site but there is little spare capacity it would increase local traffic. The extension to Gamston would have negligible influence on the A453.</p> <p>C3 NET/Bus/Rail interchanges (except Clifton) For interchanges contributing to the A453 corridor there is a possible site on Southchurch Drive by the shopping centre. Clifton South P&amp;R and Parkway Station P&amp;R sites are separately identified schemes.</p>

<p>Bus schemes</p> <p><i>Works</i></p> <p>D24 P&amp;R off Junction 23a D4 J24 bus priority</p> <p><i>Bus lanes</i></p> <p>D2 A453 Farnborough Rd to Clifton Flyover bus lanes D20a Gotham Rd Clifton bus lanes</p> <p><i>Services</i></p> <p>D5,6 Selected service improvements frequency/timing/fare structure) D10 Clifton Village bus service D15,16,17- A453 corridor including Airport express bus services</p> <p><i>Other measures</i></p> <p>D8 Real time information D12 Bus Marketing D14 Renewal of bus Fleet D11,18 Integration (NET/Bus/Rail) D21 Local parking at major bus stops D23 New generation bus stops</p>	<p>Bus omissions</p> <p>D13 Bus Based P&amp;R adjacent to M1. The bus P&amp;R sites at J23a and J24 are in competition. The J23a site has advantages of being adjacent to services and built –up land and the first stop for M1(S) and A42 trips. The bus priority scheme at Junction 24 would be needed later in the Study period</p> <p>D7 Core route interchanges Core route interchanges (on A52 Ring Road) have little influence on A453 and are for the Local Transport bodies to pursue.</p> <p>D20b Ring Road bus lanes at A609,Beechdale Bus lanes on the A52 Ring road north of A6005 have minimal influence on A453 corridor although relevant to transport around Nottingham City and therefore a matter for the Local Transport Bodies.</p> <p>D22 Busways in place of NET The scheme is an equivalent alternative to C2 Net to Clifton but does not feature in this Option which gives full priority to NET schemes</p>
<p>Highway schemes</p> <p>E4 M1 – Clifton single c’way improvement with at grade junctions and crawler lanes E7 Clifton single c’way improvement including traffic signal controlled roundabouts at Crusader and Farnborough Road/Fabis Drive E14 M1 junction 24 minor improvement (full traffic signal control)</p>	<p>Highway scheme omissions</p> <p>E2,5,8,9,13,15,17,24,25,27. These are all individual schemes or sets of schemes competing with those included and are less appropriate to the Option. E16 Measures on corridors adjacent to A453: No positive scheme can be envisaged. E23 Kegworth Southern bypass. Omitted only because it represents expansion of highway capacity and would not benefit A453 corridor without a major scheme for M1 J24.</p>
<p>Traffic management schemes</p> <p>F13 30 mph speed limit on A453 in Clifton* F5 UTC extension</p>	<p>Traffic management omissions</p> <p>F11 Minor works to improve the alternative A46,A52,andA606 routes: The available schemes are restricted to low priority A606 junction improvements and do not support public transport. F2/12 Re-allocation of road space: No sections of road suitable for this treatment Application to Dual section of A453 would cause severe congestion. * 50 mph speed limit omitted from M1-Clifton section as inconsistent with standard of road having grade separated junctions and crawler lanes.</p>

<p>Cycle and Pedestrian schemes</p> <p>G1 Complete a separate network of facilities</p> <p>G3 Segregation of cycles from other road users where problems experienced</p> <p>G4 Safety impts (junction facilities)</p> <p>G6 Cycle Parks</p> <p>G7 Cycle priority at junctions</p> <p>G8 Signed cycle routes on existing roads</p> <p>G9 Better surfaced paths</p> <p>H1 Segregation of pedestrians from other road users</p> <p>H2 Impts to safety, security, CCTV, at remote locations</p> <p>H4 Pedestrian priority, wide area traffic calming</p> <p>H5 Safer school routes</p>	<p>Cycle and Pedestrian omissions</p> <p>G2, G5 Bike Stops, Cycle Loans Improvement of cycle facilities as a package must be included in an Option to encourage maximum mode change. Bike stops and cycle loans are wider issues not specific to the A453 corridor</p> <p>G10 Cycle/footbridge across the R. Trent at Clifton Whilst this scheme would create a direct Beeston-Clifton link the limitations of the Transport a robust forecast of levels of use justifying the major expenditure cannot be made.</p> <p>H3 Pedestrianisation There are no significant opportunities for pedestrianisation affecting the A453 corridor not already incorporated in other schemes.</p>
<p>Demand management schemes</p> <p>I1 Road user charges. Nottingham City centre cordon £2?</p> <p>I2 Workplace parking levy Nottingham Derby, Leicester and their District centres £2?</p> <p>I3 HGV restrictions on unsuitable roads.</p> <p>I4 Parking controls Nottingham City Centre -15% capacity?</p> <p>I5 Town and District centre parking charges +15%?</p> <p>I9 Planning links to mode change/traffic Targets</p>	<p>Demand Management omissions</p> <p>I1 and I2 are mutually exclusive. They would not both be applied. One will have to be excluded in the final listing.</p> <p>Parking charges not to apply to private out of town retail centres and supermarkets</p>
<p>Freight schemes</p> <p>J5 Railheads and Sidings</p>	<p>Freight omissions</p> <p>J7 Designated routes There are no opportunities for designated routes that assist the A453 corridor</p> <p>J8 Taxation (adjustments for freight). This is an important factor in influencing modes of freight transport but not likely to be significant for the A453 corridor in the Study period</p>
<p>Travel behaviour</p> <p>K2 Education</p> <p>K4 Green commuter plans</p> <p>K6 Information</p> <p>K7 Public transport Subsidies</p> <p>K8 Reduced costs of using public transport (-10%)*</p>	<p>Travel behaviour omissions</p> <p>K9 Taxes. Possible measures can be examined but not form part of a possible recommended Option because of wider implications.</p> <p>* Lower fares</p>

**Draft COMBINED OPTION Bus Based Public Transport and moderate management**

<b>Scheme List with those having little contribution to A453 corridor omitted</b>	
<p>Rail schemes <i>Major schemes</i> B3 Trent PSB Upgrade (intermediate Scheme: signalling &amp; track changes but no flyovers) B13/15 Nottingham Station Redevelopment B17 P&amp;R Station and Nottingham – Gedling Service <i>Services</i> B6 Nottingham-Parkway service B8 Derby-Nottingham service improvements</p> <p><u>Park &amp; Ride</u> B7 Local P&amp;R at Parkway Station B5 Car parking at local stations</p> <p><u>Other measures</u> B2 Replacement rolling stock (Central Trains) B9/11 Station upgrades to modern facilities, standards inc. real-time information B14 Multi mode smartcard ticketing</p>	<p>Rail omissions B4,12,19,20 New Stations and services – South Notts Rail network. S. Notts rail schemes have little contribution to A453 corridor except for Gedling station which would help operation of Nottingham Station including possibly MML inter City services in addition to attracting journeys between the A453 Corridor and Gedling area.</p> <p>B26 Rail Park &amp; Ride at M1 motorway at Trowell As Park &amp; Ride sites B7 and D24 (E M Parkway and J23a) would attract the major P&amp;R potential of the motorway affecting the A453 corridor this site has little influence.</p> <p>B27 South of Kegworth to EM Airport link Independent light rail or bus services are superior .</p>
<p>Light Rail schemes</p>	<p>Light Rail omissions C9,17 NET extensions to Gamston and A52 Bardills: These are high cost high intervention schemes fitting the max. pub Option but not a bus based moderate Option C2 Extension to Clifton C3(part) NET/Bus/Rail interchanges C13 Clifton South Park &amp; Ride C4, NET extension to Beeston C10, 15 This Option looks at what can be done with bus improvements if NET extensions do not go ahead. Clifton South P&amp;R and Parkway Station P&amp;R sites are separately identified schemes. It can also look at the NET Extension to Clifton i.e. schemes C2,C3(part) and C13 substituted in place of scheme B22 .</p>

<p>Bus schemes</p> <p><i>Works</i></p> <p>D4 M1 Junction 24 priority</p> <p>D21 Local parking at major bus stops</p> <p>D22 Busways instead of NET Extensions (Clifton route only) *</p> <p>D23 New generation bus stops</p> <p>C13 Clifton south P &amp; R site**</p> <p><i>Bus lanes</i></p> <p>D2 A453 Farnborough Rd to Flyover bus lanes</p> <p>D20a Gotham Rd Clifton bus lanes</p> <p><i>Services</i></p> <p>D5 Selected service improvements</p> <p>D10c Clifton Village bus service</p> <p>D15,16,17 A453 corridor and Airport Express bus services</p> <p><u>Other measures</u></p> <p>D12 Bus Marketing</p> <p>D8 Real time information</p> <p>D14 Renewal of bus Fleet</p> <p>D11,18 Integration (NET/Bus/Rail)</p>	<p>Bus omissions</p> <p>D13 M1 junction 24 P&amp;R site: This P&amp;R is close to D24 P&amp;R at J23a, which is a better and more accessible site for most A453 demand. It would be under-used as a consequence.</p> <p>D20b Ring Road bus lanes at A609, Beechdale</p> <p>North of A52/A609 Ring Road is remote from A453 with little influence</p> <p>D7 Core route interchanges</p> <p>D6 Changes to fare structure/level</p> <p>* The scheme for Busways in place of NET extension to Clifton is an equivalent alternative to the NET extension not an additional scheme.</p> <p>** This scheme is listed under Light Rail (C13) but in this option would form a Bus P&amp;R site.</p>
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<p><u>Highway schemes</u></p> <p>E15/25 M1 – Clifton single c’way improvement with hard edge strips, grade separated junctions and climbing lanes, additional bus lane Parkway-M1</p> <p>E13 M1 junction 24 major improvement.</p> <p>E24 Clifton single four lane c’way with bus lanes and improvement to Crusader Roundabout</p>	<p>Highway scheme omissions E2,4,5,7,8,9,14,17,27. These are all individual schemes or sets of schemes competing with those included and are less appropriate to the Option.</p> <p>E16 Measures on corridors adjacent to A453: No positive scheme can be envisaged.</p> <p>E23 Kegworth Southern bypass. Omitted only because it represents expansion of highway capacity and would not benefit A453 corridor without a major scheme for M1 J24.</p>
<p><u>Traffic management schemes</u></p> <p>F5 UTC extension</p> <p>F11 A606 minor improvements</p> <p>F13 30 mph speed limits on A453 in Clifton*</p>	<p>Traffic management omissions F2/12 High Occupancy Lanes: less appropriate to a moderate Option * 50 mph speed limit omitted from M1-Clifton section as inconsistent with standard of road having grade separated junctions and crawler lanes</p>
<p><u>Cycle and Pedestrian schemes</u></p> <p>G1 Complete a separate network of facilities</p> <p>G3,4,7(part) Segregation from other road user and safety improvements including junction priority at problem location</p> <p>G6 Cycle parks</p> <p>G8 Signed on-road routes</p> <p>G9 Better surfacing</p> <p>H1 Pedestrian segregation</p> <p>H2 Impts. To safety &amp; security inc. CCTV</p> <p>H4 Area calming and more crossings</p> <p>H5 Safer school routes</p>	<p>Cycle and Pedestrian omissions G2, G5 Bike Stops, Cycle Loans Improvement of cycle facilities as a package must be included in an Option to encourage maximum mode change. Bike stops and cycle loans are wider issues not specific to the A453 corridor</p> <p>G10 Cycle/footbridge across the R. Trent at Clifton Whilst this scheme would create a direct Beeston-Clifton link the limitations of the Transport model prevent robust forecasting of its use.</p> <p>H3 Pedestrianisation There are no significant opportunities for pedestrianisation affecting the A453 corridor not already incorporated in other schemes.</p>
<p>Freight schemes</p> <p>J5 Railheads</p>	<p>Freight omissions J7 Designated routes There are no opportunities for designated routes that assist the A453 corridor</p> <p>J8 Taxation (adjustments for freight). This is an important factor in influencing modes of freight transport but not likely to be significant for the A453 corridor in the Study period</p> <p>J9 Shared use of bus or other restricted lanes For this scheme to be viable requires exacting conditions e.g. no cyclists or bus stops, wide lanes, no light rail- for safety reasons</p>
<p>I1 Road user charges. Nottingham City centre cordon £2?</p> <p>I2 Workplace Parking Levy £2? Where?</p> <p>I3 HGV restrictions on unsuitable roads</p> <p>I4 Parking controls – Nottingham City centre x%</p> <p>I5 Town and district centre parking charges y%*</p> <p>K2 Education</p>	<p>Demand Management/ Travel Behaviour schemes</p> <p>K9 Taxes. Possible measures can be examined but not form part of a possible recommended Option because of wider implications.</p> <ul style="list-style-type: none"> <li>This does not include private car parks owned by out of town retail centres and supermarkets.</li> </ul> <p>**Lower fares</p>

K4 Green Commuter plans K6 Information K8 Reduced cost of using public transport**	
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**Draft COMBINED OPTION HIGHWAY + public transport**

<b>Scheme List omitting those with little contribution to A453 corridor</b>	
<p>Rail Schemes</p> <p><i>Works</i></p> <p>B3 Trent PSB Upgrade (intermediate scheme: re-signalling and track changes)</p> <p>B13/15 Nottingham Station Redevelopment</p> <p><u>Other measures</u></p> <p>B2 Replacement rolling stock(Central Trains)</p> <p>B9/11 Station upgrades to modern facilities and real time information</p> <p>B14 Multimode smartcard ticketing</p>	<p>Rail omissions</p> <p>B4,12,17,19,20 New Stations and services – South Notts Rail network.</p> <p>S. Notts rail network schemes have little contribution to A453 corridor. B26 Rail Park &amp; Ride at M1 motorway at Trowell:</p> <p>More remote Park and Ride sites would not be needed in a highway expansion Option.</p> <p>B5,7 Car parking at stations: not relevant in a highway expansion Option</p> <p>B6,8 Nottingham-Parkway and improved Nottm.-Derby services: Not needed for highway expansion Option.</p> <p>B27 South of Kegworth to EM Airport link</p> <p>Independent light rail or bus services are superior.</p>
<p>Light Rail schemes</p>	<p>Light Rail omissions</p> <p>All NET and LRT extension schemes</p> <p>Not needed for Highway expansion Option. Buses and existing rail network would provide support in urban area.</p>
<p>Bus Schemes</p> <p><i>Works</i></p> <p>C13 Clifton South P&amp;R site D2 (same scheme as NET P&amp;R site)</p> <p><i>Bus Lanes</i></p> <p><i>Other measures</i></p> <p>D10c Service to Clifton Village</p> <p>D5 Selected timing and frequency improvements</p> <p>D8 Real time bus information</p> <p>D14 Renewal of bus fleet</p> <p>D11,18 Integration (NET/Bus/Rail)</p>	<p>Bus Omissions</p> <p>D2 A453 Farnborough Rd.- A52 Flyover: Not needed with major highway scheme</p> <p>D4 M1J24 bus priority: Not part of highway expansion Option</p> <p>D7 (part)Ring Road Core Route hubs/interchanges: Little contribution under this Option.</p> <p>D20a Bus Lanes Gotham Rd: not needed in highway expansion Option</p> <p>D20b Bus Lanes A52 Ring Road: little contribution under this Option</p> <p>D 5,6,15,16,17 Service improvements: Not part of highway expansion Option.</p> <p>D21,23 Bus waiting environment improvements: Not part of highway expansion Option</p> <p>D13 Bus based P&amp;R adjacent to M1 J24: D22 busways in place of NET. Not part of highway expansion Option.</p>
<p>Highway Schemes</p> <p>E2 M1 - Clifton dualling with grade separated junctions.</p> <p>E5 Clifton red route dualling in cutting – revised scheme with 50mph urban standard A453, 30mph single c'way parallel local road</p> <p>E13 M1 Junction 24 major scheme</p> <p>* Other highway scheme alternatives shown</p>	<p>Highway scheme omissions</p> <p>Competing schemes or sets of schemes.</p>

<p>after the end of this table.</p>	
<p><b>Traffic Management Schemes</b></p> <p>F5 Extension of the UTC system. F11 Minor improvements in alternative A46,A52,and A606 corridors</p>	<p><b>Traffic Management Omissions</b></p> <p>F2/12 Re-allocation of road space: Not part of highway expansion Option. F13 50 and 30mph Speed limits on A453: Limits appropriate to the scheme designs would be used.</p>
<p><b>Cycle / Pedestrian Schemes</b></p> <p>G3,4 Safety improvements at (junctions) Inc .segregation from other users at problem sites G8 Signed cycle routes G9 Better surfaced paths H2 Better pedestrian security / safety / CCTV at remote footway sites H4 Pedestrian priority, wide area traffic calming H5 Safe routes to school</p>	<p><b>Cycle and Pedestrian omissions</b></p> <p>G1 Complete a separate network of cycle facilities, G6 Cycle Parks, G7 Cycle priority at junctions: Not relevant in a highway expansion Option G2, G5 Bike Stops, Cycle Loans Improvement of cycle facilities as a package must be included in an Option to encourage maximum mode change. Bike stops and cycle loans are wider issues not specific to the A453 corridor</p> <p>G10 Cycle/footbridge across the R. Trent at Clifton Whilst this scheme would create a direct Beeston-Clifton link the limitations of the Transport a robust forecast of levels of use justifying the major expenditure cannot be made.</p> <p>H3 Pedestrianisation There are no significant opportunities for pedestrianisation affecting the A453 corridor not already incorporated in other schemes.</p>
<p><b>Freight Schemes</b></p> <p>J5(part) Planning protection for Railhead sites</p>	<p><b>Freight omissions</b></p> <p>J5 Railheads (part): Railfreight is not a key part of a highway expansion Option, but because of the highly constrained availability of suitable sites, the options need to be retained. J7 Designated routes: There are no opportunities for designated routes that assist the A453 corridor J8 Taxation (adjustments for freight). This is an important factor in influencing modes of freight transport but not likely to be significant for the A453 corridor in the Study period J9 Shared use of bus or other restricted lanes For this scheme to be viable requires exacting conditions e.g. no cyclists or bus stops, wide lanes, no light rail- for safety reasons</p>
<p>K2 Education K4 Green Commuter and cars K6 Information K8 Reduced cost of using public transport</p>	<p><b>Demand Management/ Travel Behaviour schemes</b></p> <p>I1 Road user charges. Nottingham City centre cordon I2 Workplace Parking Levy I3 HGV restrictions on unsuitable roads I4 Parking controls – Nottingham City centre I5 Out of town and town centre parking charges K9 Taxes. Possible measures can be examined but not form part of a possible recommended Option because of wider implications.</p>

**Option IVa** is the dual c'way with Red route, E14, E2, E5

**Option IVb** is the dual c'way with Yellow Route, E14, E2, E9  
+ traffic calming in Clifton E7,  
+dualling of A52 Gamston Lings Bar, impt. of Gamston junction and  
possibly single or dual 4<sup>th</sup> Trent crossing

**Option IVd** is single c'way improvements with single c'way Yellow Route, E14, E25,  
E27+ single c'way improvement in Clifton, E7

**Option IVe** is a dual/single combination of dualling M1-Clifton, Single Yellow  
Route, single 4 lane Clifton impt. E14, E2, E27, E24