

7. OPTION DEVELOPMENT AND ASSESSMENT

7.1 INTRODUCTION

7.1.1 Establishing a Preferred Transport Strategy (Section 5) created the foundation for forming and testing various Options under that Strategy, which were then developed, assessed, reviewed and refined to ultimately lead to the Preferred Option.

7.1.2 The Option development and assessment stage brings together the various strands of research initiated at the start of the Study, using the data and results from the Transport Surveys and forecasts from the Transport Model, together with the schemes identified from the sources described in Section 6. The flowchart in Figure 5.1 shows how the research and data feeds information into Option Development. The Figure also shows the Base Year and the Do Minimum situations against which Options are compared.

7.1.3 Option development and assessment followed an iterative process, illustrated in Figure 6.1. As described in Section 6, individual schemes making up the Options at this stage were developed in parallel in order to inform Option Development.

7.2 THE PREFERRED STRATEGY - INITIAL COMBINED OPTIONS

7.2.1 The Preferred Strategy contained some clear scheme implications:

- Emphasis on improvements to public transport
- The use of Demand Management in the urban context
- Measures to encourage walking and cycling
- Measures to influence travel behaviour
- Highway schemes to solve residual problems of congestion and improve safety.

7.2.2 The early indications were that there was good scope for identifying a set of public transport schemes that would be effective and mutually complementary for the Preferred Strategy, although a more detailed examination would be required as the development process continued. The preliminary tests on the Transport Model also showed that Demand Management measures contributed significantly to achieving mode transfer to public transport. The Strategy recognised that Demand Management requires improvements to public transport.

7.2.3 The initial range of Options were shaped up by an initial assessment and sift removing schemes that clearly would not qualify. The exercise identified the main common features of initial Options and the areas of uncertainty.

7.2.4 The Public Transport element consisted of schemes identified as having a contribution to the A453 corridor. For the Demand Management element it remained necessary to test different levels and areas of restraint. The Strategy required the highway schemes primarily to solve residual congestion and improve safety. It was therefore also necessary to find the appropriate level of highway provision to meet this criterion, which linked inevitably to the question of alternative routes and major schemes. Many of the issues for freight are woven into these aspects.

The resulting menu for the Initial Options was:

Public Transport: a common set of interventions and schemes for:

- Improvements in Rail infrastructure and services
- Extensions to the NET system
- Improvement and coordination of bus services

Demand Management

- Different levels and areas of Demand Management

Complementary Measures: a common set of interventions and schemes for:

- Walking and cycling
- Travel behaviour schemes

Highways: Different levels of provision and their associated possible schemes.

7.2.5 To avoid over-complicating the testing and assessment process it was considered that the next stage should test three Options addressing the main areas of uncertainty. They would all have the same Public Transport and Complementary Measures, but test the effect of varying the amount of Demand Management and the performance of the 3 different levels of highway provision.

7.2.6 To enable the Initial Options to be fully defined the possible schemes for highway provision were considered:

- M1 junction 24 minor and major improvements
- Alternative routes for A453 bypasses, concluding that only the eastern route between Clifton and Ruddington should be retained. (A full assessment is in Working Paper 27)
- M1 - Clifton junction and safety improvements
- M1 - Clifton maximum at-grade capacity based on single four lanes and junction improvements
- M1 – Clifton dual carriageway
- Clifton single carriageway eastern bypass
- Clifton dual carriageway eastern bypass
- Clifton dual carriageway on line scheme in retained cutting with two lane local road at ground level.

A two lane single carriageway on line scheme in retained cutting is technically feasible, but has not been included because it is inferior in almost every respect to the dual carriageway version, and the environmental impact would be only marginally less.

7.2.7 The resulting Initial Combined Options were selected by basic matching of the highway schemes:

Option A Public transport, demand management, walk/cycle, freight, travel behaviour schemes
Single carriageway Clifton bypass
Dual carriageway M1 – Clifton
M1 junction 24 major scheme.

Option B Public transport, no demand management, walk/cycle, freight, travel behaviour schemes
Dual carriageway Clifton bypass
Dual carriageway M1 – Clifton
M1 junction 24 major scheme.

Option C Public transport, demand management, walk/cycle, freight, travel behaviour schemes
Clifton minor single carriageway on line scheme
Wide single carriageway M1 – Clifton
M1 junction 24 minor scheme.

Consultation Options

7.2.8 Options A, B, and C were put to Public Consultation in February/March 2002 representing the different levels of highway provision, Option B being the highest level, A intermediate, and C the minimum. Section 8 examines the results of Public Consultation.

7.2.9 The 3 Options were tested in the Transport Model, initially with different levels, then all with the same level, of Demand Management. Key conclusions at this stage obtained from the Transport Model tests and appraisal of the Initial Options showed: -

Option A

- Substantial restraint in traffic growth and transfer to public transport.

Option B

- Substantial increase in use of public transport (but only after addition of Demand Management)
- Attraction of additional traffic into the A453 corridor
- Greatest reduction of traffic through Clifton

Option C

- The greatest effect in restraining traffic growth, the most transfer to public transport.
- Congestion building up again after around 2010.

Demand Management

- Identification of an optimum level and application of Demand Management

7.2.10 The effects on traffic flow and public transport use are shown in Tables 7.1 and 7.2.

7.3 IDENTIFYING A SHORTLIST OF FINAL OPTIONS

7.3.1 The effects and impacts of the Options were considered in more detail, looking for key features that might eliminate them from the final selection. At the same time the Options were reviewed to see if any new improved packages could be derived, and the important comparison with the former Red Route on line scheme introduced. The emphasis at this stage was on the highway schemes, where the differences between the Options lie.

De-selection of Options B and C

Option B

7.3.2 The dual carriageway Clifton eastern bypass in this Option would leave the existing A453 south of Barton Lodge, crossing under the Clifton-Gotham road around mid way between the limit of the houses in Clifton and Barton Lane junction. It would cross the allotments and skirt the southern end of Fairham Brook nature reserve then pass under Clifton Lane, Ruddington near the top of Brook Hill. The route would then follow a direct line, passing over Wilford Road to the A52 mid way between the A60 junction and the Wilford Road Bridge. There would be grade separated junctions at each end, but no intermediate junctions. The southern junction at Barton Lodge would provide for all turning movements. The junction at the A52 would have slip roads allowing access in all directions. The form of junction envisaged is a conventional two-bridge layout over the A52, which would be lowered and realigned in a curve to the south of the existing road.

7.3.3 During its development it was clear that Option B would remove more traffic from the A453 in Clifton than the others, but would attract a significant amount of extra strategic traffic into the corridor. Even when fully developed with the same package of public transport and other modal shift measures as the other Options it still encourages excess traffic. The extra traffic from the bypass would also exceed the capacity on the current heavily loaded A52 Ring road and the roundabout junctions at A60 and A606 compared with the Do Minimum benchmark.

7.3.4 Noise and air quality alongside the existing A453 in Clifton would be improved more with this Option than any of the others because of the lower traffic flows through Clifton.

Table 7.1 Consultation Options, Traffic and Passenger Flows, 2021 AM Peak Hour

Reference Screenlines (Inbound)		2021 AM Peak Hour				
		BY	DM	A	B	C
Outer	Pr	7,450	9,100	9,550	10,000	7,950
	Pt	2,670	3,620	4,180	4,175	4,655
Inter	Pr	9,850	11,400	10,000	10,450	8,800
	Pt	4,000	4,870	6,390	6,410	7,200
Inner	Pr	9,250	10,450	9,350	9,300	7,450
	Pt	4,750	5,005	6,530	6,555	7,290

Changes from Do Minimum (%)

		BY	DM	A	B	C
Outer	Pr	-	-	5	10	-13
	Pt	-	-	15	15	29
Inter	Pr	-	-	-12	-8	-23
	Pt	-	-	31	32	48
Inner	Pr	-	-	-11	-11	-29
	Pt	-	-	30	31	46

A453 Links (Inbound)Traffic Flows

	BY	DM	A	B	C
Thrumpton	1,100	1,350	2,350	2,900	1,300
Clifton – NTU	1,650	1,750	1,300	1000	1,500
Clifton – S’Dale	2,700	2,900	1,900	1,400	2,100
Queens Drive	2,400	2,450	1,950	2,050	1,600
Bypass	-	-	1,150	2,250	-

A52 Links (Northbound)Traffic Flows

	BY	DM	A	B	C
Clifton Bridge	5,000	5,400	4,600	4,550	3,950
Clifton to Bypass	2,900	3,150	2,650	3,150	2,900
Bypass to Knight			3,650	3,500	
Knight to W’croft	2,300	2,400	2,650	2,500	2,300

Key:	BY	Base Year (2000)
	DM	Do Minimum (2021)
	A,B,C	Options (2021)
	Pr	Traffic Flows (vehicles per hour)
	Pt	Public Transport (passengers per hour)

Table 7.2 Consultation Options, Traffic and Passenger Flows, 2021 PM Peak Hour

Reference Screenlines (Outbound)		2021 PM Peak Hour				
		BY	DM	A	B	C
Outer	Pr	-	8,900	7,950	7,900	7,500
	Pt	-	4,385	5,565	5,570	5,455
Inter	Pr	-	11,100	7,700	7,850	7,050
	Pt	-	5,490	9,875	9,885	9,760
Inner	Pr	-	10,000	5,850	6,050	5,650
	Pt	-	5,725	10,380	10,390	10,260

Changes from Do Minimum (%)

		BY	DM	A	B	C
Outer	Pr	-	-	-11	-11	-16
	Pt	-	-	27	27	24
Inter	Pr	-	-	-31	-29	-36
	Pt	-	-	80	80	78
Inner	Pr	-	-	-42	-40	-44
	Pt	-	-	81	81	79

A453 Links (Outbound)Traffic Flows

	BY	DM	A	B	C
Thrumpton	1,250	1,350	1,950	2,150	1,250
Clifton – NTU	1,700	1,700	1,050	700	1,450
Clifton – S’Dale	2,650	2,700	1,250	900	1,750
Queens Drive	1,650	1,900	650	650	600
Bypass	-	-	1,000	1,650	-

A52 Links (Southbound)Traffic Flows

	BY	DM	A	B	C
Clifton Bridge	4,550	4,750	3,500	3,400	3,550
Clifton to Bypass	2,600	2,950	2,100	2,200	2,800
Bypass to Knight			3,350	3,500	
Knight to W’croft	1,950	2,700	2,700	2,800	2,500

Key:	BY	Base Year (2000)
	DM	Do Minimum (2021)
	A,B,C	Options (2021)
	Pr	Traffic Flows (vehicles per hour)
	Pt	Public Transport (passengers per hour)

7.3.5 The introduction of a new major road corridor would cause a wide range of environmental impacts around the bypass, some of them severe, even though the SSSI at Wilwell and Fairham Brook nature reserve would be affected only by proximity. Clifton Pastures south of Clifton is currently a tranquil environment despite its urban fringe location, whilst the crossings of Clifton Lane Ruddington, and Wilford Road would result in severe localised intrusion. The route would lie entirely in the Nottingham Green Belt, which in this area forms a small but important green wedge performing a valuable function in separating and enhancing the environments of Clifton, Silverdale, and Ruddington.

7.3.6 Option C

This Option has only single carriageway schemes for the A453, which Working Paper 35 shows to be unsatisfactory for the M1–Clifton section. If the Option were amended by dualling the section from M1 to Clifton, congestion would reach current levels in the single 2 lane length in Clifton within the Study period even if the junctions were improved. The environmental problems caused by traffic diverting on to minor roads in and around Clifton would increase, whilst the existing high and unpredictable levels of congestion on the A453 would not be reduced. Option C, in retaining a single 2 lane standard for the A453, would not solve the existing problems of congestion, delay, and rat-running at all points along the A453 for the duration of the Study period and would not address a significant proportion of the existing road safety problems. These are sufficient disadvantages for it to be eliminated.

7.3.7 Amongst the GOMMMS sub objectives there are other differences between Options A, B, and C, but they are minor relative to the effects referred to in the preceding paragraphs. Taking all the effects into account the disadvantages of Options B and C are such that they could not be taken forward to the shortlist options.

Additions to the shortlist - Options D and E

7.3.8 Option D

As Option C did not fully overcome the problems of congestion especially in Clifton, a variation of the minimum highway theme was sought with greater capacity. A single 4 lane scheme through Clifton offered the possibility. This raised the question of the appropriate level of highway provision at M1 junction 24 and for M1 – Clifton. In view of the substantial addition to the amount of highway construction implied for this minimum highway Option, an assessment in some detail, set out in Working Paper 35, was undertaken, concluding that the Major scheme at J24 and a dual carriageway M1 – Clifton is necessary to support this Option.

7.3.9 Option E

Having established the basic form of Options under the Preferred Strategy and the effects of the main components, it was appropriate to make the important comparisons with the former Red Route scheme for Clifton. The level of highway provision is similar to Option B i.e. a dual carriageway basically for through traffic, with a single two lane road for local Clifton traffic. There would however be major differences in the environmental effects, and possibly significant differences in traffic loading especially on and around the A52 Nottingham Ring Road.

7.3.10 Description of the Modified Red Route in Option E

The essence of the scheme is the dual two lane urban trunk road with a 40 mph speed limit on the line of the existing A453 through the Clifton section, at a depth of about 6m below ground level, and contained between retaining walls. It returns to ground level south of Crusader roundabout and at the other end, north of Farnborough Road/Fabis Drive. A two lane parallel local road at ground level would serve the existing local road network and connect all the existing junctions, with bridges where necessary. Access points between the trunk road and the local road would be by a pair of south facing slip roads south of Green Lane and a north facing pair at Farnborough Road/Fabis Drive.

7.3.11 Effects of the Modified Red Route in Option E

In this Option there are 6 lanes of highway in the Clifton corridor, the same level of provision as in Option B with the dual carriageway eastern bypass and 2 lane existing A453. All the traffic is concentrated in the corridor, but the noise impact would be reduced by lowering the main carriageway an average 6m below ground level in cutting. Local air quality would be worse than in the other Options. The road would have a severe impact on its immediate surroundings because of the scale and hard character of the road construction with its concrete retaining walls and bridges close to a large housing area.

Option brought forward from Consultation – Option A1

Option A1

7.3.12 The environmental and other impacts of Option A are significantly different from Option B. It would still have the basic intrusive effect of the new road corridor, but would on average be around 12m (one third) narrower overall, and carry half the traffic at around 10mph lower speeds. The smaller scale of construction would enable screening and mitigation to be more effective. This Option was therefore carried forward to the final stage, incorporating minor adjustments from the ongoing refinement through the transport modelling and assessment process, and called Option A1.

7.3.13 Traffic on the existing A453 in Clifton would be about one third greater than with Option B, resulting in noise and air pollution levels similar to those in the Base Year (2000) by the year 2021. Not all of the current problems on the A453 through Clifton would therefore be addressed by the scheme, although the bypass would mitigate the problem of through traffic using Clifton Lane/Green Lane between Clifton and Ruddington.

7.3.14 Option A1 would solve congestion in the corridor, but worsen congestion on the road network connecting with the A453, in particular the A52 Ring Road (Ref. Table 7.1). It would require further major highway schemes, some of which e.g. widening of the A52 between Clifton bridge and the A60 at Nottingham Knight, would severely affect the surrounding infrastructure and could not be assured. It would create a new road corridor in Green Belt land, and have other adverse environmental impacts. In Option A1, traffic to and from the west and centre of Nottingham would continue to use the existing A453 through Clifton, some 45% of the total A453 traffic south of Clifton, but traffic is not attracted from outside the A453 corridor.

7.3.15 **The Shortlisted Options:**

- Option A1** Public transport, demand management, walk/cycle, freight, travel behaviour schemes (reviewed and updated)
Single carriageway Clifton bypass
Dual carriageway M1 – Clifton
M1 junction 24 major scheme.
- Option D** Public transport, demand management, walk/cycle, freight, travel behaviour schemes (reviewed and updated)
Clifton single 4 lane carriageway scheme
Dual carriageway M1 – Clifton
M1 junction 24 major scheme.
- Option E** Public transport, demand management, walk/cycle, freight, travel behaviour schemes (reviewed and updated)
Clifton Red Route dual carriageway scheme in retained cutting
Dual carriageway M1 – Clifton
M1 junction 24 major scheme.

7.3.16 Options A1, D, and E were tested further in the Transport Model and assessed in accordance with GOMMMS. The effects on traffic flow and public transport use are shown in Tables 7.4 and 7.5.

7.4 **SELECTING THE PREFERRED OPTION**

For the final stage of selection, the shortlisted Options as required by GOMMMS were reviewed and summarised across the full range of criteria and objectives as follows before reaching a conclusion:

- Transport forecasts and operational assessment
- Appraisal Summary Tables
- Local Objectives Summary Tables
- Commentary under GOMMMS sub objectives
- Supporting Analyses for - Distribution and Equity, Affordability and Financial Sustainability, Practicality and Public Acceptability

7.4.1 **Transport forecasts and operational assessment**

The basic travel characteristics are shown on Table 7.3. The forecasts of traffic flows and numbers of passengers on public transport are shown on Tables 7.4 and 7.5.

7.4.2 **Key findings for Option A1**

- Compared with the Do Minimum scenario, Option A1 gives rise to a modest (+6%) increase in inbound traffic crossing the outer screen line during the AM peak hour, and more significant decreases in inbound traffic crossing the intermediate and inner screen lines (decreases of -12% and -11% respectively). During the PM peak hour, more significant decreases in outbound trips crossing the outer (-8%), intermediate (-32%) and inner (-41%) screenlines are forecast.
- Of options A1, D and E, A1 offers the most significant increase in public transport-based trips across the three screenlines (+16% to +34% inbound during the AM peak hour, +26% to +86% outbound during the PM peak hour) compared with the Do Minimum scenario.
- The scheme does not give rise to a significant change in total vehicle kilometres travelled, either by private or public transport. Peak inbound total vehicle hours (private) are reduced (-12% AM, -34% PM).

7.4.3 **Key findings for Option D**

- Compared with the Do Minimum scenario, Option D gives rise to a modest (+9%) increase in inbound traffic crossing the outer screen line during the AM peak hour, and more significant decreases in inbound traffic crossing the intermediate and inner screen lines (decreases of -14% and -11% respectively). During the PM peak hour, decreases in outbound trips crossing the outer (-11%), intermediate (-34) and inner (-41%) screenlines are forecast.
- There are significant increases in public transport-based trips across the three screenlines (+13% to +31% inbound during the AM peak hour, +25 to +81% outbound during the PM peak hour) compared with the Do Minimum scenario.
- The scheme does not give rise to a significant change in total vehicle kilometres travelled, either by private or public transport. Peak inbound total vehicle hours (private) are reduced (-12% AM, -45% PM).

7.4.4 **Key findings for Option E**

- Compared with the Do Minimum scenario, Option E gives rise to an increase (+9%) in inbound traffic crossing the outer screen line during the AM peak hour, offset by decreases in traffic crossing the intermediate and inner screen lines (-12% and -12% respectively). During the PM peak hour, decreases in outbound trips crossing the outer (-9%), intermediate (-32%) and inner (-41%) screenlines are forecast.

- There are significant increases in public transport-based trips across the three screenlines (+16% to +33% inbound during the AM peak hour, +27% to +84% outbound during the PM peak hour) compared the Do Minimum scenario.
- The scheme does not give rise to a significant change in total vehicle kilometres travelled, either by private or public transport. Peak inbound total vehicle hours (private) are reduced (-12% AM, -34% PM).

7.4.5 **Appraisal Summary Tables**

A distilled version of the Option AST focussing on the ‘more important facets.’ This does not imply that the eliminated sub-objectives are unimportant or that they have not been considered in the Study but that they did not assist in distinguishing between Options. These ASTs for Options A1, D and E are shown in Tables 7.6, 7.7 and 7.8 below respectively. Full ASTs are contained in Appendix 7.2.

7.4.6 **Local Objectives Summary Tables**

The shortlisted Options have been appraised in the Local objective Appraisal Summary Tables. Tables for Options A1, D and E are shown in Tables 7.9, 7.10 and 7.11 below respectively.

7.4.7 **Supporting Analyses**

The AST shows the assessment of the Option package against the Government’s criteria, but GOMMS stipulates that three further areas of supporting investigation need to be presented:

- i) Distribution and Equity
- ii) Affordability and Financial Sustainability
- iii) Practicality and Public Acceptability

The supporting analyses cover these aspects.

Table 7.3 Comparison of Key Network Summary Statistics for the Short List Options (2021)

	OPTION									
	BY		DM		A1		D		E	
	AM Inbound	PM outbound	AM Inbound	PM outbound	AM Inbound	PM outbound	AM Inbound	PM outbound	AM Inbound	PM outbound
Total distance travelled by road (Vehicle-km)	3,692,808	3,823,120	4,581,085	4,707,171	4,478,547	4,439,238	4,480,328	4,438,957	4,479,094	4,439,661
Percentage change compared with Base Year	-	-	-	-	21%	16%	21%	16%	21%	16%
Percentage change compared with Do Minimum	-	-	-	-	-2%	-6%	-2%	-6%	-2%	-6%
Total time spent travelling by road (Veh-hours)	64,396	67,493	89,596	118,656	78,997	77,997	79,101	65,157	78,888	77,937
Percentage change compared with Base Year	-	-	-	-	23%	16%	23%	-3%	23%	15%
Percentage change compared with Do Minimum	-	-	-	-	-12%	-34%	-12%	-45%	-12%	-34%
Total travel by public transport (Veh-km)	90,808	90,808	98,616	98,616	102,363	102,363	101,840	101,840	102,063	102,063
Percentage change compared with Base Year	-	-	-	-	13%	13%	12%	12%	12%	12%
Percentage change compared with Do Minimum	-	-	-	-	4%	4%	3%	3%	3%	3%

Table 7.4 Short List Options, Traffic and Passenger Flows, 2021 AM Peak Hour

Reference Screenlines (Inbound)						
		BY	DM	A1	D	E
Outer	Pr	7,450	9,100	9,650	9,900	9,950
	Pt	2,670	3,620	4,190	4,105	4,190
Inter	Pr	9,850	11,400	10,000	9,800	10,000
	Pt	4,000	4,870	6,485	6,340	6,450
Inner	Pr	9,250	10,450	9,300	9,350	9,200
	Pt	4,750	5,005	6,700	6,560	6,675

Changes from Do Minimum (%)

		BY	DM	A1	D	E
Outer	Pr	-	-	6	9	9
	Pt	-	-	16	13	16
Inter	Pr	-	-	-12	-14	-12
	Pt	-	-	33	30	32
Inner	Pr	-	-	-11	-11	-12
	Pt	-	-	34	31	33

A453 Links (Inbound)Traffic Flows

	BY	DM	A1	D	E
Thrumpton	1,100	1,350	2,300	2,500	2,700
Clifton – NTU	1,650	1,750	1,300	2,450	2,850
Clifton – S’Dale	2,700	2,900	1,900	3,050	3,350
Queens Drive	2,400	2,450	1,950	2,150	2,150
Bypass	-	-	1,150	-	-

A52 Links (Northbound)Traffic Flows

	BY	DM	A1	D	E
Clifton Bridge	5,000	5,400	4,550	4,850	4,900
Clifton to Bypass	2,900	3,150	3,650	3,100	3,200
Bypass to Knight			2,650		
Knight to W’croft	2,300	2,400	2,650	2,450	2,500

Key:	BY	Base Year (2000)
	DM	Do Minimum (2021)
	A1, D, E	Options (2021)
	Pr	Traffic Flows (vehicles per hour)
	Pt	Public Transport (passengers per hour)

Table 7.5 Short List Options, Traffic and Passenger Flows, 2021 PM Peak Hour

Reference Screenlines (Outbound)		2021 PM Peak Hour				
		BY	DM	A1	D	E
Outer	Pr	7,600	8,900	8,150	7,900	8,100
	Pt	2,665	4,385	5,545	5,460	5,565
Inter	Pr	10,300	11,100	7,550	7,300	7,500
	Pt	3,915	5,490	9,980	9,705	9,895
Inner	Pr	8,450	10,000	5,950	5,950	5,900
	Pt	5,210	5,725	10,650	10,385	10,555

Changes from Do Minimum (%)

		BY	DM	A1	D	E
Outer	Pr	-	-	-8	-11	-9
	Pt	-	-	26	25	27
Inter	Pr	-	-	-32	-34	-32
	Pt	-	-	82	77	80
Inner	Pr	-	-	-41	-41	-41
	Pt	-	-	86	81	84

A453 Links (Outbound)Traffic Flows

	BY	DM	A1	D	E
Thrumpton	1,250	1,350	2,000	1,950	2,100
Clifton – NTU	1,700	1,700	1,000	1,850	2,050
Clifton – S’Dale	2,650	2,700	1,200	2,050	2,300
Queens Drive	1,650	1,900	650	700	750
Bypass	-	-	1000	-	-

A52 Links (Southbound)Traffic Flows

	BY	DM	A1	D	E
Clifton Bridge	4,550	4,750	3,500	3,650	3,700
Clifton to Bypass	2,600	2,950	3,300	2,800	2,850
Bypass to Knight			2,100		
Knight to W’croft	1,950	2,650	2,700	2,450	2,450

Key:	BY	Base Year (2000)
	DM	Do Minimum (2021)
	A,B,C,D,E,A1	Options (2021)
	Pr	Traffic Flows (vehicles per hour)
	Pt	Public Transport (passengers per hour)

TABLE 7.6 Distillation of Appraisal Summary Table Option A1

OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise	Slight adverse impacts from public transport schemes –mainly NET and rail - offset by their effect in road traffic reduction. Slight adverse from M1-Clifton dualling. Moderate impact from Single c'way bypass. The single carriageway eastern bypass would cause only less than 10 instances of high noise levels at dwellings (over L ₁₀ 70dbA), but a large number, around 70, would experience large increases, 5 – 10dbA from very low current ambient levels, despite the potential for mitigation with earth mounding. Houses alongside the existing A453 would gain slight relief of about 2 dbA.	Large increase – 70 houses Slight decrease- 150	Moderate Adverse
	Local Air Quality	Moderate benefits from public transport schemes. Negligible impact from M1-Clifton dualling. Slight benefit in Clifton from splitting traffic on bypass and existing road. Exceedences of the LAQ limit for NO2 occur at properties close to the ring road between Silverdale and the Bypass junction and Clifton Lane, Ruddington. Properties along the urban A453 will have NO2 levels below the national limit. No exceedences occur above the PM10 national limit. Bypass traffic creates moderate impact at crossing points.	Zones: NO2 PM10 'Losing' 10, 10. 'Winning' 4 4 Same 8 8.	Slight Adverse
	Landscape	Neutral or slight adverse impact from public transport schemes. Clifton Park & Ride site would adversely affect the rural setting. M1-Clifton dualling would slightly increase the impact of the existing highway corridor. Moderate to large adverse impacts from Clifton bypass which would affect an area of open rural landscape and Green Belt.		Moderate Adverse
	Townscape	Slight adverse impact from NET schemes. Slight adverse impact from bypass on quality of urban fringe amenity areas, affecting the local communities valued recreational and visual resource.		Slight Adverse
	Heritage of Historic Resources	Strong chance of bypass directly affecting archeological sites not known to be exceptional. Slight adverse impact of minor widening near Clifton Green.		Slight Adverse
	Biodiversity	Slight adverse impacts from Trent junction rail flyovers and M1-Clifton dualling. Moderate adverse impact from eastern bypass, affecting regionally important designated sites, causing direct loss of habitat to a local nature reserve and passing adjacent to a SSSI.		Moderate Adverse
	Water Environment	Moderate adverse impact from eastern bypass on Fairham Brook valley.		Moderate Adverse
SAFETY	Accidents	Large reduction in road accidents through improved standard of the major highway. 30 Year saving of: 9,087 casualties, 668 fatal and serious casualties. A saving of 21 PIAs from the Do Minimum is expected in 2021 along the A453 corridor including the bypass. The change occurs due to the transferral of traffic from a single high speed road on to a modern dual carriageway in rural situation. A benefit also occurs due to the split of traffic on to the bypass resulting in better driving conditions on the existing A453.	PVB = £96m	Large Benefit
ECONOMY	Transport Economic Efficiency	The strategy provides a high return on investment. The strategy provides a Net Present Value of £1,728m on a Present Value Cost of £246m, with a benefit to cost ratio of 7.30.	Net Present Value £1.730m	Benefit to cost ratio of 8.15.
	Reliability	Moderate benefits from public transport and demand management schemes working together to check traffic growth and change mode of transport. Moderate benefit of the major highway schemes removing the rest of A453 congestion. Increased capacity along within the corridor would see saturation levels drop to around 55-70% on a typical rural section and 80-95% along the Clifton corridor.		Moderate Benefit
ACCESSIBILITY	Severance	Slight increases in severance from NET schemes on-street and rail schemes at level crossings. Moderate increase along footpaths crossing eastern Clifton bypass. Reduction on A453 Clifton due to the reduction in traffic. The urban A453 would have limited access, but with five controlled crossings for pedestrians along its length. Moderate benefit from cycle and pedestrian schemes.		Slight Adverse
INTEGRATION	Land Use Policy	Moderate adverse impact from Clifton Eastern bypass. Slight adverse impact from Clifton Park & Ride & M1-Clifton dualling		Adverse

Omissions

1. Greenhouse Gases- the objective is assessed over the study area. All three Options produce similar results. Each Option reduces CO2 compared to the Do Minimum situation
2. Physical Fitness – the objective is based upon pedestrian and cycle schemes which are the same in all options. Very slight variations occur due to different degrees of mode transfer in the Options.
3. Journey Ambience – the integrated PT and highway improvements in each Option each provide a similar benefit. Very slight variations occur due to different degrees of mode transfer in the Options.
4. Security – The slight change from the Do Minimum results from Public Transport improvements which are the same for the three options.
5. Wider Economic Impacts – No change affecting economic problems or opportunities in the three options. Very Similar benefits due to reduced congestion.
6. Option Values – Benefits occur within the same Public Transport package for Options A1, D and E.
7. Access to the Transport System – As Option Values
8. Transport Interchange – As Option Values
9. Other Government Policies – Negligible specific impacts for A1, D and E

TABLE 7.7 Distillation of Appraisal Summary Table Option D

OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise	Slight adverse impacts from public transport schemes –mainly NET and rail. Landscaped scheme on A453 in Clifton gives slight benefit compared with do-minimum. Houses alongside the A453 would experience an increase of around 2 dB(A) but possible mitigation measures include small barriers, mounding and landscaping. Negligible change from the Do Minimum is expected for properties situated close to the ring road.	Slight increase 50houses Slight decrease 100	Neutral
	Local Air Quality	Moderate benefits from public transport schemes. Negligible impact from M1-Clifton scheme. Slight additional impact from higher traffic flows on A453 in Clifton. Exceedences of the LAQ limit for NO2 occur at properties close to the ring road between Silverdale and the Bypass junction and properties alongside the A453. No exceedences occur above the PM10 national limit.	Zones: NO2 PM10 Losing 4 5 Winning 4 4 Same 11 12	Slight adverse
	Landscape	Neutral or slight adverse impact from public transport schemes. . Clifton Park & Ride site would adversely affect the rural setting. M1-Clifton dualling would slightly increase the impact of the existing highway corridor.		Slight Adverse
	Townscape	Slight adverse impact from NET schemes. Slight adverse from enlargement of A453 through Clifton		Slight Adverse
	Heritage of Historic Resources	Small risk of directly affecting archeological sites not known to be exceptional. Slight adverse impact of minor widening near Clifton Green.		Slight Adverse
	Biodiversity	Slight adverse impacts from Trent junction rail flyovers and M1-Clifton dualling.		Slight Adverse
	Water Environment	Negligible changes affecting the water environment. Small area of flood plain required for M1 –Clifton widening.		Neutral
SAFETY	Accidents	Large reduction in road accidents through improved standard of the major highway. 30 Year Saving of: 9,842 Casualties, 718 fatal and serious casualties. A saving of 20 PIAs from the Do Minimum is expected in 2021 along the A453 corridor. The change occurs due to the introduction of a modern dual carriageway in rural situation and onto a modern 30 mph single 4 lane stretch through Clifton.	PVB £102m	Large Benefit
ECONOMY	Transport Economic Efficiency	The strategy provides a high return on investment. The strategy provides a Net Present Value of £1,713m on a Present Value Cost of £258m, with a benefit to cost ratio of 7.65.	Net Present Value £1,713m	Benefit to cost ratio of 7.65.
	Reliability	Moderate benefit from earlier possible implementation relieving A453 congestion. Increased capacity along the corridor would see saturation levels drop to around 55-70% on rural sections and 75-95% along the Clifton corridor at peak flows.		Moderate Benefit
ACCESSIBILITY	Severance	Slight increases in severance from NET schemes on-street and rail schemes at level crossings. A453 in Clifton would remain at similar levels to do minimum. The urban A453 would have limited access, but with five controlled crossings for pedestrians along its length. Slight benefit for cycle and pedestrian schemes		Slight Adverse
INTEGRATION	Land Use Policy	Slight adverse impact from Clifton Park & Ride & M1-Clifton dualling		Slight Adverse

Omissions

1. Greenhouse Gases- the objective is assessed over the study area. All three Options produce similar results. Each Option reduces CO2 compared to the Do Minimum situation
2. Physical Fitness – the objective is based upon pedestrian and cycle schemes which are the same in all options. Very slight variations occur due to different degrees of mode transfer in the Options.
3. Journey Ambience – the integrated PT and highway improvements in each Option each provide a similar benefit. Very slight variations occur due to different degrees of mode transfer in the Options.
4. Security – The slight change from the Do Minimum results from Public Transport improvements which are the same for the three options.
5. Wider Economic Impacts – No change affecting economic problems or opportunities in the three options. Very Similar benefits due to reduced congestion.
6. Option Values – Benefits occur within the same Public Transport package for Options A1, D and E.
7. Access to the Transport System – As Option Values
8. Transport Interchange – As Option Values
9. Other Government Policies – Negligible specific impacts for A1, D and E

TABLE 7.8 Distillation of Appraisal Summary Table Option E

OBJECTIVE	SUB-OBJECT-IVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise	Slight adverse impacts from public transport schemes –mainly NET and rail. Lowered scheme on A453 in Clifton gives slight benefit compared with do-minimum. Houses alongside the A453 would experience an decrease of around3 dB(A) compared to the Do Minimum, due to the shielding effect of the cutting. Negligible change from the Do Minimum is expected for properties situated close to the ring road.	Moderate decrease -130 houses	Slight benefit
	Local Air Quality	Moderate benefits from public transport schemes. Negligible impact from M1-Clifton scheme. Moderate additional impact from higher traffic flows on A453 in Clifton. Exceedences of the LAQ limit for NO2 occur at properties close to the ring road between Silverdale and the Bypass junction and properties alongside the A453. No exceedences occur above the PM10 national limit.	Zones: NO2 PM10 Losing 4 5 Winning 4 4 Same 11 12	Moderate adverse
	Landscape	Neutral or slight adverse impact from public transport schemes. . Clifton Park & Ride site would adversely affect the rural setting. M1-Clifton dualling would slightly increase the impact of the existing highway corridor.		Moderate Adverse
	Townscape	Slight adverse impact from NET schemes. Large adverse from major earthworks and construction on A453 through Clifton. The scale of the scheme would have an intimidating and divisive overall effect on the urban area.		Large Adverse
	Heritage of Historic Resources	Small risk of directly affecting archeological sites not known to be exceptional. Moderate adverse impact of widening near Clifton Green due to large scale of road construction.		Moderate Adverse
	Biodiversity	Slight adverse impacts from Trent junction rail flyovers and M1-Clifton dualling.		Slight Adverse
	Water Environment	Minor changes affecting the water environment. Small area of flood plain required for M1 to Clifton widening. Construction in low permeability ground		Neutral
SAFETY	Accidents	Large reduction in road accidents through improved standard of the major highway. 30 Year saving of : 10,215 casualties, 739 fatal and serious casualties. A saving of 24 PIAs from the Do Minimum is expected in 2021 along the A453 corridor. The change occurs due to the transferral of traffic from a single high-speed road on to a modern dual carriageway with limited access in both the urban and rural situations.	PVB = £104m	Large Benefit
ECONOMY	Transport Economic Efficiency	The strategy provides a high return on investment. The strategy provides a Net Present Value of £1,741m on a Present Value Cost of £258m, with a benefit to cost ratio of 7.74.	Net Present Value = £1,741m.	Benefit to Cost Ratio of 7.74.
	Reliability	Moderate benefit from relief of A453 congestion. Increased capacity along the corridor would see saturation levels drop to around 55-70% on rural sections and 60-80% along the Clifton corridor at peak flows.		Moderate Benefit
ACCESSIBILITY	Severance	Slight increases in severance from NET schemes on-street and rail schemes at level crossings. A453 in Clifton would remain at similar levels to do minimum. Although it would be easier to cross on foot or by vehicle using the bridges corresponding with the existing roads and crossings, the overall effect would be intimidating and divisive, and there would still need to be pelican crossings on the parallel service road. Slight benefit for cycle and pedestrian schemes		Slight Adverse
INTEGRATION	Land Use Policy	Slight adverse impact from Clifton Park & Ride & M1-Clifton dualling		Slight Adverse

Omissions

1. Greenhouse Gases- the objective is assessed over the study area. All three Options produce similar results. Each Option reduces CO2 compared to the Do Minimum situation
2. Physical Fitness – the objective is based upon pedestrian and cycle schemes which are the same in all options. Very slight variations occur due to different degrees of mode transfer in the Options.
3. Journey Ambience – the integrated PT and highway improvements in each Option each provide a similar benefit. Very slight variations occur due to different degrees of mode transfer in the Options.
4. Security – The slight change from the Do Minimum results from Public Transport improvements which are the same for the three options.
5. Wider Economic Impacts – No change affecting economic problems or opportunities in the three options. Very Similar benefits due to reduced congestion.
6. Option Values – Benefits occur within the same Public Transport package for Options A1, D and E.
7. Access to the Transport System – As Option Values
8. Transport Interchange – As Option Values
9. Other Government Policies – Negligible specific impacts for A1, D and E

Table 7.9 Distillation Local Objectives Option A1

Local Objective	Qualitative Impacts	Assessment
To increase sustainable accessibility to centres and facilities in ways that enhance economic activity, encourage development in and reduce social exclusion from these centres.	Improved local transport and reduced congestion will improve accessibility to local centres.	Slight Benefit
To eliminate the temporary isolation of communities through congestion.	Option significantly reduces 'rat running' through rural villages and bypass reduces traffic along the urban A453.	Moderate Benefit
To reduce traffic growth and to encourage modal change away from the private car particularly for short journeys including travel to schools, shops and other local facilities.	Encouragement of green commuter plans, travel education and safer school routes	Slight Benefit
To improve the quality and reliability of public transport.	Significant improvement and investment into Public Transport	Moderate Benefit
To improve integration between modes.	High quality interchanges proposed between bus, NET, and rail routes.	Slight Benefit
To integrate land use and transport planning by ensuring all new major development is well connected to the public transport system and accessible on foot and by cycle.	Known developments accounted for within planning data.	Moderate Benefit
To reduce the need to travel.	No significant change	Neutral
To maintain and enhance Greater Nottingham's accessibility to regional national, and international markets, particularly by modes other than the car.	Reduced congestion on A453 allows easier to EMA and Nottingham City Centre. Rail developments at Trent junction and Parkway will improve national and international connections.	Moderate Benefit
To make allowance for the operation and viability of East Midlands Airport envisaged in the Draft Regional Planning Guidance.	Significant improvements at Junction 24 along with the M1 to Clifton dualling cater for airport growth.	Slight Benefit
To reduce social exclusion and to improve the accessibility to transport for disadvantaged groups, particularly disabled people.	Lower traffic flows along the urban A453 reduces severance and a high quality NET service along with high quality buses improve accessibility to PT.	Moderate Benefit
To relieve communities from the adverse effects of through traffic, particularly heavy goods vehicles.	Bypass will reduce OGV traffic through Clifton and improved rural A453 will reduce OGV traffic through local villages.	Moderate Benefit
To reduce rat-running through Clifton and the villages in the Study area.	Bypass will reduce traffic through Clifton and improved rural A453 will reduce traffic through local villages.	Moderate Benefit
To maximise efficiency and maintain the structural integrity of existing transport networks	Current Public Transport routes maintained and improved. A453 rural highway corridor improved with bypass corridor created to relive urban section	Large Benefit
To increase transport choice in rural areas.	Maintenance of rural bus services.	Slight Benefit
To improve local air quality and to alleviate other transport impacts on health.	Bypass effectively improves air quality through Clifton but deteriorates along the bypass route.	Slight Adverse
To resolve accident problems area wide and on the A453 and improve local road safety, particularly for vulnerable road users.	Large reduction in road accidents through improved standard of the major highway. 30 Year saving of: 9,087 casualties, 668 fatal and serious casualties.	Large Benefit
To avoid or minimise the use of greenfield land and the impact on the natural environment in the corridor, particularly the most vulnerable or valued areas.	Bypass requires significant land take in an area of highly valued greenfield environment.	Adverse

Table 7.10 Distillation Local Objectives Option D

Local Objective	Qualitative Impacts	Assessment
To increase sustainable accessibility to centres and facilities in ways that enhance economic activity, encourage development in and reduce social exclusion from these centres.	Improved local transport and reduced congestion will improve accessibility to local centres.	Slight Benefit
To eliminate the temporary isolation of communities through congestion.	Reduced congestion along A453 significantly reduces 'rat running' through rural villages.	Slight Benefit
To reduce traffic growth and to encourage modal change away from the private car particularly for short journeys including travel to schools, shops and other local facilities.	Encouragement of green commuter plans, travel education and safer school routes	Slight Benefit
To improve the quality and reliability of public transport.	Significant improvement and investment into Public Transport	Moderate Benefit
To improve integration between modes.	High quality interchanges proposed between bus, NET, and rail routes.	Slight Benefit
To integrate land use and transport planning by ensuring all new major development is well connected to the public transport system and accessible on foot and by cycle.	Known developments accounted for within planning data.	Moderate Benefit
To reduce the need to travel.	No significant change	Neutral
To maintain and enhance Greater Nottingham's accessibility to regional national, and international markets, particularly by modes other than the car.	Reduced congestion on A453 allows easier to EMA and Nottingham city Centre. Rail developments at Trent junction and Parkway will improve national and international connections.	Moderate Benefit
To make allowance for the operation and viability of East Midlands Airport envisaged in the Draft Regional Planning Guidance.	Significant improvements at Junction 24 along with the M1 to Clifton dualling cater for airport growth.	Slight Benefit
To reduce social exclusion and to improve the accessibility to transport for disadvantaged groups, particularly disabled people.	Improved crossing points along the urban A453 and a high quality NET service along with high quality buses improve accessibility to PT.	Slight Benefit
To relieve communities from the adverse effects of through traffic, particularly heavy goods vehicles.	Improved rural A453 will reduce OGV traffic through rural villages.	Slight Benefit
To reduce 'rat-running' through Clifton and the villages in the Study area.	Reduced congestion along A453 will reduce 'rat-running' through Clifton and improved rural A453 will reduce traffic through local villages.	Moderate Benefit
To maximise efficiency and maintain the structural integrity of existing transport networks	Current Public Transport routes maintained and improved. A453 highway corridor improved.	Large Benefit
To increase transport choice in rural areas.	Maintenance of rural bus services.	Slight Benefit
To improve local air quality and to alleviate other transport impacts on health.	Increased traffic on the urban A453 reduces the standard of local air quality.	Slight Adverse
To resolve accident problems area wide and on the A453 and improve local road safety, particularly for vulnerable road users.	Large reduction in road accidents through improved standard of the major highway. 30 Year Saving of: 9,842 Casualties, 718 fatal and serious casualties.	Large Benefit
To avoid or minimise the use of greenfield land and the impact on the natural environment in the corridor, particularly the most vulnerable or valued areas.	Slight land take required for carriageway widening but in less sensitive areas.	Neutral

Table 7.11 Distillation Local Objectives Option E

Local Objective	Qualitative Impacts	Assessment
To increase sustainable accessibility to centres and facilities in ways that enhance economic activity, encourage development in and reduce social exclusion from these centres.	Improved local transport and reduced congestion will improve accessibility to Nottingham City, District, and local centres.	Slight Benefit
To eliminate the temporary isolation of communities through congestion.	Reduced congestion along A453 significantly reduces 'rat running' through rural villages.	Slight Benefit
To reduce traffic growth and to encourage modal change away from the private car particularly for short journeys including travel to schools, shops and other local facilities.	Encouragement of green commuter plans, travel education and safer school routes	Slight Benefit
To improve the quality and reliability of public transport.	Significant improvement and investment into Public Transport	Moderate Benefit
To improve integration between modes.	High quality interchanges proposed between bus, NET, and rail routes.	Slight Benefit
To integrate land use and transport planning by ensuring all new major development is well connected to the public transport system and accessible on foot and by cycle.	Known developments accounted for within planning data.	Moderate Benefit
To reduce the need to travel.	No significant change	Neutral
To maintain and enhance Greater Nottingham's accessibility to regional national, and international markets, particularly by modes other than the car.	Reduced congestion on A453 allows easier to EMA and Nottingham City Centre. Rail developments at Trent junction and Parkway will improve national and international connections.	Moderate Benefit
To make allowance for the operation and viability of East Midlands Airport envisaged in the Draft Regional Planning Guidance.	Significant improvements at Junction 24 along with the M1 to Clifton dualling cater for airport growth.	Slight Benefit
To reduce social exclusion and to improve the accessibility to transport for disadvantaged groups, particularly disabled people.	Pedestrian bridges across the urban A453 in cutting and a high quality NET service along with high quality buses improves accessibility to PT.	Moderate Benefit
To relieve communities from the adverse effects of through traffic, particularly heavy goods vehicles.	Improved rural A453 will reduce OGV traffic through rural villages. The dualled urban section will attract more traffic but it will be segregated from the residents.	Slight Benefit
To reduce 'rat-running' through Clifton and the villages in the Study area.	Reduced congestion along A453 will reduce 'rat-running' through Clifton and improved rural A453 will reduce traffic through local villages.	Moderate Benefit
To maximise efficiency and maintain the structural integrity of existing transport networks	Current Public Transport routes maintained and improved. A453 highway corridor improved.	Large Benefit
To increase transport choice in rural areas.	Maintenance of rural bus services.	Slight Benefit
To improve local air quality and to alleviate other transport impacts on health.	Increased traffic on the urban A453 reduces the standard of local air quality.	Moderate Adverse
To resolve accident problems area wide and on the A453 and improve local road safety, particularly for vulnerable road users.	Large reduction in road accidents through improved standard of the major highway. 30 Year saving of : 10,215 casualties, 739 fatal and serious casualties.	Large Benefit
To avoid or minimise the use of greenfield land and the impact on the natural environment in the corridor, particularly the most vulnerable or valued areas.	Slight land take due to carriageway widening including sensitive areas.	Adverse

7.4.8 Noise

GOMMMS uses a standard method to find the number of people annoyed by a scheme, but it was felt that further detailed assessment was required. A full noise assessment in accordance with the Calculation of Road Traffic Noise was carried out for representative properties within the study area.

Option A1

The bypass would cause less than 10 instances of high noise levels at dwellings (over $L_{10}70$ dB(A)), but a large number, around 70, would experience large increases, 5–10 dB(A) from very low current ambient levels, despite the potential for mitigation with earth mounding. Houses alongside the existing A453 would gain slight relief of about 2 dB(A).

Option D

Houses alongside the single 4 lane A453 would experience an increase of around 2 dB(A), affecting approximately 153 properties. Possible mitigation measures include small barriers or grass mounds and landscaping. This would provide up to a 5 dB(A) reduction and could be applicable to approximately two thirds of the properties along the route. This mitigation would bring noise levels down to below the Do Minimum levels. Negligible change from the Do Minimum is expected for properties situated close to the ring road.

Option E

Option E has been modified from the original Red Route taking the opportunity arising from the lower traffic forecast to reduce the noise and visual intrusion by having slip roads only at the ends of the central section through Clifton. However, due to the physical layout and extent of the works there is little scope for further mitigation. Substantial noise barriers would be inappropriate in the local environment of the central section.

Houses alongside the A453 would experience a decrease of around 3 dB(A) compared to the Do Minimum, due to the effect of the cutting. Negligible change from the Do Minimum is expected for properties situated close to the A52 Ring Road.

7.4.9 Local Air Quality

The GOMMMS method categorises areas along the proposed routes into ‘winners’ and ‘losers’. Winners experiencing an improvement in air quality and losers experiencing higher pollution levels with the scheme in place. In this case an increased depth of assessment was also carried out to ascertain pollutant levels at representative locations in accordance with the Design Manual for Roads and Bridges (DMRB) guidance.

Option A1

The bypass is the only one of the Clifton highway schemes that improves local air quality. This indicator is highly dependent on the amount of traffic and distances from source of the emission i.e. the road, to disperse the pollutants to lower concentrations.

Local calculations show that NO² levels closest to the carriageway in locations such as Silverdale, Cloverlands and Clifton Lane exceed the national limit of 40µg/m³. Building bypasses in open land is somewhat perversely an effective means of overcoming local air quality problems as NO² levels along the A453 are reduced to below the national limit. PM₁₀ limits are not exceeded at any of the locations.

Option D

The single 4 lane scheme through Clifton has a high volume of traffic passing through Clifton and as expected the closest properties along the A453 have NO² levels higher than the national limit. The closest properties on the Ring Road levels are above the national limit but do not differ greatly from the Do Minimum situation. PM₁₀ limits are not exceeded at any of the locations.

Option E

As with Option D a high number of vehicles pass through Clifton on the A453 and again the closest properties experience NO² levels higher than the national limit. Ring Road locations are above the national limit but do not differ greatly from the Do Minimum situation. PM₁₀ limits are not exceeded at any of the locations.

7.4.10

Accident Findings

The established approach to accident forecasting uses statistical evidence collected for actual rates on different types of existing roads. The quantitative assessments in this Study use the national average rates for forecasting future accidents. A Study-wide assessment was required to ascertain the Present Value of Benefits of a scheme while a local assessment was carried out to establish the forecast accidents within the A453 corridor.

Option A1

There would be large reduction in road accidents compared with the Do-Minimum situation, by a combination of reduced traffic growth, and the higher standard and availability of the improved A453. A 30-Year saving of: 9,087 casualties and 668 fatal and serious casualties compared to the Do Minimum. The scheme has a PVB of £96M over the same 30-year period. A saving of 21 Personal Injury Accidents from the Do Minimum is expected in 2021 along the A453 corridor including the bypass.

Option D

There would be a large reduction in road accidents in the same way as for Option A1. A 30-Year saving of: 9,842 Casualties and 718 fatal and serious casualties compared to the Do Minimum. The scheme has a Present Value Benefit (PVB) of £102M. A saving of 20 PIAs from the Do Minimum is expected in 2021 along the A453 corridor.

The road crossings and intermediate junctions would be a particular issue in this scheme. The accident forecasts for the single 4 lane scheme in Clifton have been considered in detail. Whilst pedestrians could cross the roundabouts at Crusader, Farnborough Road/Fabis Drive, and the circulatory arrangement at Green Lane, under the protection of 'green man' facilities, there are other crossing points that are well used including by children. Footbridges are an Option for future investigation near Gypsy Lane and the University main entrance to achieve desired levels of amenity. Minor road and private access points would be made left turns only.

Option E

Again, there would be a large reduction in road accidents as for Options A1 and D. A 30-Year saving of 10,215 casualties, 739 fatal and serious casualties. The scheme has a 30-year PVB of £104M. A local saving of 24 PIAs from the Do Minimum is expected in 2021 along the A453 corridor. The Red Route includes a similar pattern of pelican crossings to Option D, across the parallel local road.

Option E offers the most savings compared to the Do Minimum situation, but all three options have substantial benefits.

7.6.11 **Landscape and Townscape**

Options A, D, and E

All three Options would have neutral or slight adverse impact from public transport schemes, and the Clifton Park & Ride site would adversely affect its rural fringe location and would require a significant area of land. The M1-Clifton dualling would increase the effect of the existing highway corridor, but the overall effects would be slight.

Option A1

The Clifton eastern bypass would have moderate to large adverse impacts on open rural landscape and the urban edges of Clifton and Ruddington. The impact of the bypass in Option A is shown by the ASTs together with the additional noise and air quality assessment. Despite the smaller scale of the single carriageway scheme it has a wide range of adverse impacts on the countryside, ecology, and communities around it.

Option D

The four lane single carriageway scheme in Option D would have a very much smaller impact on the Clifton corridor than the Red Route. Almost a third of the length of road between Crusader Roundabout and Farnborough Road/Fabis Drive is already of three lane width or more. Widening to four lanes, with extra for bus laybys, would leave the existing green verges largely intact along the main length, allowing the opportunity for reducing the visual and noise impacts with soft and hard landscaping. There are particular areas of higher impact, at Farnborough Road/Fabis Drive and to a lesser degree at Green Lane. At Farnborough Road a traffic signal controlled roundabout would be needed to cope with the large amount of traffic from to and from the centre of Clifton. The roundabout would encroach significantly on the available verge on the four quadrants around the existing junction. At Green lane the existing topography would probably remain unaltered in order to protect the character of this amenity area. The introduction of traffic signals would be somewhat more intrusive than elsewhere.

Option E

The environmental effects of the on line dual carriageway in Option E are not revealed by the methodical use of GOMMMS or additional estimation of individual indicators such as noise, and air quality.

The existing A453 can accommodate a dual carriageway between retaining walls and a service road with demolition restricted to a petrol filling station/garage, and the Man of Trent Public House. It is an existing main road corridor with buildings set back apparently in order to allow for road widening.

However, it is important to recognise the domestic nature of the area. The Clifton corridor from Crusader roundabout to the junction of Farnborough Road and Fabis Drive is essentially a housing and living area if the University playing fields and halls of residence are included in that category. They generate a considerable amount of pedestrian and cycle movement. For the large numbers of people living nearby or visiting it is part of a neighbourhood.

The modified Red Route would be a new feature whose scale and character would be unsympathetic and degrading to this local environment. Although it would be easier to cross on foot or by vehicle using the bridges corresponding with the existing roads and crossings, the overall effect would be intimidating and divisive, and to maintain present levels of amenity there would still need to be pelican crossings on the parallel service road.

Clifton Green would be slightly affected.

7.4.12 **Practicality, Feasibility, and Public Acceptability**

All three Options:

Some aspects of the public transport schemes e.g. universal ticketing, and integration of services, are contradictory to the practices that derive from current legislation. However, these amount to a challenge for the future rather than an impractical recommendation. Some of the infrastructure schemes e.g. the sites for freight terminals, and some of the walking and cycling routes, are threatened by competing development, but these can also be regarded as challenges rather than barriers. Key indicators should be developed for the schemes to assist decisions to protect e.g. an outline programme, and the value of their loss to the transport infrastructure. It is suggested that the Options are entirely practical.

The acceptability of a Workplace Parking Levy or equivalent method of Demand management has yet to be proved, but the principle of charging to limit road use is gaining a wider understanding and support.

The major road schemes through Clifton are all likely arouse some degree of controversy because the issue has a long history and could affect a large number of residents and interests.

Option A1

The junction of the Clifton eastern Bypass with the A52 Ring Road is feasible, but restricts future options for the existing A52/A60 junction, which is in need of early improvement.

The bypass was included in the Public Consultation and raised a substantial body of objection. Any major road scheme runs this risk, but a particular feature of the bypass are its location in a narrow wedge of green belt land that separates Clifton and Ruddington, generating opposition from within and beyond both communities especially on environmental grounds.

Option D

The implementation of the single 4 lane scheme in Clifton should not require Highway Orders, but exchange land would be needed for any minor incursion onto the statutorily protected area of Clifton Green.

Option E

The former Red Route encountered strong local opposition despite being recommended by the Inspector for the Public Inquiry in 1996 and could be expected to do so again.

7.4.13 **Enforcement**

All three Options include elements requiring a fresh approach to transport issues in the widest sense. This is unsurprising considering the broad analysis of the problems required in Multi Modal Studies, and is a valuable contribution. The Demand Management and Travel Behaviour Measures suggest changes in regulations and practices that are currently matters of wider interest. However, they do not envisage any changes that have not already been introduced into the transport debate.

7.4.14 **Complexity and Area of Interest**

All three Options are complex and involve a very wide range of interests, as illustrated by Table 9.1 showing the transport authorities involved in implementation, and Table 8.1 and 8.2 showing the composition of the Wider Reference Group.

7.5 **CONCLUSION**

7.5.1 Section 1.1.7 of The Guidance for Multi Modal Studies advises on finding solutions to the problems addressed in the Study. It advises that “the contributions of all modes should be considered and although the genesis of the initial programme of Studies lies with problems on the trunk road network, the focus of the Studies will not primarily be on ways of providing additional road capacity. However, proposals for road improvements whether through better management, widening, or new alignments, are not ruled out and could be an output if such a solution were to be shown to be the most appropriate in the circumstances. Indeed, some schemes put on hold by the Roads Review have specifically been remitted for the Studies to consider in more detail”.

7.5.2 The former Red Route is reviewed in the Study. Its circumstances have changed by the introduction of public transport and demand management, some of which has already been committed or implemented. It actually represents an over-provision of capacity. It has significant disadvantages that in the original context had to be accepted, but does not need to be now.

7.5.3 Similarly, an eastern bypass has significant disadvantages, such that there is a presumption against it if an effective solution with less road building and impact can be found.

7.5.4 **The single four lanes on line scheme can form an effective solution in Option D, and although it also has disadvantages, they are not as severe as in Options A1 and E.**