

## **Annex 4 Halcrow 2008 York Outer Ring Road Study - Executive Summary**

### **1.0 Previous 2005 Study**

Halcrow was commissioned by the City of York Council in 2005 to undertake a transport study of the A1237 York Outer Ring Road (ORR) from the A64 Hopgrove roundabout to Copmanthorpe roundabout. The objectives of the study were to investigate existing transport problems and identify a strategy and package of improvement measures for the A1237. Based on the modelling work, appraisal of options and cost benefit analysis, the study recommended that the option of upgrading the roundabouts should be taken forward.

### **2.0 2008 Study**

In 2007/08 Halcrow were commissioned to update the study, in order to take account of events since 2005 and to include additional analysis and sequential testing of options to consider:

- At-grade improvements to existing junctions;
- Partial dualling;
- Partial grade separation;
- Partial dualling and partial grade separation; and
- Full dualling of the entire northern section of A1237 Outer Ring Road.

This document is the Executive Summary of the Final Study Report issued in September 2008.

### **3.0 2008 Baseline Analysis**

A review of the existing and predicted future year baseline transport issues and problems along the ORR was undertaken. The review included analysis of:

- Overall 'Degree of Saturation' and approach arm capacities for the ORR junctions;
- Traffic flow levels on links between junctions;
- Journey times along the ORR;
- Journey times along the Inner Ring Road (IRR); and
- Queue lengths at ORR junctions. The key issues of the baseline analysis are summarised below.

#### **Key Issues – Baseline Analysis**

- Highway capacity improvements on the A1237 are required to accommodate existing and future year traffic flows at many of the ORR junctions;
- Journey times on the ORR are predicted to increase from around 19 minutes to 27 minutes in 2021 representing a 42% increase;
- Average journey speeds on the A1237 are low and characterised by congestion and delays at junctions for both orbital and radial movements which impacts on public transport reliability;
- Significant queues are predicted to occur at a number of junction approaches;
- Almost all the junctions on the A1237 have congestion on certain approaches at present – this existing congestion is expected to worsen and new congestion to occur on other approaches;
- Link flows on the A1237 in future years are constrained by junction capacities; and,
- Journey times around the IRR are also predicted to lengthen in future years.

#### 4.0 2008 Options

The following highway improvement options were considered:

**Option A – Do Minimum** – This option was considered to reflect the likely future year baseline scenario and includes planned highways improvements Access York Phase 1 Park and Ride sites and the Highways Agency improvement scheme for the A1237/Hopgrove roundabout.

**Option B1 – Selected At Grade Junction Improvements (all junctions from Wetherby Road to Clifton Moor & Haxby Road)** – This option modelled upgrades to only the most congested of the junctions on the ORR. The junctions improved were Wetherby Road, A59, York Business Park, A19, Haxby Road and minor works at Clifton Moor.

**Option B2 – Selected At Grade Junction Improvements (all junctions from Wetherby Road to Strensall Road)** – This option models at grade improvements to all the junctions from Wetherby Road to Strensall Road.

**Option B3 – At Grade Junction Improvements** – This option modelled upgrading all the existing junctions on the ORR through at grade improvements such as localised widening of approaches and exits from the roundabouts to remove bottlenecks and enlargement.

**Option C1 – Selected At Grade Junction Improvements (Wetherby Road to Strensall Road)** – This option uses the improvements as per Option B2 and includes dual carriageway links from Wetherby Road to Clifton Moor.

**Option C2 – Dualled Links + At Grade Junctions** – This option builds on Option B by retaining the At Grade improvements and adding dual carriageway links from Wetherby Road to Clifton Moor junctions. These links sections carry the most traffic on the ORR and are also fairly short in length offering a targeted dual carriageway solution.

**Option D – Basic Dual** – This option developed Option C by introducing Grade Separated Junctions (GSJs) at the A1237/A59, A1237/York Business Park and A1237/A19 junctions. This option retained the dual carriageway links from Wetherby Road to Clifton Moor junctions introduced in Option C. The three junctions identified for GSJs carry the most traffic on this section of the ORR.

**Option E – Basic Dual + Extra Dualled Links** – This option built on Option D by adding additional dual carriageway links from the A1237/Clifton Moor junction to the A1237/Haxby Road junction.

**Option F – Enhanced Dual** – This option built on Option E by adding new Grade Separated Junctions at A1237/Clifton Moor, A1237/Wigginton Road and A1237/Haxby Road junctions.

**Option G – Enhanced Dual + Extra Dualled Links** – This option built on Option F by adding additional dual carriageway links to the remaining link sections on the ORR from the A1237/Haxby Road junction to the A1237/Malton Road junction.

**Option H – Full Dual** – This option modelled the ultimate solution of full grade separation and dualing along the entire length of the ORR. Through traffic has a free flow route from end to end.

**Option I – New Relief Road** – This option modelled the theoretical alignment of a new 'relief road' running parallel to, and North of, the existing Outer Ring Road with connections to the existing ORR at Wetherby Road, A59, A19 and Wigginton Road corridors.

## 5.0 2008 Option Assessment

The transport impact of the various highway improvement schemes considered was examined using both the SATURN city wide traffic model and a detailed PARAMICS micro-simulation model developed to model the A1237 ORR and its immediately surrounding study area.

Seven measures of performance were used to assess the impact of each scheme and compare the schemes against each other. These were:

- Journey times and average speeds along the ORR,
- Journey times along the IRR;
- Total network travel time in the ORR study area;
- Total network travel time across the City of York;
- Total network travel distance across the City of York;
- Total number of network trips and average vehicle speed for the City of York; and,
- Impact on P&R Trips.

The key findings of our assessment are shown below and in Table 1.

### **Key Issues – Assessment of Highway Options**

- Options analysed covered the full range of possibilities from do nothing through to the provision of a grade separated dual carriageway and additional link road.
- The modelling work suggests that both junctions and also links are restricting traffic flows on the ORR.
- The Do-Minimum option brings about some relief to congestion problems on the ORR.
- Option B3: At Grade improvements shortens ORR journey times by 5-6 minutes and performs better in all the indicators when compared to the Do-Minimum.
- The option of full dual (Option H) performs well in transport terms, but has a high cost and environmental impact.
- The impact of the options and performance against the seven indicators is directly proportional to the amount of improvement proposed at the junctions.
- The additional link road (Option I) does not perform as well as the on-line full dual alternative (Option H).
- Travel Time savings are predicted across all options when compared to the Do-minimum.
- P&R Trips increase with the introduction of Access York Phase 1 P&R in the Do Minimum (Option B) but P&R trip levels remain fairly static between the other options.

The purpose of this work stream was to assess the engineering feasibility of upgrading the north section of the York Outer Ring Road to dual carriageway standard. Proposed alignments and outline drawings of proposed junctions were also developed. High level engineering solutions were identified with the appropriate associated costs.

The key results from our desktop review of constraints are summarised below.

### **Key Issues – Assessment of Engineering Feasibility**

- Environment – No sites or areas of land with protected environmental designations such as Special Scientific Interest (SSSI) or Areas of Outstanding Natural Beauty (AONB) within the study area.
- Archaeology – No Scheduled Monuments within the study area.
- Architecture/Heritage – No World Heritage Sites within the study area.
- Engineering - 56 critical link constraints were identified, 36 of a high priority level of impact. The majority of the major constraints were the number of structures along the route and the presence of utility equipment.
- Engineering – The engineering feasibility of improving, replacing or adding new structures to upgrade the existing single carriageway structures to dual carriageway standard was examined within the full report and the key points are:
  - There is no case to demolish the existing structures;
  - Additional separate bridge structures should be constructed alongside; and
  - The same form of construction (pre-stressed concrete beams) should be used.
- Engineering – 28 junction constraints were identified, 26 of which are of a high level of potential impact. These were primarily due to utility company equipment being present in the junction area and close proximity to existing buildings.

### **7.0 Economy/Appraisal Summary**

Costs and benefits identified within the main report were taken forward into the appraisal process. Costs and benefits were discounted over a 60 year period to enable the calculation of the Benefit Cost Ratio (BCR) of each option.

The appraisal results and performance against the other key transport indicators are shown in Table 1.

The option that represents the best value for money is Option B1 with a BCR of 4.40. This is due to the selected approach to improvements where money is only spent of the most congested junctions.

However, Options D – H generate higher levels of transport benefits but cost more to construct. There is congestion within Option B1 which is removed in some of the more expensive options.

Option B2 includes roundabout improvements and subways at Wigginton and Strensall Road. Option B2 is a high value scheme with additional benefits (addressing severance of local communities) relative to Option B1.

Table 1 – Summary of Option Performance and Economy

Option	Year	Description	Outer Ring Road				Whole of York					City Centre		Economy					
			Journey Times ORR Clockwise	Journey Times ORR Anti-Clockwise	Annual travel time ORR	Daily AM Travel Time ORR	Whole of York Travel Time	Whole of York Travel Distance	Whole of York Number of Trips	Over Capacity Queues	Park and Ride Usage	Journey Times IRR Clockwise	Journey Times IRR Anti-Clockwise	Scheme Base Cost	Scheme Risk Cost	Total Scheme Cost	2014 Outturn Total Scheme Cost	BCR	Value for Money
			Minutes	Minutes	Hours 000s	Hours	Hours	000s km		pcus.hr	PCUs per Hr	Minutes	Minutes	£ million	£ million	£ million	£ million		
<b>Base Year</b>	2005	2008 Network	18.9	19.4	276	1,089	6,432	230	36,708	269	-	24	17	-	-	-	-	-	-
<b>Do Nothing</b>	2021	2008 Network	27	27	427	1,687	11,674	290	44,950	2,862	778	31.3	28.5	-	-	-	-	-	-
<b>Option A</b>	2021	Access York Phase 1 (3 P&Rs + A59 R/B upgrade) + Hopgrove R/B	25	27	477	1,886	11,314	297	44,950	2,502	1505	30.7	25.9	-	-	-	-	-	-
<b>Option B1</b>	2021	Selected At Grade Improvements (Wetherby Rd to Clifton Moor + Haxby Rd)	23	25	318	1,190	11,091	297	44,950	2,531	1498	29.9	24.6	£13,132	£3,500	£16,632	£21,659	4.40	High
<b>Option B2</b>	2021	At Grade Improvements from Wetherby Road to Strensall Road	21.3	22.4			10,899	299	44,950	2,155				£22,936	£5,213	£28,149	£36,657	2.60	High
<b>Option B3</b>	2021	At Grade Improvements at all Junctions	21	22	301	1,190	10,851	299	44,950	2,143	1510	29.7	24.3	£28,296	£6,482	£34,778	£45,290	2.32	High
<b>Option C1</b>	2021	At Grade Improvements from Wetherby Road to Strensall Road, with dual carriageway from Wetherby Road to Clifton Moor	16.4	19.3			11,013	299	44,950	2,552				£42,131	£5,213	£47,344	£61,654	1.60	Medium
<b>Option C2</b>	2021	Dual Wetherby Rd to Clifton Moor	16	19	318	1,257	10,976	298	44,950	2,531	1552	28.8	23.3	£47,491	£6,482	£53,973	£65,313	1.42	Medium
<b>Option D</b>	2021	Dual Wetherby Rd to Clifton Moor (GSJ A59 - A19)	16	19	295	1,168	10,064	296	44,950	1,666	1504	27.9	22.4	£83,334	£14,362	£97,695	£115,491	0.90	Poor
<b>Option E</b>	2021	Dual Wetherby Rd to Haxby Rd (GSJ A59 - A19)	14	17	282	1,115	9,970	296	44,950	1,582	1514	27.8	22	£87,785	£14,362	£102,147	£122,076	0.92	Poor
<b>Option F</b>	2021	Dual Wetherby Rd to Haxby Rd (GSJ A59 - Haxby Rd)	14	15	292	1,154	9,661	293	44,950	1,366	1524	27.3	21.3	£111,503	£21,483	£132,986	£157,215	0.67	Poor
<b>Option G</b>	2021	Dual Entire Length, (GSJ Wetherby to Haxby Rd)	12	12	300	1,186	9,397	294	44,950	1,274	1530	26.5	20.6	£136,595	£23,785	£160,380	£193,986	0.52	Poor
<b>Option H</b>	2021	Dual and Grade Separated Entire Length	11	11	288	1,140	9,381	293	44,950	1,301	1532	26.6	20.7	£170,396	£33,007	£203,403	£243,196	0.44	Poor
<b>Option I</b>	2021	Relief Road Wetherby Road to Hopgrove	17	17	474	1,875	10,005	302	44,950	1,668	1524	27.8	22.5	£128,190	£15,470	£143,660	£180,179	0.01	Poor

## **8.0 Conclusions and Recommendations**

Options have been investigated which cover the full range of possibilities from the revised baseline condition through to the provision of a grade separated dual carriageway and the provision of a new additional link road.

The study recommends that Option B2: Selected At Grade Improvements (Wetherby Road to Strensall Road) should be taken forward.