

# Appendix D – Results of Economic Sensitivity Test

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Project:	<b>A2 Buncrana Road</b>	Job No:	<b>60033975</b>
Subject:	<b>Stage 2 Economic Analysis Sensitivity Tests</b>	Date:	<b>04 November 2008</b>

## 1.1 Introduction

This Technical Note has been prepared to discuss the Sensitivity Assessments undertaken for the economic analysis element of the A2 Buncrana Road widening scheme. The following test has been undertaken:

- A set of 'alternative' future year flows have been produced, using observed data factored up to the future year (2015). These flows also include the trips associated with 1,000 no. houses built-out on the H1/H2/ lands.

## 1.2 Sensitivity Test Procedure

### **Sensitivity Test Flows**

Given that the Derry Transport Model (DTM) forecasts significant levels of traffic on the network at 2015 (primarily as a result of the trips associated with the full build-out of the H1/H2 lands), it was decided that sensitivity tests be undertaken using observed flows factored up by NRTF Central growth to 2015, together with the inclusion of trips associated with only a partial build-out of H1/H2, in this case 1,000 houses.

As such, flows from the various Automatic Traffic Counter (ATC) surveys recorded in and around Buncrana Road between 2006 and 2008 were used to form the basis of determining daily 7-day AADT flows on the network. In addition, turning count data at the various junctions from both 2006 and 2008 was used to determine traffic movements for use in the COBA model.

NRTF Central growth rates were used to factor the 2006 and 2008 flows up to the 2015 assessment year. COBA then extrapolates additional year traffic flows for each of the remaining assessment years by way of the NRTF growth rates.

### **H1/H2 Traffic**

The trips associated with a build-out of 1,000 houses on the H1/H2 lands were determined as follows. Daily 85<sup>th</sup> percentile trip rates from TRICS 2008(b) suggested 10.188 daily trips per unit, given a total of 10,188 trips associated with the H1/H2 lands. It was further assumed that the split between H1 and H2 was 50:50, with therefore 500 units effectively each located to the east and west of Skeoge roundabout.

The traffic distribution was determined as follows:

- 70% of traffic would use Buncrana Road (S)
- 20% of traffic would use Skeoge Link
- The remaining 10% would use Buncrana Rd (N)
- Given the movements observed at Branch Roundabout, the 70% on Buncrana Road would split to 50% on Buncrana Road further south and 20% on Branch Road itself.

### **Comparison of traffic levels**

These development trips were added to the 2015 'background' traffic to produce the assessment flows. A comparison between the DTM and the Sensitivity Test flows is made in Table 1 for selected roads coded within the COBA network, which reveals that in general, the flows in the sensitivity test are much lower than those in the DTM. The Sensitivity Test flows are reproduced at the end of this note.

**Table 1 – Comparison of two model scenario flows**

Road	2015 Model Flow (7-day AADT)	
	Derry Model (DE2B)	Sensitivity Test
Buncrana Road north of Skeoge Roundabout	36,386	19,858
Buncrana Road south of Skeoge Roundabout	49,154	24,747
Buncrana Road north of Branch Roundabout	45,494	28,531
Buncrana Road south of Branch Roundabout	27,653	23,202
Buncrana Road south of Springtown Road	17,132	26,444
Buncrana Road north of Racecourse Road	16,011	26,543
Buncrana Road south of Racecourse Road	28,088	29,727
Skeoge Link	38,195	15,167
Templemore Road	20,492	19,690
Branch Road	37,400	30,788
Springtown Road	16,213	9,055
Racecourse Road	16,028	19,327
Pennyburn Industrial Estate	11,541	11,192

**1.3 Results – Revised Models with Sensitivity Test flows**

The results of the assessment using the Sensitivity Test flows are presented in Table 2. The results show much lower BCRs than those shown in Table 7.16 of the *A2 Buncrana Road Improvements Stage 2 Scheme Assessment Report* (Stage 2 SAR) and this is due to the lower traffic flows produced in the Sensitivity Test. However, the Red Route still produces the best NPV/BCR, followed by the Blue and then Purple Routes.

**Table 2 – Results for COBA Assessments using Sensitivity Test flows**

Impact		Red	Blue	Purple	Navy
A	Consumer User Benefits (£000s)	£64,340	£70,294	£66,907	£24,474
B	Business User Benefits (£000s)	£62,267	£70,948	£66,446	£31,753
C	Private Sector Provider Impacts (£000s)	£1,060	£758	£727	£410
D	Accident Benefits (£000s)	-£1,458	-£27,625	-£14,359	£7,556
E	Emissions Benefits	£548	£366	£349	£885
G	Present Value of Benefits (PVB) (= A + B + C + D + E)	£126,758	£114,741	£120,069	£66,078
H	Present Value of Costs (PVC)	£28,479	£30,845	£34,193	£19,159
I	Net Present Value (NPV) (£000s) (= F – G)	£98,279	£83,895	£85,876	£46,919
	Benefit to Cost Ratio (BCR) (= F / G)	4.451	3.720	3.512	3.449

The results in Table 3 show the same COBA assessments however with the 'Indirect Tax Revenues' removed. With this element removed, each of the scheme's NPVs/BCRs improve, and the Red Route still performs best of the three options.

**Table 3 – Revised Sensitivity Test results with Indirect Tax Revenues removed**

Impact	Red	Blue	Purple	Navy
Indirect Tax Revenues	-£4,730	-£3,150	-£3,008	-£7,525
Revised Present Value of Benefits (PVB)	£122,028	£111,591	£117,061	£58,553
Revised Present Value of Costs (PVC)	£23,749	£27,695	£31,185	£11,634
Net Present Value (NPV) (£000s)	£98,279	£83,896	£85,876	£46,919
Revised Benefit to Cost Ratio (BCR)	5.138	4.029	3.754	5.033

Table 4 reflects the results of the assessments when the Navy route is combined with each of the three other routes. This table is comparable with Table 7.17 of the Stage 2 SAR.

**Table 4 – Revised results for combined COBA Assessments using Sensitivity Test flows**

Impact		Red+Navy	Blue+Navy	Purple+Navy
A	Consumer User Benefits (£000s)	£60,653	£56,401	£50,225
B	Business User Benefits (£000s)	£59,191	£58,860	£50,647
C	Private Sector Provider Impacts (£000s)	£1,124	£546	£426
D	Accident Benefits (£000s)	£3,045	-£23,143	-£10,574
E	Emissions Benefits	£535	£188	£116
G	Present Value of Benefits (PVB) (= A + B + C + D + E)	£124,548	£92,852	£90,840
H	Present Value of Costs (PVC)	£40,117	£41,093	£43,999
I	Net Present Value (NPV) (£000s) (= F – G)	£84,431	£51,759	£46,841
	Benefit to Cost Ratio (BCR) (= F / G)	3.105	2.260	2.065

Table 5 reflects the results of the above assessments with the removal of Indirect Tax Revenues.

**Table 5 – Revised combined Sensitivity Test results with Indirect Tax Revenues removed**

Impact	Red+Navy	Blue+Navy	Purple+Navy
Indirect Tax Revenues	-£4,604	-£1,611	-£1,003
Revised Present Value of Benefits (PVB)	£119,944	£91,241	£89,837
Revised Present Value of Costs (PVC)	£35,513	£39,482	£42,996
Net Present Value (NPV) (£000s)	£84,431	£51,759	46,841
Revised Benefit to Cost Ratio (BCR)	3.377	2.311	2.089

## 1.4 Conclusion

The above revised analyses suggest the following:

- Using the Sensitivity Test flows, the Red Route performs best, followed by Blue and then Purple, however the BCRs produced are much closer together (ranging between 4.5 – 3.5) than the BCRs included in the Stage 2 SAR (ranging between 10.0 – 5.6).
- Removing the Indirect Tax Revenues enables the Red Route to perform noticeably better than the other two routes in both flow scenarios (i.e. when the three routes are considered on their own, and when combined with the Navy Route).

SENSITIVITY TEST FLOWS









