Aberdeen Access from the South Core Document

Aberdeen City Council, Aberdeenshire Council, Nestrans

Transport Report

TRANSPORT REPORT

Description:

Aberdeen Access from the South Core Document

Author:

Julie Sey/Peter Stewart

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SIAS Limited
13 Rose Terrace
Perth PH1 5HA
UK

tel: 01738 621377
fax: 01738 632887
perth@sias.com
www.sias.com

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1 INTRODUCTION

1.1 Introduction

This report concludes a study undertaken by SIAS Limited on behalf of Aberdeen City Council, Aberdeenshire Council and Nestrans concerning access to Aberdeen from the South. The study has been carried out in a manner consistent with Scottish Transport Appraisal Guidance (STAG) and is considered appropriate to feed into the transport appraisal input to a STAG Part 1. The study follows on from original work undertaken by JMP Consulting and its final report (*Aberdeen South Access Study – Final Report*) produced in November 2006. This follow on study has been undertaken as a result of the Scottish ministerial announcement on 1 December 2005 with regard to the preferred Aberdeen Western Peripheral Route (AWPR) alignment corridor with an additional new spur road to Stonehaven. The announcement presented a configuration of the AWPR sufficiently different from that previously considered to warrant this updated study.

On 2 May 2006 the Minister announced the preferred alignment for the AWPR and the Stonehaven spur.

The purpose of this study is to revisit the previous study by JMP, as a result of the revised route for the AWPR and consider the proposed short, medium and long term options including a 1,000 space Park & Ride facility, introducing any alternative options where necessary.

The main focuses of the study are the A90 (T) Stonehaven Road and A956 Wellington Road corridors to the south of Aberdeen including the four main road bridges over the River Dee:

- Bridge of Dee
- Queen Elizabeth II Bridge
- King George VI Bridge
- Victoria Bridge

The Scottish Transport Appraisal Guidance sets out the process to enable practitioners (and decision makers) to identify value for money transport solutions to identified transport problems. This Transport Scotland/Scottish Government guidance provides a framework for practitioners to use when undertaking a transport planning and appraisal process from the earliest phases of planning, through appraisal and implementation to post evaluation. The main recurring themes in the Guidance are in seeking to be:

- Objective led – all activities and decisions should arise from the established aims of the planning organisation with respect to transport and associated policy areas
- Open minded – the Guidance suggests working up transport proposals on a basis of defined objectives supported by a thorough understanding of the problems and opportunities in the area, rather than seeking to fit an existing proposal retrospectively to planning objectives
- Pragmatic – work done should reflect the relative need for accuracy, the scale and expected impacts of proposals and their costs
- Auditable – it must be possible to see clearly how planners have moved from objectives to their final conclusions
- Inclusive – effective involvement of stakeholders is not presented as a chore but as a crucial input to arriving at a final proposal which meets expectations and which can be delivered

This report sets out the process and conclusions from the first phases of the STAG process as set out below:

- Analysis of problems, issues and constraints
- Objective setting
- Option generation, sifting and development

- Appraisal
- Conclusions

1.2 Study Aims

In undertaking the appraisal, SIAS has made use of the S-Paramics microscopic simulation traffic models developed by JMP Consulting which were used in the previous study. The main aims of the study are to:

- review the Aberdeen South Access Study in light of the revised proposed route for the AWPR
- review the options identified in the original study for the short, medium and long term
- review the preferred location for a Park & Ride facility to the south of the city
- identify and test alternative solutions where appropriate

Information from ASAM, the Aberdeen Sub Area Model of TMfS will be used, taking cognisance of the preferred route of the Aberdeen Western Peripheral Route (AWPR) and any other proposals currently contained within the Modern Transport System.

In accordance with the Modern Transport System (MTS) Strategy for the north east up to 2011, this study will investigate elements of the original study objective to “investigate proposals to improve traffic flows and reduce delays for all modes of traffic on Trunk and Local roads approaching Aberdeen from the South” in traffic operation terms.

Further objectives have been developed in accordance with local and regional strategies. Although the aim of the study at this stage is not to produce detailed designs, the deliverability of any improvements identified and their compatibility with wider objectives should be considered, with further investigation and detailed design requiring to be considered at a future date.

1.3 Report Format

This core document provides an overview of the study and is accompanied by the following appendices which provide more detail for the key stages:

- A: Aberdeen Sub Area Model (ASAM) assumptions and growth
- B: Stakeholder Workshop summary and Initial Option Sifting
- C: Technical report for 2008 short term traffic model testing
- D: Technical report for 2012 medium term traffic model testing
- E: Technical report for 2027 long term traffic model testing
- F: Appraisal Summary Tables

2 ANALYSIS OF PRESENT AND FUTURE PROBLEMS

2.1 Introduction

A comprehensive problem, issues and objective setting workshop was held on Tuesday 6 March 2007. This workshop was attended by key officers from Aberdeen City Council, Aberdeenshire Council and Nestrans as well as the Police Service, Fire Service, Councillors, Bus Operators, members of the business community and other parties (a list of invitees is provided in Appendix B). This chapter presents an analysis of existing and potential constraints, problems and opportunities.

2.2 Geographic Context

The City of Aberdeen is the main settlement in the North East of Scotland and, as well as being a vibrant centre in its own right, it also provides the economic centre and opportunities for many of the Aberdeenshire towns, providing trade and commerce links with the rest of Scotland, the UK and Europe.

The southern area of Aberdeen is bounded to the east by the North Sea and contains some of Aberdeen's main residential and industrial areas. The main road access for the majority of locations south of Aberdeen is the A90, which feeds to the A956 Wellington Road via Charleston Interchange. The railway also runs through the southern area, connecting the city centre with towns and cities to the north west and to the south. There are no rail connections to the North East towns of Peterhead and Fraserburgh. The city is constrained in the north and south by two rivers, the Don and the Dee respectively. The Aberdeen South area is illustrated in Figure 2.1.

The most prominent geographic features in the south are Kincorth Hill and the River Dee which currently has six bridge crossings:

- Bridge of Dee - Road traffic bridge with width restriction
- King George VI Bridge - Road traffic bridge
- Rail Bridge - Rail traffic
- Wellington Suspension Bridge - Currently closed. Potential pedestrian/cyclist use
- Queen Elizabeth II Bridge - Road traffic bridge
- Victoria Bridge - Road traffic bridge

The Bridge of Dee is the main trunk road bridge connecting the A90 over the River Dee. The Bridge of Dee is a seven-arched bridge dating from the 1520s. Built following a bequest of £20,000 by Bishop William Elphinstone who died in 1514, the bridge was completed by Bishop Gavin Dunbar. It was the site of a battle, in 1639, between the Royalists under Viscount Aboyne and the Covenanters who were led by the Marquis of Montrose. Restored in 1718-21 and widened in the 19th century, the bridge still features the original 16th-century piers, coats of arms and passing places.[1]

Wellington Road (A956) provides the main access to the Tullos and Altens industrial areas as well as the Cove Bay, Nigg, Kincorth, Balnagask and Torry residential areas, crossing the River Dee at Queen Elizabeth II Bridge. It is also the main access to Aberdeen Harbour from the south. The northern sections of Wellington Road are closely bounded by development on either side, up to Balnagask Road where the western side is bounded by a significant drop to the river and the eastern side is bounded by the high walls of Aberdeen (Craiginches) Prison.

1 http://www.geo.ed.ac.uk/scotgaz/features/featurefirst1487.html

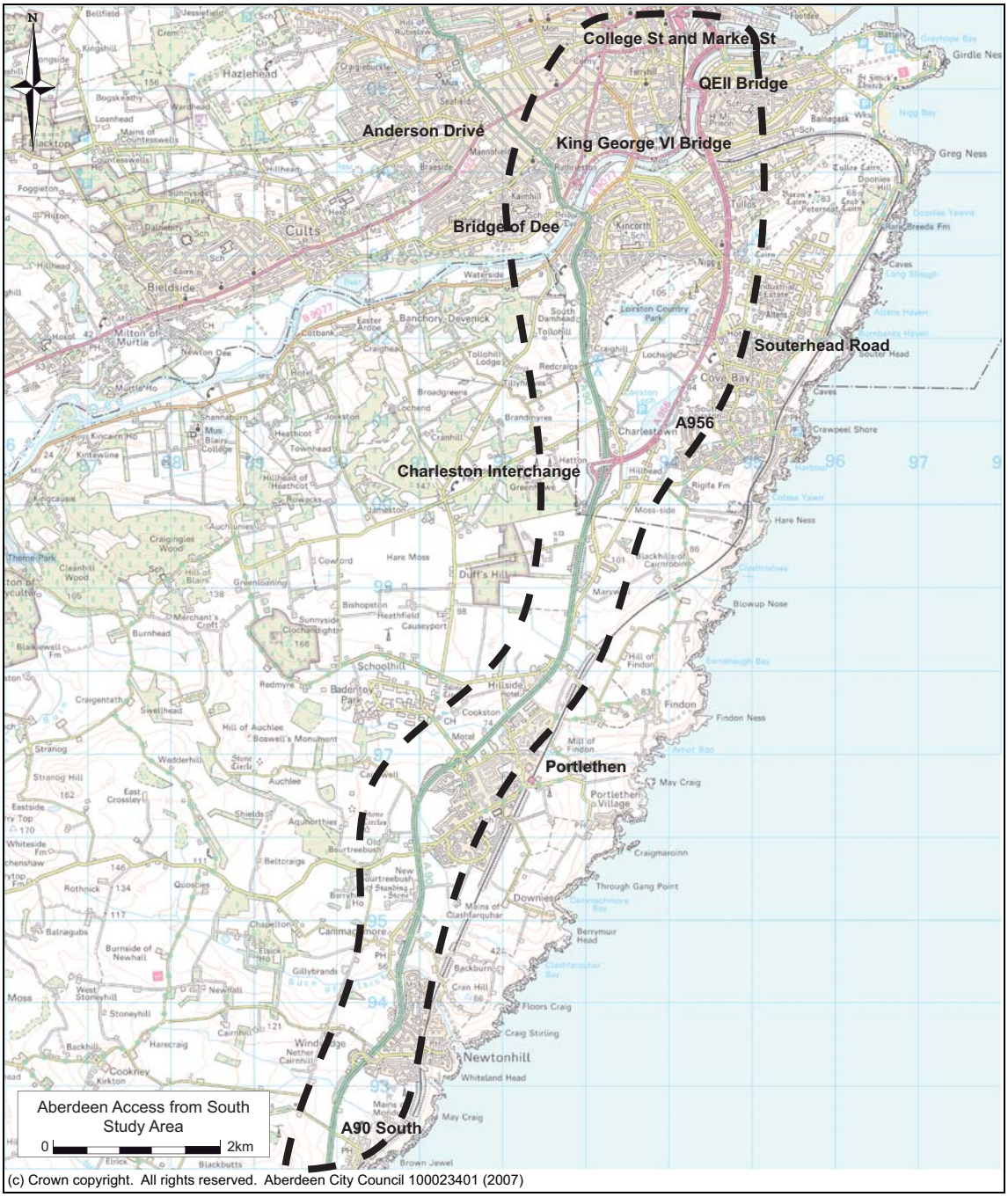

Figure 2.1 : Aberdeen Access from South Study Area

The gradients from the south pick up from Stonehaven to Charleston before dropping back down to the bridge crossing points. This gradient is a particular problem for HGVs on both the A90 and the A956 as they travel south. The A956 gradient problems for freight traffic are compounded by traffic signals and the loss of momentum they can impose on laden vehicles.

2.3 Social Context

In 2004 the population of Aberdeen City was estimated at 204,000 and the population of Aberdeenshire 233,000. There has been a population movement from Aberdeen City to Aberdeenshire, especially for families. In a recent study *Long Distance Commuting in Scotland* (Scottish Executive, July 2006) it was found that Aberdeenshire had the highest level of long distance out-commuters relative to its population

in Scotland. A long distance commuter was classed as those making a journey greater than 15km distance from home to work.

Projections from the General Register Office for the years 2004-2024 indicate that population changes could be as follows:

- Aberdeen City -23%
- Aberdeenshire +8%

The Structure Plan and Local Plans aim for planned expansion of the North East along development corridors, to maintain vitality of the city and region over the coming years.

Although Aberdeen is perceived to be an affluent city with low unemployment (<2%) and relatively high wages, there are pockets of deprivation where incomes are well below the Aberdeen and Scottish averages, see Figure 2.2.

Areas of Torry and Balnagask are two of the most deprived areas of Aberdeen, and in fact Scotland, based on the Scottish Index of Multiple Deprivation which takes into account; income, employment, health, education skills, training and housing. Areas of Torry rank within the top 10% of most deprived areas and areas of Balnagask within the top 5% in Scotland.

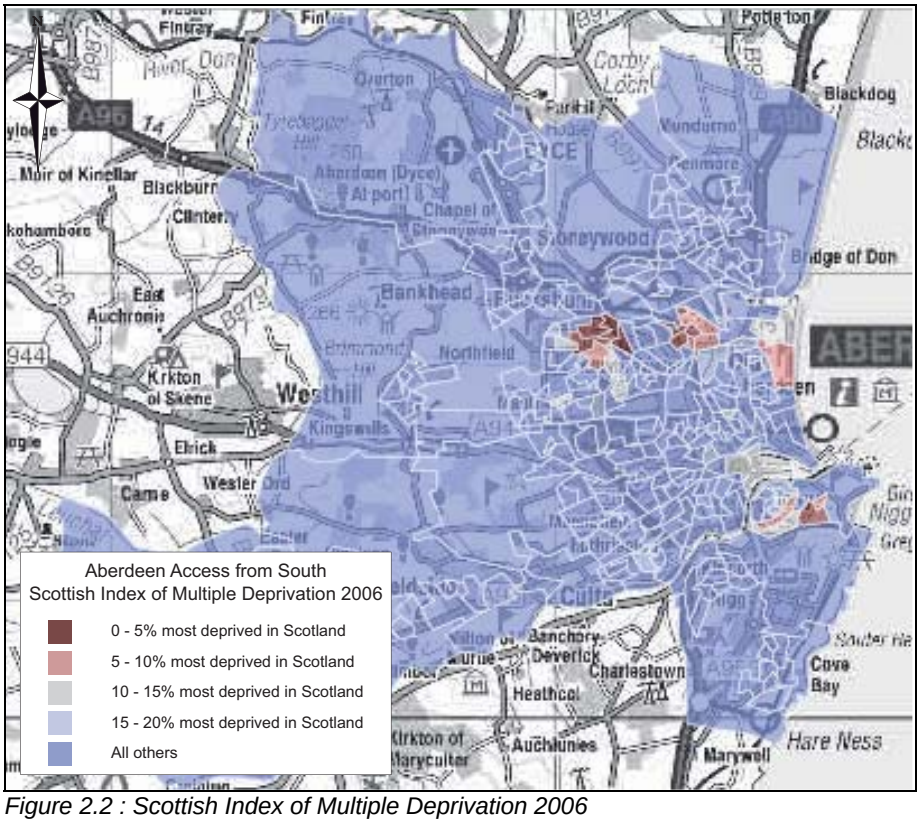

Figure 2.2 : Scottish Index of Multiple Deprivation 2006

Source: http://www.scotland.gov.uk/stats/simd2006/map.asp

2.4 Economic Context

The *Economic Review for the North East Scotland*[2], published by the North East Scotland Economic Forum in 2005, based on 2003 figures commented that:

[2] http://www.neser.org.uk/pdf/Economic_Review_2005.pdf

Estimates of local economic output (Gross Domestic Product) are produced by Mackay Consultants. Gross Domestic Product (GDP) in North East Scotland in 2003 was £8.3 billion, 1.2% higher than in 2002. However, North East economic growth for 2003 was below the Scottish growth rate of 2%.

The transport network is critical to the economic development potential in the North East. Inadequate transport infrastructure is likely to adversely affect the future competitiveness of industry.

Aberdeen is the Oil Capital of Europe and has become a centre of excellence for various elements of oil and gas exploration and production. Many local companies are now established in other oil and gas producing areas. Improved transport links to and from Aberdeen Airport and Harbour would enhance the ability of these (and other) companies to exploit overseas opportunities. Additionally, more overseas companies could be attracted into Aberdeen.

The expertise generated by the oil and gas sector is an important feature of recent moves towards diversification in the local economy, particularly technology and knowledge based industries. The ability of the North East to continue to attract and invest in these new industries depends on an efficient modern transport network.

While the North East has a reputation for excellence in the oil and gas sector, it also has a manufacturing base requiring efficient movement of freight both outwards for fresh foods including fish, finished and processed goods and inwards for raw materials and semi-finished goods. The retail, forestry and wholesale sectors also rely on the road network to enable movement of goods. The regional transport strategy[3] details that, in the period 2000 to 2004, an average of almost 30 million tonnes (excluding oil and gas which are predominantly moved by pipeline) were moved to/from or within Grampian per year.

- Around 80% of freight is moved by road, 18% goes through the region's ports
- An annual average of 15.4 million tonnes of freight is moved within Grampian region: much of this is high bulk items moving short distances
- Just under 4 million tonnes of freight per year was lifted by HGV in Grampian and moved to the rest of Scotland; 974,000 tonnes was moved to the rest of the UK
- In the same period 3.3 million tonnes of freight moved from the rest of Scotland to Grampian, along with 961,000 tonnes from elsewhere in the UK
- In volume terms, there is a positive balance of trade with the rest of Scotland and the UK, and exports amount to 24% of total freight moved
- The value of Scottish road freight accruing to the region is estimated at £263 million in a report for the Scottish Executive in 2006, 11.5% of the Scottish total; and the value of cross border road transport is £262 million, 7.9% of the Scottish total

2.5 Strategic Road Network

The River Dee bridge crossings are the focus points for the main strategic entry points to the north and north east from the south, see Figure 2.3. In particular the Bridge of Dee is the direct link between the A90 (T) Stonehaven Road and the A90 (T) South Anderson Drive. The current crossing points and associated infrastructure are at capacity during peak times, with significant delays on the existing trunk road network. The Bridge of Dee currently operates with a width restriction which prevents freight traffic from crossing and resulting in a significant rerouteing from the A90 via Great Southern Rd, King George VI Bridge, Riverside Drive and Holburn Street.

In the south, the strategic motorway network links via Perth to the A90 which is dual carriageway to Bridge of Dee. The Bridge of Dee span is single carriageway and presents the first constriction to the continuous Trunk Road network from dual carriageway from Aberdeen to Perth and dual or motorway standard from Perth to the rest of Scotland and beyond.

[3] http://www.nestrans.org.uk/db_docs/docs/Final%20RTS%20-%20March%202007.pdf

The road network also caters for the lack of rail linkage to the north, providing vital links to the large Aberdeenshire towns of Ellon, Fraserburgh and Peterhead.

A validated microsimulation traffic model of the Aberdeen South area was developed by JMP Consulting in 2004. This report follows from the model development stage in which an S-Paramics microsimulation traffic model was developed for the area. The base model confirmed the considered local view of significant traffic problems at a number of locations in the study area.

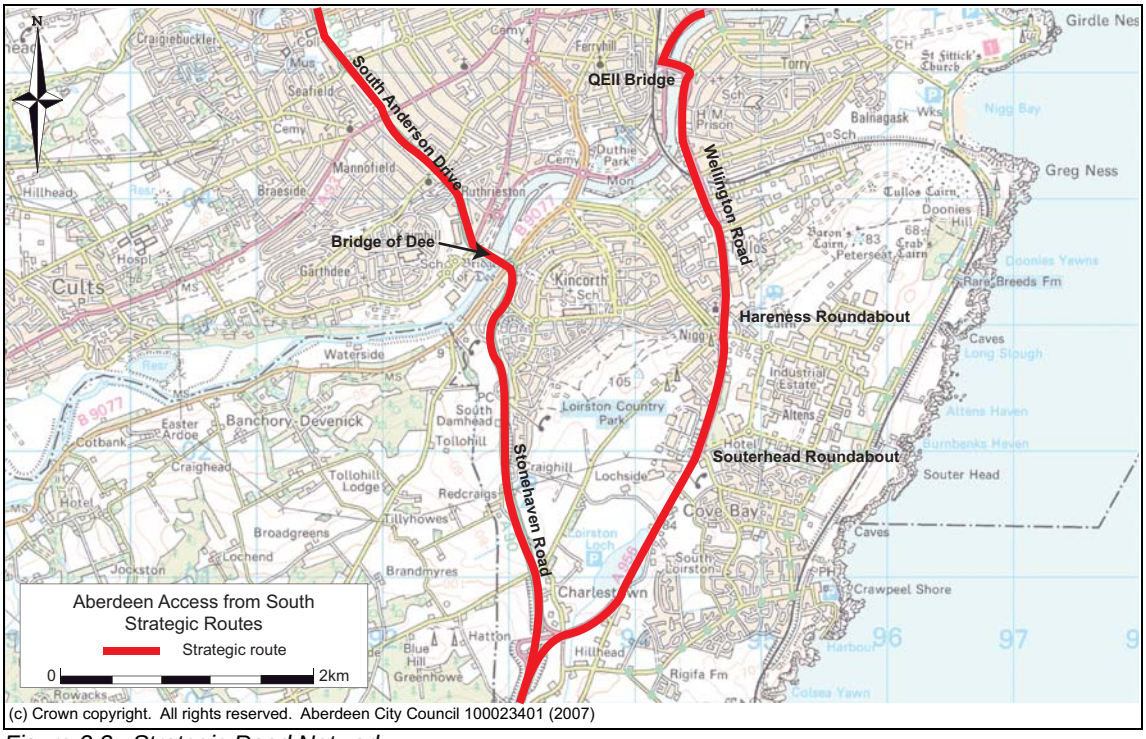

Figure 2.3 : Strategic Road Network

2.6 Local Road Network

There are significant congestion problems entering and exiting Aberdeen to and from the south during the AM and PM peak periods. Figure 2.4 identifies the main elements of the local road network.

The following routes can have significant delays:

- Stonehaven Road northbound on approach to Bridge of Dee during AM peak
- Wellington Road northbound on approach to Souterhead Roundabout during AM peak
- Wellington Road northbound between Hareness Rd and Balnagask Rd during AM peak
- Wellington Road northbound on approach to Queen Elizabeth II Bridge during AM peak
- Great Southern Road on approach to King George VI Bridge and Riverside Drive during AM peak
- West Tullos Road on approach to King George VI Bridge during AM and PM peak
- Leggart Terrace on approach to Bridge of Dee during AM peak
- South College Street on approach to Queen Elizabeth II Bridge during PM Peak
- Riverside Drive on approach to King George VI Bridge during PM peak
- North Esplanade West on approach to Queen Elizabeth II Bridge during PM peak
- South Anderson Drive on approach to Bridge of Dee during PM peak

- Garthdee Road on approach to Bridge of Dee during PM peak
- Great Southern Road on approach to Stonehaven Road during PM peak
- Wellington Road southbound on approach to Souterhead Roundabout during PM peak
- Wellington Road southbound between Balnagask Rd and Hareness Rd during PM peak
- Hareness Road on approach to Wellington Road during PM peak
- Greenbank Road on approach to Wellington Road during PM peak
- Souterhead Road on approach to Wellington Road during PM peak

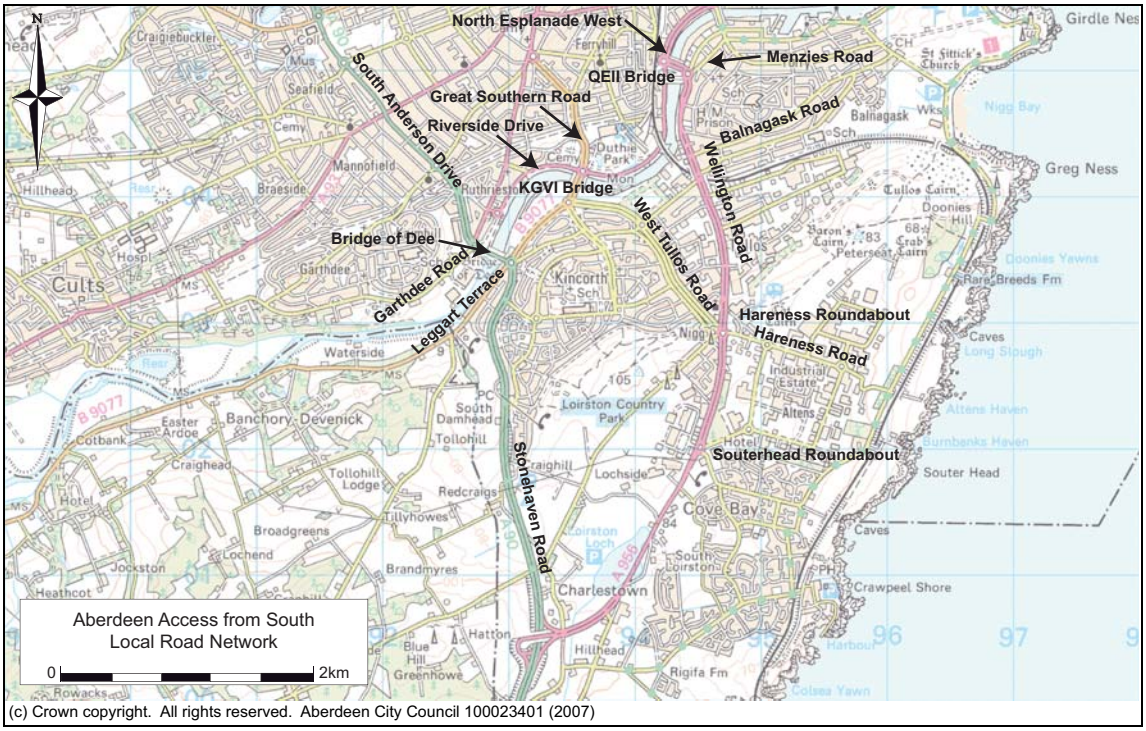

Figure 2.4 : Local Road Network

The delays experienced on the primary corridors can lead to rat-running, or a perception of rat-running, through key residential areas. During the PM peak the Kincorth area suffers from drivers rerouteing to avoid congested key junctions to access the A90 to travel both northbound and southbound

The congestion during both peak periods on both primary routes via the A90 and the A956 leads to an increase in traffic using the coastal route. It is perceived that this pushes traffic through the Torry area, which affects bus routes and local residents as well as future development and regeneration of the area.

Pedestrian crossing facilities, cyclist safety and motorcyclist safety are a key concern at most roundabouts in the southern network, particularly Bridge of Dee where footway width is minimal. Key roundabouts are:

- Souterhead Roundabout
- Hareness Roundabout
- Bridge of Dee/Stonehaven Road Roundabout
- King George VI Bridge/Stonehaven Road Roundabout

2.7 Environment

2.7.1 Environmental Sensitivities and Constraints

Although consideration has been given to the environmental effects of schemes, no detailed environmental assessment has been undertaken as part of this study. Any options moving forward within a STAG process would be subject to detailed environmental appraisal as defined in the STAG guidelines.

2.7.2 Noise and Vibration

Background noise levels in the study area may be high due to the nature of heavily trafficked routes. The railway is also a source of noise. No other sources of noise have been identified.

2.7.3 Air Quality

No air quality assessment has been undertaken as part of this study. Any options moving forward in a STAG process would be subject to detailed air quality assessment as defined in the STAG guidelines.

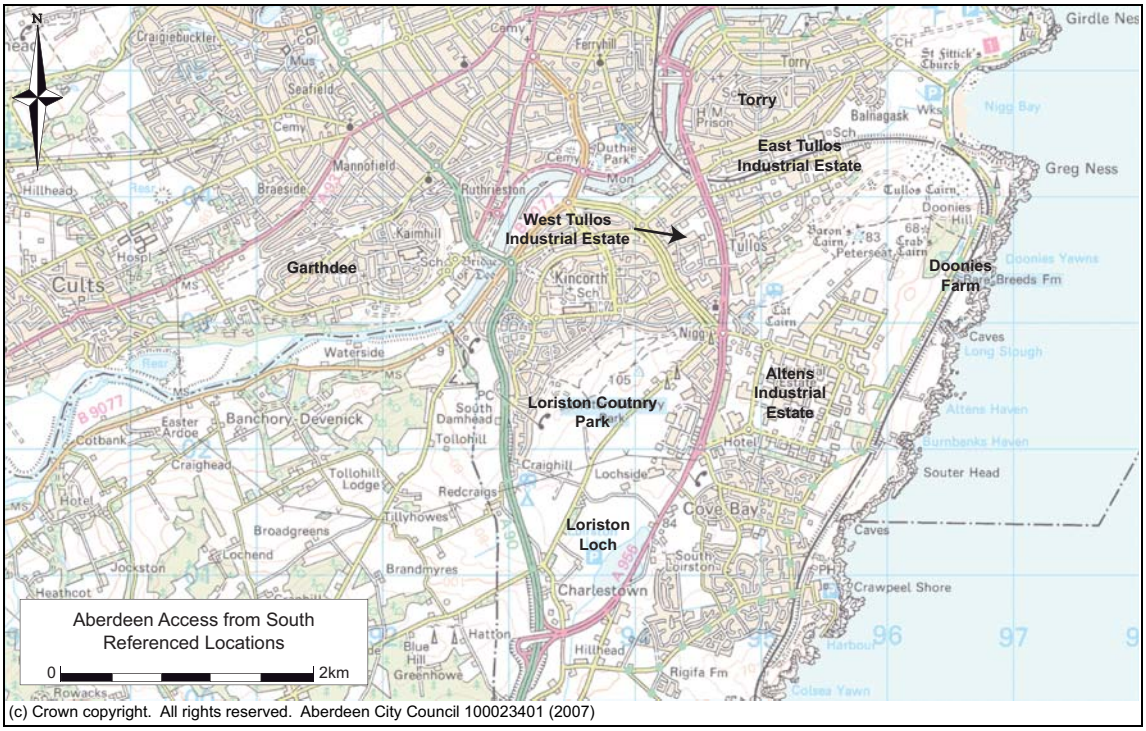

Figure 2.5 : Selected Referenced Locations

2.7.4 Water Quality, Drainage and Flood Defence

The principle watercourse in the southern area is the River Dee which runs in an approximately west to east direction. Loriston Country Park, containing Loriston Loch, is situated to the north of Wellington Road (A956) just east of Charleston Interchange. Kincorth Hill is a local nature reserve.

Geology

Geology should be investigated as the STAG process evolves in the STAG Part 2 assessment.

2.7.5 Biodiversity

Biodiversity is the *variety of life*, including all living things and their environments, from the smallest bacterium to the largest tree. Following the UN Earth Summit in 1992 in Rio, over 150 nations signed up to protect biodiversity. As part of the UK response, Local Biodiversity Action Plans (LBAPs) have been set up throughout the country.

North East Scotland LBAP Partnership has designated 195 local priority species, 80 of which are also UK Biodiversity Action Plan priority species. Action for most species is carried out through the relevant Habitat Action Plans, however, specific Species Action Plans are being implemented for those species where habitat action alone will not fully address the needs of that particular species (aspen hoverfly, daubenton bat, water vole, red squirrel, wych elm). The potential impact of any schemes moving forward in a STAG process should be considered during the STAG Part 2 with particular reference to the potential impacts at Loriston Country Park and the River Dee.

2.7.6 Agriculture and Soil

The area contains agricultural use at Lochinch Farm, the Countryside Ranger Service base and an outpost of the City Council's Doonies Farm at Nigg. At most times of the year there is a selection of rare or unusual breeds of farm animals including shorthorn and Gloucester cattle and sheep.

During the summer many of the fields are not grazed but are used to grow a hay or silage crop for winter feed for the animals. These fields then become a haven for insects, birds and wildflowers.

The Ranger Service is based in a converted granite barn, the Lochinch Countryside Interpretation Centre, which is open by arrangement and available for visiting groups to use as a base and indoor facility for educational visits.

Soil type requires investigation as the STAG process moves forward during STAG Part 2.

2.7.7 Cultural Heritage

The Bridge of Dee (including sundial) is a Category A listed building and scheduled historic monument. Category A denotes buildings of national or international importance, either architectural or historic, or fine little-altered examples of some particular period, style or building type.

2.7.8 Predicted Future Environmental Baseline (Year 2027)

Improving the operation of some of the key congestion points should serve to improve on the detrimental environmental effects of transport congestion. Traffic that stops and starts with low speed or stationary periods uses fuel in an inefficient way and so pollutes the air in the local environment. Reducing the incidence of delay should therefore reduce air pollution within the local urban context.

2.8 Public Transport

Some bus services run along Wellington Road and into Cove/Altens. Direct bus services are illustrated in Figure 2.6 and Figure 2.7, and the service operation is described in Table 2.1. The most frequent bus service route No. 13 operates via Souterhead Road to the city centre. This provides a service at all times including off peak, weekday evenings, Saturdays and Sundays. One other bus service provides a local connection to Kincorth. The bus service No. 107/113/117 provides a frequent service from Aberdeenshire towns to the south (Portlethen, Stonehaven) and on to Montrose with coverage also during the weekday, evenings, Saturday and Sunday. Despite the reasonable frequency of routes potential direct destinations are limited and the volume of buses in this area of the city is not high.

There is potential to make greater use of public transport as part of any Park & Ride located in the southern area. If replicated in the same manner as the Bridge of Don Park & Ride this would provide a

direct frequent service from a Park & Ride to the city centre and on, linking to another Park & Ride on the other side of the city.

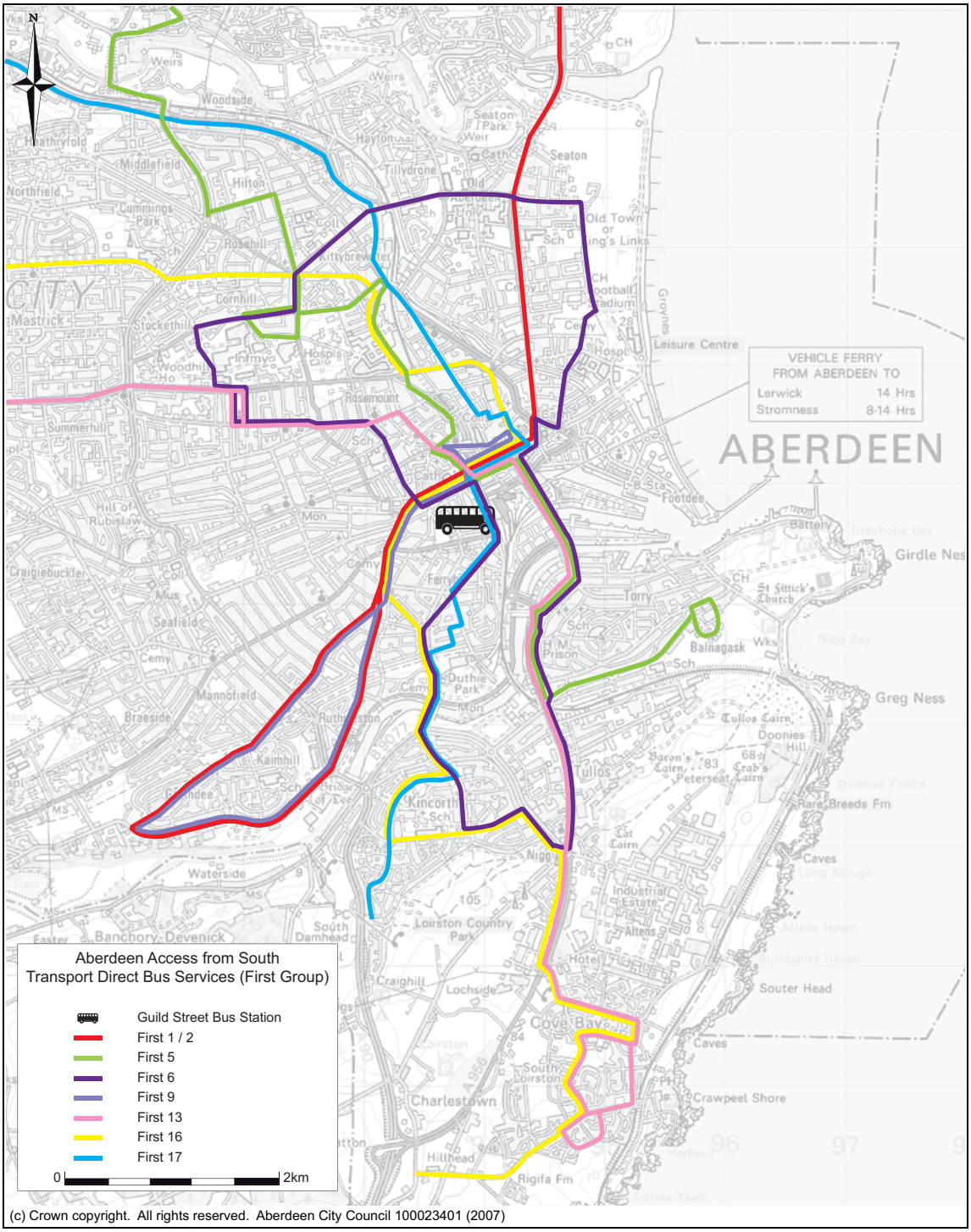

Figure 2.6 : Aberdeen South Bus Routes: First Group

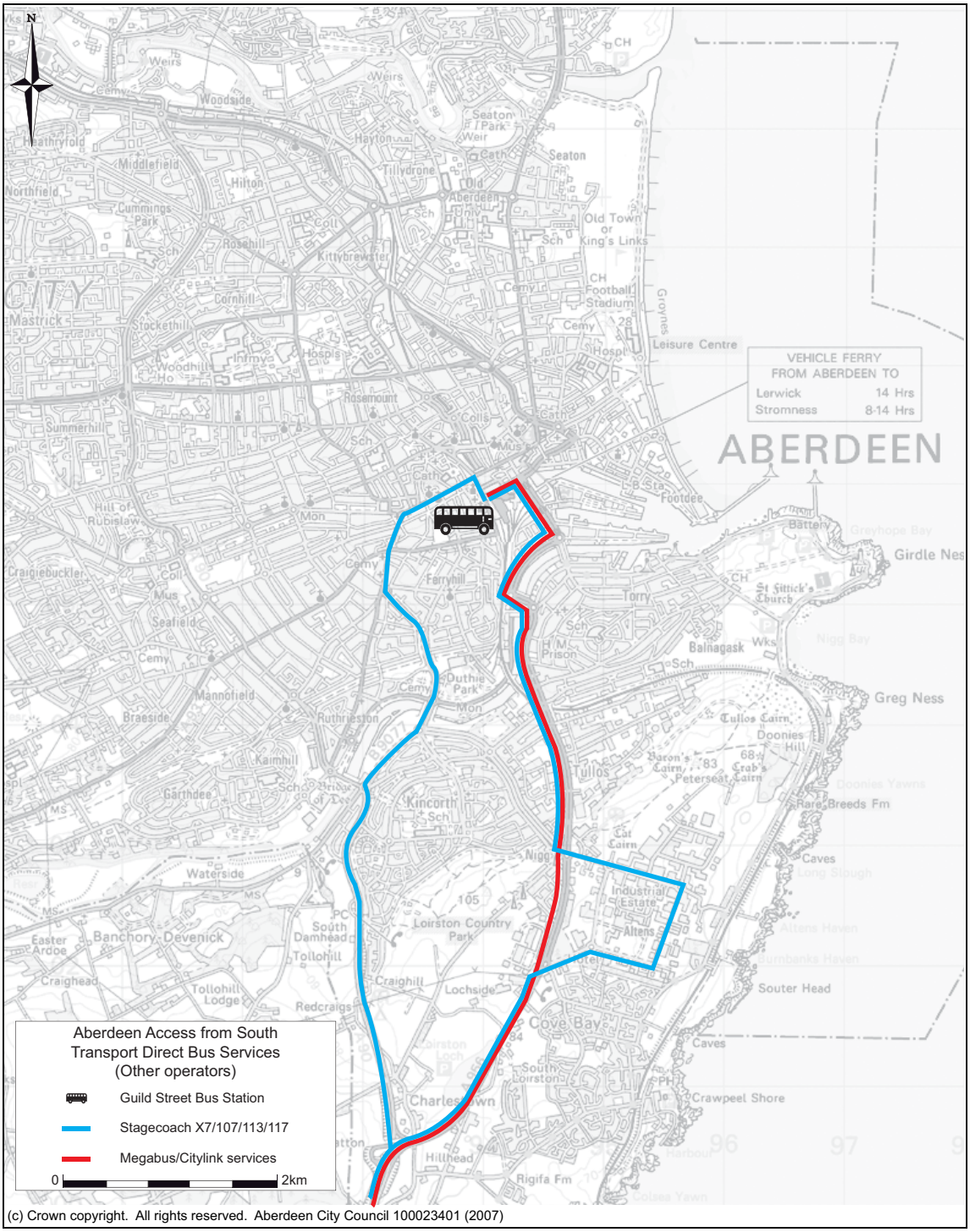

Figure 2.7 : Aberdeen South Bus Routes: Other Operators

Table 2.1 : Bus Route Operation

Route No.	Route	Operator	Pk Hr Freq (min) Mon-Fri	Daytime Frequency (min)	Frequency (min) Mon - Fri Evenings (18:30 onwards)	Range of Operation	Frequency (min) Sat	Range of Operation Sat	Frequency (min) Sun	Range of Operation Sun
EXISTING LOCAL SERVICES RUNNING ALONG WELLINGTON ROAD (A956)										
13	Cove - Nigg Post Office - Market Street - Mastrick Shops	F	15	15	30	05:30 - 23:19	20	05:30 - 23:44	30	09:00 - 22:56
16	Charleston Road - Altens - Redmoss - Kincorth Academy - Duthie Park - Rubislaw Place - Holburn Junction - Broad Street - Berryden Rd -Springhill	F	12	12	0 (from Crawpeel Rd)	06:46 - 18:10	12	07:05 - 18:48	No Services Depart from or near Crawpeel Road	NA
X7/107/113/117	Aberdeen Bus Station - Nigg Post Office - Portlethen - Stonehaven - Montrose	SC	20	20	8 Services	05:50 - 23:25	30	07:00 - 23:25	2 services per hour	08:25 - 23:25
1	Danestone - Garthdee (Red Line)	F	12	12	30	04:55 - 23:51	12	07:01 - 23:52	30	07:01 - 23:52
2	Scotstown - Auchinyell (Red Line)	F	12	12	30	04:55 - 23:51	12	04:45 - 00:21	30	07:01 - 23:52
5	Balnagask - Dubford (Line Green Line)	F	15	15	30	06:21 - 23:34	15	06:60 - 00:04	30	09:04 - 23:28
6	Seaton - City Centre - Kincorth - Foresterhill Hospital - Seaton	F	30	30	30	05:55 - 23:14	30	06:55 - 23:47	30	09:50 - 23:38
9	Woolmanhill (John Street) to Robert Gordon's Uni (Lavender Line)	F	15	15	40	08:00 - 21:30	n/a	n/a	n/a	n/a
17	Dye - Newhills - Faulds Gate (Blue Line)	F	10	10	30	05:01 - 23:41	10	05:01 - 23:51	30	07:30 - 23:41
LONG DISTANCE BUS SERVICES RUNNING PAST 'GATEWAY' SITE : stops at Aberdeen Bus Station only										
MEGABUS/CITY LINK	Aberdeen - Dundee - Perth - Dunfermline - Edinburgh	MB/CL	60	60	1 Service	06:35 - 19:15	60	06:35 - 19:15	60	06:35 - 19:15

Operators: F=First Aberdeen, SC=Stagecoach

The main problem noted for the southern area is the perceived lack of a cohesive public transport linking employment centres at Altens and Tullos to residential centres across the city. A number of employers operate shift patterns. It is also a perceived problem that bus services do not cater for these shift patterns outwith the normal peak times, and bus stops are inadequately positioned to make public transport attractive to a number of employment sites.

2.9 Vehicular Access

Information from the AWPR project[4] does not show traffic information for Wellington Road. However, from Aberdeen City Council automatic traffic counters in May and November 2006 the 7-day average daily traffic was 16,700 vehicles. There had been a rise in traffic on this route of 11% between 2002 and 2006. The traffic growth on this route is being tackled with an integrated package of measures being brought forward by the City Council through its transport strategy. Wellington Road is also currently being dualled between Souterhead Roundabout and its interchange at Charleston with the A90. This will increase capacity on this link, easing congestion at Charleston in the AM peak albeit bringing traffic to the congested Souterhead Roundabout. The dualling will be beneficial to vehicles exiting Souterhead roundabout southbound in the PM peak.

2.10 Park & Ride Plans

Local and Regional Transport Strategy Plans are to provide a new Park & Ride site that would assist in access to Aberdeen from the south. The potential locations for this site will be discussed later in this document and the appendices.

[4] http://www.awpr.co.uk/downloads/Public%20Exhibitions/October%202007/Display%20Boards/34%20traffic%20flows.pdf

The Park & Ride site proposals are independent of improvements to the south, although improving the satisfactory operation of southern corridors to make public transport more effective will benefit those proposed Park & Ride schemes and support the overarching Regional Transport Strategy (RTS) strategy as illustrated in Figure 2.8. The precise location of these sites is dependent on the final junction designs for the AWPR and future Park & Ride studies.

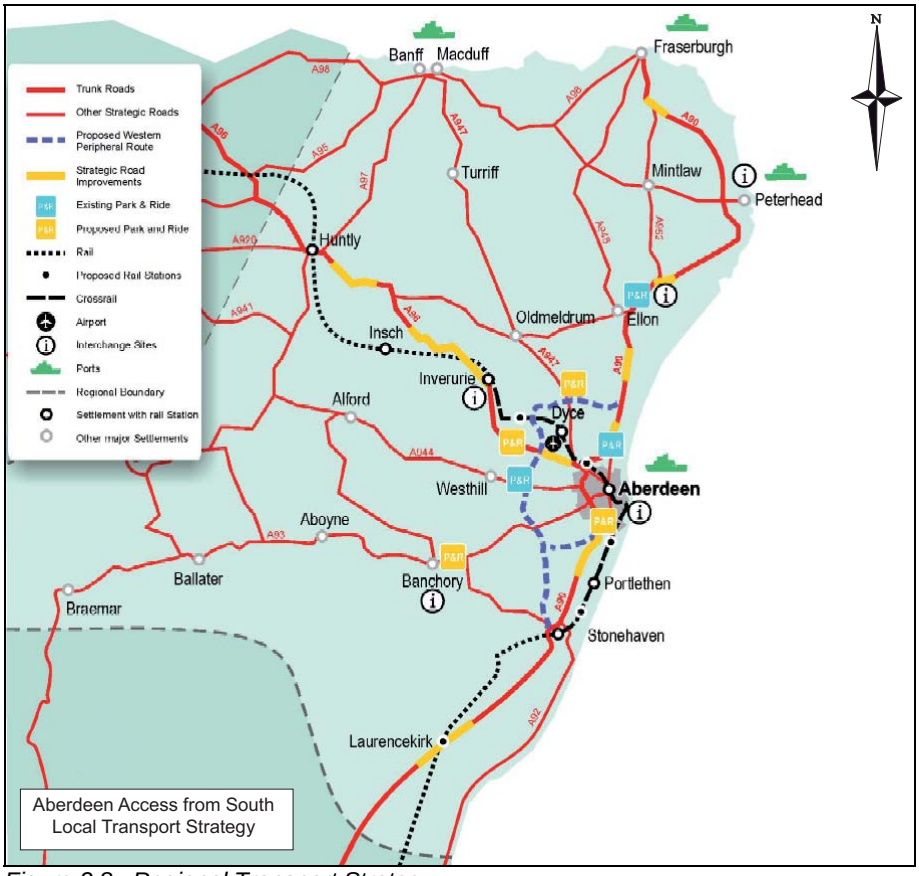

Figure 2.8 : Regional Transport Strategy

2.11 Train Services

There is an existing rail service from the south to Aberdeen City Centre. Table 2.2 and Table 2.3 show the existing frequencies to the main stops south of Aberdeen for the AM (inbound to Aberdeen) and the PM (outbound from Aberdeen) periods.

Table 2.2 : AM Train Connections to South to and from Aberdeen

AM Arrivals to Aberdeen

Dundee	Stonehaven	Portlethen	Aberdeen
-	06:52	07:01	**07:15**
06:35	07:25	-	**07:48**
06:56	07:51	08:00	**08:13**
07:23	08:18	08:27	**08:39**
08:25	09:15	-	**09:37**
09:03	-	-	**10:16**

Table 2.3 : PM Train Connections to South to and from Aberdeen

PM Departures from Aberdeen

Aberdeen	Portlethen	Stonehaven	Dundee
16:22	-	16:38	17:31
16:41	-	16:57	17:50
17:22	17:31	17:40	18:32
17:55	18:04	18:13	19:10
18:23	-	18:40	19:34
19:25	-	19:41	20:31
19:41	19:49	19:57	20:53

Aberdeen Crossrail aims to provide more frequent cross-city rail services between Inverurie, Aberdeen and Stonehaven, and create opportunities for new stations, linking housing and employment areas. It is a key part of the Modern Transport System strategy developed by Nestrans and endorsed by the Scottish Executive and subsequent Regional Transport Strategy. Nestrans has commissioned a STAG Stage 2 study of proposals for Aberdeen Crossrail.

2.12 Travel Choices

The Aberdeen South area currently serves a variety of users:

- strategic long-distance traffic
- commuters into Aberdeen
- access to Aberdeen Harbour and the employment opportunities there
- the local residents on both sides of the River Dee
- retail at Garthdee
- education at Garthdee
- public transport users
- commercial traffic accessing the north and north-east
- access to Altens and Tullos industrial areas and employment

Journey to work is acknowledged, in both the Local Plan and the LTS, as a key target for change to more sustainable modes, and is therefore considered as part of the strategy for Aberdeen Access from the South.

Local towns and villages in Aberdeenshire have large populations of commuters. Data from Aberdeenshire Council[5] main centres in Aberdeen's travel to work area and beyond the city boundary have the following populations:

- Stonehaven - 10,614
- Portlethen – 6,632
- Westhill – 10,392
- Inverurie – 11,062
- Ellon – 9,712

[5] http://www.aberdeenshire.gov.uk/statistics/population/sapef2007_tables.pdf

- Peterhead – 17,561
- Fraserburgh – 12,451

Aberdeenshire, as a rural area with many dispersed towns and villages, does not have the same level of public transport service as enjoyed in Aberdeen. Aberdeenshire has the highest percentage of households with no access to a bus in mainland Scotland (6%, second only to Shetland/Orkney; the average for Scotland is 1%).

The main modes of travelling to work in Scotland, Aberdeen City and Aberdeenshire are shown in Figure 2.9. There is a marked difference in the number travelling to work and study by bus or by walking between Aberdeen City and Aberdeenshire. Aberdeenshire has a greater percentage of people working from home which reduces the need to travel for that sector of the population.

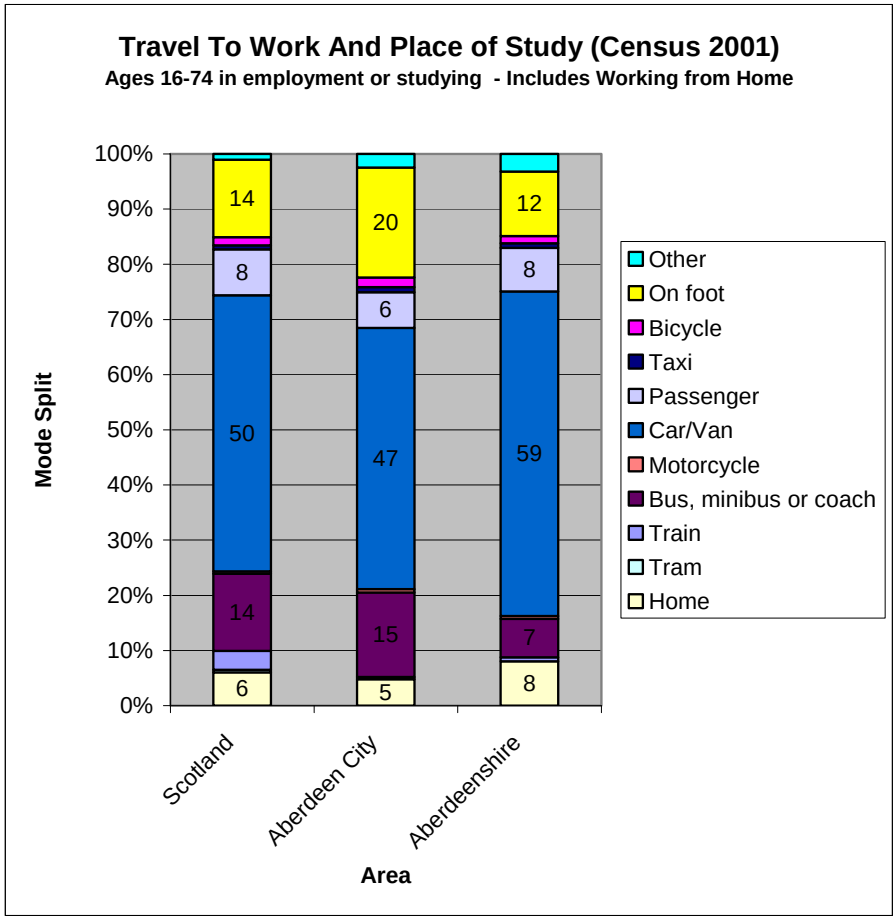

Figure 2.9 : Main Modes of Travelling to Work or Study

Accessibility to bus services with high frequencies is markedly different between Aberdeenshire and Aberdeen City as shown in household survey results in Figure 2.10.

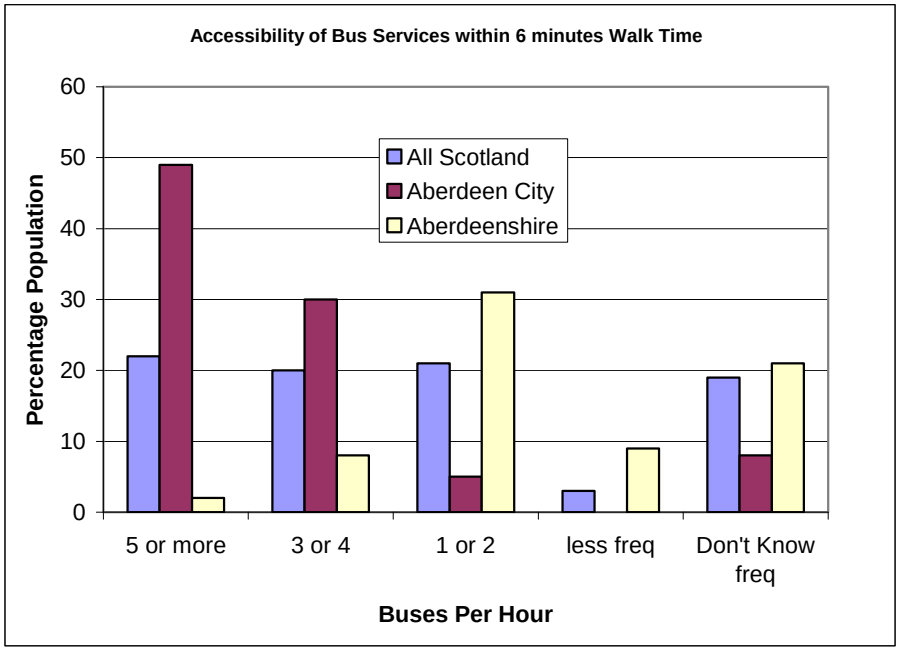

Figure 2.10 : Accessibility of Bus Services

Source: http://www.scotland.gov.uk/Resource/Doc/205253/0054645.pdf

2.13 Aberdeen Western Peripheral Route (AWPR)

As discussed in the introduction, an announcement was made on 1 December 2005 by the Scottish Transport Minister with regard to a preferred corridor for the Aberdeen Western Peripheral Route (AWPR). The preferred AWPR corridor was significantly different from the corridor previously assessed in the Aberdeen South Access Study.

This study uses the latest design for the AWPR corridor location and introduces the AWPR into the study at the medium term (2012) and long term (2027).

The AWPR is predicted to reduce traffic congestion in the south of Aberdeen as it provides an alternative route to the north, instead of travelling northwards on the two main corridors with which this study is concerned, A90 (T) and A956.

Advantages predicted to be brought about by the AWPR are:

- reduction in traffic on South Anderson Drive
- reduction in traffic on the A90 (T) south of Charleston
- improved journey times across the region
- increased opportunity for employment through improved linkage
- increased opportunity for public transport and freight improvements due to traffic reductions

2.14 Aberdeen Access from the South Problems Summary

Traffic problems in Aberdeen South are not due to one cause, but are attributable to a range of social, economic, geographic and transportation issues, which when combined, result in significant delay to all modes of traffic, reduce public transport performance and affect efficient movement of freight.

In a social context there is a general movement of population from Aberdeen City to Aberdeenshire which brings an increase in commuter trips. The population of Aberdeen City is projected to fall by 23% in the 20 years from 2004, while the population of Aberdeenshire is projected to rise by 8% over the same period.

Committed developments of both industry and housing in Aberdeen South will exacerbate the current traffic problems unless infrastructure is in place. In an economic context, structure and local plans are aiming for diversification in the local economy, which will require a Modern Transport System (MTS) to support it.

Road traffic issues regarding access to Aberdeen from the South arise in the main from the River Dee and its four road crossings, which are significant points of congestion. Conflicting movements of traffic to the city centre and to the Tullos/Altens industrial areas on Wellington Road in the AM peak, and vice versa in the PM peak, are also a source of congestion.

Freight access is an issue due to width restrictions requiring an HGV ban on Bridge of Dee, and height restrictions on Riverside Drive. Growth in traffic in recent years means that key areas are now over capacity at peak times for extended periods.

Existing public transport services link housing and industrial areas. Some bus priority measures are already in operation on Wellington Road, but the level of congestion in the area means public transport services, along with all other modes of transport, are significantly delayed.

The perception of poor or a lack of travel choices has an influence on travel habits, and the nature of small villages and rural areas in Aberdeenshire results in a high level of car use. Improvements to the public transport network are required in order to provide alternative travel choices and change travel habits. Problems can be summarised as:

- problems for freight and commercial traffic due to insufficient infrastructure, routeing and gradients
- existing congestion and delay around development sites, the development of which would support the local plan aims to make the City of Aberdeen more attractive to families, with the chance to enhance the more deprived areas around Torry and Balnagask
- the desire to promote more sustainable, socially inclusive and healthy modes of transport (i.e. proposed Park & Ride) will be hampered by inability to operate effectively in the south of Aberdeen due to the congested road network
- geographic constraints due to gradients, river, embankments, existing development and property boundaries
- problems for pedestrian and cyclist safety at key locations
- congestion causing delays to existing public transport
- no effective relationship between public transport and employment shift working patterns linked with main residential sites throughout the city

3 PLANNING OBJECTIVES

3.1 Introduction

Planning objectives have been established to provide a clear indication of what this appraisal is trying to achieve. The appraisal is concerned with investigating potential transport changes in the study area. The planning objectives have focused on desired transport outcomes following a broad consideration of the actual and potential future situation in the study area, drawing significantly on the appreciation of existing and potential problems as described in the previous chapter.

In planning the objectives, consideration has been given to the relevant transport and planning aspirations of central and local government as set out in relevant Local and Regional Transport Strategies, Local Plans and Structure Plans, as well as the development objectives.

3.2 Aims

The aim of this appraisal is to address the transport issues for Aberdeen access from the south and recommend measures that will alleviate those problems to the satisfaction of all parties and in compliance with local, regional and national policy objectives for the short, medium and long term.

3.3 Structure Plans & Local Plans

3.3.1 Structure Plan

North East Scotland Together, the Aberdeen & Aberdeenshire Structure Plan 2001-2006 was published in June 2002. The purpose of the document is to set out a shared strategic statement about the future use of land in the North East. In particular, it provides a long-term vision which takes into account the different functions of, and relationship between, settlements in the area. The new structure plan is currently being developed.

The plan provides the framework for improvements to the main road network such as the A90, A96 and A947. The outcome of such improvements must not run counter to the need to reduce travel, especially by car. Justification for improvements must be based on issues such as road safety, improving access for buses and freight vehicles, and making an overall positive contribution to the aim of a modern transport system.

The structure plan's vision is the development of a sustainable community in the North East that meets the needs of the present, without compromising the ability of future generations to meet their own needs. This will embrace the social and cultural identity of the North East in a way that improves its economic competitiveness, and delivers prosperity and a high quality of life for everyone within a secure and well-managed environment.

Achieving this will be based firmly on three principles:

- responsible management of natural, built and community resources
- fairness in allocation of these resources between competing demands
- the need to benefit both existing and future generations

Structure Plan Transport policy principles are contained in Policy 30, 31, 32 and 33 as below.

POLICY 30: The Main Communications Network in the North East and Beyond

Improvements to the main communications network must support the development framework, contribute to the modern transport system, and reflect the need to reduce travel, particularly by car.

Aberdeenshire and Aberdeen City Councils will encourage the Strategic Rail Authority, Trunk Road Authority and other relevant agencies to improve rail, road, port, pipeline and airport infrastructure both inside and outside the structure plan area. The local authorities will bid for funds and press other agencies to invest in transport infrastructure and services.

POLICY 31: Connecting Communities in the North East

New developments and measures to manage transport infrastructure will help reduce the need to travel, particularly by car. Local plans and local transport strategies will also help realise this aim.

Development proposals:

- will be well related to existing settlements and avoid dispersed patterns of development
- will be close to existing public transport services or deliver major improvements to public transport services
- together with the management of transport infrastructure, will maintain or enhance the vitality and viability of the economy, in particular Aberdeenshire town centres and Aberdeen city centre
- will give priority to proposals that increase the proportion of journeys by public transport, rail and sea freight, walking and cycling, and help reduce demand for private car travel

POLICY 32: Transport Infrastructure: Safeguarding Land and Minimising Environmental Impacts

Land identified in local plans will be safeguarded for transport proposals that contribute to the modern transport system. The best practicable environmental option, not entailing excessive cost, will be required to mitigate the impacts of transport proposals. Development proposals that result in a breach of National Air Quality Standards will not be permitted.

POLICY 33: Sharing Responsibility for Transport

Developer contributions, secured by planning or legal agreement, will be required to mitigate any adverse effects of the travel patterns created by the development on the existing transport infrastructure or services, or the wider community. They should address any shortfalls in the choice of transport available to the development. There will be a presumption against development whose travel demands (identified in a transport assessment) will not be satisfied by:

- proposed car park spaces up to the maximum number for the development
- existing or possible new public transport
- cycling, walking and other non-car measures

3.3.2 Local Plan

Green Spaces – New Places, the Aberdeen City Local Plan, is the means by which sustainable new communities will be delivered around Aberdeen over the next five years and beyond. At the heart of Green Spaces-New Places is a concept which suggests we are custodians of our important green spaces and valued areas, so that they can be enjoyed by future generations. It is vital that we provide the framework to satisfy the needs of the current generation, if Aberdeen is to continue to thrive as a city. The Public Local Inquiry into objections to the Finalised Aberdeen Local Plan took place between February and December 2006 and Reporters have made recommendations in respect of the objections received in late August 2007. Proposed modifications to the Local Plan are to be advertised and any objections received will be considered prior to formal adoption procedures.

The Local Plan vision is –

> *Successful cities embrace change in a positive and enlightened fashion and use it constructively. Aberdeen sits at the heart of a thriving city region and it is vital we maintain and continue this. Aberdeen City Council is committed to the diversification of the city's economy and ensuring that Aberdeen is recognised as a 'Global Energy City'. The diversification of Aberdeen's economy requires that the city itself grows and this development is a strategic imperative. This is supported by our own efforts to create conditions in the city which will encourage the sustainable growth of prosperity and jobs.*

3.3.3 Community Plan

Aberdeen City's first Community Plan sets out a vision for the future of the city and how it is intended to achieve it. It is a social, economic and environmental design for Aberdeen. More recently **The Aberdeen City Alliance** was established in June 2002. This was a key action in the Community Plan which was launched in Nov 2001 (Leading the City).

The community plan vision is for a sustainable city with an integrated transport system accessible to all.

Key aims:

- **Integration**: through land use planning and transport integration, to make sure that the objectives set in the Transport Strategy are met in the most efficient way possible
- **Accessibility**: to ensure all citizens have access to a range of transport options which reflect differing needs of age, gender, disability and income
- **Choice**: to maintain and improve the range of transport choices available to, from and within the city
- **Partnership**: to ensure, through partnership working, that strategic transport needs are adequately addressed and that transport operators are encouraged to work in the long-term best interests of the area

North East of Scotland Transport Partnership (Nestrans)

Nestrans is the regional transport partnership for north east Scotland and became a statutory regional transport partnership on 1 April 2006. Nestrans has developed a long-term Regional Transport Strategy to 2021 which builds on the Modern Transport System.

The vision of Nestrans is

> *to deliver a transport system for the north east of Scotland which enables a more economically competitive, sustainable and socially inclusive society.*

It is a key task from the Nestrans Delivery Plan 2005/6 to champion the transport and economic case for trunk road improvements in the north east and promote proposals for improvements at trunk road bottlenecks including Haudagain Roundabout.

Aberdeen City Local Transport Strategy

Aberdeen City Council Local Transport Strategy (LTS) December 2000 is currently under review. A Final Draft Local Transport Strategy (LTS) 2008-2012 has been consulted upon. After analysis of the responses, a Final LTS will be produced and presented to the City Council in Spring 2008 for approval and adoption. The approach to the transportation strategy is based on the following statement:

> *The development of a transport strategy in Aberdeen City will recognise the sustainability objective of preserving and enhancing our environmental quality for future generations. Through an emphasis on reducing car dependence and facilitating more environmentally-*

friendly forms of transport, strategies for sustainable transport in Aberdeen will aim to reconcile the various demands of society, the economy and the environment by:-

- *meeting the accessibility and safety needs of the community;*
- *supporting economic activity and growth; and*
- *minimising the local and global environmental and resource impacts of transport and providing environmental benefits where possible.*

The LTS has five key objectives:

- to take full account of the environmental, social and economic implications of transport
- to maximise accessibility for all to services and job opportunities
- to campaign for improved external links to Aberdeen by rail, sea, road and air
- to improve safety in transportation matters
- to ensure the efficient use of resources in accordance with the strategy

The LTS also has a series of specific sub-objectives and targets.

3.4 National Policy

Scotland's Transport Future

The transport white paper, June 2004, emphasises the importance of all with a stake in transport working together to achieve common goals. It follows on from extensive consultation and sets out the Scottish Government's ambitions for improving the planning and delivery of transport at a local, regional and national level.

The Scottish Government vision is for:

An accessible Scotland with safe, integrated and reliable transport that supports economic growth, provides opportunities for all and is easy to use; a transport system that meets everyone's needs, respects our environment and contributes to health; services recognised internationally for quality, technology and innovation, and for effective and well-maintained networks; a culture where fewer short journeys are made by car, where we favour public transport, walking and cycling because they are safe and sustainable, where transport providers and planners respond to the changing needs of businesses, communities and users, and where one ticket will get you anywhere.

The overall aim is to promote economic growth, social inclusion, health and protection of our environment through a safe, integrated, effective and efficient transport system. The objectives are to:

- promote economic growth by building, enhancing, managing and maintaining transport services, infrastructure and networks to maximise their efficiency
- promote social inclusion by connecting remote and disadvantaged communities and increasing the accessibility of the transport network
- protect our environment and improve health by building and investing in public transport and other types of efficient and sustainable transport which minimise emissions and consumption of resources and energy
- improve safety of journeys by reducing accidents and enhancing the personal safety of pedestrians, drivers, passengers and staff
- improve integration by making journey planning and ticketing easier and working to ensure smooth connection between different forms of transport

Scottish Planning Policy SPP17

Planning for Transport, August 2005, states that land use planning has a key role in supporting the achievement of the Scottish Ministers' economic, environmental and social objectives. The national focus on transport is now on delivery of projects. Integration of land use and transport planning can play a positive role in supporting the Scottish Government's transport delivery agenda. For the transport network to support the economy most effectively, land use planning should assist in reducing the need to travel; in creating the right conditions for greater use of sustainable transport modes; and in avoiding or mitigating adverse environmental impacts.

The overall vision is of a Scotland where the economy can flourish and communities can function without significant environmental and social problems arising from car dependency, traffic congestion and pollution.

3.5 Planning Objective Workshops

A workshop was held on 6 March 2007 to agree constraints and opportunities, and identify transport planning policies from the relevant policy documents, the Local Transport Strategies, Local Plans and Structure Plans of both Aberdeen City Council and Aberdeenshire Council.

The planning objectives have been considered in the light of the Government's five key objectives of environment, safety, economy, accessibility and integration.

The workshop sought to confirm a set of SMART (Specific, Measurable, Attainable, Relevant and Timed) planning objectives to be used for the appraisal of potential solutions.

3.6 Planning Objectives

A total of 15 draft planning objectives were developed from regional and local policy, each of which fell into one of the government's five key objective categories. The 15 draft planning objectives are shown in Table 3.1.

Draft objectives were developed with the specific problems and constraints of access to Aberdeen from the South in mind:

- significant delay to all modes of traffic
- reliability of public transport
- severance
- root causes of traffic problems
- safety

Through the process of the workshop, objectives were amended to represent the views of the key stakeholders. The amended objectives are shown in Table 3.2.

Table 3.1 : Draft Planning Objectives

	Planning Objectives	From
ECONOMY	To contribute to the growth and diversification of the local economy and the success of Scotland's economy.	EC1, EC2
	To reduce congestion and unreliability, and have effective journey times particularly where it impacts on the efficient movement of goods.	EC6, EC13
	To ensure transport infrastructure and services are available to facilitate the demands of new and incoming businesses.	EC15
SAFETY	To provide a secure travel environment which is safe from actual and perceived intimidation and danger.	SS2
	To reduce the incidence of casualties in all transport related accidents especially vulnerable users, such as cyclists, pedestrians and motorcyclists.	SS3
SOCIAL INCLUSION & ACCESSIBILITY	To make socially-inclusive and healthy transport modes more attractive to use, including cycling, walking and public transport measures.	SI 4, M2
	To improve the accessibility of social inclusion areas.	SI 5 part
	To contribute to the City Council's regeneration aims.	SI 8
	To minimise traffic induced severance on communities	AC1 Nestrans
ENVIRONMENT	To improve the local environment by reducing air and noise pollution problems.	EN1
	To contribute to the national target of reducing CO2 and other greenhouse gases.	EN2
	To develop a transport system that protects, enhances and promotes the natural, built and cultural heritage.	EN5
INTEGRATION	To ensure a long-term vision, consistent with the corporate and community objectives set by the Council and its partners.	INT1
	To integrate transport with land use planning to ensure that transport networks serve development in an efficient and sustainable way.	INT2
	To enable efficient movement by people and of goods where interchange is required.	INT5

Table 3.2 : Amended Planning Objectives

	Planning Objectives
ECONOMY	To contribute to the growth and diversification of the local and regional economy and the success of Scotland's economy.
	To reduce congestion and unreliability, and have effective journey times particularly where it impacts on the efficient movement of goods.
	To provide transport infrastructure and services to facilitate the demands of existing, new and incoming businesses.
	To improve transport efficiency in and around Aberdeen South including new developments to the South of the River Dee (Altens, Tullos, Torry)
SAFETY	To provide a secure travel environment which is safe from actual and perceived intimidation and danger.
	To reduce the incidence of and potential for collisions and all transport related collisions especially vulnerable users, such as cyclists, pedestrians and motorcyclists.
SOCIAL INCLUSION & ACCESSIBILITY	To encourage socially-inclusive and healthy transport modes other than single car occupancy.
	To improve the accessibility between residential and employment areas.
	To minimise traffic induced severance on communities
ENVIRONMENT	To improve the local environment by reducing air pollution problems.
	To contribute to the national target of reducing CO2 and other greenhouse gases.
	To develop a transport system that protects, enhances and promotes the natural, built and cultural heritage.
INTEGRATION	To support a long-term vision, consistent with the local, regional and national community plan objectives.
	To integrate transport with land use planning to ensure that transport networks serve development in an efficient, effective and sustainable way.
	To enable efficient movement by people, goods and services where interchange is required.

In order to achieve a concise set of objectives for the initial appraisal of potential options, the key stakeholders voted for the five objectives which they deemed most important. The five objectives with the largest number of votes were then agreed and adopted as the key planning objectives for the option sifting process.

The environmental objective, although ranked sixth, was included to ensure all five of the government's key criteria would be considered.

The six key planning objectives are shown in Table 3.3.

Table 3.3 : Key Planning Objectives

	Planning Objectives	Score
Economy	To reduce congestion and unreliability, and have effective journey times particularly where it impacts on the efficient movement of goods.	**12**
Safety	To reduce the incidence of and potential for collisions and all transport related collisions especially vulnerable users, such as cyclists, pedestrians and motorcyclists.	**10**
SOCIAL INCLUSION & ACCESSIBILITY	To encourage socially-inclusive and healthy transport modes other than single car occupancy.	**8**
	To improve the accessibility between residential and employment areas.	**9**
ENVIRONMENT	To improve the local environment by reducing air pollution problems.	**7**
Integration	To integrate transport with land use planning to ensure that transport networks serve development in an efficient, effective and sustainable way.	**13**

3.7 Checking Objectives are Relevant

It is important within the STAG process to check that planning objectives are directly relevant to the actual problems identified. Proposed transport measures should meet planning objectives and therefore aim to alleviate the identified transport problems.

Table 3.4 demonstrates the planning objectives established are directly relevant to the problems and opportunities identified during the workshops. The problems shown in Table 3.4 have been derived from a collation of workshop comments and discussion, and are summarised as follows:

- problems for freight and commercial traffic due to insufficient infrastructure, routeing and gradients
- existing congestion and delay around development sites, the development of which would support the local plan aims to make the city of Aberdeen more attractive to families with the chance to enhance the more deprived areas around Torry and Balnagask
- the desire to promote more sustainable, socially inclusive and healthy modes of transport (i.e. proposed Park & Ride) will be hampered by inability to operate effectively in the south of Aberdeen due to the congested road network
- geographic constraints due to gradients, river, embankments, existing development and property boundaries
- problems for pedestrian and cyclist safety at key locations
- congestion causing delays to existing public transport
- no effective relationship between public transport and employment shift working patterns linked with main residential sites throughout the city

The planning objectives, also from the workshop, address these problems in terms of each of the five key government objectives of environment, safety, economy, integration and accessibility. A general appraisal overview of the government objectives will also be considered during the appraisal. Key relationships between objectives and problems are shown in Table 3.4. There will be other instances where measures to achieve objectives will have beneficial impacts on established problems.

Table 3.4 : Planning Objectives are Directly Relevant to Problems

		Problems/Opportunities						
		Problems for freight and commercial traffic due to insufficient infrastructure, routeing and gradients	Existing congestion and delay around key development sites whose development would support the local plan aims to make the City of Aberdeen more attractive to families with the chance to enhance the more deprived areas around Torry and Balnagask	The desire to promote more sustainable, socially inclusive and healthy modes of transport (i.e. proposed Park and Ride) will be hampered by inability to operate effectively in the South of Aberdeen due to the congested road network	Geographic constraints due to gradients, river, embankments, existing development and property boundaries	Problems for pedestrian, cyclist and motorcycle safety at key locations	Congestion causing delays to existing public transport	Need for an effective relationship between public transport and employment site working patterns to be linked with main residential sites throughout the city
Govt. Objective	**Planning Objectives**							
Economy	To reduce congestion and unreliability, and have effective journey times particularly where it impacts on the efficient movement of goods.	X			x			x
Safety	To reduce the incidence of and potential for collisions and all transport related collisions especially vulnerable users, such as cyclists, pedestrians and motorcyclists.	x		x		x		
Social Inclusion & Accessibility	To encourage socially-inclusive and healthy transport modes other than single car occupancy.			x		x	x	x
	To improve the accessibility between residential and employment areas.		x	x	x		x	x
Environment	To improve the local environment by reducing air pollution problems.	x		x				
Integration	To integrate transport with land use planning to ensure that transport networks serve development in an efficient, effective and sustainable way.	x	x		x		x	x

4 OPTION GENERATION, SIFTING & DEVELOPMENT

4.1 Introduction

This chapter sets out the options which may have potential to ameliorate the transport problems identified and contribute to planning objectives.

An afternoon workshop was held on 6 March 2007 to develop and propose options and ideas for the short, medium and long term which would form the assessment of Access to Aberdeen from the South.

The workshop, attended by key stakeholders, was held to develop further ideas for alternative short, medium and long term options. The development of these options was undertaken to provide realistic and deliverable options within the assessment timeframes. The options previously developed and tested by JMP formed part of this exercise, as did additional measures raised by Nestrans and the Freight Quality Partnership.

In the medium term, the preferred site for a 1,000 space Park & Ride facility and any priority measures required to ensure reliable bus journey times were considered. For the purpose of this study a desktop review was undertaken to confirm/review the appropriateness of sites (e.g. if adequate access cannot be achieved due to the new proposed layout of the AWPR).

The three preferred Park & Ride options from previous studies to be considered in the medium term are:

- Schoolhill
- Loch Inch
- Charleston

4.2 Option Generation Workshop

The workshop session allowed the key stakeholders an opportunity to develop short, medium and long term ideas as possible solutions. Key areas were highlighted as requiring specific traffic solutions:

- Garthdee/Bridge of Dee
- King George VI Bridge
- Queen Elizabeth II Bridge
- Wellington Road
- Hareness
- Souterhead Roundabout
- A90 Corridor/Charleston
- General consideration

The stakeholders were split into two groups and plans of the key areas were distributed. It was requested that all options be considered at this stage, regardless of constraints such as cost, scale and deliverability. A summary of options generated is provided in Appendix B.

4.3 Option Sifting

The initial option sifting process involved scoring each of the possible options generated at the workshop against the key planning objectives, to ascertain which met those objectives. Where the options had the potential to meet the objectives, they were then considered as either part of a package for traffic model assessment or as a measure worthy of future consideration but outwith the scope of this study and traffic model testing.

There was also a sifting exercise to remove duplicated options, and any that were statements rather than specific deliverable options. It was apparent that not all the options can be tested using the S-Paramics model. The tables were split into options that have a modelling relevance and those with no modelling relevance.

Each item, whether fit for modelling or not, was scored against the key objectives (agreed at the March workshop) and the implementability criteria in accordance with STAG. The final score for options was agreed with Nestrans and Aberdeen City Council.

Appendix B provides details of the options considered and their agreed scoring against key objectives and implementability criteria.

4.4 Option and Package Development

4.4.1 Introduction

The original project brief stated that the principal objective would be to

> *investigate proposals to improve traffic flows and reduce delays for all traffic on trunk and local roads approaching Aberdeen from the south*

Packages of the options identified during the key stakeholder workshops were developed for the short medium and long term, which had the potential to achieve the main objective and the key planning objectives developed earlier in the workshop. Package development was undertaken in agreement with the client group at all stages.

Packages have been brought together taking the most likely beneficial measures at each of the key locations in combination, i.e. Bridge of Dee, King George VI Bridge, QEII Bridge, Wellington Road, Hareness Roundabout, Souterhead Roundabout and Charleston Interchange etc. The first package is considered the core package, and subsequent packages are detailed to identify secondary measures which may or may not improve the overall network performance.

Where items within a core package clearly fail to provide any benefit to network performance they were removed from the test package.

The modelling years to be considered for the test packages are:

- 2008
- 2012 with Aberdeen Western Peripheral Route
- 2027 with Aberdeen Western Peripheral Route

The packages of short (2008), medium (2012) and long term (2027) option testing for application in the S-Paramics model were discussed between Aberdeen City Council, Nestrans and SIAS to ensure focused testing and agreement prior to undertaking any network evaluation.

The meeting was conducted at St Nicholas House, Aberdeen on 12 July 2007 and this combined with subsequent communication, outlined key short, medium and long term packages for consideration. It was agreed that the assessment of bus priority and Park & Ride were appropriate for the medium term.

In addition to the traffic model tests it was important to consider other road users including pedestrians and cyclists, as well as alternative travel such as public transport including rail and bus.

Where appropriate, designs have been produced to conceptual, preliminary stage to indicate alignments and scale of new infrastructure.

4.4.2 Short Term Packages - 2008

The short term packages were considered within the 2008 models.

Packages were developed in a layered approach, aiming, in the first instance, to assess key areas, and evaluate the performance/success of options considered, before progressing to the next package which sought benefits in additional areas of the network.

The options which were considered for short term improvements and traffic modelling were combined into four main packages as shown in Table 4.2.

Table 4.1 : Short Term Packages Considered

Reference	Package	Description	Rationale
Base	Base 04	JMP Validated Base 04	Provides a comparitive base to existing conditions
Do-Min	Do Min 2008	2008 forecast demand	Provides an assessment baseline for comparison
1	P 1	Local junction improvements. Signalisation, Left slip lanes, remarking	Completed over a number of sensitivity tests to evaluate the merits of each measure considered. Designed to improve the use of existing road capacity.
2	P2	Lane reduction on Bridge of Dee Southbound.	To aid HGV flow from Great Southern Road to Stonehaven Road through managing the circulating flow from Bridge of Dee into a single lane
3	P3	HGV/Bus lane on Great Southern Road between Bridge of Dee and King George VI Bridge	To reduce delay to freight traffic as a result of the existing width restriction on Bridge of Dee in the short term
4	P4	Increased roundabout diameter on Northside of King George VI Bridge	To aid HGVs having to route away from Bridge of Dee due to the width restriction make the right turn from Riverside Drive to King George VUI Bridge as efficiently as possible

- Package 1 forms the main package and investigates a range of measures designed to improve use of existing road capacity, such as signalisation of roundabouts, increased signalisation at junctions, segregated left turn lanes and remarking of roundabout lanes
- Package 2 carries forward measures considered successful from the Package 1 testing and investigates measures to provide easier egress for HGVs from Great Southern Road (southbound) through managing the circulating flow from Bridge of Dee into a single lane
- Package 3 carries forward the best from the Package 1 and Package 2 testing and assesses the performance of an HGV/Bus lane on Great Southern Road between Bridge of Dee and King George VI Bridge
- Package 4 investigated the potential to enlarge the roundabout on the north side of King George VI bridge to aid the HGV routeing from Riverside Drive

4.4.3 Medium Term Packages - 2012

The agreed preferred package from the short term was carried into the medium term testing. The medium term options should consider Park & Ride, as well as bus priority and HOV lane opportunities.

Over the course of the modelling work SIAS evolved and distilled tests into potential solutions for the Aberdeen South area. The full schedule of tests considered is provided in Table 4.2.

Table 4.2 : Medium Term Packages Considered

Reference	Package	Description	Rationale
Base	Base 04	JMP Validated Base 04	Provides a comparitive base to existing conditions
Do-Min	Do Min 2012 (with ST Imp)	2012 forecast demand with potential short term measures	Provides an assessment baseline for comparison
1	P 1-1	Signalise all four terminal junctions at KGVI Bridge and Bridge of Dee through replacing roundabouts with traffic signals	Provides an assessment of demand management opportunities for these key approaches to and from Aberdeen
2	P 1-2	Signalise Bridge of Dee Junction with Stonehaven Rd	Provides an assessment of demand management opportunities for this key approach to Aberdeen from the South and potential for future demand management
3	P 1-3	Signalise KGVI Bridge Northern Junction with Riverside Drive	Provides an assessment of demand management opportunities for this junction which is currently limited within the existing roundabout configuration
4	P 2-1	Add new pedestrian/cycle bridge and remove footways on Bridge of Dee and signalise Hareness Road / Wellington Road, incorporating pedestrian crossings	Provide pedestrian/cyclist improvements and also alieviate congestion, particularily in the PM peak for this key industrial access and provide opportunities for appropriate demand management
5	P 3-1	One way Gyratory System using Bridge of Dee and KGVI Bridge	Assess measure considered from previous study but also consider pedestrian crossings
6	P 4-1	Replace Souterhead Roundabout with signal controlled junction	To alieviate congestion, particularily in the PM peak for this key industrial access and provide opportunities for appropriate demand management
7	5-1a	Park and Ride at Schoolhill with no new bus priority measures	Provide a baseline for assessment of Park and Ride bus priority measures
8	5-1b	Park and Ride at Schoolhill with existing lane on Wellington Road northbound given over to public transport to form bus lane between Charleston and QEII Bridge	Assess the impact of a complete lane being given over to public transport where possible on Wellington Road Northbound between Charleston and QEII Bridge
9	5-1c	Park and Ride at Schoolhill with existing lane on Wellington Road northbound given over to public transport to form bus lane between Charleston and new Souterhead Junction	Assess the impact of a complete lane being given over to public transport where possible on Wellington Road Northbound between Charleston and new Souterhead Junction
10	5-1d	Park and Ride at Schoolhill with existing lane on Wellington Road northbound given over to public transport to form bus lane between new Souterhead Junction and Hareness Road	Assess the impact of a complete lane being given over to public transport where possible on Wellington Road Northbound between new Souterhead Junction and Hareness Road
11	5-1e	Park and Ride at Schoolhill with existing lane on Wellington Road northbound given over to public transport to form bus lane between Hareness Road and QEII Bridge	Assess the impact of a complete lane being given over to public transport where possible on Wellington Road Northbound between Hareness Road and QEII Bridge
12	5-1f	Park and Ride at Schoolhill, Loch Inch and Charleston with **additional** lane provided on Wellington Road to develop bus lane between Charleston and QEII Bridge	Assess the impact of a new lane being provided for public transport over this section of Wellington Road
13	P 6-1	HOV Lane (using existing infrastructure between Schoolhill and Bridge of Dee (finishing approximately 100m prior to Bridge of Dee Roundabout to allow weaving)	75% - 25% split assumed for SOV and HOV respectively
14	P 6-2	HOV Lane (using existing infrastructure between Schoolhill and Bridge of Dee (finishing approximately 100m prior to Bridge of Dee Roundabout to allow weaving)	70% - 30% split assumed for SOV and HOV respectively
15	P 6-3	HOV Lane (using existing infrastructure between Schoolhill and Bridge of Dee (finishing approximately 100m prior to Bridge of Dee Roundabout to allow weaving)	65% - 35% split assumed for SOV and HOV respectively
16	P 6-4	HOV Lane (using existing infrastructure between Schoolhill and Bridge of Dee (finishing approximately 100m prior to Bridge of Dee Roundabout to allow weaving)	60% - 40% split assumed for SOV and HOV respectively

The packages were made up of the key option tests from the medium term measures, followed by the best of these options plus any secondary option tests.

The investigation of bus priority routes and/or HOV routes will form a major part of the overall medium term package of testing.

Correspondence with and initial reporting to Nestrans and Aberdeen City Council concluded the medium term testing and agreed the scope and appropriateness of measures to be carried forward into the long term packages.

4.4.4 Long Term Packages - 2027

The agreed preferred package from the medium term was carried into the long term testing to form the 'Do-Minimum'. A long term test considering the 'Do-Nothing' (preferred short term measures only) was also evaluated.

A summary of the long term packages is given in Table 4.3 below.

Table 4.3 : Long Term Packages Considered

Reference	Package	Description	Rationale
Base	Base 04	JMP Validated Base 04	Provides a comparitive base to existing conditions
Do-Nothing	Do Nothing 2027	2027 forecast demand with potential short term measures	Provides an assessment baseline for worst case
Do-Min	Do Minimum 2027	2027 forecast demand with potential medium term measures	Provides an assessment baseline for comparison
1	P 1	Widen Bridge of Dee with either Roundabouts or Traffic Signals at terminal junctions	To access the benefits of providing significantly more capacity on the Bridge of Dee and the impact on the surrounding road network
2	P2	New two-way bridge upstream of Bridge of Dee	Investigate the impact of retaining Bridge of Dee in it's current form (width restriction revoked) but providing additional capacity upstream via Garthdee
3	P3	New two-way bridge upstream of Bridge of Dee to form gyratory (BOD one-way southbound, new bridge one-way northbound)	Investigate the impact of retaining Bridge of Dee in it's current form (width restriction revoked) but providing additional capacity upstream via Garthdee under a one-way gyratory arrangement
4	P4	Hign Occupancy Vehicle Lane on Great Southern Road between Bridge of Dee and King George VI Bridge in both directions	Assess the potential benefits to the road network through the provision of HOV lanes over this section

- Package 1 – Widen Bridge of Dee (BOD)
  - (a) with roundabouts
  - (b) with traffic signals
- Package 2 – New two-way bridge upstream of Bridge of Dee
- Package 3 – New bridge upstream of Bridge of Dee to form gyratory (BOD one way southbound, new bridge one-way northbound)
- Package 4 – HOV lane on Great Southern Road from BOD to King George VI Bridge

A further measure included in all the long term packages is Leggart Terrace diverted onto the A90 Stonehaven Road. As part of this measure, vehicles can access Leggart Terrace from the southern Bridge of Dee junction, but egress from Leggart Terrace is no longer permitted. Roundabouts were added on Leggart Terrace and on the A90 to access the new link between the two.

The full design of this linkage will require consideration of gradient variation and property. This should not affect the modelling results.

4.4.5 Consideration

In addition to the above traffic model tests it was important to consider other road users including pedestrians and cyclists, as well as alternative travel such as public transport including rail and bus.

All designs have been produced to conceptual, preliminary stage to indicate alignments and scale of new infrastructure.

4.5 Park & Ride

As one of the initial aims of this study, a review of the preferred location for a Park & Ride facility to the south of the city was undertaken. This was undertaken in the medium term with the preferred option carried forward to all long term testing.

In addition to the previous JMP study, two earlier studies were completed by Halcrow on behalf of Aberdeen City Council:

- A956 (South) Corridor Park & Ride Site Identification and Assessment (October 2000)
- A956 (South) Corridor Park & Ride Site Identification and Assessment – Supplementary Sites (February 2002)

Three potential sites for a Park & Ride facility were identified in the Halcrow studies and carried forward to the JMP assessment and these sites will be tested as options in this study. The sites are:

- Loch Inch
- Charleston
- Schoolhill

Details of all traffic model testing are contained within appendices C, D and E for the short, medium and long term.

5 ABERDEEN SUB AREA MODEL (ASAM3B) ITERATION

5.1 Introduction

This chapter summarises the assumptions, along with the most recent methodology for developing the linkage between the Aberdeen Access from South S-Paramics model (AAFSPM) developed by JMP Consulting and the higher tier Aberdeen Sub Area Model (ASAM3b). Details of this process and the results are provided in Appendix A.

5.1.1 ASAM3b

ASAM3b is a higher tier TRIPS traffic model which can be used to provide future year cordon demand forecasts for input to more detailed local models around areas of specific concern.

ASAM3b uses expected land use changes across Aberdeen & Aberdeenshire in tandem with trip end and demand models to calculate the growth in traffic over time. Due to the coarse zone definition, the model does not isolate detailed trip rates for each specific development, however, the demand model does generate the total level of (traffic) trips originating and destinating in each development area.

5.2 ASAM3b Development Growth

5.2.1 2012 Growth

ASAM3b takes into account future population projections and housing projections and is constrained to national future population totals, therefore by 2027 ASAM3b uses estimates to assume how many trips will take place in the Aberdeen area.

The effect of this is that while all developments may be constructed by 2027 to the south of Aberdeen and it may be desirable to have all developments fully occupied, ASAM3b predicts that they may only be part occupied at 2027.

Also, the built-in assumption is that there will only be 70 – 75% occupancy at any point in time, as it is very unusual for every industrial unit on a business park to be occupied at the same time.

ASAM3b has been developed for the purpose of providing future year forecasts for the north east area and has been considered fit for purpose on a number of studies. It should be considered as the most reliable source of forecast information.

The development trips forecast for 2012 are a close match for those assumed in ASAM3b, and will form the basis of the growth in 2012.

5.3 ASAM3B Influence

The application of growth from the ASAM3b cordon to the AAFSPM matrices should achieve the same measure of absolute growth across the matrix total. This is based on the assumption that local plan developments have been correctly applied within the higher tier model and resultant absolute growth should be accurate. Percentage growth can be misleading where the cordon totals show levels of variation.

Table 5.1 shows the ASAM3b and AAFSPM matrix total comparisons for the AM and PM 2.5 hour peak periods.

Table 5.1 : Matrix Growth (ASAM3B Cordon and AAFSPM)

			AM			PM		
YEAR	Forecast Scenario		ASAM3B Total Veh	AAFSPM Total Veh	Total Growth Diff (AAFSPM - ASAM3B)	ASAM3B Total Veh	AAFSPM Total Veh	Total Growth Diff (AAFSPM - ASAM3B)
2004	*Base*	*Matrix Total*	*28007*	*31475*		*29585*	*40496*	
2008	Reference Base	Matrix Total	29182	32650		30877	41788	
		Abs Diff to Base	1175	1175	0	1292	1292	0
		Percentage Diff to Base	104.2%	103.7%	-0.5%	104.4%	103.2%	-1.2%
2012	No AWPR	Matrix Total	30748	34217		32599	43510	
		Abs Diff to Base	2741	2742	0	3014	3014	0
		Percentage Diff to Base	109.8%	108.7%	-1.1%	110.2%	107.4%	-2.7%
2012	With AWPR	Matrix Total	29219	32687		31458	42369	
		Abs Diff to Base	1212	1212	0	1873	1873	0
		Percentage Diff to Base	104.3%	103.9%	0%	106.3%	104.6%	-1.7%
2027	With AWPR	Matrix Total	31619	35087		33857	44768	
		Abs Diff to Base	3612	3612	0	4272	4272	0
		Percentage Diff to Base	112.9%	111.5%	-1.4%	114.4%	110.5%	-3.9%

Table 5.1 shows that in 2012, with no MTS and AWPR influence, growth of around 2689 vehicles is anticipated in the AM peak within the ASAM3b cordon (9.6%). When this is applied in the AAFSPM growth of 2689 is delivered in the S-Paramics model matrices (8.5%).

In the PM peak, with no MTS or AWPR, growth of around 2792 vehicles is anticipated within the ASAM3b cordon (9.4%). When this is applied within the AAFSPM growth of 2792 is delivered in the S-Paramics model matrices (6.9%).

Table 5.1 shows that good correlation of absolute growth in all model forecast year scenarios has been achieved in the AM and PM peaks.

6 SHORT TERM OPTION ASSESSMENT

6.1 Introduction

The short term options comprise a series of options which were developed and tested in order to assess whether any of those that could be delivered in this timescale provide the potential to relieve congestion, as an interim solution before medium and long term measures are implemented.

The detailed technical report for short term modelled test results is provided as Appendix C. The following sections provide a summary of the short term findings.

6.2 Short Term Packages

6.3 Summary of Short Term Testing

The short term Do-Minimum model was based on the 2004 Base model infrastructure, with the addition of dualling from Charleston to Souterhead on the A956 which is under construction at time of writing.

The short term Do-Minimum model represents an assessment year of 2008. Growth was derived from the Aberdeen Sub Area Model (ASAM3b) model using an interpolation procedure between 2005 and 2012. Details of growth are reported in the ASAM3b iteration technical report Appendix A.

The growth from the 2004 Base model applied using ASAM3b forecasts to form the 2008 future year models is summarised as follows for the AM and PM peak periods:

- AM Peak 2004 Base 31475 vehicles growth of 3.7% (1175 vehicles) to 2008 giving 32650 vehicles in 2008
- PM peak 2004 base 40496 vehicles with growth of 3.2% (1292 vehicle) to 2008 giving 41788 vehicles in 2008

Four work packages were agreed by Aberdeen City Council and Nestrans, and assessed using the 2008 Do-Minimum model as the reference case. The summary findings for the work packages are provided in the following sections.

6.3.1 Package 1

Package 1 formed the main package and investigated a range of measures, over nine sensitivity tests, designed to improve use of existing road capacity, such as signalisation of roundabouts, increased signalisation at junctions, segregated left turn lanes and remarking of roundabout lanes.

The key measures identified as potential short term solutions from the Package 1 testing were:

- segregated left turn lanes from Great Southern Road to Stonehaven Road, Great Southern Road to King George VI Bridge and King George VI Bridge to West Tullos Road
- segregated left turn lane from Wellington Road Southbound to Hareness Road
- extended 3 lanes on Wellington Road northbound approach to Hareness Roundabout
- Abbotswell Crescent left in/left out to Wellington Road and West Tullos Road
- minor adjustments to signals at Souterhead Roundabout and Balnagask Rd/Somerfield junction

The impact of these changes was found to be limited over the AM peak, with journey times and mean delay remaining relatively consistent with the 2008 Do-Minimum. In the PM peak the measures suggested in Package 1 showed potential to reduce mean travel times across the study area network and reduce key journey times.

6.3.2 Package 2

Package 2 carried forward measures considered successful from the Package 1, testing and investigating measures to provide easier egress for HGVs from Great Southern Road (southbound) through managing the circulating flow from Bridge of Dee into a single lane. Package 2 testing considered:

- Bridge of Dee single lane exit onto southern roundabout
- Great Southern Road to Stonehaven Road dedicated left turn lane

The modelled results and observations from Package 2 showed significant additional queuing and delay on Holburn Street and Riverside Drive due to the lane reduction on the Bridge of Dee entry to the Stonhaven Road roundabout. Traffic re-routeing to avoid this increased delay ultimately travels via Great Southern Road (Westbound) and causes a significant further increase in delay on the Great Southern Road approach to the Stonehaven Road roundabout. Package 2 measures were rejected and omitted from further consideration.

6.3.3 Package 3

Due to the lack of clear benefit from Package 2, Package 3 carried forward Package 1 as its reference, to assess the performance of an HGV/bus lane on Great Southern Road between Bridge of Dee and King George VI Bridge. Package 3 added:

- HGV/Bus lane on Great Southern Road between Bridge of Dee and KGVI Bridge

The Package 3 test results showed little overall change to the network performance and efficiency for both general traffic and HGV traffic when comparing overall mean delay and key journey routes. As such, the provision of a bus/HGV lane has been omitted from future test scenarios though it may be worth further consideration as part of any package of HGV/bus improvements.

6.3.4 Package 4

With neither Package 2 nor 3 offering significant benefits over Package 1, Package 4 again adopted Package 1 as its reference condition, to assess the performance of a new large roundabout on the northern side of King George VI Bridge to aid the movement of commercial traffic.

The initial model findings and observations did show benefits from Package 4 through improved journey times for some routes during the AM peak. However, the release of traffic from Riverside Drive in the PM period caused downstream congestion problems at King George VI Bridge/West Tullos Road and Bridge of Dee/Stonehaven Road.

It is considered unlikely that this option could be built in the short term due to the likely acquisition of cemetery land and the potential requirement for land from Duthie Park. Taking this into account, and considering the initial model findings, the larger roundabout on the northern side of King George VI Bridge has been rejected at this stage and omitted from future testing.

6.3.5 Additional Short Term Measures not Modelled

Some of the options raised at the stakeholder workshops, while not suitable for traffic modelling, could be considered within the short term time frame. These measures could assist in meeting the key objectives identified for access to Aberdeen from the South. Measures raised by stakeholders but were not suitable for modelling or incorporation into this appraisal are listed below, they have been scored against key planning objectives and details can be found in Appendix B:

- public transport subsidy at peak times
- prevent rat running through Torry and other residential areas
- improve public transport access to East and West Tullos Industrial estates

- travel management organisation (TMO) for the Altens, Tullos and Cove areas to implement green travel plan initiatives
- westbound Trinity Quay traffic signals. Maintain Trinity Quay southbound phase even when Guild Street has green
- Wellington Road southbound, consider signal adjustment to allow for speed and acceleration of HGVs

6.4 Findings

Components of the short term assessment, which traffic modelling has shown may provide some benefits to the Aberdeen south study area, are:

1. segregated left turn lane Great Southern Road to King George VI Bridge
2. segregated left turn lane King George VI Bridge to West Tullos Road
3. segregated left turn lane Wellington Road to Hareness Road
4. segregated left turn lane Great Southern Road to Stonehaven Road
5. extended 3 lanes on Wellington Road northbound approach to Hareness Roundabout
6. adjusted traffic signals Souterhead Roundabout
7. adjusted traffic signals Balnagask Road/Somerfield junction
8. adjusted traffic signals Wellington Road/Greenbank Road

The reconfiguration of access around Abbotswell Crescent/Wellington Road/West Tullos Road has not been adopted for future testing as the required routeing of bus services would conflict with any future potential to install traffic signal control at the Hareness Road/Wellington Road junction.

Figure 6.1 shows the locations of these measures. These components will form the Do-Minimum base for the medium term, 2012 with Aberdeen Western Peripheral Route, options.

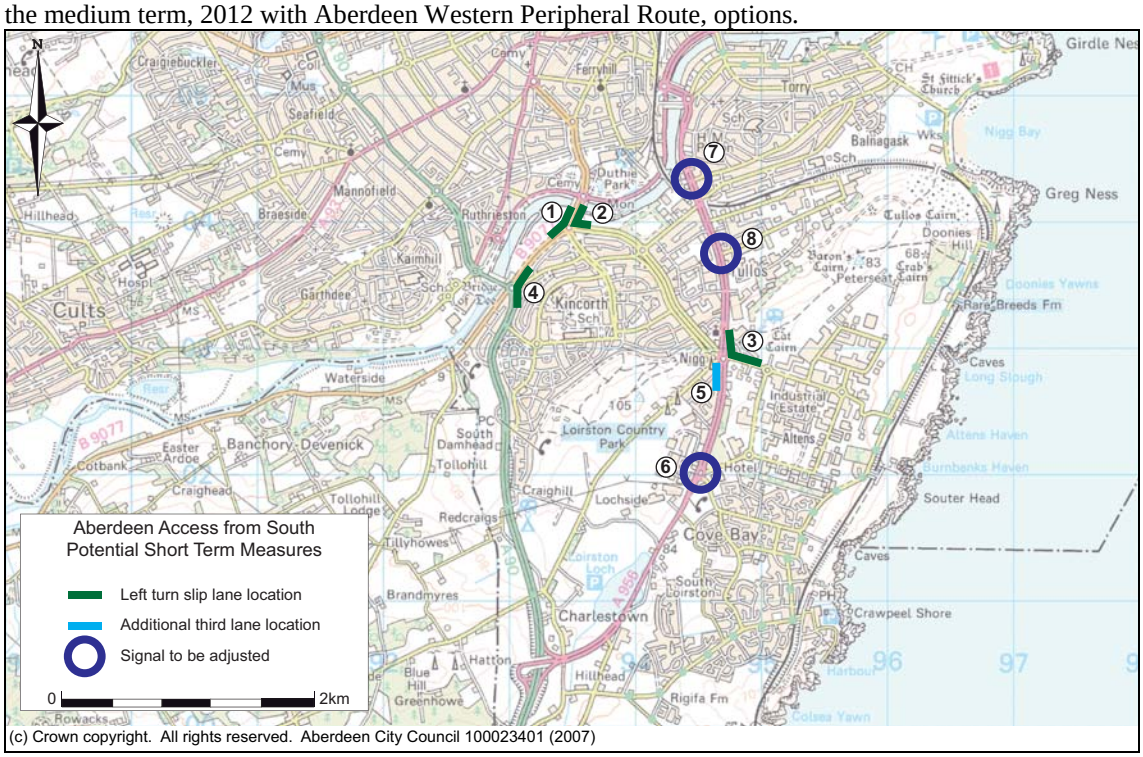

Figure 6.1 : Potential Short Term Measures

7 MEDIUM TERM OPTION ASSESSMENT

7.1 Introduction

The medium term options comprise a series of options which were developed and tested in order to assess whether any provide the potential to relieve congestion before long term measures are implemented.

The detailed technical report for medium term modelled test results is provided in Appendix D. The following sections provide a summary of the medium term findings.

7.2 Summary of Medium Term Testing

In order to undertake the medium term testing, a reference case model was developed:

- 2012 Do-Minimum = Short Term Do-Minimum model + Short Term improvements, also includes AWPR and new Charleston and Schoolhill interchanges

Six work packages were agreed by Aberdeen City Council and Nestrans and carried out in the 2012 Do-Minimum model. The work packages were:

- Package 1 – signalise Bridge of Dee and King George VI Bridge
- Package 2 – create separate pedestrian/cycle bridge, remove footway on Bridge of Dee, signalise Hareness Rd/ Wellington Rd junction
- Package 3 – one way gyratory using BOD and KGVI Bridge
- Package 4 – replace Souterhead Roundabout with signal controlled junction providing bus priority and improved pedestrian/cyclist facilities
- Package 5 – Park & Ride and bus priority options
- Package 6 - High Occupancy Vehicle (HOV) options on Stonehaven Road

The traffic growth applied to the 2004 base model, using ASAM3b forecasts to form the 2012 future year model matrices (with Aberdeen Western Peripheral Route), can be summarised as follows for the AM and PM peak periods:

- AM Peak 2004 Base 31475 vehicles growth of 3.9% (1212 vehicles) to 2012 giving 32687 vehicles in 2012 in the AM peak period
- PM peak 2004 base 40496 vehicles with growth of 4.6% (1873 vehicles) to 2012 giving 42369 vehicles in 2012 in the PM peak period

7.3 Summary of Results

In Package 1 the terminal junctions of the Bridge of Dee and King George VI Bridge were signalised in different combinations, but no scenario tested showed any benefits over the existing roundabouts. This was mostly due to restraint caused by bridge widths, parapets and abutments.

Signalisation of the Hareness Road/Wellington Road junction in Package 2 did reduce queueing in the PM peak, and would allow control of traffic for any future public transport initiatives. The creation of a separate pedestrian/cycle bridge would provide a safety and comfort benefit and also allow the footways and thus the width restriction on the Bridge of Dee to be removed which will improve localised HGV travel times.

In Package 3, with the one way gyratory using Bridge of Dee and King George VI Bridge, results showed significant congestion in both the AM and PM peaks. Some PM travel times were approximately four times greater than the 2012 Do-Minimum.

Package 4 adopted Package 2 as its reference. The redesign of Souterhead Roundabout as a signal controlled junction provided benefits for all road users, in particular pedestrians, cyclists and public transport. Package 4 was the preferred option from the modelling assessment.

SIAS considered previous studies and undertook an assessment, in traffic operational terms on the Access from South S-Paramics model networks, for potential Park & Ride sites at:

- Loch Inch
- Charleston (East)
- Schoolhill (Duff's Hill)

The model testing adopted Package 4 as its reference and found Schoolhill to be the most suitable site, confirming the findings of previous studies.

Package 6 included the preferred measures from Packages 2, 4 and 5 and tested a high occupancy vehicle lane on the A90 in a northbound direction between Charleston and finishing 100m south of Bridge of Dee. Results found that there could be benefits for HOVs over general traffic through providing these lanes, and disbenefits to other users could be low.

The final assessment undertaken was for HGV crawler lanes on Wellington Road southbound. Investigation of these proposals found a need to assess the issues around Wellington Road in more detail. A better understanding of issues focusing on HGVs is required. This should be done as part of a separate study taking cognisance of specific survey data for HGVs.

7.4 Additional Medium Term Measures not Modelled

Some of the options raised at the stakeholder workshops, while not suitable for traffic modelling, could be considered within the medium term. These measures could assist in meeting the key objectives identified for access to Aberdeen from the South. Measures raised by stakeholders but were not suitable for modelling or incorporation into this appraisal are listed below, they have been scored against key planning objectives and details can be found in Appendix B:

- quality bus partnerships with bus operators
- quality bus partnership to Stonehaven and Portlethen
- parking review and restrictions where required in Aberdeen city centre
- shuttle buses travelling around Aberdeen South and linking to rail
- integrated bus services to station and integrated ticketing
- linkage to industrial estates from Schoolhill Park & Ride via Cairnrobin, and provide infrastructure to give link to Altens
- underpass/priority measures to get buses to/from Park & Ride
- provide a link for public transport between Stonehaven Road and Wellington Road

Some of these additional suggestions are reflective of other elements within the Regional and Local Transport Strategies and the delivery of these strategies could provide additional benefit.

7.5 Findings

The medium term measures which through traffic modelling have shown a positive impact when tested are:

- pedestrian footbridge over River Dee which also enables removal of footways and width restriction on Bridge of Dee

- replace Wellington Road/Hareness Roundabout with signalised junction incorporating pedestrian and cyclist facilities
- Abbotwell Crescent existing access to West Tullos Road to retain left in/left out with access created further west from Abbotswell Crescent to West Tullos Road for public transport with potential traffic signal control.
- replace Souterhead Roundabout with signalised junction incorporating pedestrian and cyclist facilities
- Park & Ride located at Schoolhill subject to future detailed investigation
- new bus lane on Wellington Road between Charleston and Hareness Road increasing northbound lane provision to three lanes
- consideration of High Occupancy Vehicles (HOV) lane on the A90 northbound between Charleston and 100 metres south of Bridge of Dee, linked to Park & Ride site

These measures would provide significant benefits to pedestrians, cyclists, multi occupancy vehicles and public transport while also aiding the movement of freight around the Altens and Tullos industrial areas.

It will be important to ensure that land is available to facilitate conceptual designs and that a thorough consultation exercise is carried out.

8 LONG TERM OPTION ASSESSMENT

8.1 Introduction

The long term options comprise a series of options which were developed and tested in order to assess whether any provide the potential to relieve congestion.

The detailed technical report for long term modelled test results is provided in Appendix E. The following sections provide a summary of the long term findings.

8.2 Summary of Long Term Testing

In order to undertake the long term testing two reference models were developed:

- 2027 Do-Nothing – Medium Term Do-Minimum model + Short Term (2008) preferred improvements, using 2027 traffic demands
- 2027 Do-Minimum – Medium Term Do-Minimum model + Medium Term (2012) preferred improvements, using 2027 traffic demands

Four work packages were agreed by Aberdeen City Council and Nestrans and tested with the 2027 Do-Minimum model as a reference. The work packages were:

- Package 1 – widen Bridge of Dee (BOD)

  (c) with roundabouts

  (d) with traffic signals
- Package 2 – new two-way bridge upstream of Bridge of Dee
- Package 3 – new bridge upstream of Bridge of Dee to form gyratory (BOD one way southbound, new bridge one-way northbound)
- Package 4 – (HOV) lane on Great Southern Road from BOD to King George VI Bridge in both directions

In all packages Leggart Terrace is diverted onto the A90 Stonehaven Road. As part of this measure vehicles can access Leggart Terrace from the southern Bridge of Dee junction but egress from Leggart Terrace is no longer allowed. Roundabouts were added on Leggart Terrace and on the A90 to access the new link between the two. In this instance the roundabouts are conceptual, the junctions would benefit from future detailed design and possible consideration of traffic signal control.

Whilst initial discussion with Aberdeen City Council Officers has indicated that a route is possible for the diversion of Leggart Terrace, the full design of this revised linkage will require full consideration of gradient variation and property.

The growth applied to the 2004 base model, using ASAM3b forecasts to form the 2027 future year models (with AWPR), can be summarised as follows for the AM and PM peak periods:

- AM Peak 2004 Base 31475 vehicles growth of 11.5% (3612 vehicles) to 2027 giving 35087 vehicles in 2027 in the AM peak period
- PM peak 2004 base 40496 vehicles with growth of 10.5% (4272 vehicles) to 2027 giving 44768 vehicles in 2027 in the PM peak period

8.3 Summary of Results

8.3.1 Package 1

In Package 1 where the Bridge of Dee is widened to 6 lanes with roundabouts forming the junctions at either end, queueing was observed on Stonehaven Road in both the AM and PM peaks. This queueing

extended down Stonehaven Road onto the new Leggart Terrace link. The root cause of congestion was the southern roundabout of the Bridge of Dee being unable to cope with the 2027 traffic demands.

In Package 1 with signal controlled junctions at each end of the Bridge of Dee, the bridge operated well and no significant congestion was observed due to the increased stacking capacity of the bridge. Traffic signals also afforded better provision for pedestrians and cyclists.

8.3.2 Package 2

The new bridge in Package 2 reduced congestion in the Garthdee area in the PM peak compared to Package 1, but showed significantly more congestion on South Anderson Drive. This was due in part to the release of vehicles now using the new bridge and travelling east along Garthdee Road increasing the cutting movement on South Anderson Drive, but also to the limitations of the existing Bridge of Dee. As identified during the medium term assessments, developing signal controlled junctions for the Bridge of Dee terminal junctions is difficult due to the limited stacking capacity of the single lane in each direction over the bridge span.

8.3.3 Package 3

Analysis of Package 3 identified that the gyratory design would increase queue lengths on Holburn Street and Garthdee Road. Package 3 was observed to have the highest number of unreleased vehicles with existing developments in the Garthdee area struggling to clear traffic and access Garthdee Road. The design of Package 3 intensifies the volumes of traffic concentrated on Garthdee Road and mixes the trip purposes between local traffic, retail traffic and strategic traffic. Significant congestion is observed on Garthdee Road in both the AM and PM peaks. In the PM peak the constant flow of traffic on Garthdee Road means traffic cannot exit the Asda zone and up to 500 vehicles can be queued in this area.

8.3.4 Package 4

The results from Package 4 have shown that the HOV lane has benefits for the network in the AM peak for inbound traffic. The introduction of HOV lanes did not adversely affect average maximum queue lengths, which were found to be consistent with Package 1. No benefits were found in the PM peak from having a southbound HOV lane on Great Southern Road, mainly due to the introduction of traffic signals at Bridge of Dee removing much of the delays to westbound traffic.

8.3.5 Additional Long Term Measures not Modelled

Some of the options raised at the stakeholder workshops, while not suitable for traffic modelling, could be considered in the longer term time frame. These measures could assist in meeting the key objectives identified for access to Aberdeen from the South. Measures raised by stakeholders that were not suitable for modelling or incorporation into this appraisal are listed below, they have been scored against key planning objectives and details can be found in Appendix B:

- local charging schemes (parking, congestion, etc.)
- heavy rail options
- improved coastal route east of A956 for development access
- more trains at Portlethen
- new pedestrian/cycle footbridge options across the network
- additional pedestrian/cycle bridge to connect at RGU over the River Dee
- raise height under Wellington Suspension Bridge (Riverside Drive at South College Street)
- enhancement of existing Crossrail proposals to include additional stations to improve rail access to industrial and residential areas to the south of the city

Some of these additional suggestions are reflective of other elements within the Regional and Local Transport Strategies and the delivery of these strategies could provide additional benefit.

8.4 Findings

The long term measures which have shown a positive impact when tested through traffic modelling are:

- Leggart Terrace diverted onto Stonehaven Road
- widened Bridge of Dee (six lanes)
- signal controlled junctions at each end of Bridge of Dee
- third lane for HOV use Northbound on Great Southern Road between Bridge of Dee and King George VI Bridge

Significant consultation will be required before considering the Bridge of Dee widening as it is a grade A listed structure. Equally, new road construction to divert Leggart Terrace onto Stonehaven Road further south will require careful consideration, though it will be vital to the success of any long term option

The provision of a new bridge upstream certainly alleviated some of the congestion around Garthdee but, based on current traffic flow predictions, did not benefit South Anderson Drive as the Bridge of Dee will still have limited capacity. Further to the implementation of the Aberdeen Western Peripheral Route it is suggested that traffic volumes and changes are monitored closely to further enhance the understanding of the impact of either a widened Bridge of Dee or a new bridge upstream.

8.5 Further Consideration – Riverside Drive/King George VI Bridge

In all long term assessment scenarios, congestion is observed at the southern roundabout of the King George VI Bridge in the PM peak. This causes queueing across the bridge and onto Riverside Drive. In the long term, improvements may have to be considered at this location. The large roundabout option considered during the short term option testing may require further consideration and consultation, with particular regard to land acquisition issues.

9 PREFERRED PACKAGE APPRAISAL

9.1 Introduction

This chapter sets out the appraisal of the preferred short, medium and long term packages identified as having potential to provide a positive contribution to the operation of the road network on approach to Aberdeen from the South. Appraisal Summary Tables (ASTs) are provided in Appendix F.

9.2 Appraisal

In addition to the more detailed Appraisal Summary Tables, a short summary table presents the overall findings of the appraisal of measures against the local planning objectives. The appraisal is based on qualitative information on impacts in line with the guidance, but utilising quantitative information where available. The appraisal has been based on the professional judgement of the project team.

The appraisal was conducted based on STAG methodology, considering the agreed planning objectives, the Government's key criteria and implementability criteria. A seven point scale has been used for considering the relative size or scale of a scheme's impact, and it has been noted whether the proposal would bring:

- major benefit – benefits or positive impacts which, depending on the scale of benefit or severity of impact, the project team feels should be a principal consideration when assessing a proposal's eligibility for funding
- moderate benefit – anticipated to have only a moderate benefit or positive impact. Moderate benefits and impacts are those which, taken in isolation, may not determine a proposal's eligibility for funding, but taken together could do so
- minor benefit – anticipated to have only a small benefit or positive impact. Small benefits or impacts are those which are worth noting, but the project team believes are not likely to contribute materially to determining whether a proposal is funded or otherwise
- no benefit or impact – anticipated to have no or negligible benefit or negative impact
- small minor cost or negative impact – anticipated to have only a small cost or negative impact. Small costs or impacts are those which are worth noting, but the project team believes are not likely to contribute materially to determining whether a proposal is funded or otherwise
- moderate cost or negative impact – anticipated to have only a moderate cost or negative impact. Moderate costs/ negative impacts are those which taken in isolation may not determine a proposal's eligibility for funding, but taken together could do so
- major cost or negative impacts – costs or negative impacts which, depending on the scale of cost or severity of impact, the project team should take into consideration when assessing a proposal's eligibility for funding

9.3 Schemes Considered

In terms of the transportation appraisal work undertaken within this study, only the preferred schemes and their related infrastructure were appraised against the agreed criteria. Clearly, as each future year scenario has been developed, it has inherited the Do-Something (preferred scenario) from the preceding term testing. To reduce duplication in appraisal summary, only the core packages were scored. The packages can be summarised as follows. The core packages are indicated in **bold** type:

- **2008 Short Term Do-Nothing**
- **2008 Short Term Do-Something**
- 2012 Medium Term Do-Minimum (same infrastructure as 2008 Do-Something)
- **2012 Medium Term Do-Something**

- 2027 Long Term Do-Nothing (same infrastructure as 2008 Do-Something)
- 2027 Long Term Do-Minimum (same infrastructure as 2012 Do-Something)
- **2027 Long Term Do-Something**

Table 9.1 provides a summary of the scheme scoring against each set of criteria. The following sections provide a radar chart for each scheme, demonstrating the key strengths and weaknesses of each scheme.

Table 9.1 : Summary of Appraisal Against Objectives

	Short Term Do-Nothing	Short Term Do-Something	Medium Term Do-Somethi	Long Term Do-Something
Planning Objectives				
Objective 1	××	✓	✓✓	✓✓✓
Objective 2	×	-	✓✓	✓✓✓
Objective 3	-	-	✓✓	✓✓
Objective 4	-	-	✓	✓✓
Objective 5	×	✓	✓✓	✓✓✓
Objective 6	-	-	✓	✓✓
Implementability				
Technical	-	×	×	×××
Operational	-	-	✓✓	✓✓✓
Financial	-	-	×	××
Public	-	×	×	××
Governments Objectives				
Environment	××	✓	✓✓	✓
Safety	×	-	✓✓	✓✓✓
Economy	××	×	✓✓	✓✓✓
Integration	-	-	✓	✓✓
Accessibility	×	-	✓	✓✓✓

✓	Minor Benefit	×	Minor Disbenefit	- No Impact
✓✓	Moderate Benefit	××	Moderate Disbenefit	
✓✓✓	Major Benefit	×××	Major Disbenefit	

Objective 1 - Economy	To reduce congestion and unreliability, and have effective journey times particularly where it impacts on the efficient movement of goods.
Objective 2 - Safety	To reduce the incidence of and potential for collisions and all transport related collisions especially vulnerable users, such as cyclists, pedestrians and motorcyclists.
Objective 3 - Social Inclusion & Accessibility	To encourage socially-inclusive and healthy transport modes other than single car occupancy.
Objective 4 - Social Inclusion & Accessibility	To improve the accessibility between residential and employment areas.
Objective 5 - Environment	To improve the local environment by reducing air pollution problems.
Objective 6 - Integration	To integrate transport with land use planning to ensure that transport networks serve development in an efficient, effective and sustainable way.

9.3.1 2008 Short Term Do-Nothing

Figure 9.1 summarises the appraisal of the 2008 short term Do-Nothing.

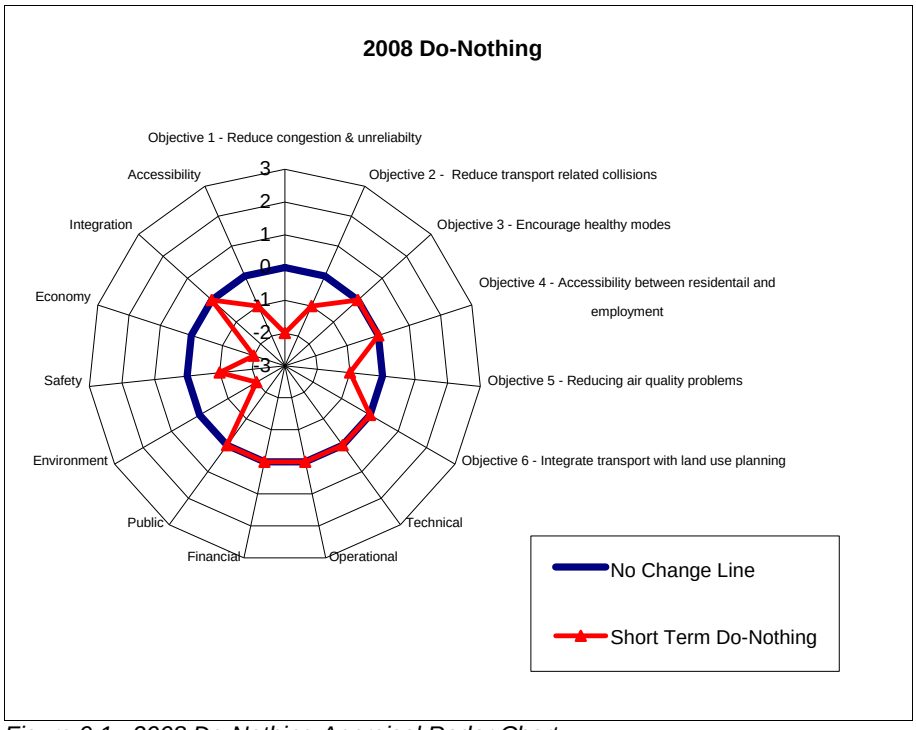

Figure 9.1 : 2008 Do-Nothing Appraisal Radar Chart

Figure 9.1 demonstrates that if nothing is done to improve the transport network for access to Aberdeen from the South, deterioration in the ability to meet key objectives will ensue. None of the local planning objectives will be met, and it is likely that with increased traffic due to development growth, congestion and unreliability will increase. This will in turn increase the likelihood of transport related collisions and increase air quality problems.

9.3.2 2008 Short Term Do-Something

The short term preferred package of measures would introduce the following infrastructure, combined with complementary measures. The preferred infrastructure measures consist of:

- segregated left turn lane Great Southern Road to King George VI Bridge
- segregated left turn lane King George VI Bridge to West Tullos Road
- segregated left turn lane Wellington Road to Hareness Road
- segregated left turn lane Great Southern Road to Stonehaven Road
- extended 3 lanes on Wellington Road northbound approach to Hareness Roundabout
- adjusted traffic signals Souterhead Roundabout
- adjusted traffic signals Balnagask Road/Somerfield junction

Additional measures, which were unsuitable for model testing, were suggested by stakeholders. These have been initially scored in the option appraisal tables (some positive, some negative) in Appendix B. The measures for the short term include:

- public transport subsidy at peak times

- prevent rat running through Torry and other residential areas
- improve public transport access to East and West Tullos Industrial estates
- travel management organisation (TMO) for the Altens, Tullos and Cove areas to implement green travel plan initiatives
- westbound Trinity Quay traffic signals. Maintain Trinity Quay southbound phase even when Guild Street has green
- Wellington Road southbound, consider signal adjustment to allow for speed and acceleration of HGVs

Some of these additional suggestions are reflective of other elements within the Regional and Local Transport Strategies and the delivery of these strategies can provide additional benefit.

Figure 9.2 summarises the appraisal of the 2008 short term Do-Something.

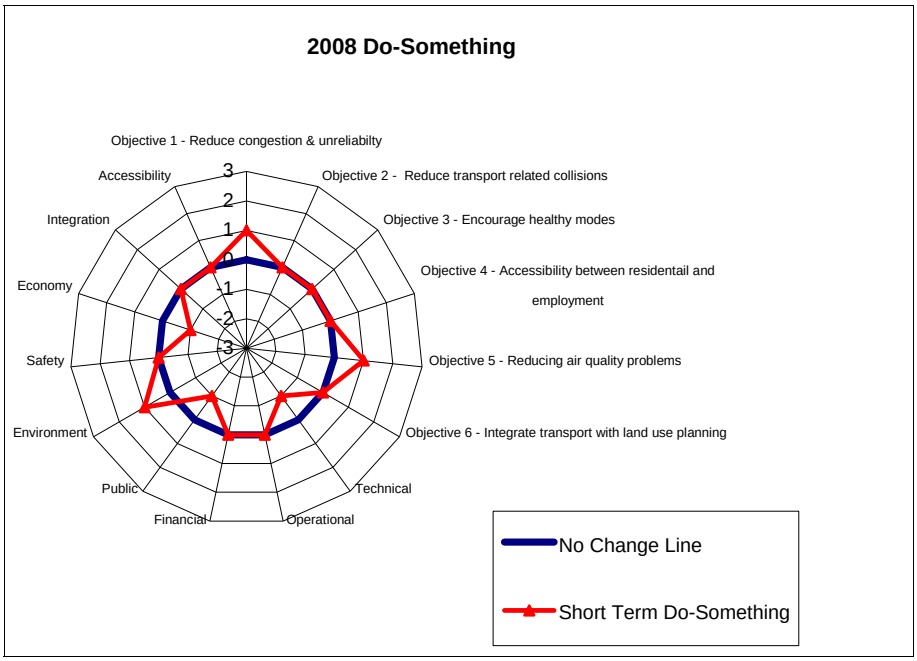

Figure 9.2 : 2008 Do-Something Appraisal Radar Chart

Figure 9.2 illustrates that short term measures are required to maintain the existing operation of the Aberdeen South network and avoid losing ground on the key local planning and government objectives. Some of the critical junctions have significant left turn flows. If segregated left turn lanes can be accommodated, they will help move traffic on to reduce queue lengths during the peaks. This may reduce some local congestion which may in turn reduce local air quality levels through reducing queuing vehicles.

The 2008 Do-Something should be straightforward to implement, though some segregated left turning lanes will need careful detailed design to ensure they do not affect local properties. If local property is affected, the public consultation exercise will be paramount.

9.3.3 2012 Do-Something

The medium term measures which have shown a positive impact when tested by modelling are:

- pedestrian footbridge over River Dee which also enables removal of footways and width restriction on Bridge of Dee

- replace Wellington Road/Hareness Roundabout with signalised junction incorporating pedestrian and cyclist facilities
- Abbotwell Crescent existing access to West Tullos Road to retain left in/left out with access created further west from Abbotswell Crescent to West Tullos Road for public transport with potential traffic signal control.
- replace Souterhead Roundabout with signalised junction incorporating pedestrian and cyclist facilities
- Park & Ride located at Schoolhill subject to future detailed investigation
- new bus lane on Wellington Road between Charleston and Hareness Road increasing northbound lane provision to three lanes
- consideration of High Occupancy Vehicles (HOV) lane on the A90 northbound between Charleston and 100 metres south of Bridge of Dee, linked to Park & Ride site

Figure 9.3 summarises the appraisal of the 2012 medium term Do-Something.

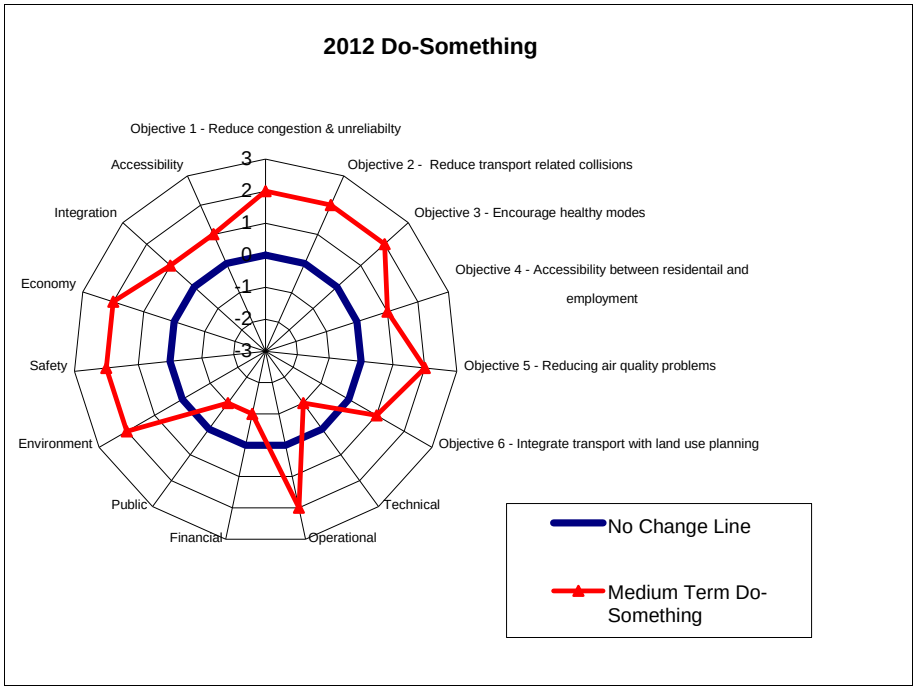

Figure 9.3 : 2012 Do-Something Appraisal Radar Chart

Figure 9.3 illustrates that the 2012 Do-Something preferred measures will begin to meet the key objectives. Improvements on Wellington Road, through the installation of traffic signals, give more control and facilities to pedestrian and cycles, while managing queue lengths during peak times which may provide better reliability. Public transport priority linking with the Park & Ride will encourage healthy modes and should begin to integrate land use with transport.

The safety improvement of providing a separate pedestrian/cycle bridge will also allow the removal of the width restriction from Bridge of Dee and this will reduce localised HGV journey distances which will in turn reduce their impact on air quality around the River Dee and to residential properties on Riverside Drive.

Additional measures, which were unsuitable for model testing, were suggested by stakeholders. These have been initially scored in the option appraisal tables (some positive, some negative) in Appendix B. The measures for the medium term include:

- strengthening of quality bus partnerships with bus operators

- introduction of quality bus partnership to improve services to Stonehaven and Portlethen
- parking review and restrictions where required in Aberdeen city centre
- shuttle buses travelling around Aberdeen South and linking to rail
- integrated bus services to station and integrated ticketing
- linkage to industrial estates from Schoolhill Park & Ride via Cairnrobin, and provide infrastructure to give link to Altens
- underpass/priority measures to get buses to/from Park & Ride
- provide a link for public transport between Stonehaven Road and Wellington Road

Some of these additional suggestions are reflective of other elements within the Regional and Local Transport Strategies and the delivery of these strategies can provide additional benefit.

9.3.4 2027 Do-Something

The long term measures which have shown a positive impact when tested through traffic modelling are:

- Leggart Terrace diverted onto Stonehaven Road
- widened Bridge of Dee (six lanes)
- signal controlled junctions at each end of Bridge of Dee
- third lane for HOV use northbound on Great Southern Road between Bridge of Dee and King George VI Bridge

Figure 9.4 summarises the appraisal of the 2012 medium term Do-Something.

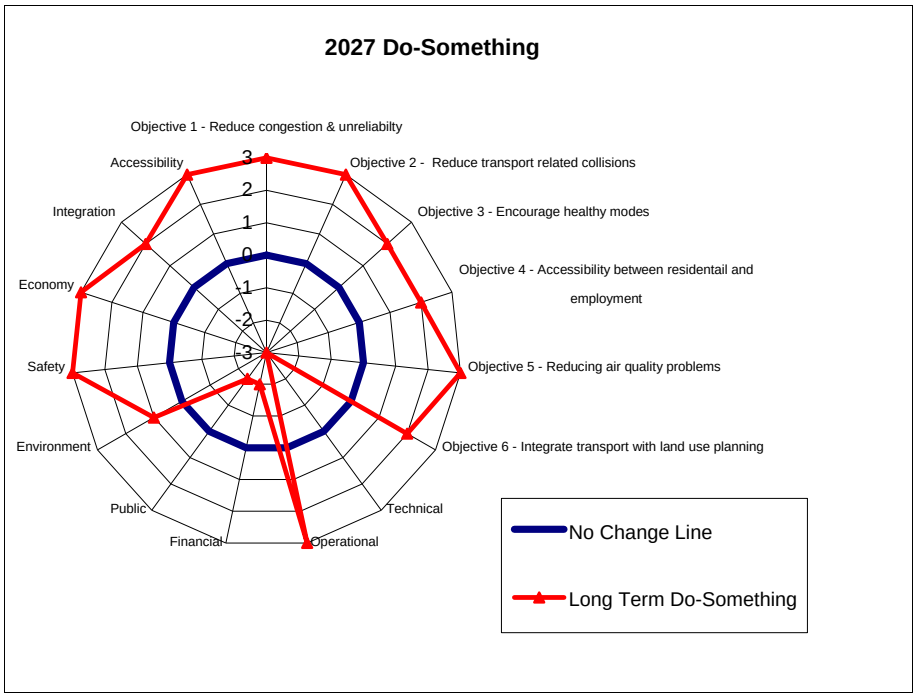

Figure 9.4 : 2027 Do-Something Appraisal Radar Chart

Figure 9.4 illustrates that the 2027 Do-Something preferred options will show significant benefits on the majority of the key objectives, which will be achieved mainly through the clear route hierarchy afforded by the proposed measures.

The widening of the Bridge of Dee will be expensive and technically difficult due to the historic nature of the facades and the grade A listed and historic monument status. Every effort should be made to maintain as much integrity of the bridge as possible.

The ability to provide stacking capacity on the bridge itself allows traffic signals to be installed at either end, providing better traffic management and better facilities for pedestrians and cyclists.

It should be borne in mind that the need to divert Leggart Terrace is crucial to the success of any option considered for the approach to Bridge of Dee from the south. Providing the ability to split up strategic and local traffic movements is key.

The public perception of these measures is likely to be against schemes which can be seen to be new road construction such as diverting Leggart Terrace and widening Bridge of Dee. The current operation of this area has no segregation of use, which is to the determent of the local economy, environment and community. Multi-purpose trips converge at this location with inadequate infrastructure for private vehicles, commercial traffic, pedestrians and cyclists.

Additional measures, which were unsuitable for model testing, were suggested by stakeholders. These have been initially scored in the option appraisal tables (some positive, some negative) in Appendix B. The measures for the longer term include:

- local charging schemes (parking, congestion, etc.)
- heavy rail options
- improved coastal route east of A956 for development access
- more trains at Portlethen
- new pedestrian/cycle footbridge options across the network
- additional pedestrian/cycle bridge to connect at RGU over the River Dee
- raise height under Wellington suspension Bridge (Riverside Drive at South College Street)
- enhancement of existing crossrail proposals to include additional stations to improve rail access to industrial and residential areas to the south of the city

Some of these additional suggestions are reflective of other elements within the Regional and Local Transport Strategies and the delivery of these strategies can provide additional benefit.

10 SUMMARY

10.1 Introduction

Following a change in the Aberdeen Western Peripheral Route alignment and addition of new spur road link to Stonehaven, SIAS was commissioned in early 2007 to review a study regarding Access to Aberdeen from the South undertaken by JMP Consulting.

SIAS has undertaken a transport appraisal in a manner consistent with the STAG process. It has been, objective led, open minded, pragmatic, auditable and inclusive. The main criteria have been to develop potential options for the short, medium and long term to benefit access from the south of Aberdeen and meet local planning and government objectives.

The problems and opportunities, objectives and options were discussed during a workshop with key stakeholders at the beginning of the study. Throughout the study the client group has been informed of evolving options and findings for the short, medium and long term.

The following provides a brief summary of the findings.

10.2 Traffic Modelling

Microsimulation modelling has been used to quantify options where required using models originally developed by JMP Consulting. Options not suitable for traffic modelling have been scored in accordance with STAG relative to the agreed objectives. These were then included for future consideration or rejected.

Packages of options were agreed with the client group to form the basis for modelling work. All modelling work has been carried out in a consistent manner, with the higher tier Aberdeen Sub Area Model (ASAM3b) providing future local plan growth as well as the impact from the Aberdeen Western Peripheral Route (AWPR).

The years evaluated consider:

- 2008 Short Term
- 2012 Medium Term with AWPR
- 2027 Long Term with AWPR

The traffic modelling was conducted in a structured manner which required that measures preferred for a forecast scenario should be adopted and be complementary to the subsequent forecast scenario.

10.3 2008 Short Term

The traffic modelling results found that if nothing is done in the short term, the problems relating to congestion, delay, accessibility, public transport unreliability, HGV routeing, industrial access and egress would all remain and deteriorate. It has also identified that, while it is not possible within the short term to address all of the issues, some local network changes and changes with regard to public transport service provision and increased liaison with business communities could assist in limiting the deterioration. Local junction improvements such as segregated left turn lanes and reviewed signalised junction operation can all help.

Additional measures, which were unsuitable for model testing, were suggested by stakeholders. These have been initially scored in the option appraisal tables (some positive, some negative) in Appendix B but excluded from the overall appraisal. The measures for the short term include: *public transport subsidies at peak times, prevention of rat running through residential areas, improved public transport access to East and West Tullos industrial estates and setting up a TMO for the Altens, Tullos and Cove areas to implement green travel plan initiatives*.

Some of these additional suggestions are reflective of other elements within the Regional and Local Transport Strategies and the delivery of these strategies can provide additional benefit.

10.4 2012 Medium Term

The traffic modelling results again found that in the medium term at 2012 with the AWPR in place, significant problems would still be felt around the industrial areas of Wellington Road, which will provide an obstacle to future development and economic growth.

A revision to infrastructure at the critical Souterhead and Hareness Roundabouts was investigated and showed potential to significantly improve access, while also providing significant benefits to pedestrian and cycling through the installation of signalised junctions.

The safety improvement of providing a separate pedestrian/cycle bridge will also allow the removal of the width restriction from Bridge of Dee and this will reduce localised HGV journey distances and travel times which will in turn reduce their impact on air quality around the River Dee and to residential properties on Riverside Drive.

An investigation of previous Park & Ride studies, combined with revised traffic modelling, indicate that Schoolhill would offer the most efficient Park & Ride location to the south of Aberdeen in traffic operation terms. Crucially, installing signalised junctions also provides the opportunity to initiate bus priority which would enhance any Park & Ride facility south of Souterhead.

HOV and HGV lanes were investigated within the scope of medium term time frames. The HOV analysis showed that some benefits could be achieved with a lane on the A90 northbound towards Bridge of Dee. The investigation for HGV crawler lanes on Wellington Road was inconclusive, and considers that additional information and understanding of the problems for HGVs on Wellington Road southbound is required.

Additional measures, which were unsuitable for model testing, were suggested by stakeholders. These have been initially scored in the option appraisal tables (some positive, some negative) in Appendix B. The measures for the medium term include: *quality bus partnerships with bus operators, quality bus partnership to Stonehaven and Portlethen, parking review and restrictions where required in Aberdeen city centre, shuttle buses travelling around Aberdeen South and linking to rail, integrated bus services to station and integrated ticketing, linkage to industrial estates from Schoolhill Park & Ride via Cairnrobin and provide infrastructure to give link to Altens, underpass/priority measures to get buses to/from Park & Ride, provide a link for public transport between Stonehaven Road and Wellington Road.*

Some of these additional suggestions are reflective of other elements within the Regional and Local Transport Strategies and the delivery of these strategies can provide additional benefit.

10.5 2027 Long Term

The traffic modelling results found that in the long term further problems would evolve at the River Dee Bridge crossings.

The resolutions to problems at Bridge of Dee in the longer term are limited and most would involve some form of compulsory purchase of land and/or property. The least intrusive solution is a widening of the Bridge of Dee which would maintain the existing alignment of the A90 (T) South Anderson Drive and the A90 (T) Stonehaven Road. Widening the Bridge of Dee, while technically possible, will meet opposition as it is a grade A listed historic monument.

Any solution around Bridge of Dee will require Leggart Terrace to be diverted to tie in with the A90 (Stonehaven Road) at a point south of the existing junction. Otherwise the existing southern junction of Bridge of Dee will be unable to cater for the forecast traffic flows as either a roundabout or a traffic signal controlled junction.

The long term testing also identified continued problems at King George VI Bridge/Riverside Drive and the option of a larger roundabout considered during the short term tests may require further consideration.

Additional measures, which were unsuitable for model testing, were suggested by stakeholders. These have been initially scored in the option appraisal tables (some positive, some negative) in Appendix B. The measures for the longer term include: l*ocal charging schemes (parking, congestion etc.), heavy rail options, improved coastal route east of A956 for development access, More trains at Portlethen, New pedestrian/cycle footbridge options across the network, additional pedestrian/cycle bridge to connect at RGU over the River Dee, raise height under Wellington Suspension Bridge (Riverside Drive at South College Street), Crossrail with two stops, one at north end of Wellington Road and one at south end, enhancement of existing crossrail proposals to include additional stations to improve rail access to industrial and residential areas to the south of the city.*

Some of these additional suggestions are reflective of other elements within the Regional and Local Transport Strategies and the delivery of these strategies can provide additional benefit.