

7 Accessibility and Social Inclusion

Government Objective

To promote social inclusion by connecting remote and disadvantaged communities and increasing the accessibility of the transport network.

7.1 Introduction

7.1.1 STAG advises that *“the scope and detail required in the accessibility analysis needs to be commensurate with the planning objectives”*. It requires consideration of two aspects of Accessibility and Social Inclusion, viz:

- Community Accessibility; and
- Comparative Accessibility.

7.1.2 Consideration of the Planning Objective suggests that it is a sub-set of the over-arching Government Objective, and therefore the initial appraisal proceeds as follows:

- Community Accessibility (split into Public Transport provision and Local Accessibility, per STAG Chapter 10); and
- Comparative Accessibility (split into Impacts by People Group and Impacts by Location, again per STAG Chapter 10).

7.2 Community Accessibility

7.2.1 STAG requires the impacts to be differentiated between Public Transport Network coverage and Local Accessibility (sometimes referred to as “Severance”).

Public Transport Network Coverage

7.2.2 Public transport network coverage seeks to ensure that everyone has access to a public transport alternative to the private car¹⁹ - specific targeting of certain people groups is considered separately under the Comparative Accessibility sub-heading.

7.2.3 Access to public transport is unlikely to be improved by the construction of the Bypass however reliability and efficiency of existing public transport services would be improved due to the diversion of through traffic away from Dumfries town centre.

Local Accessibility

7.2.4 This sub-heading deals with physical access impacts focusing principally on pedestrians and cyclists. It was previously described as “severance”, and is usually associated with new or redesigned infrastructure.

¹⁹ STAG section 10.2.3

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- 7.2.5 The bypass might cause severance along its route, but the areas affected have relatively little interaction across the proposed alignment, and appropriate means of providing connectivity (eg underbridges) can be provided where necessary.
- 7.2.6 The Southern Bypass would also provide an opportunity to “build in” cycle facilities allowing it to be connected into the existing cycle network. It will reduce traffic volumes in the town centre which will result in positive benefits for pedestrians and cyclists through potential improvements targeted at walking and cycling.

7.3 Comparative Accessibility

- 7.3.1 The proposed bypass will have an affect on local accessibility as traffic is diverted away from the town centre. This will allow for better access on local routes, with particular benefits for the north and west of Dumfries which will exhibit reduced traffic levels. The north and west of Dumfries are currently the most deprived parts of the town.

Development of an Accessibility Planning Model for the Region

- 7.3.2 We developed an Accession model of the SWestrans region to examine accessibility issues. Accession is an accessibility planning software developed by MVA Consultancy under contract to the Department for Transport (DfT) and it is recommended for use by English Local Authorities in the development of Local Transport Plans. It has also been widely adopted in Scotland as a means of objectively assessing existing accessibility and illustrating potential improvements.
- 7.3.3 The following data were imported into the Accession model:
- **road network details** – we have utilised Map Mechanics road speed data to ensure comprehensive road coverage of the model area (excludes private roads). This data is more accurate than the Integrated Transport Network (ITM) layer of Ordnance Survey MasterMap data as the speeds are calculated from rush hour speeds using GPS signals from real vehicles (between 0700-0900 and 1600-1900 for the AM and PM peaks respectively). The road speeds use an average of the two-way movements;
 - **origins** – the model uses data zones. There are a total of 3875 data zones in Scotland (each comprising of between 500 to 1000 household residents). Data zones group together contiguous Census 2001 Output Areas with similar social characteristics. Through Scottish Neighbourhood Statistics, data zones are the core geography for making available small area statistics; and
 - **destinations** – the employment data used is based on Transport Model for Scotland (TMfS) forecast data which is basically 1153 employment zones with a number of jobs attached to each specific zone – the destination zones all sit within the local authority boundaries for South Lanarkshire, Borders, East or South Ayrshire and Dumfries and Galloway (TMfS has no data for England).
- 7.3.4 As public transport services in the Dumfries area are unlikely to change dramatically with the inclusion of the Dumfries Southern Bypass, we have not included any analysis of public transport accessibility.

Model Calculations

- 7.3.5 When undertaking the road-based calculations, we have assumed that any postcodes that lie within 2 kilometres of a road node (spaced at 500m intervals), will be able to connect into the road network. Generally, the connection distance is usually set to 1 km but in a rural setting such as Dumfries and Galloway it is appropriate to extend this distance to 2km.
- 7.3.6 To ensure clarity, journey (drive) times are based on the travel time for each road section, hence no allowance for time spent accessing or parking the vehicle is included. The delay incurred at junctions is reflected in the road speed assigned to each link.

Scottish Index of Multiple Deprivation (SIMD)

- 7.3.7 The SIMD 2006 is utilised to define small areas concentrations of multiple deprivation. Each of the 6505 datazones are ranked from 1 to 6505 with 1 being the most deprived and 6505 the most affluent. The Index considers 7 groups, namely: Current Income; Employment; Health; Education; Skills and Training; Geographic Access to Services; and Housing and Crime.
- 7.3.8 For this analysis, we are particularly concerned with the Geographic Access to Services and the Employment categories together with the total SIMD ranking. The following bullets indicate the factors which contribute to the ranking system.
- **Geographic Access to Services** – calculates drive times to the nearest primary/secondary school, General Practice, Post Office and shopping facilities; and
 - **Employment** – based on the number of men and women aged below 65 and 60 respectively claiming unemployment benefit, incapacity benefit or severe disablement allowance together with the number of people claiming benefit under the new deal for the under 25s and New Deal 25+.

Discussion of Results

- 7.3.9 We have used the CRH as the destination as it is located in the heart of the Dumfries South area, is a major source of employment and typical of the facilities in the vicinity, and provides a vital lifeline service to the region.
- 7.3.10 It is worth noting that the results presented below represent current conditions and do not take into account traffic growth, new and future development. Consequently, this analysis may underestimate the households experiencing improvements in accessibility. The traffic modelling presented in the Economy Chapter presents a more detailed analysis of journey times with and without the Southern Bypass in the 2020 forecast year.

Accessibility Impacts – Geographic Access to Services

- 7.3.11 The following Figures 7.1 and 7.2 show the drive time from each of the postcodes in the Dumfries and Galloway area into the CRH with and without the Southern Bypass.
- 7.3.12 The picture which emerges is as anticipated with a gradual reduction in accessibility moving further away from Dumfries. Inspection of the figures indicates that the Southern Bypass facilitates access to the area with an improvement in journey times for trips originating south-west of the town centre. Table 7.1 presents the numerical values which inform the thematic mapping. In total, a significant 4010 postcodes benefit from a change in drive time if the Southern Bypass is in-situ.

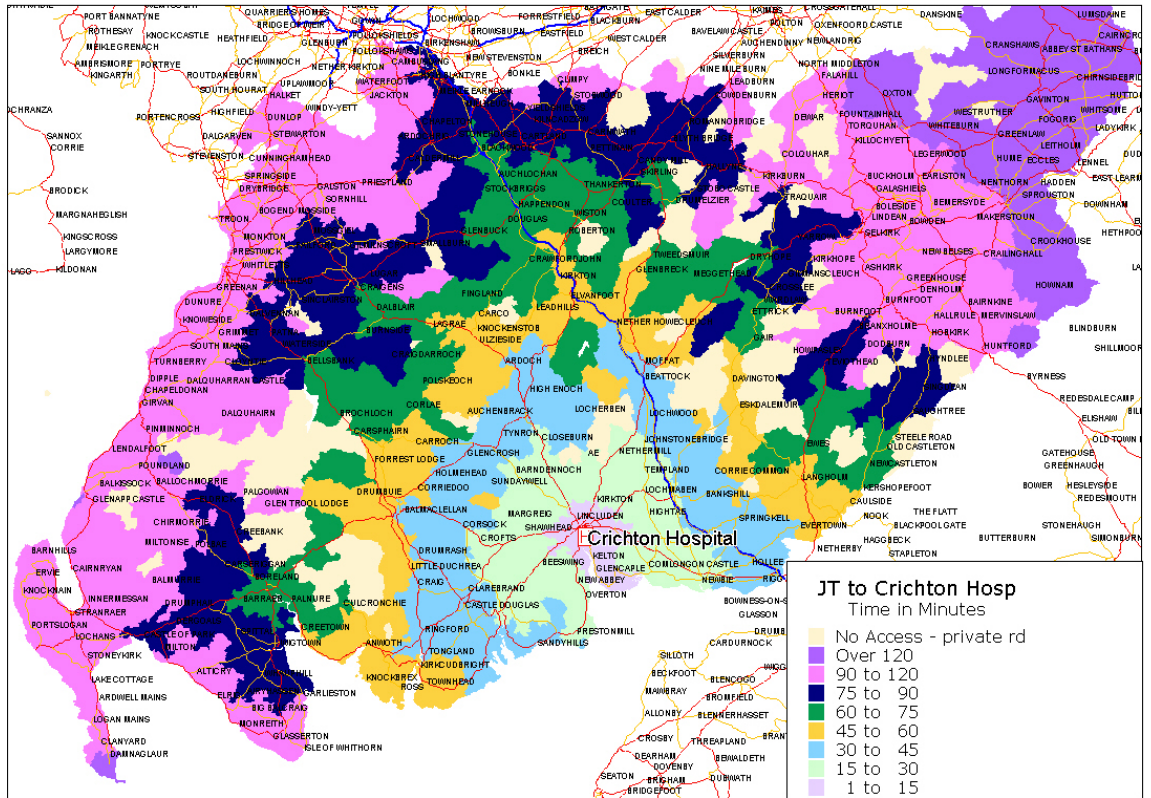


Figure 7.1 Drive Time to CRH

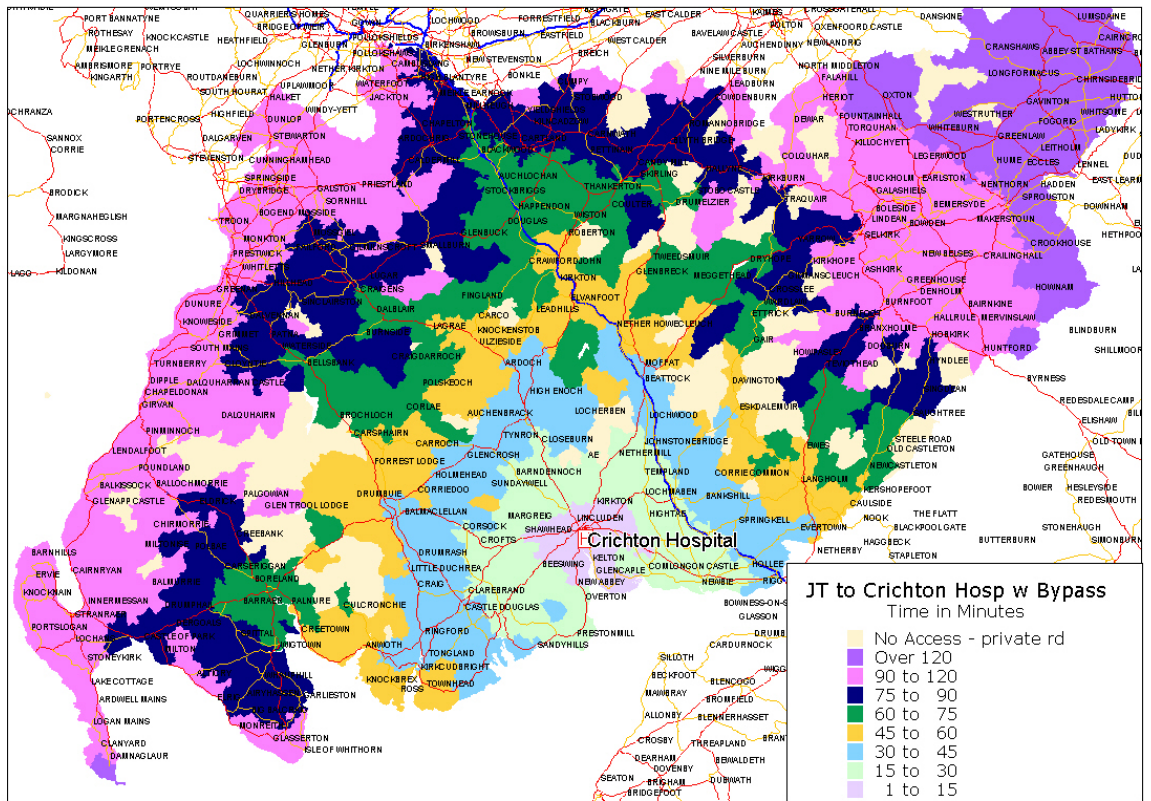


Figure 7.2 Drive Time to CRH with Southern Bypass

Table 7.1 Cumulative Time - Drive Time to CRH

| | <15 | <30 | <45 | <60 | <75 | <90 | <120 | >120 |
|------------|-------|-------|-------|-------|-------|--------|--------|-------|
| Households | 19155 | 35264 | 48656 | 56928 | 73262 | 162158 | 359172 | 14548 |
| Diff | 20248 | 37372 | 50733 | 57414 | 75138 | 172105 | 360307 | 13377 |
| Diff | 1093 | 2108 | 2077 | 486 | 1876 | 9947 | 1135 | 1171 |

7.3.13 Figure 7.3 presents drive time savings to the CRH. Similar to above analysis, towns such as Beeswing, Overton, Kirkbean and Sandyhills south-west of the town centre indicate the greatest time savings. Inspection of Table 7.2 indicates that a large number of households in the region benefit from time savings of between 1 and 3 minutes.

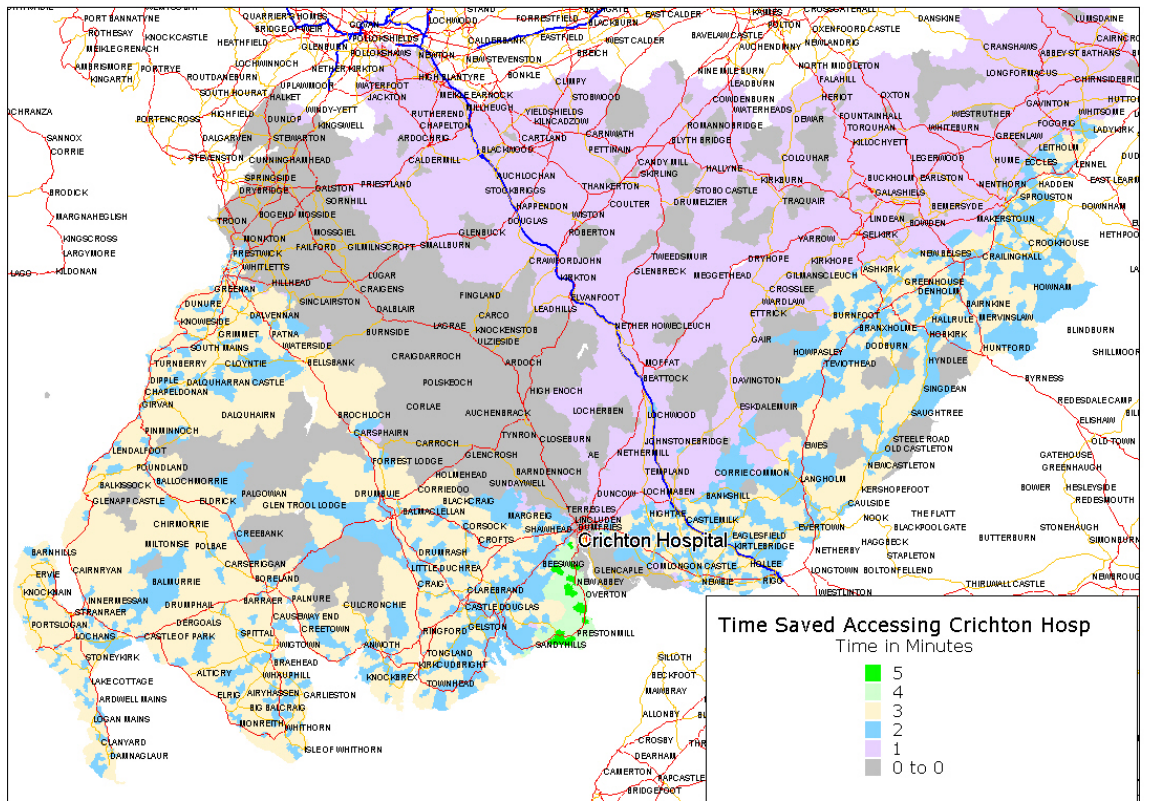


Figure 7.3 Drive Time Savings Accessing the CRH

Table 7.2 Number of Households

| Savings | 1 min | 2 min | 3 min | 4 min | 5 min | Do Not Save |
|------------|--------|-------|-------|-------|-------|-------------|
| Households | 184275 | 37689 | 61434 | 705 | 105 | 89661 |
| Percentage | 49.2% | 10.1% | 16.4% | 0.2% | 0.03% | 24.0% |

7.3.14 Accessibility is a key issue in rural Dumfries and Galloway with 76 of Scotland’s most access deprived zones, as per the SIMD Index, located within the authority boundary. Figure 7.4 presents these access deprived zones with details of the time savings resulting from the Southern Bypass.

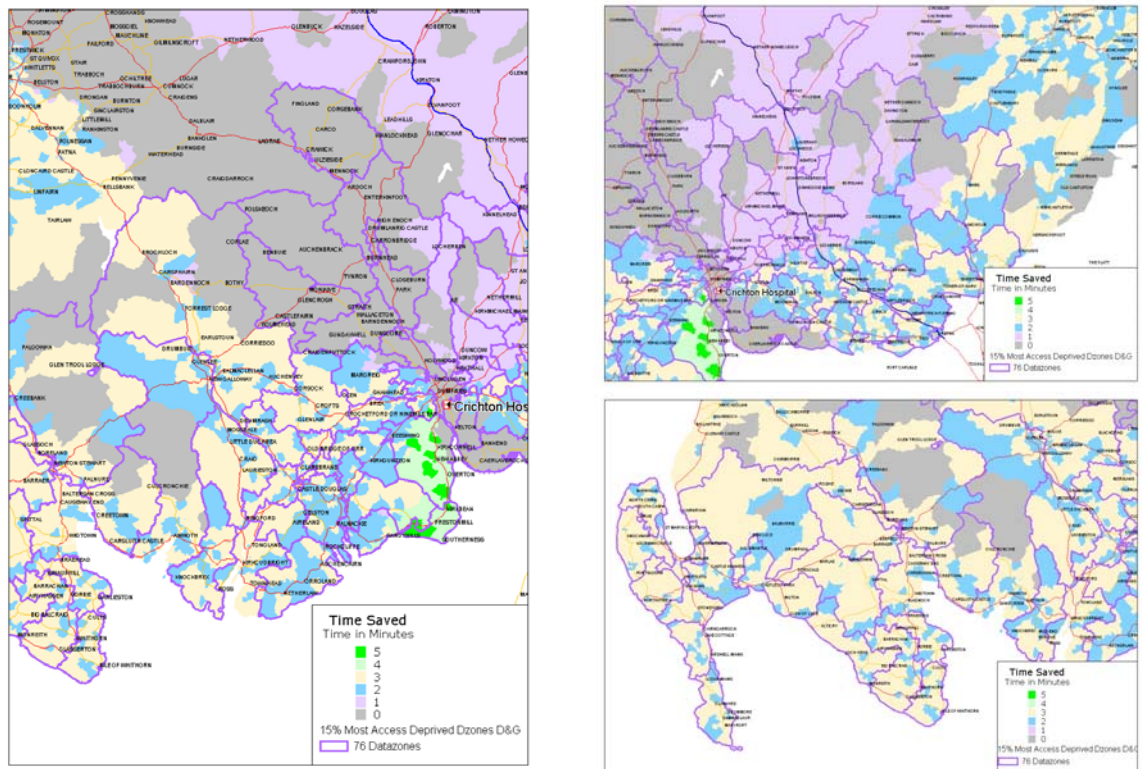


Figure 7.4 SIMD Index - 76 Most Access Deprived Zones in Scotland

Accessibility Impacts – Employment

7.3.15 Accessibility Indicators (known as ‘Hansen’ indicators) provide a value for each zone in the model. The value reflects the cost of travelling to all the other zones in the modelled area. For travel to work, the indicator is a function of travel times from each zone to all employment, weighted by the number of jobs in each zone (scale = 7000 represents good access, 1 represents poor access).

7.3.16 As mentioned previously, we have utilised the TMfS employment areas (Figure 7.5) to evaluate the change in access to employment opportunities. Figure 7.6 presents the change in access to employment as a consequence of building a Southern Bypass. In total, 69808 out of the 71094 households in the region exhibit improved access to employment with 1286 households showing no change.

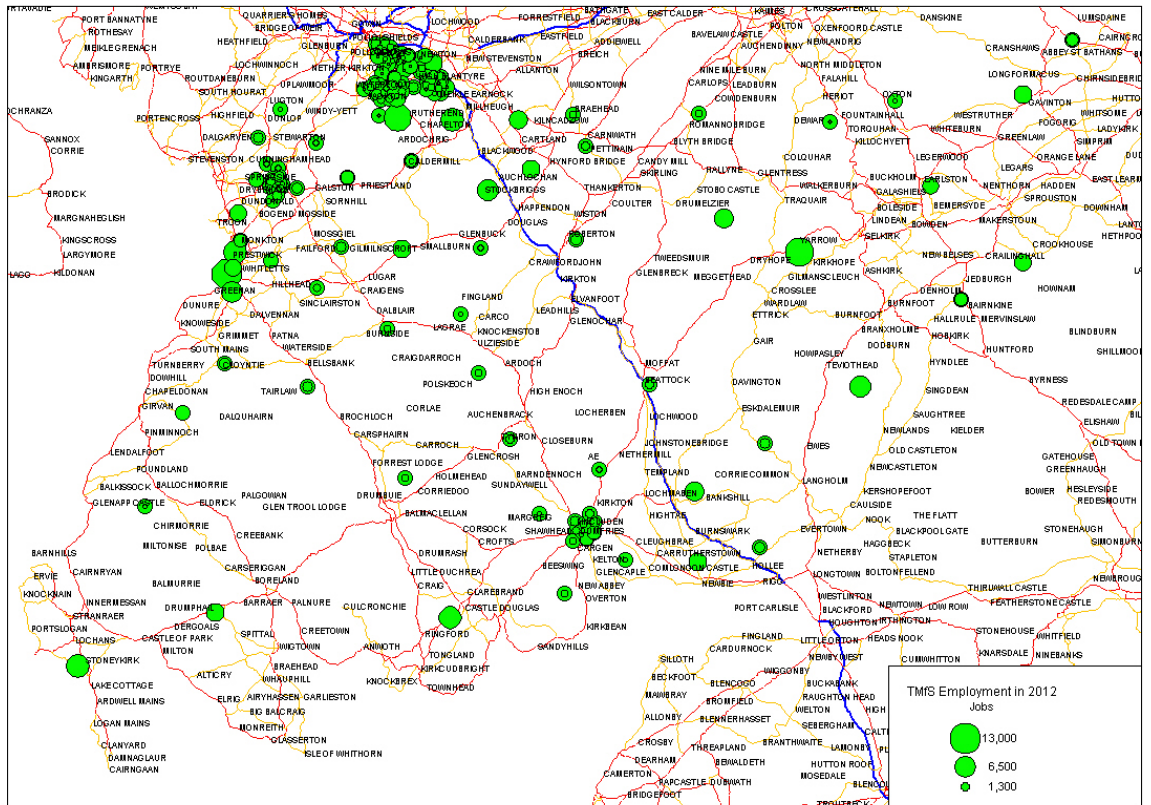


Figure 7.5 TMs Employment Areas

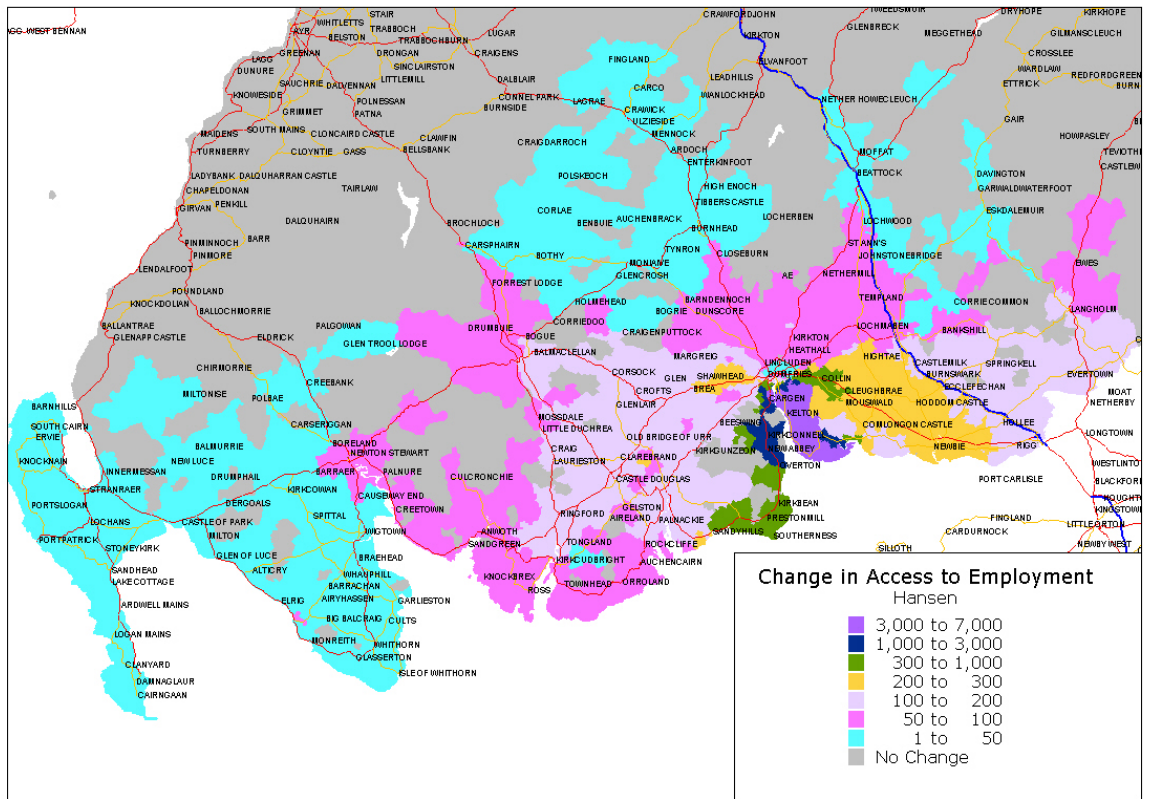


Figure 7.6 Hansen Measure of Access to Employment

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7.3.17 Figure 7.7 below presents the same data as above (Figure 7.6) but is more focused on the immediate vicinity around Dumfries Town Centre. Examination of the figure indicates that the provision of a Southern Bypass will increase accessibility for a number of areas, but most notably Caerverlock Castle, Overton, Kirkconnel, Bankend and Cargen Bridge (purple areas).

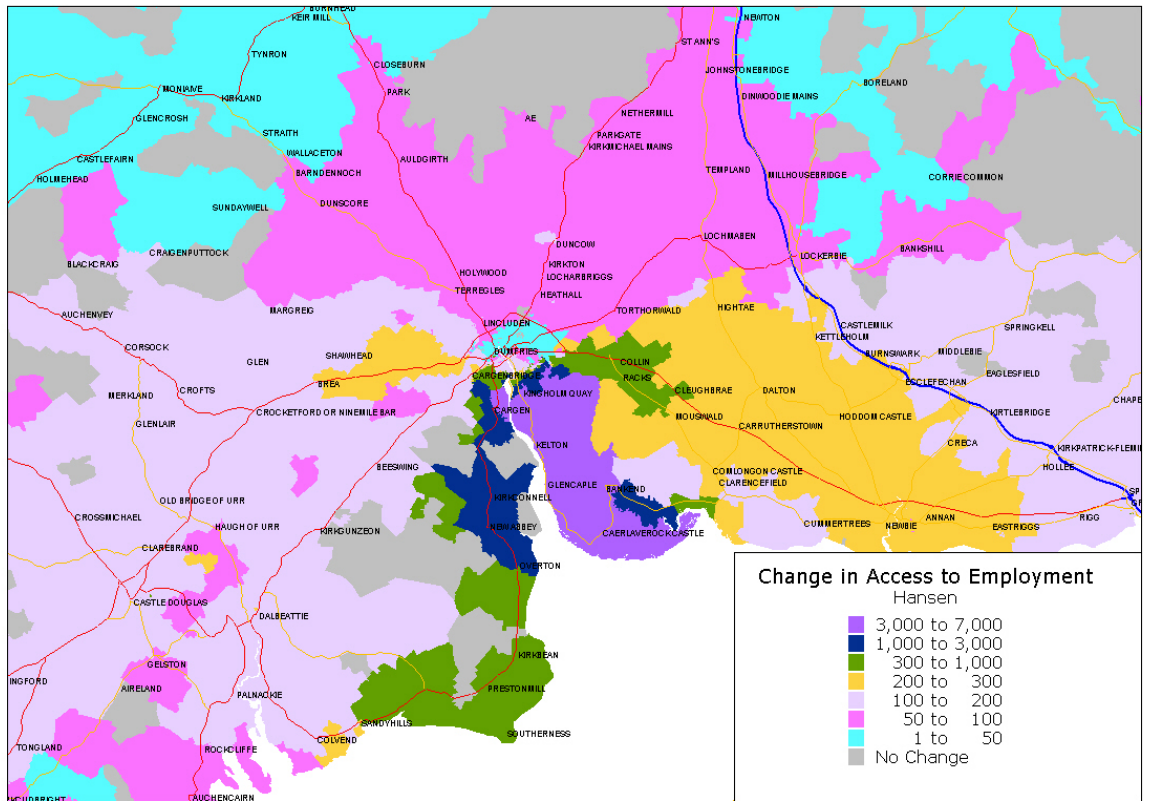


Figure 7.7 Hansen Measure - Focused on Dumfries and Surrounding Area

7.4 Overall Assessment for Accessibility/Social Inclusion

| | Community Accessibility | | Comparative Accessibility | | Overall Appraisal for Accessibility/Social Inclusion |
|--------------------------|-------------------------|---------------------|---------------------------|-----------|--|
| | PT Network Coverage | Local Accessibility | People Groups | Locations | |
| Dumfries Southern Bypass | O | O | ✓ | ✓✓ | ✓ |

8 Cost to Government

8.1 Introduction

8.1.1 Cost to Government refers to all costs incurred by the public sector as a whole; costs and revenues to private sector operators are separately identified.

8.2 Calculation of Cost to Government and Overall Economic Cost

8.2.1 Scheme capital costs were provided by Dumfries and Galloway Council and have been uplifted to 2006 construction prices. An optimism bias of 44% was applied to the costs. Operating and maintenance costs were calculated using NESAs values. These values were entered into TUBA to compare government costs with the TEE Benefits, as shown in Table 8.1. Reference to the table shows that Southern Bypass has a very strong BCR.

8.2.2 Capital Costs in 2008 prices for construction of the Dumfries Southern bypass have been estimated as:

- 2008 Base Construction costs - **£35 Million**;
- Total costs assuming 44% optimism bias - **£51 Million**.
- An allowance of **£4.6 Million** should be made to cover maintenance costs over the 60 year period.

Table 8.1 Overall Economic Appraisal

| £k, in 2002 Prices | |
|--|---------------|
| Present Value of TEE Benefits (PVB) | 234936 |
| Other Benefits/Disbenefits | |
| Accident Benefits | -857 |
| Carbon Benefits | 807 |
| Present Value of Other Benefits | -50 |
| Present Value of All Benefits (PVB) | 234886 |
| Public Sector Impacts | |
| Revenue | Nil |
| Operating Costs | 1340 |
| Investment Costs | 29752 |
| Indirect Tax Revenues | 5615 |
| Present Value of Costs (PVC) | 36707 |
| Overall Impact | |
| Net Present Value (NPV) | 198986 |
| Benefit Cost Ratio (BCR) | 6.4 |

8 Cost to Government

Note: the Indirect Tax Revenues cost is the predicted loss of government tax revenue due to lower fuel consumption as a result of the scheme

9 Implementability

9.1 Introduction

9.1.1 STAG Section 5.3 requires planners to consider the implementability of the options under assessment, a summary of which is included in the Appraisal Summary Tables (ASTs). This implementability assessment is required under four sub-headings:

- Technical Issues;
- Operational Issues;
- Financial Issues; and
- Public Issues.

9.2 Timescale and Relationship with Imminent Local Development Plan (LDP)

9.2.1 The Southern Bypass is an integral part of the of the LDP with regards to medium-long-term development aspirations in Dumfries, particularly for the development of the area south of Dumfries around the Crichton and Dumfries Royal Infirmary sites.

9.2.2 Phasing might be sensible to match development of the Southern Bypass with planned land-use changes to the affected area, and close working with the Local Development Plan team will be essential to achieve this.

9.3 Technical Issues

9.3.1 In terms of building the bypass route, there are no obvious technical challenges associated with this type of intervention.

9.3.2 In terms of the route infrastructure, all aspects would be feasible to implement using existing design standards and technology and any particular challenges for road infrastructure are already well-known. Whilst it is possible that site-specific difficulties might emerge during detailed design and subsequent construction, these are not foreseen at this stage.

9.3.3 The preferred alignment has been chosen to take account of known geographical and topographical features and so navigate these with known engineering solutions.

9.3.4 The Southern Bypass is intrinsically linked to progress on development in the Dumfries South area. It is important that infrastructure is fit for the demands placed upon it by development, and hence the two must proceed hand-in-hand to similar timescales. Accordingly some form of phased construction of the Bypass may be sensible, keeping it in step with the development it supports.

9.4 Operational Issues

- 9.4.1 There are no known operational disbenefits associated with the Dumfries bypass proposals. The Southern Bypass will provide an alternative to the existing A75 to the north of the town, which will have particular benefits in the event that one of the bypasses is closed by an incident, and will help to improve the perceived reliability of the A75 route to the Loch Ryan ports. In addition, it will relieve congestion in the town centre and facilitate access to the critical healthcare and education facilities to the south.

9.5 Financial Issues

- 9.5.1 The TEE appraisal demonstrates a very robust BCR. However, the volume of funding for the construction of the Dumfries bypass is considerable, and clearly outwith the financial resources ordinarily available to either Dumfries and Galloway Council or SWestrans. No money was earmarked for the project in the Strategic Transport Projects Review (STPR). Government funding of some description will be required to take the project forward. This could take the form of a submission to a future iteration of the STPR, and other avenues to explore include:

- opportunities for developer contributions towards parts of the bypass; and
- finance secured from European sources.

9.6 Public Issues

- 9.6.1 It is anticipated the public would generally be in favour of the Dumfries bypass. Dumfries has a history of traffic congestion which would in part be relieved by the construction of the route. Local politicians have campaigned for the introduction of the bypass to a generally supportive public. This view is robustly supported by the consultation response described in Chapter 3.
- 9.6.2 It is probable that a Public Inquiry will be necessary before proceeding with construction of the Southern Bypass; a Public Inquiry will certainly be required before approval of the new Local Development Plan (LDP). There is a risk that the inquiry into the Bypass would swamp consideration of the LDP if an attempt was made to combine the two, so it would seem sensible that two separate inquiries are convened, albeit in running broadly in parallel.
- 9.6.3 It is entirely likely that there would be some form of environmental opposition as is common with any road building schemes in the country, and consequently the supporting appraisal – particularly of environmental impacts and their proposed mitigation – will be of crucial importance.

10 Risk and Uncertainty

10.1 Context

10.1.1 In April 2003, the Treasury published its Green Book on Transport Project Appraisal. The aim of the Green Book is to ensure at the outline business case stage a better estimate is made of the capital costs that will eventually be incurred. To mitigate optimism, the Green Book recommends that uplifts of estimates should be applied to ensure that decision-makers have a more realistic idea of the likely outlay at the earliest opportunity in the appraisal process. The theory behind the approach is that as the scheme is developed, the scope of the project becomes more defined and risks are more easily identified and hence, the level of optimism bias can be reduced. The guidance requires capital projects to:

- include an '**optimism bias**' factor; and
- be assessed using a **discount rate** of 3.5% rather than the previous figure of 6%.

10.1.2 Three subsequent changes have taken place: firstly, in June 2004, the Department for Transport (DfT) published *Procedures for Dealing with Optimism Bias in Transport Planning* which updated the April 2003 Treasury advice. Secondly, the DfT has advised that the discounting period for transport projects should extend to 60 years with the last 30 years using a discount rate of 3% and thirdly, the price base for economic appraisal is now 2002 and not 1998 as previously.

10.2 Optimism Bias

10.2.1 An appropriate optimism bias factor has to be determined. Using the terminology of the Green Book, a typical road construction project would be categorised as either Standard or Non Standard Civil Engineering. The Green Book provides ranges of optimism bias factors under these categories for both Works Duration, i.e. the time taken on site to build the project, and Capital Expenditure, the cost of building the project. Here, we are concerned with Capital Expenditure and the relevant Green Book ranges are therefore:

- Standard Civil Engineering 3% to 44%; and
- Non Standard Civil Engineering 6% to 66%.

10.2.2 These values were derived following the publication in July 2002 of Mott MacDonald's *Review of Large Public Procurement in the UK*. The review compared supply estimates data for 282 capital projects built between 1981 and 1998 with a budget of more than £10m at 2001 prices. The review identified a range of sources of budget estimate error associated with various areas of risk. A methodology was suggested for estimating optimism bias for new projects based on the risk associated with different components.

10.2.3 Following the guidance given in the Green Book, we conclude that, at this stage, the project is Standard Civil Engineering and therefore the upper bound for optimism bias is 44%.

10.2.4 However, the main aims of the published Procedures for Dealing with Optimism Bias in Transport Planning are to:

- provide empirically based optimism bias up-lifts for selected reference classes of transport infrastructure projects; and
- provide guidance on using the established optimism bias uplifts to produce more realistic forecasts for the individual project's capital expenditures.

10.2.5 The types of transport scheme under the direct and indirect responsibility of the DfT have been divided into a number of distinct groups where the risk of cost overruns within each of the groups can be treated as statistically similar. For each of the groups, a reference class of completed transport infrastructure projects has been used to establish probability distributions for cost overruns for new projects similar in scope and risks to the projects in the reference class. Based on this, the necessary uplifts to ensure that the risk of cost overrun is below certain pre-defined levels have been established. These up-lifts are reflected in Table 10.1 below, with the relevant stages highlighted.

10.3 Using the Established Uplifts

10.3.1 The Guidance requires that the established uplifts for optimism bias should be applied to estimated budgets at the time of decision to build a project.

10.3.2 Given the high-level strategic nature of the design work undertaken to date, we have applied Optimism Bias at the "upper bound" of 44%.

10.3.3 Chapter 6 reported an economic assessment undertaken by applying a 44% optimism bias factor to the costs and extending the assessment period to 60 years; the first 30 at 3.5% discount rate and the last 30 at 3%. The price base is now 2002.

Table 10.1 Applicable Capital Expenditure Optimism Bias Uplifts

| Category | | Stage 1 | Stage 2 | Stage 3 |
|--|--|---|--|--|
| Local Authority and Public Transport Schemes | | Programme Entry | Conditional Approval | Full Approval |
| Highways Agency Schemes | | TPI entry/ Preferred Route Decision | Order Publication/Works Commitment | Works Commitment |
| Railways | | Grip Stage 1: Pre-feasibility | Grip Stage 3: Option selection | Grip Stage 5: Design development |

| Category | Types of Projects | Stage 1 | Stage 2 | Stage 3 |
|-------------------|---|---------|---------|---------|
| Roads | Motorway Trunk roads <u>Local roads</u> Bicycle facilities Pedestrian facilities Park and ride Bus lane schemes Guided buses on wheels | 44% | 15% | 3% |
| Rail | Metro Light rail Guided buses on tracks Conventional rail High speed rail | 66% | 40% | 6% |
| Fixed Links | Bridges and Tunnels | 66% | 23% | 6% |
| Building Projects | Stations and Terminal buildings | 51% | - | 4% |
| IT Projects | IT system development | 200% | - | 10% |

Based on WebTAG Unit 3.5.9, Tables 8 and 9