

12 Vehicle Travellers

12.1 Introduction

This chapter outlines the assessment undertaken to determine the potential effects of the scheme on the quality of driving conditions for vehicle travellers. This includes the changes to the views from the road and effects of the scheme on driver stress.

'View from the road' is defined as the extent to which vehicle travellers, particularly drivers, are exposed to the different types of scenery through which a route passes.

'Driver stress' relates to three main components; frustration, fear of potential accidents and uncertainty relating to the route being followed. The level of stress incurred by a driver can be affected by many factors, including variations in the driver's skill, experience and knowledge of the road. Frustration can occur due to the driver's inability to drive at a speed consistent with their wishes in terms of the general standard of the road, a lack of suitable overtaking opportunities increases frustration levels. Fear of potential accidents is related to several factors which include inadequate sight distances, the likelihood of pedestrians, presence of junctions, higher speeds, inadequate lighting and poorly maintained road surfaces. The level of uncertainty may be raised by lack of route knowledge and poor signage.

12.2 Methods

12.2.1 Baseline Methods

Information on baseline conditions was gathered from the available data including Ordnance Survey mapping, traffic modelling data derived from a traffic survey carried out on Thursday 29th April 2004 and various site visits during 2005, combined with local knowledge of the route.

12.2.2 Impact Assessment Methods

This assessment has been carried out following the guidelines set out in Volume 11, Section 3; Part 9 of the DMRB.

As outlined in Chapter 3, impacts are considered in terms of the value or sensitivity of the baseline feature and magnitude of the predicted impact on that feature. The significance of the predicted impacts is determined through a combination of value and magnitude as detailed below.

Value / Importance or Sensitivity

The value / importance of views from the road and sensitivity in relation to driver stress was determined as detailed in Table 12.1 below.

With regard to views from the road, a number of aspects were considered to determine value / sensitivity including the types of scenery and landscape, the extent of traveller's views, the quality of the landscape and the presence of features of particular interest or prominence.

Driver stress can be difficult to accurately measure, but components of driver stress relate to road layout, signage, lighting, road surface conditions and sight distances among others. Recommendations in Volume 11, Section 3, Part 9 of the DMRB suggest the use of a three point scale, where new or improved routes, designed in accordance with the Departments current standards will normally have low to moderate driver stress. However, "do minimum" or "do nothing" options may have sections of low, medium and high driver stress, and data on traffic speeds and flows will influence this assessment of driver stress.

Table 12.1. Definition of Value of Views from the Road and Level of Driver Stress.

Value/Level	Criteria	
	Views from the Road	Driver stress
High	The traveller is exposed to extensive views of a high quality landscape, area of unique landscape character or features of particular interest.	Road conditions are expected to result in the driver exhibiting a high level of one or a combination of the following components of driver stress: frustration, fear of accidents and route uncertainty.
Medium	The traveller is exposed to partial/intermittent views of a high quality landscape (or extensive views of a moderate quality landscape), area of unique/distinctive landscape character or features of interest.	Road conditions are expected to result in the driver exhibiting a moderate level of one or a combination of the following components of driver stress: frustration, fear of accidents and route uncertainty.
Low	The traveller is exposed to views of an area of low quality landscape/unremarkable landscape character or has heavily restricted views/no view of the surrounding landscape regardless of quality.	Road conditions are such that the driver is expected to exhibit low levels of frustration, fear of accidents and route uncertainty.

Impact Magnitude

The magnitude of impact was assessed independently of the value or sensitivity of the feature and assigned to one of the categories listed in Table 12.2 below.

Table 12.2. Impact Magnitude Criteria for Vehicle Travellers.

Criteria	Definition
Major	A major alteration in views from the road or in driver stress such that the driving experience is significantly affected.
Moderate	An alteration in views from the road or in driver stress such that the driving experience would be changed to a noticeable degree.
Slight	Minimal alteration in views from the road or in driver stress such that there would be a measurable change but this would not noticeably affect the driving experience.
Negligible	Very little appreciable change in views from the road or in driver stress not considered relevant enough to have any perceptible effect on the driving experience.

Impact Significance

The significance of impact (beneficial or adverse) was determined as a combination of the value/sensitivity of the views from the road or level of driver stress and the magnitude of impact as shown in Table 12.3 below.

Table 12.3. Impact Significance Criteria for Vehicle Travellers.

Value or Sensitivity	Magnitude of Impact			
	Major	Moderate	Slight	Negligible
High	Major	Major	Moderate	Slight
Medium	Major	Moderate	Slight	Negligible
Low	Moderate	Slight	Negligible	Negligible

12.3 Baseline Conditions

12.3.1 Views from the Road

Within the area of the proposed scheme, the A68 is the only route for through traffic. There is a network of minor roads to either side of the A68 as shown in Figure 1.1, the key roads being the D47/5 to Carfare, the C83 to Kirktonhill and the C84 to Oxton which carry local traffic.

In terms of a driving experience, the existing A68 is an attractive route with the dominant topography of the Moorfoot and Lammermuir Hills providing a significant transition between the Lothians and the Borders. There is an appreciable change from the arable lowlands by the Forth Estuary, to the open moorland plateau of the summit at Soutra Hill, to the valley landscapes of the Leader Water and the River Tweed.

Photographs showing typical views from this section of the A68 are contained in Figure 12.1.

Soutra Hill lies to the north of the proposed scheme on the border between Midlothian and Scottish Borders districts. As the A68 leaves Midlothian, it rises up onto Soutra Hill then descends down into the Borders. As the A68 curves down from Soutra Hill into the Borders, the Headshaw Burn lies to the east of the road and the landscape changes from moorland to upland valley grazing. Approaching the stretch of road proposed for improvement, the drivers' view south east is contained by the valley. Figure 12.1, Photograph 1 shows a large cutting to the west of the road, and low-lying land by the burn to the east, which has recently been planted with trees and is known as Henry's Wood. The road swings round the cut slope, and crosses the Headshaw Burn by the junction leading west to Oxton (C83) and east to Carfrae (D47/5). The driver then follows the valley down to Carfraemill roundabout with grassland sloping up to the east of the road and the lower land by the Leader Water to the west. The village of Oxton is situated beyond the Leader Water to the west. Beyond this to the south the view opens out to the wider river valley.

Views from the side road network are similar to those available from the A68. Although, with the exception of the C84 Oxton road, the side roads are narrow and lined with hedges which limits views of the surrounding landscape.

In accordance with Table 12.1, the value of the area with respect to views from the road is therefore considered to be **medium**.

12.3.2 Driver Stress

Driver stress has three main components: frustration, fear of potential accidents, and uncertainty relating to the route being followed.

For southbound traffic the existing road layout to the north of the proposed scheme comprises the downhill single lane section of the Soutra South climbing lane. This lane is marked with continuous double solid white lines for the whole length of the climbing lane, a distance of approximately 3.25 km. This can result in a build up of traffic behind a slow moving vehicle such as a farm tractor, causing driver frustration; this is illustrated in Figure 12.1 (Photograph 1). The bottom of the climbing lane is approximately 150 metres north of the C83 Kirktonhill and D47/5 Carfrae left/right staggered junction. Immediately south of the junction there is a short section of road (350m in length) with full overtaking sight distance, as shown in Figure 12.1, Photograph 3. Drivers that use the route on a regular basis are aware that this short straight section of road exists and this results in a high level of stress for drivers trying to overtake with the possibility of the sudden appearance of oncoming traffic.

Fear of potential accidents is high where there are T-junctions on the main road and the speed of through traffic is high. This situation occurs for southbound traffic at the C83 Kirktonhill and D47/5 Carfrae left/right staggered junction at the bottom of Soutra South climbing lane, as shown in Figure 12.1, Photograph 2. Speeds are also high in the vicinity of the C84 Oxton junction. None of these junctions have a right turning refuge for vehicles wishing to turn right and this also adds to driver stress.

Uncertainty over the route being followed is low in both directions as the A68 follows a consistent north west to south east alignment with many clear landmarks and relatively few road junctions.

There are advance direction and direction signs on the A68 for the C84 Oxton junction both northbound and southbound. There are also junction marker posts to locate the junction at night. The existing signage for this junction is therefore sufficient to indicate its location.

At the C83 Kirktonhill and D47/5 Carfrae left/right staggered junction there are direction signs both northbound and southbound but an advance direction sign in the southbound direction only. There are no junction marker posts. The existing signage at this junction is therefore not to full standard.

The level of driver stress for the existing route with respect to southbound traffic is therefore considered to be **high**.

For northbound traffic the existing road layout to the south of the proposed scheme comprises a Differential Acceleration Lane (D.A.L.) leading north from Carfraemill roundabout with dedicated overtaking in the northbound direction. To the north of the proposed scheme the Soutra South climbing lane provides an overtaking opportunity, although there is no advance to indicate its presence and therefore drivers unfamiliar with the route will not know of its existence until they actually reach it. However, for regular users of the route the presence of the climbing lane provides a guaranteed opportunity to overtake slower moving vehicles and thus decreases driver frustration on this section of the route, resulting in a lower level of stress for northbound traffic.

A fear of potential accidents for northbound traffic is caused by the combination of T-junctions without right-turning refuges and high speed on the main road occur at C84 Oxton junction and at the C83 Kirktonhill and D47/5 Carfrae left/right staggered junction.

The level of driver stress for the existing route with respect to northbound traffic is therefore considered to be **medium**.

It is useful to compare the above classification which is based on actual knowledge of the local conditions with the guidance only tables contained within DMRB, Volume 11; Section 3; Part 9. Considering current driving conditions the average peak hourly flow per lane on this section of the A68 lies between 600 – 800 units/hour and average journey speeds on the route taken from the traffic survey are greater than 70 km/hr. Thus, with reference to Table 3 of DMRB, a moderate level of driver stress would be experienced under current traffic flow conditions.

This compares well with the subjective assessment above, which rates the route at a similar level.

12.3.3 Accident Data

A detailed assessment of the reported personal injury accidents (PIA) on the A68 over the scheme length between the bottom of the existing Soutra South Climbing Lane and Carfraemill Roundabout has been carried out. This has been based on statistics contained within the SBC Road User Group Traffic Section between January 1999 and December 2007. A nine year period has been considered in order to give the report an accurate and relevant illustration of the number and type of accidents occurring on the A68. Over this period, ten PIA's occurred.

Of the ten accidents reported, two were classified as serious with the remaining eight being classified as slight. There were no fatal accidents within this section of the A68 within the last nine years.

The PIA rate per Million Vehicle Kilometres (PIA/Mveh-km) is a useful indicator as to the relative safety of a section of road. Rates are calculated by dividing the number of accidents by the traffic flow, multiplied by the length of road under consideration. This rate is then factored to give a figure in accidents per million vehicle kilometres over a set period. To ensure an accurate comparison with other roads, only accidents in the last three years (2005 – 2007) inclusive have been used in this calculation. The relevant figure for this section of the A68 is 0.24 PIA/Mveh-km which is greater than the 2006 Scottish Trunk Road average for non built up Trunk roads of 0.15 PIA/Mveh-km. The level of driver stress for this aspect is therefore considered **medium**.

12.4 Assessment of Impacts

12.4.1 Views from the Road

Views from the road will mainly be affected during the construction period and immediately post-construction and this is discussed in Chapter 16 – Disruption due to Construction.

Due to the on-line nature of the scheme, views from the completed road will be comparable to the existing situation. It could be considered that the increase in carriageway surface area combined with the new and improved signage and road markings would have an adverse impact on views but these additions are predicted to only have a marginal adverse effect on views from the road. The medium value views from the road combined with the negligible adverse impact result in an overall **negligible adverse** impact significance.

In order to widen the carriageway, two existing cuttings will have to be further excavated resulting in a larger area of cut. The two cuttings are located opposite Riggsyde and again on the east side of the road approximately 500 metres further north. This impact will not be significant as the views from the road at this location are currently restricted by the existing terrain. Restrictions on views in these areas will not be significantly increased by the slightly larger cut slopes. When combining the medium value in terms of views from the road with the negligible adverse impact, this

results in an overall **negligible adverse** impact significance.

The proposed new access road serving the D47/5 Carfrae road will alter driver views in this area by taking them away from the existing road into a more open space, thus resulting in slightly more open and different views of the surrounding area. Landscaping will help limit the localised visual impact of this new feature. The small pocket of land between the new access road and the A68 gives an opportunity to incorporate landscaping features to improve the views. Longer views from the road of the surrounding landscape will not be greatly affected by this new access due to its position in the existing topography as it will blend into the existing slope to the east. The medium value views combined with the slight beneficial impact results in an overall **negligible beneficial** impact significance.

The closure of the C83 junction and provision of the proposed new side road linking the existing C84 to the C83, will result in different and more open views of the surrounding area for vehicles accessing the farms and properties to the northwest of Oxton. An existing line of trees and proposed hedge planting will help mitigate the visual impact of this new route. The medium value views combined with the slight beneficial impact results in an overall **negligible beneficial** impact significance.

In the longer term it is anticipated that views from the road will be enhanced in terms of improved landscaping, new / replacement hedgerows, additional wooded areas and a general feeling of openness associated with the widened carriageway and verges. The proposed landscaping involves the extension of the tree-lined avenue which leads away from Carfraemill roundabout. This terminates at the C84 Oxton junction and new / replacement hedges are then proposed to run along the highway boundary. These new and improved landscape features are set well back from the road and in some instances are at the bottom of new fill slopes or at the top of the minor cut slopes and as such will permit intermittent and open views of the surrounding landscape. These proposals are shown in Figures 9.2, 9.3 and 9.4.

From the discussion above it is considered that the scheme will result in a negligible adverse impact on driver views immediately following scheme completion. When combined with the site's medium sensitivity, this equates to a **negligible adverse** impact significance on driver views, in accordance with the criteria set out in Table 12.3.

12.4.2 Driver Stress

The scheme will provide 1.29km of dedicated overtaking in the southbound direction after the changeover section at the bottom of the Soutra South climbing lane. The removal of the C83 Kirktonhill junction will eliminate all turning manoeuvres at this location. There will also be a right turning refuge incorporated into the changeover section at C84 Oxton junction for southbound traffic. The only other junction on the route is the D47/5 to Carfrae. This junction is to be improved and moved approximately 100 metres further south. Its location, on the two-lane side of the

WS2+1, means that traffic can safely wait in the single lane and then cross the two lanes into the junction when a suitable gap in the opposing flows occurs. Due to the low traffic flows using this side road no right turning refuge is to be provided. All of the field accesses and the private access at Riggsyde onto the trunk road will be stopped up thereby reducing the fear of accidents.

These improvements will have a major beneficial impact magnitude with respect to driver stress for southbound traffic. This combined with the high level of existing driver stress will result in an improvement of **major beneficial significance** for **southbound traffic**.

For northbound traffic the scheme will extend the existing dedicated overtaking on the D.A.L. from 250m to 460m which will increase the opportunity for cars to overtake slower moving vehicles exiting the roundabout. The removal of the C83 Kirktonhill junction will eliminate all turning manoeuvres at this location. The retention of a junction serving the D47/5 Carfrae road will maintain a certain degree of driver stress especially as northbound traffic will be delayed occasionally by right turning traffic, (estimated approximately 2-3 vehicles per hour turning right). In addition northbound traffic will be prohibited from overtaking and the existing Soutra South northbound climbing lane will be reduced by approximately 375m. This could cause some degree of frustration, albeit a balancing reduction in the fear of a potential accident should also occur.

The effect of these changes will have a slight beneficial impact magnitude with respect to driver stress for northbound traffic. This combined with the medium level of existing driver stress will result in a change of **slight beneficial significance** for **northbound traffic**.

12.4.3 Potential Accidents

The provision of a WS2+1 carriageway configuration with additional carriageway width and a definitive separation between opposing traffic flows will give vehicles more space to avoid potential collisions.

Uncertainty over the route being followed will remain low as the A68 follows a consistent north west to south east alignment. This will be further improved with the inclusion of improved road signage as part of the scheme.

Unfamiliarity with the WS2+1 road configuration may cause an increase in driver stress in the short term. This will ease with the passing of time as driver understanding improves and the number of schemes utilising this configuration increases. The impact upon road accidents is therefore considered to be moderate beneficial in magnitude, resulting in a **moderate beneficial** overall impact.

12.5 Mitigation

Although adverse changes in views from the road are considered to be negligible, mitigation measures will be incorporated into the design to decrease any impacts, negligible or otherwise, and to ensure that the scheme blends in with the surrounding landscape as quickly as possible.

Mitigation of the potential impacts on visual amenity is discussed in Chapter 9 (Landscape and Visual Effects). The following measures are also likely to benefit views from the new road:

- Appropriate earthworks - Minimal cut/fill slopes where practicable.
- Appropriate seeding and landscaping of earthworks to reflect surrounding vegetation.
- Replacement and additional planting of hedgerows and roadside vegetation and the establishment of tree screens where appropriate.
- Replacement planting of mature trees lost to the scheme.
- Once the landscaping measures have had time to establish, the impact will become even less adverse. Figures 9.2, 9.3 and 9.4 show the proposed landscaping measures which will reduce the impact of the proposed scheme in terms of views from the road.

The scheme is designed to provide safe, dedicated overtaking opportunities in both directions along this section of the A68. Also, improved signage like advance notification for overtaking sections, changeover sections and junctions along with clear road markings will significantly reduce of driver stress and therefore no further mitigation measures are proposed.

12.6 Residual Impacts

Table 12.4 presents the impact assessment results before and after the application of mitigation. The residual impacts upon driver views (with the inclusion of mitigation measures identified above) are assessed as being of **negligible adverse**.

The scheme will result in a **major beneficial impact** on driver stress for southbound traffic and a **slight beneficial impact** on driver stress for northbound traffic.

Table 12.4. Summary of Impact Before and After Mitigation.

	Impact Before Mitigation	Impact After Mitigation
Driver Views		
Views along new alignment	Negligible, adverse	Negligible, adverse
Cuttings at Riggsyde	Negligible, adverse	Negligible, adverse
D47/5 Carfrae Access Road	Negligible, beneficial	Negligible, beneficial
New Side Road	Negligible, beneficial	Negligible, beneficial
Views immediately after construction	Negligible, adverse	Negligible, adverse
Driver Stress		
Southbound	Major, beneficial	Major, beneficial
Northbound	Slight, beneficial	Slight, beneficial
Accidents	Moderate, beneficial	Moderate, beneficial