### **Social and Distributional Impacts Full Appraisal - Final Report**

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# 1. Introduction

### 1.1 Purpose of Report

This report presents findings from the appraisal of Social and Distributional Impacts (SDIs) for the A6 to Airport Relief Road. The appraisal has been undertaken in accordance with WebTAG guidance, published by the Department for Transport (DfT) in **TAG Units 2.13 (Project Manager)** and **3.17 (Expert)**.

The Environmental Assessment for this scheme has identified adverse Air Quality and Noise impacts in some locations and these are shown in this report. These adverse impacts are currently the subject of further detailed assessment to determine whether specific mitigation measures could be implemented in these areas as part of the scheme to reduce any of these adverse impacts. The outcome of this work will be reported in the Environmental Statement.

### 1.2 Background

### 1.2.1 What are SDIs?

The Department has developed its understanding of Social and Distributional Impacts through work over the last few years, including a detailed literature review of SDIs in transport interventions, and consideration of current practice in appraisals. The work to date has shown that there is a clear distinction between 'social' and 'distributional' impacts.

**'Social'** impacts relate to effects on individuals and society and lend themselves to assessing the social change processes invoked by the introduction of a transport intervention. These impacts include the effects on communities such as cohesion, stability and services; people's way of life (how they live, work and play); the environment such as the quality of the air and landscape; the health and wellbeing; personal fears and sense of security. There are points of overlap between social, economic and environmental impacts, because economic and environmental impacts can have social consequences and vice versa. Social research provides one of the toolkits, alongside economics and physical science, which can be used to measure and explain these impacts.

'**Distributional**' impacts relate to the extent to which there are differences in the way impacts affect different groups in society. For example, the noise impacts of an intervention will affect different groups of households, with some experiencing increases, and others decreases. Depending on the geographical locations of different groups of people, these groups will each experience different impacts.

### 1.2.2 Why are SDIs important?

Social and distributional impacts are an important consideration in transport appraisal. Prior to the development of WebTAG guidance, there had not been a systematic analysis of the impacts of transport schemes on different groups of people. The 'net' impacts of a transport schemes can 'mask' the differential effects experienced by different groups. Whilst appraisal might demonstrate that the overall net impact is beneficial, there will be winners and losers, and it is crucial that the analyst (and the promoter) understands who these winners and losers are.

For some interventions, addressing SDIs may not be a core objective; however, in the majority of cases, there is likely to be a mixture of positive and negative impacts experienced by different groups of people, in different locations and to different magnitudes. Whilst some impacts may be unintentional, it is important to consider these impacts within the appraisal process to inform decision makers of the likely benefits and impacts, enabling mitigation against any negative impacts and/or maximising positive benefits.

The term SDIs has evolved since it was first introduced in the Department's Guidance on Transport Innovation Funds (TAG Unit 3.12.4) and further research has enabled the development of eight new SDI indicators as follows

- High levels of **noise** can be experienced adjacent to busy transport corridors. The evidence suggests that children are vulnerable to high levels of noise, which affects their concentration when learning;
- Similarly, poor **air quality** can also be experienced in areas adjacent to busy and congested road corridors, which often pass through deprived urban areas. Whilst it is well understood that poor air quality has serious health implications, particularly respiratory disease, there is limited evidence on the social groups that are at particular risk;
- Children and older people are at particular risk from accidents on the road network (as pedestrians), whilst young male drivers and motorcyclists are also high risk groups. There is also a clear link between pedestrian accidents and social class: children from Social Class V are five times more likely to be involved in fatal accidents than those from Social Class I<sup>1</sup>;
- Certain groups of people have particular concerns about their **personal security** when using the transport network, including women (who value the ability to call for help if needed), younger people (who fear bullying), older people (many of whom wish to see greater control of youth behaviour) and disabled people (who often feel vulnerable to bullying and verbal abuse);
- Severance of communities by traffic and transport infrastructure is a particular problem for people without access to a car, some older people, people with disabilities, and school children, because they are often reliant on walking in the local community and in some cases have restricted mobility;
- Accessibility to services is often a particular problem for young people living in rural areas (access to further education and employment), school children (availability of school buses), some older people (physical mobility in boarding / alighting and on board the vehicle), disabled people (physical accessibility and lack of information), black and minority ethnic (BME) communities (routes to specialist shopping centres or places of worship) and carers (who have complex travel needs);
- The **affordability** of transport (both in terms of public transport fares and the costs of running a car) is often a problem for young people and low income households, particularly for travel to employment and education; and
- Low-income households and deprived communities often do not benefit from the transport user benefits resulting from improvements to the transport system if they are not users of the network, either because they do not have access to a car or have limited travel horizons in their use of public transport.

### 1.3 Overview of SDI Process

The approach outlined in the Department's guidance ensures that the SDI appraisal is proportionate to the scale of the issue and follows a degree of iteration in the initial steps to ascertain whether a full appraisal is required. Figure 1-1 (adapted from WebTAG) shows the process detailing each key point of decision making illustrated by the six identified Steps.

<sup>&</sup>lt;sup>1</sup> White, D *et al, Road accidents and children living in disadvantaged areas: a literature review* (Scottish Executive, 2000)

#### Figure 1-1: SDI Process

The outcome of Step 0 is an initial screening proforma to identify if further steps are required. Appendix A of this report includes the proforma for A6 to Manchester Airport Relief Road. Steps 0, 1, 2 and 3 are described in detail in TAG Unit 3.17 while an outline is provided for Steps 4 and 5. If the screening process in Step 3 identifies that an impact should be subject to detailed SDI analysis, Step 4 directs the SDI analyst to specific TAG units for the detailed technical analysis.

### 1.4 Scheme Overview

The proposed A6 to Manchester Airport Relief Road scheme includes a new dual carriageway connecting the A6 to Manchester Airport. The scheme bypasses local centres including - Bramhall, Cheadle Hulme, Hazel Grove, Handforth, Poynton and Wythenshawe District Centres and Gatley and Heald Green.

The scheme improves access to / from Manchester Airport and its employment areas as well as Hazel Grove, Newby Road, Bramhall Moor Lane, Poynton, Handforth Dean and Stanley Green employment areas. Access to a number of regeneration areas is also improved by the scheme, including Stockport Town Centre and Wythenshawe. The junction providing access to the A5149 Chester Road also provides the entry point to the proposed Poynton Relief Road.

The scheme will provide a high quality route for freight vehicles to access the strategic road network (i.e. M56) and Manchester Airport from the south east Manchester and Cheshire East / Derbyshire area, and as an alternative route to using existing residential streets.

The new road is approximately ten kilometres long, of predominantly dual carriageway standard and will include ten new and six improved junctions. It also incorporates a further four kilometres of existing A555 dual carriageway to the south of Bramhall. There are four rail crossings in the new sections, one of which crosses the West Coast Main Line. A pedestrian and cycle route is proposed for the whole length of the scheme, including retrofitting it to the four kilometre existing section of A555. The alignment of the A6 to Manchester Airport Relief Road is presented in Figure 1-2.



#### Figure 1-2 A6 to Airport Relief Road Scheme Area

The proposed scheme will provide an improvement in the allocation of existing road space in favour of sustainable modes of transport, thereby improving access for public transport, pedestrians and cyclists, and improving the quality of life in residential areas along the south Manchester corridor.

The majority of benefits will accrue to road users and local residents through improved access to centres of employment, commerce and leisure facilities. A package of complementary measures will maximise the scope of potential benefits by making the most efficient use of road space where there are forecast reductions in car traffic. These measures will prevent available road space from simply filling up with more cars. Similarly, a package of mitigation measures will contribute to the overall value for money by limiting any negative impacts resulting from the scheme. Together, the complementary and mitigation measures will help secure substantial environmental, safety and social benefits.

### 1.4.1 Scheme Objectives

The A6 to Manchester Airport Relief Road scheme will alleviate a number of problems to bring benefits to the local population and businesses and to the wider economy. The major problems in the area and objectives defined to address them are presented below.

Problems	Objectives
Poor connectivity along the south Manchester corridor, with a fragmented east-west highway network and lack of surface access to Manchester Airport, that acts as a barrier to economic growth and regeneration	<i>Increase employment and generate economic</i> <i>growth</i> by providing efficient surface access and improved connectivity to, from and between Manchester Airport, local, town and district centres, and key areas of development and regeneration (e.g. Manchester Airport Enterprise Zone)
Congestion on the local and strategic network, with average vehicle speeds of less than 10mph on most parts of the highway network and journey times that are longer than all other 'large' urban areas across the UK, including those in London	<b>Boost business integration and productivity</b> : improve the efficiency and reliability of the highway network, reduce the conflict between local and strategic traffic, and provide an improved route for freight and business travel.
There are particular congestion problems along the A6 and in the urban centres of Gatley, Bramhall, Heald Green, Hazel Grove, Poynton, Wilmslow, Handforth and Cheadle Hulme, leading to delays to public transport and affecting accessibility.	Reduce the impact of traffic congestion on local businesses and communities. Promote fairness through job creation and the regeneration of local communities: reduce severance and improve accessibility to, from and between key centres of economic and social activity
Poor environmental conditions in the District and Local Centres along the south Manchester corridor, caused by the high volume of traffic passing through these towns to reach other destinations, leading to a number of locations in the study area being designated Air Quality Management Areas	<b>Support lower carbon travel:</b> reallocate road space and seek other opportunities to provide improved facilities for pedestrians, cyclists and public transport.
Unsafe conditions for pedestrians and cyclists through busy urban areas along the extent of the south Manchester corridor, with all non-motorised transport users facing severance and problems of safely accessing education, employment and leisure facilities	<i>Improve the safety of road users, pedestrians</i> <i>and cyclists:</i> reduce the volume of through-traffic from residential areas and retail centres.

### 1.5 Scheme Corridor Overview

Appendix A provides a socio-demographic profile of the area with maps illustrating specific areas with high proportions of vulnerable groups. The scheme is located in an area alongside some of the least deprived and most deprived areas in England as shown in Figure 1-1. At the eastern end of the scheme alignment areas such as Bramhall, Poynton and Hazel Grove include some of the least deprived areas in the country. These areas also have lower than average levels of no car households, younger people and children and people claiming Job Seekers Allowance.

In contrast closer to Manchester Airport at the western extent of the scheme are some of the most deprived areas in England. This includes Woodhouse Park which is home to many areas within the 10% most deprived in England. This area includes pockets of high deprivation as well as higher than average proportions of young people and children and people claiming Disability Living Allowance and Job Seekers Allowance.



Figure 1-1 – Deprivation levels by Super Output Area (Indices of Deprivation 2010)

### 1.6 Report Structure

Following on from this Introduction the remaining report is structured as follows:

- Chapter 2: Initial Screening Proforma outlines the key findings of the Step 0 screening process;
- Chapter 3: **Full Appraisal (Steps 1-5)** details the approach taken to assess each required SDI indicator and the outputs from the appraisal; and
- Chapter 4: **Summary of Findings** describes the main outputs from the SDI appraisal in a matrix and summary text to be included within an Appraisal Summary Table

Appendix A provides the socio-demographic profiling of the scheme area and Appendix B presents the completed DfT Proforma.

# 2. Initial Screening Proforma (Step 0)

### 2.1 Initial Screening - Approach

The initial screening assessment considers the likely positive and negative impacts of the eight SDI indicators on specific vulnerable groups, including children, older people and people on low incomes. The assessment uses existing available data from various sources of information, including the Draft Major Scheme Business Case<sup>2</sup>, Environmental Scoping Report<sup>3</sup> and police.uk crime mapping and national database.

A number of key questions were presented in a Proforma published by the DfT which were considered during the initial screening. The questions covered the following:

- Is the option being considered likely to have negative or positive impacts on specific groups of people, including children, older people, disabled people, Black and Minority Ethnic (BME) communities, people without access to a car and people on low incomes?
- Can the likely impacts be mitigated through re-design or amendment?
- Are the impacts either significant or concentrated?

### 2.2 Initial Screening - Key Findings

The findings from the initial screening are presented in the Proforma (see Appendix B) and summarised in Table 2.1 below. The Proforma also makes recommendations, where appropriate for further analysis through a full appraisal. It is considered that the next steps in the appraisal process should be undertaken to identify the likely impacts of air quality, noise, accidents, user benefits, severance and accessibility on different vulnerable groups. However social and distributional impacts on personal affordability are considered minimal and/or dispersed and hence do not need further assessment.

Indicator	Likely SDI Impact	Recommendations
Air Quality	Yes	Proceed to Steps 1-3
Noise	Yes	Proceed to Steps 1-3
Accidents	Yes	Proceed to Steps 1-3
Personal Security	Yes	Proceed to Steps 1-3
Severance	Yes	Proceed to Steps 1-3
Accessibility	Yes	Proceed to Steps 1-3
Personal Affordability	No	No further assessment required
User Benefits	Yes	Proceed to Steps 1-3

Table 2.1: Summary of F	roforma
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<sup>&</sup>lt;sup>2</sup> SEMMMS A6 to Manchester Airport Relief Road – Draft Major Scheme Business Case (Programme Entry) Rev0.3 1007/4.4/035

<sup>&</sup>lt;sup>3</sup> SEMMMS A6 to Manchester Airport Relief Road – Environmental Scoping Report February 2011

# 2.3 Full Appraisal (Steps 1-5) – Approach

Following on from the initial screening (Step 0), the steps included in the full SDI appraisal are as follows:

### 2.3.1 Step 1 - Confirmation of impacted area

The initial screening gained a broad understanding of the areas likely to experience impacts as a result of the scheme. Within Step 1, a more detailed examination is required to investigate the spatial impacts of the scheme. The affected area is likely to vary depending on the individual SDI indicator being appraised.

### 2.3.2 Step 2 - Identification of the social groups in the scheme area

Step 2 requires the analysis of socio-demographic data to develop a profile of:

- The **transport users** that will experience changes in travel generalised costs resulting from the scheme; and
- The people living in those areas identified as likely to be affected by the scheme.

The analysis uses a common dataset of socio-demographic data and plots the proportions of vulnerable groups within the affected area.

The graphical and statistical outputs of the full socio-demographic profiling of a 1km buffer of the alignment is provided in Appendix A. Unless otherwise stated these figures show the 20% most populated Output Areas (OAs) for each of the vulnerable groups from all OAs in Manchester and Stockport and selected OAs in Cheshire East<sup>4</sup>. More specific socio-demographic analysis relating to individual SDI indicators is presented in the following chapter.

### 2.3.3 Step 3 – Full Screening

This step examines information collated in the previous two steps to assess the potential impacts of each of the SDI indicator. The results will determine the scale, significance and degree of spatial impacts against socio-demographic concentrations of vulnerable groups, suggesting where a full appraisal is required and hence the completion of Steps 4 and 5.

### 2.3.4 Step 4 – Detailed Analysis

Step 4 requires a full appraisal for the identified SDI indicators to generate technical data for use within the SDI analysis. This includes:

- Core analysis for the impact, which followed the requirements of the respective TAG Unit;
- Application of the demographic profile data, collated in Step 2 to analyse the proportions of vulnerable groups of interest for the individual SDI indicator; and
- Analysis of social and distributional impacts, across the groups of interest for the impact under consideration.

### 2.3.5 Step 5 – SDI Matrix

Each of the impacts examined in Step 4 will be appraised to provide a qualitative score for each vulnerable group under consideration. The seven-point scoring system follows the existing appraisal process of being - Large beneficial / Moderate beneficial / Slight beneficial/ Neutral/Slight adverse / Moderate adverse or Large adverse.

<sup>&</sup>lt;sup>4</sup> Cheshire East OAs include only those that are located within the former Macclesfield District boundary in order to limit the geographical area for which the analysis was undertaken.



The scores and qualitative assessment are summarised in the Matrix of Social and/or Distributional Impacts and key findings presented in the Appraisal Summary Table.

# 3. Full Appraisal (Steps 1-5) – Findings

### 3.1 Noise Assessment

### 3.1.1 Introduction

Any intervention that increases traffic levels and/or speeds or reduces physical gaps between people and traffic will give rise to noise impacts within a localised area. This relates to new roads such as the A6 to Manchester Airport Relief Road as well as impacts on the existing network through the redistribution of traffic. The noise assessment has examined Core Traffic data noise outputs from the project noise specialists (Mouchel) to identify any areas experiencing noise level changes pre-mitigation in accordance with TAG Unit 3.3.2 (Step 1). Analysis on the demographic profile of areas likely to be affected has been completed through the examination of the Indices of Deprivation 2010 (ID) income domain population, proportions of children under 16 years of age from Census 2001 data and the locations of schools (Step 2). The outputs from Step 2 fed into a screening process (Step 3), to determine if it was appropriate to undertake further analysis into the impacts of noise level changes on vulnerable groups and complete a matrix of SDI findings (Steps 4 & 5).

### 3.1.2 Confirmation of impacted area

The existing noise environment is dominated by road traffic noise from local roads and frequent aircraft noise from the nearby Manchester International Airport. The noise assessment follows guidance from WebTAG and includes 19,488 properties in the noise assessment area.

The noise assessment area was based on Core Traffic Data from Mouchel using the affected road network. Figure 3.1 presents the properties included in the assessment area by the associated change in noise levels (above or below 1dB) as a result of the proposed scheme. Around half of the properties experience no change in noise levels; but where the proposed new road links into the existing A555 (Handforth) there are areas of increased noise levels. Pockets of reduced noise levels are demonstrated in areas near Hazel Grove, Poynton, east of Woodford and north-east of the Airport.

Areas with a significant concentration of noise impacts resulting from changes in traffic levels due to the scheme, are shown in more detail in Figures 3-2 to 3-7. These show minor adverse noise impacts in the Wythenshawe area for properties close to the scheme with some neutral and beneficial impacts on local roads within the same area (Figure 3-2). There are major adverse impacts along the extent of the scheme through the areas of Handforth, Heald Green, Kitts Moss, Woodford and Poynton. However there are some local roads in these areas where there are minor through to major beneficial impacts on noise impacts due to the re-routing of traffic to the new relief road.

The areas with major adverse noise impacts are being considered for noise mitigation measures that will reduce the level of noise to these properties from the new road.

The A6 through High Lane and Disley already carries a significant volume of traffic close to residential properties. Because of this, although traffic is forecast to increase on this road as a result of the scheme, the change in noise levels is limited as shown in Figure 3.7.



Figure 3-1 – Noise Impact Area

Figure 3-2 Noise impacts: Woodhouse Park, Wythenshawe



Scheme alignment approximate



Figure 3-3 Noise impacts: Handforth and Heald Green

Scheme alignment approximate





Scheme alignment approximate



Figure 3-5 Noise impacts: Woodford and Poynton

Scheme alignment approximate





#### Scheme alignment approximate



#### Figure 3-7 Noise Impacts: High Lane and Disley

### 3.1.3 Identification of vulnerable groups in the area

WebTAG guidance states that the only clearly established evidence of a social impact of noise is on children's concentration when learning although there is no quantitative cause-effect relationship. It is therefore necessary as part of the SDI assessment to examine the impact of noise on schools in the area.

Two schools are located within a 250m of the scheme or other affected roads. One school falls within an area having a slight adverse noise impact whilst the other has a major adverse noise impact.

The SDI appraisal also requires the assessment of noise impacts against English income deprivation quintiles. As shown in Figure 1-1 approximately half of the proposed scheme alignment runs through areas within the 20% least income deprived within England, whilst the airport end of the proposed scheme passes through areas within the 20% most income deprived.

Table 3-1 displays the proportions of properties in each of the national income deprivation quintiles within the noise assessment area, the three relevant local authorities and nationally.

		Noise Impact Area	Stockport, Cheshire East <sup>5</sup> and Manchester	England
	1 - most deprived	12.2%	31.7%	20.0%
Income Quintile	2	5.0%	16.8%	20.0%
	3	11.9%	16.5%	20.0%
	4	30.2%	14.5%	20.0%
	5 - least deprived	40.7%	20.5%	20.0%

 Table 3-1 Proportion of vulnerable groups in noise assessment area, compared to local and national

 proportions

The level of noise impacts likely to be experienced by the vulnerable groups is summarised in Table 3.2 and more detailed breakdown by magnitude of impact can be found in Appendix C<sup>6</sup>. Overall 53% (10,263) of properties experience no change in noise levels. Forty-four percent in the assessment area (8,569 properties) were forecast to have an increase in noise levels, and 3% (629 properties) were predicted to experience a decrease in noise levels.

The majority of properties within the most deprived income quintile experience no change in noise levels (80%), or an increase in noise (18%) as a result of the proposed scheme. However, the majority of properties experiencing an increase in noise only receive minor impacts. Conversely 62% of residents in the least deprived income quintile experience a predicted increase in noise levels.

		Noise increase	No change	Noise decrease
	1 - most deprived	5.0%	18.5%	8.6%
Income Quintile	2	5.8%	4.4%	1.7%
	3	7.0%	16.2%	7.9%
	4	25.0%	34.1%	39.4%
	5 - least deprived	57.2%	26.8%	42.3%

#### Table 3-2 Distribution of noise impacts (1dB) across income deprivation quintile groups

### 3.1.4 Appraisal of Noise SDIs

The SDI appraisal demonstrates the winners and losers in terms of noise impacts as a result of the scheme. Table 3.3 provides a breakdown of the distribution of noise impacts by income deprivation quintiles in accordance with WebTAG Unit 3.3.2.

Overall, a higher number of properties (8,569) experience an increase in noise, compared with 629 experiencing a decrease. However the majority of these properties (54%) experiencing an increase in noise are predicted to experience a minor adverse impact.

The most income deprived quintile (1) demonstrates the lowest proportion of net losers (5%); with Quintile 5 experiencing the highest proportion (58%).

The distribution of the noise benefits and disbenefits can be compared with the overall income group distribution to identify whether or not impacts are evenly distributed. The table shows that

<sup>&</sup>lt;sup>5</sup> Due to the size and spread of Cheshire East, only output areas in Macclesfield have been used for demographics <sup>6</sup> Using Guidance from Design Manual for Roads and Bridges (See Table C-2)

there is higher proportion of properties in the least deprived areas (Quintile 5) experiencing noise disbenefits than may be expected from an equal distribution of benefits in relation to the total population living within Quintile 5 overall. The proportion of properties located in Quintile 1 and receiving disbenefits is lower than the proportion of properties located in this quintile in the area overall.

Taking into account the noise impacts for those living in properties located in the most deprived income quintile and for the impact on schools in the area, overall the scheme has been appraised as having a **slight adverse** impact on noise SDIs.

		IMD Income domain				
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	TOTAL
Properties with increased noise	432	500	600	2151	4913	8596
Properties with decreased noise	54	11	50	248	266	629
Properties with no change in noise level	1898	455	1665	3495	2750	10263
Net number of losers	378	489	550	1903	4647	
Total number of winners / losers across all groups						7,967
Net winners as %	4.7%	6.1%	6.9%	23.9%	58.3%	
Share of total Properties in assessment area	12%	5%	12%	30%	41%	
Overall Assessment	×	××	×	×	***	

Table 3-3 Noise	e impacts	income	deprivation	distribution

Assessment criteria used (WebTAG 3.3.2):

Overall noise Impact is **adverse** and the impact for the group as a proportion of the total is:

Adverse (i.e. increased noise) and smaller than the proportion of the population of the group in the total population = \*

Adverse (i.e. increase noise) that is broadly in line with the proportion of the population of the group in the total population = **\***\*

Adverse (i.e. increased noise) and significantly greater than the proportion of the population of the group in the total population = **\*\*\*** 

A benefit (i.e. a reduction in noise) =  $\sqrt{\sqrt{2}}$ 

### 3.1.5 Commentary on the Noise SDI Assessment

The Noise Assessment recorded above is on the basis of no noise mitigation measures being implemented. Through this assessment, adverse Noise impacts are identified in a number of locations and these are currently the subject of further detailed assessment to determine whether specific mitigation measures could be implemented in specific areas as part of the scheme to reduce any of these adverse impacts. The outcome of this work, along with details of any proposed mitigation measures will be reported in the Environmental Statement.

### 3.2 Air Quality Assessment

### 3.2.1 Introduction

Any intervention that results in a change in traffic levels (especially HGVs) and results in a change in the amount of slow moving traffic or reduces physical gaps between people and traffic may give rise to impacts on air quality. The air quality appraisal has examined outputs from the air quality assessment pre-mitigation produced by Mouchel in accordance with WebTAG guidance Unit 3.3.3.

Analysis on the demographic profile of the areas likely to be affected was completed examining the Indices of Deprivation 2010 (ID) income data, population proportions of children under 16 years of age and the locations of schools (Step 2). The outputs from Step 2 fed into a screening process (Step 3), to determine if it was appropriate to undertake further analysis into the impacts of air quality changes on vulnerable groups and complete a matrix of SDI findings (Steps 4 & 5).

### 3.2.2 Confirmation of impacted area

In total there are 175,364 residential properties in the air quality impact assessment area, with an estimated population of 413,859<sup>7</sup>. Air quality impacts included those with at least a small change in quality. Those properties with imperceptible changes in air quality were considered to have no significant change in impact.

Figure 3-8 shows the location of properties within the assessment area where air quality impacts are greater than imperceptible. More detailed maps showing the impacts of air quality in the assessment area are shown in Figures 3-9 to 3-13.

There are some small adverse impacts in Wythenshawe, north of the airport (see Figure 3-9) however this area also includes properties receiving small and medium beneficial impacts. Adverse impacts on air quality can be found in areas of Cheadle Hulme (Figure 3-10) including some major adverse impacts for properties located within close proximity to the scheme. This is also the case for properties close to the scheme in Bramhall and Hazel Grove as shown in figure 3-11. However, the map shows that beneficial impacts will be received by properties on local roads in these areas.

Figure 3-12 shows that beneficial air quality impacts are predicted in and around central Stockport with some major beneficial impacts predicted for properties close to the motorway and deprived areas in the centre of Stockport.

Figure 3-13 shows the area around the A6 through High Lane and Disley indicating some small adverse impacts close to the A6.

SEMMMS A6 to Airport Relief Road SDIs Appraisal.docx

<sup>&</sup>lt;sup>7</sup> Population factored from dwellings using an average factor of 2.36 people per property



Figure 3-8 Air Quality Assessment Area

Figure 3-9 Air quality: Woodhouse Park, Wythenshawe



Scheme alignment approximate



Air Figure 3-10 Air quality: Cheadle Hulme

. Scheme alignment approximate





Scheme alignment approximate



#### Figure 3-12 – Air Quality: Stockport

Figure 3-13 – Air Quality: High Lane and Disley



### 3.2.3 Identification of vulnerable groups in the area

WebTAG guidance states that children are at more risk from air pollution due to the fact that they generally spend more time outside and therefore experience more exposure to harmful pollutants that impact on lung development. Although there is not currently enough evidence to conclude that these groups are more at risk as a result of poor air quality, it is recommended that consideration is given to the changes in air quality that are experienced by children.

Within the scheme area the proportions of children are similar to that of Stockport, Cheshire East and Manchester local authorities as well as England as a whole. Figure A-1 shows a higher proportion of under-16s to the north of the airport in Wythenshawe where properties are shown to experience either no change or a small adverse impacts in air quality.

In particular, the air quality impacts are most significant to children when they are outdoors and therefore an assessment of schools in the area has also been undertaken due to the fact that children spend time walking to and from school and playing outside. There are 24 schools within a 1 mile buffer of the scheme all of which receive only imperceptible air quality changes as a consequence of the scheme.

The SDI appraisal also requires the assessment of air quality impacts against English income deprivation quintiles. As shown in Figure B.12 approximately half of the proposed scheme alignment runs through areas within the 20% least income deprived within England, whilst the airport end of the proposed scheme passes through areas within the 20% most income deprived.

Table 3.4 displays the proportions of properties in each national income deprivation quintiles within the air quality assessment area against the relevant local authorities and national breakdown.

		Air Quality Impact Area	Stockport, Cheshire East and Manchester	England
	1 - most deprived	26.2%	31.7%	20.0%
Income Quintile	2	19.3%	16.8%	20.0%
	3	19.3%	16.5%	20.0%
	4	16.8%	14.5%	20.0%
	5 - least deprived	16.9%	20.5%	20.0%

#### Table 3-4 Proportion of income deprivation groups in noise assessment area

The level of air quality impacts likely to be experienced by vulnerable groups within the area is shown in Table 3.5 with more detailed impacts by magnitude of change shown in Appendix C. Overall 5% (8,909) of households experience an improvement in air quality and 2% in the assessment area (3868 households) were forecast to have a deterioration in air quality as a result of the proposed scheme.

Of those properties experiencing an improvement in air quality levels, 37.4% are in Quintile 1 . A predicted deterioration in air quality is highest for those living in Quintile 4 (34%) and Quintile 5 (37%).

		Improvement in air quality	No change	Deterioration in air quality
	1 - most deprived	37.4%	25.8%	16.8%
Income Quintile	2	21.1%	21.1%	5.9%
	3	21.4%	19.5%	6.1%
	4	6.3%	16.9%	34.1%
	5 - least deprived	13.8%	16.6%	37.1%

Table 3-5 Distribution of air quality impacts across income deprivation quintile groups

### 3.2.4 Appraisal of Air Quality SDIs

The SDI appraisal demonstrates the winners and losers in terms of air quality impacts as a result of the scheme. Table 3.6 provides a breakdown of the distribution of these impacts by income deprivation quintiles in accordance with WebTAG Unit 3.3.3.

Overall, a lower number of households (3,836) experience deterioration in air quality, compared with 8,909 that experience an improvement which provides an overall beneficial impact on air quality. The most income deprived quintile (1) demonstrates the highest proportion of net winners with over 53% of all properties experiencing improvements in air quality. Quintile 4 has the lowest proportion of net losers in terms of air quality impacts (14%).

Examining the distribution of the benefits and disbenefits compared to what may be expected from the overall distribution of population within each income quintile within the assessment area further demonstrates the distribution of air quality impacts, and this is shown in Figure 3.17. The table shows that the households in Quintiles 4 and 5 receive a significantly lower proportion of benefits than may be expected from an equal distribution relating to the total population proportions and Quintile 1 has a much higher proportion of benefits.

Although the benefits of improvements in air quality are not evenly distributed across the income groups there are a high number of properties in all the income quintile groups receiving beneficial impacts in air quality. In addition, those living in the most deprived areas are receiving the highest proportion of the beneficial impacts.

In addition the impact on children is assessed as being beneficial as the impact on schools is negligible and the number of children in the areas is line with local and national rates. As such it is likely that children will receive the overall beneficial impact of the scheme on air quality.

Taking this into account the scheme has been appraised as having a **large beneficial** impact on air quality SDIs.

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	TOTAL
Properties with improved air quality	3331	1878	1909	563	1228	8909
Properties with a deterioration of air quality	648	230	236	1318	1436	3868
Properties with no change in air quality	41924	34341	31766	27552	27004	162587
Net number of winners	2683	1648	1673	-755	-208	
Total number of winners across all groups						5041
Net winners as %	53.2%	32.7%	33.2%	-15.0%	-4.1%	
Share of total Properties in assessment area	26%	21%	19%	17%	17%	
Overall Assessment	$\checkmark$ $\checkmark$ $\checkmark$	$\checkmark \checkmark \checkmark$	$\sqrt{\sqrt{\sqrt{1}}}$	***	***	

Table 3-6 Air Quality Impacts Income Deprivation Distribution

Assessment criteria used (WebTAG 3.3.3):

Overall air quality Impact is **beneficial** and the impact for the group as a proportion of the total is:

Beneficial and 5% greater (or more) than the proportion of the group in the total population  $\sqrt[4]{\sqrt{4}}$ Beneficial and in line (+/-5%) with the proportion of the group in the total population  $\sqrt[4]{4}$ 

Beneficial and 5% smaller (or less) than the proportion of the group in the total population  $\checkmark$ 

Overall impact is **beneficial** and the impact for the group as a proportion of the total is a disbenefit **\*\*\*** 

### 3.2.5 Commentary on the Air Quality SDI Assessment

The Air Quality assessment reported here is on the basis of no mitigation measures included as part of the scheme. The assessment has highlighted adverse Air Quality impacts in a number of locations. These locations are currently the subject of further detailed assessment with a view to determining whether specific environmental mitigation measures could be implemented in these areas as part of the scheme to reduce any of these adverse impacts. The outcome of this work will be reported in the Environmental Statement.

### 3.3 Accidents Assessment

### 3.3.1 Introduction

Any intervention that increases traffic levels and speeds or reduces physical separation between people and traffic can give rise to increases in accidents. The approach for the full appraisal of SDIs of accidents used data from the accident assessment as well as STATS 19 data from the DfT's Road Casualties online database. This included identifying accident locations (Step 1) and, where available, the age and gender of casualties to assess any impacts on vulnerable groups (Step 2). The outputs from Steps 1 & 2 fed into a full screening process in step 3 to determine whether it was appropriate to undertake any further analysis and complete a matrix of SDI findings (Steps 4 & 5).

### 3.3.2 Confirmation of impacted area

In order to identify the impacted area for the accident assessment; analysis was undertaken to identify all links on the modelled network with a change in traffic flow of +/- 10%. Accident analysis outputs from the accident model were then used to identify the Do Something and Do Minimum accident numbers for each link in the identified area. Each link was then classified according to the rate of change of the number of accidents between the Do Minimum and Do Something scenarios.

### 3.3.3 Identification of vulnerable groups in the area

There are several potential vulnerable groups in terms of accidents including children and younger people, young men (particularly as drivers) and older people as well vulnerable road users such as pedestrians, cyclists and motorcyclists. There is also evidence that people living in more deprived areas are more vulnerable to accidents on the highway network.

Figures B1, B2, B3 and B4 in Appendix B highlight areas with the highest percentage of under 16s, young adults (16-25 years), older people within a 1km buffer of the proposed scheme alignment. These show that the proportions of these groups residing in the area are in proportion with local and national levels.

### 3.3.4 Appraisal of Accident SDIs

Analysis has been undertaken to identify significant concentrations of vulnerable groups that might be impacted within the scheme area using STATS 19 data on personal injury accidents for the five years from 2005 to 2009<sup>8</sup>. This data profiles casualties by age, gender and type of road user and deprivation score and is used to identify the baseline conditions in terms of victim typology.

Table 3-7 presents this data at a national and assessment area level for comparison. This shows that the proportion of vulnerable user accident casualties in the assessment area is generally in line with the national rate of accident casualties. There are slightly fewer pedestrian, motorcycle, and accident involving young male drivers and children and a slightly higher casualty rate for cyclists and older people.

	Accident casualties- All Roads	Accident Casualties - Assessment Area	Difference
Car	64.9%	67.0%	2.1%
Pedestrian	12.2%	11.9%	-0.3%
Motorcyclist	9.3%	6.8%	-2.5%
Cyclist	6.7%	7.3%	0.6%
Fatal	1.1%	0.8%	-0.3%
Serious	11.1%	8.7%	-2.4%
Slight	87.8%	90.5%	2.7%
Male	58.1%	54.9%	-3.2%
Female	41.9%	45.1%	3.2%
<16	10.0%	9.0%	-1.0%
70+	5.3%	5.8%	0.5%
Male drivers aged 16-24	15.6%	14.3%	-1.3%

Table 3-7 -	All Accident	Casualties	2005-2009:	Accident	Impact	Area

<sup>&</sup>lt;sup>8</sup> Road Casualties Online http://www2.dft.gov.uk/pgr/statistics/datatablespublications/accidents/roadcasualtiesonline/index.html

Table 3-8 profiles casualties between 2005 and 2009 by vulnerable user type, age group and residential deprivation score on highway network links experiencing a reduction (>30% or <30%), no change (>5% or <5%) or increase (>30% or <30%) in accidents within the assessment area.

The table shows that for the majority of highway network links with accidents involving vulnerable users groups over the last 5 years there will be either no change or a reduction in accidents. In all cases there are more links experiencing a reduction in accidents involving vulnerable users than for links experiencing an increase in accidents.

	Change in Accident Rates					
Vulnerable Group / Accident Type	Significant reduction (>30%)	Slight reduction (<30%)	No Significant Change (<5% or <5%)	Slight Increase (<30%)	Significant Increase (>30%)	
Car	5.4%	26.2%	57.6%	9.3%	1.5%	
Pedestrian	4.0%	29.5%	53.9%	11.3%	1.4%	
Motorcyclist	7.9%	26.7%	52.1%	12.4%	0.9%	
Cyclist	7.2%	28.6%	50.7%	12.6%	0.9%	
Fatal	3.1%	23.4%	62.5%	7.8%	3.1%	
Serious	5.9%	28.1%	54.3%	10.5%	1.2%	
Slight	5.5%	26.8%	56.5%	10.0%	1.3%	
Male	5.8%	26.6%	56.1%	10.1%	1.4%	
Female	5.0%	27.3%	56.6%	9.8%	1.2%	
<16	4.6%	25.1%	56.0%	13.5%	0.9%	
70+	4.9%	29.4%	51.2%	13.0%	1.5%	
Male drivers aged 16-24	7.2%	24.0%	55.9%	10.9%	2.1%	

#### Table 3-8 - Summary of accidents savings from accident analysis:

#### Accident Casualty Types between 2005 and 2009

The proposed scheme will remove traffic from local roads, particularly in areas with vulnerable groups and this is reflected in the accident analysis reported in the Business Case that shows a significant reduction in slight injury accidents. Segregated pedestrian crossing facilities are incorporated along the new dual carriageway road and this will further help towards achieving a low accident rate. A detailed analysis of accident data demonstrates that accidents involving vulnerable groups are more likely to occur on links experiencing no change or a reduction in accident numbers as a result of the proposed scheme and hence has been assessed as **moderate beneficial** as shown in Table 3.9.

Table 3-9 -	Summary	of SDI	Accident	Assessment
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Impact	Pedestrians	Cyclists	Motor- cyclists	Young Male Drivers Aged 16-25	Older People	Children
Large Beneficial						
Moderate Beneficial	✓	✓	$\checkmark$	✓	~	✓
Slight Beneficial						
Neutral						
Slight Adverse						
Moderate Adverse						
Large Adverse						

### 3.4 Severance

### 3.4.1 Introduction

Severance is often an unintended consequence of a measure intended to address other problems. Severance issues may be identified at an early stage and in many cases a design solution may reduce or eliminate impacts. Step 1 involved the identification of the area experiencing potential severance impacts, followed by a review of the demographic profile within the identified area (Step 2). The outputs from Step 2 inputted into a screening process (Step 3), to determine if it was appropriate to undertake further analysis of the changes in severance and agree the approach to be undertaken (Steps 4 & 5).

### 3.4.2 Confirmation of impacted area

#### Changes in traffic flow

The assessment area for severance includes any location with physical changes in road alignment or where links on the road network experience significant changes (>10%) in traffic flows<sup>9</sup>. The area has been defined to include links with changes over this >10% change threshold within 1km of the scheme as well as sections of the A6 to the east of the scheme. Although there are links outside of this boundary predicted to experience a change >10% in traffic flows to the assessment focuses on the local area only as this is where most concentrated impacts are likely to be experienced, as more general model noise may impact on links located further away from the scheme location.

#### Severance due to new alignment

There are number of public rights of way networks that will be affected by the scheme. Most of these are located between Bramhall and Poynton including the Ladybrook Valley Interest Trail and to the south east of Manchester Airport.

The Environmental Scoping Report<sup>10</sup> states that there is also a well-established network of local roads that provide access between communities located to the north and south of the corridor and to a range of associated facilities and institutions, golf courses, various community recreational areas, sports fields, schools, churches and retail centres within the corridor; and the stations at Heald Green, Poynton and Hazel Grove.

The report states that the proposed scheme will involve temporary disruption for users of local roads and other rights of way that cross the proposed scheme alignment, disruption that could be 'potentially significant' in some areas. When completed the scheme includes measures to ensure continued access which 'in some instances could involve rationalisation of current provision and movements'.

### 3.4.3 Identification of vulnerable groups in the area

There are certain groups that are particularly vulnerable to the effects of severance. These include no car households, older people, children and people with disabilities. Table 3-10 provides a breakdown of the number and proportion of these groups living within the severance assessment area and a comparison with the proportions of these populations living within local authorities of Manchester, Cheshire East and Stockport as well as the national levels. The table shows that overall the proportion of vulnerable groups within the scheme area is either in line or lower than the local or regional rates with significant lower of non car ownership and low levels of people aged over 70 years.

<sup>&</sup>lt;sup>9</sup> Links with 10% change traffic flows Do Something against the Do Minimum

<sup>&</sup>lt;sup>10</sup> SEMMMS A6 to Manchester Airport Relief Road Environmental Scoping Report Feb 2010

However, the socio-demographic maps in Appendix B show that there are concentrations of the vulnerable groups at a higher level than the three main local authorities – Stockport, Manchester and Cheshire East rate located within the scheme area. There are 14 schools located within a 1km buffer of the scheme alignment and the relatively high percentage of children in some areas (over 24%) show that there are likely to be many walking journeys to/from schools within the scheme area where there may potentially be changes in traffic flow.

Vulnerable Group	% of total population	% Cheshire East/ Stockport/ Manchester	% England
Children: aged <16	20.3%	20.4%	20.1%
Older people: aged 70+	6.3%	11.1%	11.5%
Disability Living Allowance (DLA) Claimants	4.9%	6.6%	5.3%
No Car Households	21.5%	33.8%	26.8%
Overall population in 1km buffer area	44,816		

Table 3-10	- Vulnerable G	rouns livina	within Severa	nce Impact Area
		oups inving		

### 3.4.4 Appraisal of Severance SDIs

The scheme area for severance as shown in Figure 3.18 demonstrates a fairly even balance between the number and distribution of roads experiencing an increase and decrease in traffic flows as a result of the proposed scheme.

The majority of links showing a traffic flow reduction are in residential areas such as Wythenshawe, Bramhall and Poynton which will potentially provide benefits to these communities through reduced severance caused by traffic volumes. Furthermore these local communities may benefit from a safer and more pedestrian friendly environment through a reduction in traffic.

However there are a few areas that experience an increase in traffic flow and therefore a potential increase in severance. These include:

- Dean Row Road;
- A34;
- A6; and
- Gillbent Road, Cheadle Hulme.

#### Dean Row Road/Finney Green, Wilmslow

As Figure 3.14 shows the scheme results in a reduction of traffic travelling along the B5358 as traffic turns off along Dean Row Road to access the A34 which links to the new proposed road. Although traffic flows on Dean Row Road are currently relatively low there is a predicted 50% increase in traffic on Dean Row Road as far as the junction with the A34.



Figure 3-14- Traffic Flow Changes – Dean Row Road Area

This increase in traffic could potentially impact on accessibility and severance for people wishing to reach Dean Oaks Primary School and Oakdene Baby Unit from the South (Lincoln Road, Tudor Road. There are also bus stops on Dean Row road and pedestrian access to these stops in light of extra traffic forecasts should be taken into consideration. However, there are benefits in terms of reduced levels of traffic on Handforth Road which is the main access point to Dean Oaks Primary School.

#### A34

Although increases in traffic are expected on the A34 this road already acts as a barrier to movement as it is a dual carriageway. The provision of footbridges and crossings for pedestrians already exists on the A34 in strategic locations connecting communities. Therefore it is not envisaged that levels of severance would change as a consequence of increased levels of traffic as a result of the scheme.

#### A6

Figure 3-15 shows the area of the most eastern extent of the impact of the scheme around the villages of Disley and High Lane in Cheshire East. The link with the A6 results in traffic increases of up to 34% which could have implications for residents in this area in terms of accessing services such as Disley Primary school, High Lane Primary school, Disley rail station, and other local amenities north and south of the A6 Buxton Road. A package of mitigation measures is being developed aimed at assisting pedestrian and cycle safety along this length of the A6.



#### Figure 3-15– Traffic flow changes on the A6 – Disley and High Lane

#### Gillbent Road, Cheadle Hulme

There is a predicted increase in traffic on the Gillbent Road as more traffic accesses the relief road from the north east (see Figure 3.16) resulting in an average 15% increase in traffic along the route. This has potential adverse impacts on communities living on the west of Gillbent Road accessing shops, schools and other services on the east of Gillbent Road.



Figure 3-16– Traffic flow changes around Gillbent Road, Cheadle Hulme

There are a few small areas with a high proportion (over 28%) of people aged 70 over and people aged under 16 years within this area. These groups of people are more likely to be pedestrians wanting to use local facilities. It is therefore important that any increase in traffic levels does not act as a barrier to accessing local services.

The assessment of severance has examined changes in traffic flows as a result of the proposed scheme. The analysis demonstrates that a higher proportion of roads within the scheme area receive a reduction (>10%) in traffic. Furthermore these roads are more commonly located in residential areas where pedestrian activity is likely to be more prevalent and hence a reduction in traffic in these areas is more beneficial then on roads located in rural locations.

The roads experiencing an increase in traffic flows (>10%) are linked to the proposed new road and in the case of the A34, this road already acts a barrier to severance and hence an increase of traffic on this road is unlikely to change residents perceptions of severance in this area.

As shown by Table 3-11 the overall SDI assessment has appraised the impact on severance as **Slight Beneficial** to the vulnerable groups within the scheme area.

Impact	Older People	Children	No car Households	People with disabilities
Large Beneficial				
Moderate Beneficial				
Slight Beneficial	✓	✓	$\checkmark$	✓
Neutral				
Slight Adverse				
Moderate Adverse				
Large Adverse				

 Table 3-11 - Summary of the A6 to Airport Relief Road Scheme Severance SDI Impacts

### 3.5 Accessibility Assessment

### 3.5.1 Introduction

Transport scheme options will often have differentiated impacts on accessibility as experienced by different groups of people. This reflects a range of social and distributional factors including differences in travel needs and places of residence. Step 1 of the accessibility assessment process has identified the area for which public transport accessibility impacts are likely to occur. Step 2 examined the socio-demographic profile of this study within this area to identify the implications on these vulnerable groups. Step 3 used these outputs to determine overall impacts based upon any changes the scheme would bring about to the public transport network.

# 3.5.2 Step 1 – Confirmation of Areas impacted by the proposed intervention

For the initial screening a broad understanding of the areas on which the proposed scheme was likely to have an impact was used. Limited data is currently available on the proposed revisions to timetables or routeing of public transport services as a consequence of the scheme. Therefore for the purpose of this analysis a qualitative approach has been used to determine likely impacts based on existing data.

In order to identify the geographical area on which the scheme will have an impact, accession outputs have been used to identify existing public transport accessibility to Manchester Airport. This destination has been used as one of the key objectives of the scheme is to provide improved connectivity to employment opportunities at the airport and surrounding employment sites.

Manchester Airport is served by a network of local and regional buses running daily from early morning to late night, including weekends and bank holidays with a 24 hour bus service operating to/from Manchester Airport from Manchester city centre.

In addition to the bus services serving Manchester Airport there are a number of bus services operating in the scheme area serving local centres. As there is currently no information from local bus operators on any changes to bus services in the area in terms of timetabling or routeing as a consequence of the scheme it is difficult to accurately assess the accessibility benefits of the scheme. However, it is expected that some services may be affected in terms of travel times as a result of changes in traffic flows, and potential re-routing as a consequence of the scheme.

An Accession model based on October 2011 data was developed to identify existing public transport access to Manchester Airport. Figure 3-17 shows the results from this model for the AM peak period (7am – 9am), demonstrating bus journey times within specific time thresholds overlaid on to the existing bus network.



Figure 3-17- Public Transport Accessibility to Manchester Airport – AM Peak

### 3.5.3 Step 2 – Identification of social groups in the affected area

There are certain groups that are particularly vulnerable to the effects of poor accessibility. These groups include no-car households, young people, older people, households with dependent children, black and minority ethnic communities and people with disabilities.

The socio-demographic profile for the area provided in Appendix B shows that the proportions of these groups within the study area are in line with/ or lower than national or local rates. However these groups are more likely to be users of public transport services and therefore the impacts of the proposed scheme on bus service accessibility will disproportionately impact on these vulnerable users.

### 3.5.4 Appraisal of Accessibility SDIs

Due to the limited availability of journey time data from the traffic modelling outputs and any future proposed timetabling and re-routeing of local bus services it is not possible to undertake a full accessibility appraisal based on any future scenario Accession model. Therefore the accessibility appraisal of SDIs follows a qualitative assessment to consider the likely impacts to bus services and the potential impacts this may have on vulnerable groups.

It is not considered that any major changes will occur to bus timetables as a result of the scheme. Although traffic flow changes occur on many of the routes used by bus services it is unlikely that this will be of a magnitude to impact on journey times and speeds.

However, residents living at the eastern extent of the scheme where direct bus services to the airport (e.g. 199 Skylink from Buxton) could be re-routed onto the relief road may experience improvements in journey time This would be particularly beneficial for bus users living along the A6 including those in Disley and Hazel Grove and from Stockport. Where there are high proportions of younger and older people. Therefore the accessibility SDIs are appraised as **Slight Beneficial** overall as shown in Table 3-12.

Table 3-12 - Summary of the A6 to Airport Relief Road Scheme Accessibility SDI Impacts

Impact	Older People	Children	No car Households	People with disabilities
Large Beneficial				
Moderate Beneficial				
Slight Beneficial	~	$\checkmark$	✓	$\checkmark$
Neutral				
Slight Adverse				
Moderate Adverse				
Large Adverse				

### 3.6 Personal Security Assessment

### 3.6.1 Introduction

Some schemes may introduce perceived or real security risks that affect transport choices by different groups of people. Where choices are constrained by concerns regarding security and especially where those affected do not have access to a car, access to certain places or travel at desired times may be denied to members of these groups.

Step 1 in the assessment involved the identification of the area experiencing impacts on personal security, followed by a review of the demographic profile within the identified area (Step 2). The outputs from Step 2 fed into the screening process (Step 3), to determine if it was appropriate to undertake further analysis of the impacts on personal security (Steps 4 & 5).

### 3.6.2 Confirmation of impacted area

For the initial screening a broad understanding of the areas on which the transport scheme was likely to have an impact was used. Highway schemes are likely to impact on a wide range of users and therefore the definition of a scheme area is inappropriate. However, schemes relating to public transport, walking and cycling should consider the specific location where the scheme improvements are being made as well as the catchment area for walking to the scheme location.

The area used for the security analysis has therefore focused on parts of the route adjacent to the proposed new road, designated by a 1km buffer of the alignment in order to assess the impact on pedestrians who live and/or work in the area.

### 3.6.3 Identification of vulnerable groups in the area

There are certain groups that have particular concerns about their personal security including older people, children, women, black and minority ethnic residents and people with disabilities. Table 3.13 shows the concentration of each of these vulnerable groups compared to local and national levels.

Vulnerable Group	% Scheme Area	% Cheshire East/ Stockport/ Manchester	% England
Older People (Aged 70+)	6.3%	11.1%	11.5%
Children (People Aged Under 16)	20.3%	20.3%	20.1%
Women	51.7%	51.5%	51.3%
Disability Living Allowance Claimants	4.9%	6.6%	5.3%
Black and Minority Ethnic Residents	7.2%	10.9%	18.1%

Table 3-13 – Concentration of Vulnerable Groups in Security Impacts Area

This shows that the area has a lower or similar proportion of younger people, older people and people with disabilities in line with local and national proportions. The socio-demographic maps in Appendix B provide an overview of the concentrations and locations of these groups within the scheme area. These include high concentrations of:

- Children aged under 16 in the Woodhouse estate; and
- Older people in the Styal area;

### 3.6.4 Appraisal of Security SDIs

This step uses the information gained in the previous two steps to undertake a full screening of the personal security impacts of the scheme.

Police crime maps<sup>11</sup> show that for December 2011 the neighbourhood areas of Stockport East, Cheshire East and Woodhouse Park and Sharston all had an average level of crime and antisocial behaviour compared with the rest of England and Wales based on the number of crimes per 1000 people within the population area. However, the most common incidents reported within the area involve anti-social behaviour and violent crimes. Security issues are often linked to perceptions of poor security and therefore good design of public transport stops, interchanges and passenger facilities is fundamental to improve the actual and perceived levels of security.

There is no information available regarding public transport users in the area but these are likely to be older and younger people and people without access to a car of which there are high concentrations. It is anticipated that the improved network infrastructure including pedestrian crossings, safety barriers and pedestrian deterring pavement and planting will help to provide a more controlled area for the safe crossing of pedestrians. This will provide some positive impact on security. Furthermore the design of the scheme has taken into account landscaping issues that help to minimise concealed areas and ensure open visibility and clear sight lines.

Overall the assessment demonstrates a **slight beneficial** impact on security across the scheme area as a result of the proposed scheme.

<sup>&</sup>lt;sup>11</sup> http://www.police.uk

SEMMMS A6 to Airport Relief Road SDIs Appraisal.docx

### 3.7 User Benefits Assessment

### 3.7.1 Introduction

In the majority of cases user benefits are associated with any new transport intervention but these are generally net outcomes. Within the net outcome some people may experience disbenefits for example through longer journey times or lower public transport service frequencies. Step 1 in the assessment involved the identification of the area experiencing user benefit changes, followed by a review of the demographic profile within the identified area (Step 2). The outputs from Step 2 fed into a screening process (Step 3), to determine if it was appropriate to undertake further analysis and complete a matrix of SDI findings (Steps 4 & 5).

Whilst guidance suggests using the entire modelled area for the user benefits assessment, this assessment focuses on a cordon area of influence within the SEMMMS highway model, which enables a finer degree of accuracy when reporting such benefits due to the detailed calibration of the model within the area. Calculations in the outer zones, which extend to the entire UK, will require data aggregation and assumptions which may skew the analysis and therefore to ensure accuracy, the cordon area of influence is considered to be a suitable assessment area for user benefits assessment, as shown in Figure 3-18.



Figure 3-18 - User Benefit Area of Interest

The assessment considers the change in the cost of travel (including time and financial based costs) follows TAG Unit 3.5.3. TUBA calculations for the SDI assessment are based on the following:

- AM, IP and PM trips;
- Use of 'commuting and other' trips from SATURN model (i.e. excluding business travel);
- Highway costs only (time and charges);
- Only Internal to internal trips within the assessment area; and
- 60 year appraisal period (2017-2076).

Figure 3-19 spatially demonstrates the calculated user benefits as a result of the scheme. The benefits are wide spread across the assessment area, which are likely to be due to a reduction in traffic levels across a number of other roads within the area due to the implementation of the relief road and the attractiveness of this route over alternatives. Benefits extend across the assessment area, with only small pockets of disbenefit around High Lane, New Mills, Low Leighton, and. Residents across the assessment area in areas such as Cheadle, Stockport, Wilmslow and Macclesfield experience large user benefits as a result of the scheme (>£50 per head benefit<sup>12</sup>).



#### Figure 3-19 - User benefits within area of interest

#### 3.7.2 Identification of vulnerable groups in the area

In the case of user benefits, it is necessary to understand the income distribution of users in the assessment area. This has been undertaken by mapping income deprivation according to their national rank, using data from the Indices of Deprivation (ID 2010) Income Domain at Super Output Area level.

Overall, 96% of the population within the assessment area experience a benefit as a result of the scheme, and just under 4% of residents experience a disbenefit, as shown in Table 3-15. A higher proportion of residents in the two most deprived income quintiles experience benefits of the scheme compared to those in the two least deprived areas.

Table 3-14 - Distribution of user benefits across population by Income Deprivation Quintiles

<sup>&</sup>lt;sup>12</sup> TUBA outputs have been disaggregated from zone level to postcode level to allow the calculation of benefits per head and assign income deprivation quintiles. WebTAG guidance recommends completing this analysis at super output area (SOA) level, however as zone boundaries do not match SOA boundaries, postcode level statistics have been used for this assessment. Within these calculations a total of 27 zones in the assessment area do not have any population within them and are therefore excluded within this analysis.

Incomo Quintilo	Impa	Total in	
income Quintile	Benefit	Disbenefit	assessment area
1 – most deprived	138,678 (99.8%)	247 (0.2%)	138,926 (17.3%)
2	129,236 (98.0%)	2,614 (2.0%)	131,850 (16.4%)
3	140,672 (97.5%)	3,651 (2.5%)	144,322 (18.0%)
4	159,147 (91.5%)	14.759 (8.5%)	173,906 (21.6%)
5 - least deprived	204,870 (95.5%)	9,554 (4.5%)	214,425 (26.7%)
Total Population	772,604 (96.2%)	30,825 (3.8%)	803,428

### 3.7.3 Appraisal of User Benefits SDIs

The SDI appraisal demonstrates the winners and losers of user benefits as a result of the proposed scheme. Examining the **distribution** of benefits and disbenefits compared to what may be expected from the overall distribution of population within each income quintile within the assessment area further demonstrates the spread of user benefits, Figure 3-20.

The distribution of benefits across users is approximately proportionate to the overall distribution of the population within each of the income quintiles within the assessment area. Whilst disbenefits are felt by residents in each income quintile, the spread of disbenefits is not proportionate and impacts more on those in the least deprived areas. The majority of residents experiencing a disbenefit as a result of the scheme are situated within the least deprived income quintiles - particularly income quintile 4, where just under half of all residents in the assessment area experiencing a disbenefit are situated.



Figure 3-20 - User Benefits - Distribution of benefits across the population by Income Deprivation Quintiles, compared to expected distribution

In addition to examining the proportion of the population experiencing benefits and disbenefits of the scheme, it is important to understand the **value** of benefits and disbenefits experienced across each of the income quintiles.

In terms of the **value** of benefits, overall there are net benefits of the scheme, the value of benefits is distributed proportionately across the income quintiles, i.e. the proportion of benefits is within +/- 5% of the proportion of population in each income quintile within the assessment area, has been seen in Table 3-15. As identified earlier, disbenefits are experienced by residents in all income quintiles; however the largest disbenefits are felt by those in the least deprived income quintiles (4 and 5). The total value of disbenefits is however considerably lower than the value of benefits as a result of the scheme for each quintile.

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
Total population	138,926	131,850	144,322	173,906	214,425	803,428
Proportion of overall population	17.3%	16.4%	18.0%	21.6%	26.7%	-
Overall user benefits	£46,962,230	£32,687,314	£40,281,260	£62,248,119	£79,743,481	£261,922,405
Sum of benefits	£47,195,050	£32,733,583	£40,367,440	£63,949,757	£80,791,221	£265,037,051
Distribution of benefits	17.8%	12.4%	15.2%	24.1%	30.5%	-
Sum of <u>disbenefits</u>	-£232,820	-£46,269	-£86,179	-£1,701,639	-£1,047,739	-£3,114,646
Distribution of disbenefits	7.5%	1.5%	2.8%	54.6%	33.6%	-
Assessment	$\checkmark\checkmark$	$\checkmark\checkmark$	$\checkmark\checkmark$	$\checkmark\checkmark$	$\checkmark\checkmark$	<b>√</b> √

 Table 3-15 - Distribution of user benefit costs, by Income Deprivation Quintile

Scoring used is as follows - Overall new benefits:

Beneficial and 5% greater (or more) than the proportion of the group in the total population  $\sqrt{\sqrt{4}}$ 

Beneficial and in line (+/-5%) with the proportion of the group in the total population  $\checkmark\checkmark$ 

Beneficial and 5% smaller (or less) than the proportion of the group in the total population  $\checkmark$ 

Overall impact is **beneficial** and the impact for the group as a proportion of the total is.... A disbenefit **\*\*\*** 

The proportion of residents experiencing benefits from the scheme is fairly distributed across income groups. Only around 4% of residents within the assessment area experience disbenefits as a result of the scheme, and the majority of these residents live within the least deprived income quintiles within the assessment area. The value of these disbenefits is also considerably lower than the value of benefits experienced in each income quintile. As such the SDI appraisal had assessed user benefits as **moderate beneficial**.

In the majority of cases there are user benefits associated with a transport intervention but these are generally net outcomes. Within the net outcome some people may experience disbenefits for example through longer journey times or lower public transport service frequencies. Step 1 in the assessment will involve the identification of the area experiencing user benefit changes, followed by a review of the demographic profile within the identified area (Step 2). The outputs from Step 2 will feed into a screening process (Step 3), to determine if it is appropriate to undertake further analysis and complete a matrix of SDI findings (Steps 4 & 5).

# 4. Summary of Findings

## 4.1 Appraisal Outputs

Table 4.1 presents a summary of the key social and distributional impacts for inclusion in the Appraisal Summary Table.

Assessed Indicator	Summary of Key Impacts	Seven Point Scale Assessment
	Overall, a higher number of properties (8,569) experience an increase in noise, compared with 629 experiencing a decrease. However the majority of these properties (54%) experiencing an increase in noise are predicted to experience a minor adverse impact.	
Noise	The most income deprived quintile (1) demonstrates the lowest proportion of net losers (5%); with Quintile 5 experiencing the highest proportion (58%).	Slight Adverse
	Although the most deprived income group has the lowest proportion of disbenefits of all income groups, the overall impact of the scheme is adverse and as such the SDIs for noise has been assessed as <b>Slight Adverse</b> .	
Air Quality	Overall, a lower number of households (3836) experience deterioration in air quality, compared with 8,909 that experience an improvement which provides an overall beneficial impact on air quality. The most income deprived quintile (1) demonstrates the highest proportion of net winners with over 53% of all properties experiencing improvements in air quality. Quintile 4 has the lowest proportion of net losers in terms of air quality impacts (14%). Although the benefits of improvements in air quality are not evenly distributed across the income groups there are is a relatively high number of properties in all income quintile groups receiving beneficial impacts in air quality. In addition, those living in the most deprived areas are receiving the highest proportion of the beneficial impacts. Taking this into account the scheme has been appraised as having a <b>large beneficial</b> impact on air quality SDIs.	Large Beneficial
Accidents	There is an overall reduction of 885 accidents forecast over the 60 year appraisal period. The SDI analysis used 5 years worth of casualty data to identify the potential impacts as a result of the change in accident numbers on potentially vulnerable groups through mapping casualty locations and analysing demographic and user information. The assessment identified that the benefits are proportionately distributed across different user groups and past locations of accident show that there is likely to be more vulnerable users experiencing a reduction in accidents than those experiencing an increase in accidents. There the scheme demonstrates a <b>moderate beneficial</b> impact on accidents.	Moderate Beneficial

Table	4.1-	Summarv	of	Kev	Impacts
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Severance	The Scheme will result in a reduction of traffic on local residential and rural roads potentially providing improved conditions for pedestrians and removing potential barriers caused by traffic levels. However the level of severance will be increased in some areas, these are at the location of the scheme itself and at roads predicted to receive an increase due to traffic accessing the new road. Measure to reduce severance to public rights of way and local access roads have been considered at the design stage of the scheme	Slight Beneficial
Accessibility	There is no current information from public transport operators regarding potential changes to their services as a result of the A6 to Manchester Airport Relief Road. Accession analysis shows that the population able to access the airport by PT is wide reaching. Reduction in traffic flows in the local area may reduce rat running and enable bus services to run more efficiently. The scheme should in particular provide improvements for PT passengers travelling to the airport (or destinations on the way) from the A6 Corridor and Stockport. The scheme is assessed as having a <b>slight beneficial</b> impact on accessibility.	Slight Beneficial
Security	Overall the assessment demonstrates a <b>slight beneficial</b> impact on security across the scheme area as a result of the proposed scheme.	Slight Beneficial
User Benefits	The proportion of residents experiencing benefits from the scheme is fairly distributed across income groups. Only around 4% of residents within the assessment area experience disbenefits as a result of the scheme, and the majority of these residents live within the least deprived income quintiles within the assessment area. The value of these disbenefits is also considerably lower than the value of benefits experienced in each income quintile. As such the SDI appraisal had assessed user benefits as <b>moderate beneficial</b> .	Moderate Beneficial

Table 4.2 – SDI Matrix

	DISTRIBUTIONAL IMPACTS			S				S	OCIAL IMP	ACTS					
	Inco	Income Groups (Income Domain)				U	ser Groups	5			So	cial Grou	ps		
	Мо	ost Depriv	ved Leas	t Depriv	/ed										Black
Impacts	0-20%	20- 40%	40- 60%	60- 80%	80- 100%	Pedestria ns	Cyclists	Motor- cyclists	Children & Young People	Young Males	Older People	No Car House holds	Wom en	People with Disabilities	and Minority Ethnic
User benefits	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark\checkmark$	$\checkmark$										
Noise	×	××	×	×	×××				×						
Air quality	$\checkmark$	$\checkmark$	$\checkmark \checkmark \checkmark$	* * *	***				$\checkmark$						
Accidents						$\checkmark\checkmark$	$\checkmark\checkmark$	$\checkmark\checkmark$	$\checkmark\checkmark$	$\checkmark\checkmark$	$\checkmark\checkmark$				
Security									$\checkmark$		✓		~	$\checkmark$	$\checkmark$
Severance									$\checkmark$		~	$\checkmark$		$\checkmark$	
Accessibility									$\checkmark$		✓	$\checkmark$		$\checkmark$	
Affordability	N/A	N/A	N/A	N/A	N/A										

Key:

 $\checkmark \checkmark \checkmark =$  Large Beneficial

 $\checkmark \checkmark$  = Moderate Beneficial

✓ = Slight Beneficial

x = Slight Adverse

**xx** = Moderate Adverse

**xxx** = Large Adverse

0 = Neutral

# Appendix A : Socio-demographic Assessment

Dataset/Social Group	Approx total in Study Area (1km buffer of scheme alignment)	% of Population	Cheshire East/ Stockport/ Manchester	England
Children: aged <16	9099	20.3%	20.4%	20.1%
Young adults: aged 16-25	4468	10.0%	14.3%	12.1%
Young men: aged 16- 24	2418	5.4%	7.1%	6.1%
Older people: aged 70+	2830	6.3%	11.1%	11.5%
Disability Allowance Claimants	2195	4.9%	6.6%	5.3%
No Car Households	3984	21.5%	33.8%	26.8%
Women	23173	51.7%	51.5%	51.3%
Black and Minority Ethnic	3211	7.2%	10.9%	18.1%
Job Seekers allowance claimants (working age)	788	2.9%	4.8%	3.9%
Total Population	44816			
Working Age population	27334			
Households	18529			

#### Table A-4-1 – Socio-demographic profile of study area

All of the following figures show the 20% most populated Output Areas for each of the vulnerable groups from all Output Areas in Manchester and Stockport and selected Output Areas in Cheshire East.



Figure A.1 - Proportion of Children (aged under 16 years) - Census 2001

Figure A.2 - Proportion of Young People - (aged 16-24) - Census 2001





Figure A.3 - Proportion of Young Males - (Aged 16-24) - Census 2001

Figure A.4 - Proportion of Older People (aged 70 and over) – Census 2001





Figure A.5 - Proportion of Black Minority Ethnic Population – Census 2001

Figure A.6 - Proportion of Non-car Households – Census 2001





Figure A.7 – Proportion of Disability Living Allowance Claimants

Figure A.8 - Proportion of Job Seekers Allowance Claimants





Figure A.9 - Proportion of Women - Census 2001

Figure A.10 - Proportion of Carers- Households with dependent children (Census 2001)





Figure A.11 - Index of Deprivation – National Rank by Super Output Area (ID 2010)

Figure A.12 - Income deprivation – National Rank (ID 2010)



# **NTKINS**

# Appendix B : Initial Screening Proforma

#### ASSESSMENT OF SOCIAL AND DISTRIBUTIONAL IMPACTS (SDIs) OF TRANSPORT INTERVENTIONS Proforma for reporting conclusions of first screening stage (Step 0)

This form is intended for use by scheme promoters to capture the considerations, assessment and conclusions of the first screening stage of the SDI analysis (Step 0). For a full description of Step 0 please see WebTAG guidance units 2.13 and 3.17. These initial screening tests are not intended to be onerous and should require no additional data collection or analysis. At this stage promoters are only expected to carry out a qualitative assessment, based on their professional judgement and that of the technical specialists responsible for undertaking assessment of noise, air quality, safety, security, severance, accessibility, personal affordability and user benefits.

Sources of information:

A6 to Manchester Airport Relief Road – Draft Major Scheme Business Case (Programme Entry) Rev0.3 1007/4.4/035

#### Scheme name: A6 to Manchester Airport Relief Road

The proposed A6 to Manchester Airport Relief Road scheme includes a new 2lane dual carriageway connecting the A6 to Manchester Airport. The scheme bypasses Bramhall, Cheadle Hulme, Hazel Grove, Handforth, Poynton and Wythenshawe District Centres and Gatley and Heald Green Local Centres.

The scheme improves access to / from Manchester Airport and its employment areas as well as Hazel Grove, Newby Road, Bramhall Moor Lane, Poynton Handforth Dean and Stanley Green employment areas. Access to a number of regeneration areas is also improved by the scheme, including Stockport Town Centre and Wythenshawe. The junction providing access to the A5149 Chester Road also provides the entry point to the proposed Poynton Relief Road.

The scheme will provide a high quality route for freight vehicles to access the strategic road network (i.e. M56) and Manchester Airport from the south east Manchester and Cheshire East / Derbyshire area, and as an alternative route to using existing residential streets.

The new road is approximately 10 kilometres long, of predominantly dual 2-lane carriageway standard and will include ten new and seven improved



junctions. It also incorporates a further 4 kilometres of existing A555 dual carriageway to the south of Bramhall. There are four rail crossings in the new sections, one of which is over the West Coast Main Line. A pedestrian and cycle route is proposed for the whole length of the scheme, including retrofitting it to the 4 kilometre existing section of A555.

#### **Scheme Objectives**

- Increase employment and generate economic growth by providing efficient surface access and improved connectivity to, from and between Manchester Airport, local, town and district centres, and key areas of development and regeneration (e.g. Manchester Airport Enterprise Zone)
- **Boost business integration and productivity**: improve the efficiency and reliability of the highway network, reduce the conflict between local and strategic traffic, and provide an improved route for freight and business travel.
- Reduce the impact of traffic congestion on local businesses and communities.
- **Promote fairness through job creation and the regeneration of local communities**: reduce severance and improve accessibility to, from and between key centres of economic and social activity
- **Support lower carbon travel:** reallocate road space and seek other opportunities to provide improved facilities for pedestrians, cyclists and public transport.
- Improve the safety of road users, pedestrians and cyclists: reduce the volume of through-traffic from residential areas and retail centres; reallocate road space and seek other opportunities to provide improved facilities for pedestrians, cyclists and public transport.

Impact	Impact Impact Impact Impact Impact Impact Impact Impact Impact relevant to stated scheme Impact Impa		Can potential negative impacts be eliminated through design or mitigation?	Are potential impacts, where presumed, likely to be 'significant and	Next steps: what further screening (Step 1 to 3), or full SDI analysis (Step 1 to 5) is necessary	
(Consider each separately)				concentrated'?	and/or proportionate to potential impact? (Provide rationale for	
	(If yes, provide details)	(Provide details)	(Provide details)	(Provide details)	proposal)	
Air Quality	Yes. Scheme objectives specifically mention the reduced levels of air pollution due to the impact of reduced traffic congestion and through traffic in District and Local Centres.	The Draft Major Scheme Business Case presented the Air Quality appraisal undertaken in accordance with WebTAG Unit 3.3.3. Further work is currently being undertaken to identify changes in PM10 and NO2 between the DM and DS scenarios and the distribution of these impacts	Refinements to the scheme's detailed design are on-going. This enables the potential elimination or mitigation of any localised air quality issues.	It is likely that any impacts will be concentrated to the scheme area and any surrounding roads experiencing a change in traffic flow levels.	Proceed to Steps 1-3. Need to assess the outputs from the air quality assessment to ascertain the distribution of impacts across income groups and children in the area. Indices of Deprivation 2010 and Census 2001	

		Analysis needs to be undertaken to assess whether the key vulnerable groups will experience better or worse air quality as a result of the scheme. Sections of the proposed scheme also overlap with Manchester and Stockport Air Quality Management Areas.			outputs of air quality modelling.
Noise	Yes. Scheme objectives specifically mention the reduced levels of noise pollution due to the impact of reduced traffic congestion and through traffic in District and Local Centres.	The Draft Major Scheme Business Case presented the Noise appraisal undertaken in accordance with WebTAG Unit 3.3.2. The results showed an overall moderate adverse appraisal of noise impacts. Further analysis is required to assess the likely noise impacts on the vulnerable groups.	Any noise issues arising may be potentially mitigated against through the detailed design stage.	It is likely that the impacts will be concentrated to the scheme area and surrounding roads experiencing a change in traffic flow levels.	Proceed to Steps 1-3. Further analysis needed to assess the outputs from the noise assessment to ascertain the distribution of impacts across schools, young children and income groups in the scheme area. Indices of Deprivation 2010, Census 2001, and schools data will be used alongside outputs from noise modelling.
Accidents	Yes. Specific scheme objective to improve the safety and security of all road users by removing through-traffic from	The accident appraisal summarised in the Draft Major Scheme Business Case identifies an overall reduction of 885 accidents over a 60 year period as a result of the scheme.	Refinements to the scheme's detailed design are on-going. This enables the potential elimination or mitigation against clusters of accidents.	It is likely that the impacts will be concentrated in certain areas potentially where levels of traffic are likely to increase.	Proceed to Steps 1-3. Further work is required to examine STATS 19 data associated with accidents occurring in the area over the five years to 2009

	residential areas and retail centres. It will also reallocate road space and seek other opportunities to provide improved facilities for pedestrians, cyclists and public transport.	Further examination of the accident analysis undertaken is needed to identify potential locations of accidents and the implications for vulnerable groups in order to show that accident savings are being equally distributed across different users. Accident risk is higher for children (especially those living in deprived areas), young adults, and older people. Census 2001 data identifies some small concentrations of these groups within close proximity of the scheme. There are also vulnerable road users such as pedestrians and cyclists and accident records can be used to identify casualty prevalence amongst these users.			years. This data will be combined with an assessment of the proportions of vulnerable road users and groups living in the area on links where accident rates are likely to increase. An examination of the likely safety implications for non-motorised users is required as a consequence of the provision of segregated facilities.
Security	Yes. The scheme aims to improve the safety and security of all road users by removing through- traffic from residential areas and retail centres. It will also reallocate road space and seek other opportunities to provide improved facilities for pedestrians, cyclists and public transport.	A number of design features have been incorporated to ensure that security issues are considered for pedestrians, cyclists and motor vehicle users. These include minimisation of concealed areas, design of overbridges in accordance with relevant guidelines; and landscaping to ensure clear sightlines.	Refinements to the scheme's detailed designs are on-going. This provides an opportunity to gain a better understanding of any vulnerable groups in the local area, enabling the introduction of new security measures to encourage scheme usage and promote equality of opportunity.	Security impacts are likely to be concentrated in areas where there is a change in traffic levels and also where new crossing points such as underpasses or bridges have been constructed or where new public transport waiting facilities are located.	Proceed to Steps 1-3. As the scheme objectives contain a specific reference to security then it is recommended that further screening is undertaken.

Severance	Yes. The scheme aims to regenerate the local communities and encourage community, cultural and social inclusion through reduced severance and improved accessibility to, from and between key centres of economic and social activity	Severance has been appraised in accordance with TAG Unit 3.6.2 and provided a slight beneficial appraisal, based on a reduction of traffic of up to 19% in local areas. The new scheme alignment will provide new and enhanced non- vehicular routes, footbridges and underpasses. It is important to ensure that these routes and crossing facilities enhance cohesion and do not increase severance by acting as a barrier.	Mitigation can include the understanding of key crossing points in areas where there is likely be significant changes in traffic level of local roads. An understanding of the local community and the key flows for pedestrians and cyclists in the area is important to provide facilities for crossing and safe access and mitigate against any severance issues.	Yes severance impacts are likely to be concentrated along the scheme location where an increase in severance could occur or in local areas where reduced traffic means that severance is potentially reduced.	Proceed to Steps 1-3. Further work is required to assess the locations of vulnerable users and the key facilities and destinations that are important to them within the local areas surrounding the scheme. This information can then be used to identify scheme measures that will impact on severance levels in the local area.
Accessibility	Yes. The scheme aims to regenerate the local communities and encourage community, cultural and social inclusion through reduced severance and improved accessibility to, from and between key centres of economic and social activity	Currently there is no information on public transport services likely to use the proposed scheme. However there is likely to be benefits in accessibility for public transport users due to journey time improvements due to a removal of traffic through the various District and Local Centres. Some services may also be re-routed. There is also likely to be improvements for pedestrians and cyclists due to the implementation of measures to improve routes for these users.	It is important to consider the impact of the scheme on public transport services and ensure all information about the scheme is fully accessible to all users	Impacts are likely to be concentrated to passengers using existing services in the area.	The scheme objectives contain explicit reference to accessibility, hence the recommendation that further screening is undertaken. Further work should examine public transport accessibility levels to key services for vulnerable groups in the areas and any changes that may impact on existing journeys. This will make use of an existing Accession model and socio-demographic data.

Personal Affordability	No. There is no specific objective relating to the affordability of transport as a consequence of the scheme.	There are no specific changes identified to fare structures that are likely to affect personal affordability.	No impacts identified requiring mitigation	N/A	No further steps required as scheme unlikely to have an impact.
User Benefits	Yes. The scheme aims to promote sustainable economic development through the provision of efficient surface access and improved connectivity to, from and between Manchester Airport and the local, town and district centres and employment sites and wider strategic network.	There are user benefits associated with the scheme as reported in the Draft Major Scheme Business Case Transport Economic Efficiency (TEE) Table these are reported as a net beneficial outcome of £800 million. However it is important to understand how these benefits are distributed and if this distribution is equal across different income groups.	It is difficult to mitigate against issues arising at this stage of the detailed design but this will be reviewed during the on-going design stages of the scheme.	It is likely that any impacts will be concentrated to the local area and to users in the Greater Manchester Area.	Proceed to Steps 1-3. As the scheme objectives contain a specific reference to user benefits then it is recommended that further screening is undertaken. Need to examine the TUBA outputs to gain information on a zonal level which can be matched with socio- demographic boundaries. This will enable an assessment of the user benefits against income mapping.



# Appendix C : Magnitude of Noise and Air Quality Impacts

#### Table C-1 – Noise Impacts on Properties by Magnitude and Income Quintile Group

Noice Impe	Noise Impact on Properties		Income Deprivation Quintile					
Noise impac			2	3	4	5	Total	
Magnitude	Major Adverse	5	97	229	578	1160	2069	
	Moderate Adverse	30	278	152	301	1089	1850	
	Minor Adverse	397	125	219	1272	2664	4677	
	Total Adverse	432	500	600	2151	4913	8596	
	Negligible Adverse	1020	360	612	2438	1606	6036	
	No Change	581	58	149	138	173	1099	
	Negligible Beneficial	297	37	904	919	971	3128	
	Total No Change	1898	455	1665	3495	2750	10263	
	Minor Beneficial	53	9	50	246	252	610	
	Moderate Beneficial	1	2	0	1	13	17	
	Major Beneficial	0	0	0	1	1	2	
	Total Beneficial	54	11	50	248	266	629	
Total Proper	ties	2384	966	2315	5894	7929	19488	

Table C-2 – DMRB Guidance for Classifying Magnitude of Noise Impacts

Noise Change L <sub>A10,18h</sub>	Magnitude of Impact
0	No Change
0.1 – 0.9	Negligible
1 – 2.9	Minor
3 – 4.9	Moderate
5 +	Major

		Income Deprivation Quintile					
		1	2	3	4	5	Total
Magnitude	Large Adverse	1	0	0	3	5	9
	Medium Adverse	14	0	0	82	87	183
	Small Adverse	633	230	236	1233	1344	3676
	Total Adverse	648	230	236	1318	1436	3868
	Imperceptible Adverse	5663	1432	2293	4763	5166	19317
	No Change	34759	25509	20623	18556	17729	117176
	Imperceptible Beneficial	1502	7400	8850	4233	4109	26094
	Total No Change	41924	34341	31766	27552	27004	162587
	Small Beneficial	2334	1557	1804	541	1087	7323
	Medium Beneficial	358	187	99	22	120	786
	Large Beneficial	639	134	6	0	21	800
	Total Beneficial	3331	1878	1909	563	1228	8909
Total		45903	36449	33911	29433	29668	175364

Table C-3 - Air Quality Impacts on Properties by Magnitude and Income Quintile Group

Table C-4 - DMRB Guidance for Classifying Magnitude of change in annual NO<sub>2</sub> Impacts

Magnitude of Change	Increase / Reduction (µg/m <sup>3</sup> )			
Large	>4			
Medium	> 2 - 4			
Small	≥ 0.4 – 2			
Imperceptible	< 0.4			
No Change	0			