

Appendix 18.2

Revised Environmental Transport Assessment

1 BASELINE CONDITIONS

- 1.1 The updated baseline information for each of the proposed HGV Routes is provided in this section.

Data Collection Methodology

- 1.2 This section summarises the methodology used to collect baseline data.









Baseline Traffic Flows

- 1.3 Automatic Traffic Counts (ATCs) were undertaken between June and October 2017 and recorded the directional volume of traffic, vehicle classification and vehicle speed. ATC data is reported based on five main vehicle classifications:

- Pedal Cycles and Motorcycles;
- Cars and Light Goods Vehicles;
- Passenger Service Vehicle (PSV);
- Heavy Goods Vehicles (HGVs), which are sub-divided into:
 - Other Goods Vehicle 1 (OGV1); and
 - Other Goods Vehicle 2 (OGV2).

- 1.4 **Figure 1.1** is an extract from the Design Manual for Roads and Bridges (DMRB) and illustrates the various classifications for HGVs, which have been applied within the analysis of the observed traffic survey data.

Figure 1.1: Commercial Vehicle Classifications

Commercial vehicle (cv)	cv class*	cv category
	Buses and Coaches	PSV
	2-axle rigid	OGV1
	3-axle rigid	
	3-axle articulated	OGV2
	4-axle rigid	
	4-axle articulated	
	5-axle articulated	
	6 (or more) -axle articulated	

1.5 The observed data has been used to derive the following traffic flows:

- 24hr Annual Average Daily Traffic (24hr AADT) flows and the percentage of HGVs for the air quality assessment;
- 18hr (06:00 – 00:00) Annual Average Weekday Traffic (18hr AAWT) flows and the percentage of HGVs for the noise assessment; and
- 12hr (07:00 – 19:00) weekday traffic flows and a breakdown of the traffic in terms of volume of OGV1 and OGV2 to inform the environmental transport assessment.

1.6 It is not possible from the ATC surveys to determine how many of the HGVs are agricultural vehicles and therefore camera surveys were undertaken for some of the days that the ATC surveys were undertaken to establish the average number of agricultural vehicles using the roads over a 12 hour period (07:00-19:00).

1.7 This data enabled neutral baseline traffic flows to be determined. They are considered neutral as the data is based on days within school term time and therefore avoided the school summer holiday and the data also excludes days that coincided with non-regular events such as the Fylde Vintage and Farm Show, which takes place annually in June.

- 1.8 In addition to the neutral baseline traffic flows, traffic surveys were undertaken during the harvest period (surveys undertaken at the end of August and start of September 2017) to establish the number of agricultural vehicles using the roads during the harvest season.

Vulnerable Users

- 1.9 Data from cameras has been collected for a 12 hour period (07:00-19:00) on a number of different days during the summer months to observe the number of vulnerable users travelling in each direction. Vulnerable users include pedestrians, cyclists and equestrians. The summer months were chosen in order to determine peak vulnerable users to provide a robust assessment. It is considered that there are likely to be fewer vulnerable users on the roads at other times of the year.
- 1.10 Those roads that have no footways on either side have been surveyed in more detail to understand the number of adults, children, prams and people walking dogs. Those roads that have at least one footway have only been surveyed in terms of total number of pedestrians.

Accident History

- 1.11 Accident data was requested from Lancashire Police for the local highway network for the five years period up to 30th April 2017.

Road Widths

- 1.12 Manual for Streets states that two HGVs require 5.5m to pass. This does not take account of bends in the road, where greater widths may be required to allow two HGVs to pass safely. Notwithstanding this guidance, in order to provide a level of robustness to the assessment, a carriageway width survey was commissioned by an independent topographical survey company to measure the section of roads to be used by HGVs that are less than 6m in width. The survey measured:

- Carriageway width;
- Footway width (if there is one);
- Hedge to hedge width; and
- Verge width on each side of the road.

Swept Path Analysis

- 1.13 Detailed swept path analysis using AutoTRACK software has been undertaken for each of the HGV Routes for a 16.5m 6 axle articulated vehicle (OGV2).

- 1.14 The HGVs serving the Site will all be classified as OGV2 but will vary in size and axles (refer to **Figure 1.1**). For all phases of the project, except the drill mobilisation and demobilisation phase, the OGV2s used by Cuadrilla will be no greater than 6-axle articulated vehicles.
- 1.15 For the drill mobilisation and demobilisation, there will be a need for a small number of deliveries to be made on larger articulated low loader vehicles. Whilst these deliveries are not classified as abnormal indivisible loads (AILs), Cuadrilla will provide prior notification to the police before the drill mobilisation and demobilisation is undertaken. Cuadrilla will also escort these vehicles along the HGV Routes to the Site. Separate swept path analysis has been undertaken for the junctions on the HGV Routes using a 7-axle articulated low loader vehicle. The road links between the junctions have not been assessed as the roads would be cleared ahead of these deliveries being made.

Baseline Conditions

- 1.16 HGVs will be permitted to access and egress the Site on weekdays between 07:30 – 18:30. Therefore, the baseline data in **Tables 1.1** to **1.3** below is for the 12 hour weekday period that encompasses the HGV delivery hours (i.e. 07:00-19:00).
- 1.17 24hr AADT and 18hr AAWT traffic flows, which inform the air quality and noise assessments respectively, are summarised in **Table 1.4** below.
- 1.18 Accident data has also been plotted using GIS for each of the proposed HGV Routes. In addition, GIS plots have been undertaken of all accidents on the proposed HGV Routes involving vulnerable users. These plots are provided in **Appendix A**.
- 1.19 Based on the topographical surveys, carriageway widths have been plotted at regular intervals for each of the roads proposed to be used by HGVs to access the Site. These drawings (Drawing Numbers 172806/SK/06, 172806/SK/07 and 172806/SK/08) are provided in **Appendix B**.

Table 1.1 Green Route via Elswick and Roseacre – Observed Data used for the Environmental Transport Assessment

12 hr Weekday Average Traffic Flows (07:00-19:00)						
Road	Direction	Total Vehicles	HGV			HGV %
			OGV 1	OGV2	Total HGV	
B5269 Thistleton Road	Eastbound	1316	118	14	132	10%
	Westbound	1328	141	16	157	12%
	Two-way	2644	259	30	289	11%
Roseacre Road	Northbound	329	23	4	27	8%
	Southbound	299	19	2	21	7%
	Two-way	628	42	6	48	8%
12 hr Average Weekday Tractors (included within and not additional to the HGV flows)						
		Neutral Month Tractors		Harvest Tractors		
B5269 Thistleton Road	Eastbound	8		45		
	Westbound	7		40		
	Two-way	15		85		
Roseacre Road	Northbound	11		12		
	Southbound	11		11		
	Two-way	22		23		
Accidents over 5 years						
		Slight	Serious	Fatal	Total	
B5269 Thistleton Road		2	1	0	3	
Roseacre Road		3	0	0	3	
Accidents over 5 years involving vulnerable users						
		Pedestrians	Cyclists	Equestrians	Total	
B5269 Thistleton Road		0	1	0	1	
Roseacre Road		1	0	0	1	
Cyclists and Equestrians (12 hr Weekday Average)						
		Cyclist		Equestrians		
B5269 Thistleton Road	Eastbound	42		0		
	Westbound	50		0		
	Two-way	92		0		
Roseacre Road	Northbound	44		0		
	Southbound	44		0		
	Two-way	88		0		
Pedestrians (12 hr Weekday Average)						
		Children	Adults	Adults with dog	Total Pedestrians	
B5269 Thistleton Road	Eastbound	*	*	*	0	
	Westbound	*	*	*	1	
	Two-way	*	*	*	1	
Roseacre Road	Northbound	0	1	2	3	
	Southbound	0	1	1	2	
	Two-way	0	2	3	5	

* roads have footways and only total pedestrians surveyed rather than more detailed breakdown provided for roads with no footways

Table 1.2 Red Route via Elswick and Inskip – Observed Data used for the Environmental Transport Assessment

12 hr Weekday Average Traffic Flows (07:00-19:00)						
Road	Direction	Total Vehicles	HGV			HGV %
			OGV 1	OGV2	Total HGV	
B5269 Thistleton Road	Eastbound	1316	118	14	132	10%
	Westbound	1328	141	16	157	12%
	Two-way	2644	259	30	289	11%
B5269 Lodge Lane	Eastbound	704	77	12	89	13%
	Westbound	776	76	12	88	11%
	Two Way	1480	153	24	177	12%
B5269 Preston Road	Northbound	586	43	10	53	9%
	Southbound	510	42	8	50	10%
	Two Way	1096	85	18	103	9%
Higham Side Road	Northbound	541	50	8	58	10%
	Southbound	535	56	5	61	14%
	Two Way	1076	106	13	119	12%
Average Weekday Tractors (included within and not additional to the HGV flows)						
		Neutral Month Tractors		Harvest Tractors		
B5269 Thistleton Road	Eastbound	8		45		
	Westbound	7		40		
	Two-way	15		85		
B5269 Lodge Lane	Eastbound	6		7		
	Westbound	4		6		
	Two Way	10		13		
B5269 Preston Road	Northbound	6		8		
	Southbound	7		12		
	Two Way	13		20		
Higham Side Road	Northbound	6		3		
	Southbound	5		2		
	Two Way	12		5		
Accidents over 5 years						
		Slight	Serious	Fatal	Total	
B5269 Thistleton Road		2	1	0	3	
B5269 Lodge Lane		2	0	0	2	
B5269 Preston Road		2	0	0	2	
Higham Side Road		0	0	0	0	
Accidents over 5 years involving vulnerable users						
		Pedestrians	Cyclists	Equestrians	Total	
B5269 Thistleton Road		0	1	0	1	
B5269 Lodge Lane		0	1	0	1	
B5269 Preston Road		0	0	0	0	
Higham Side Road		0	0	0	0	
Cyclists and Equestrians (12 hour Weekday Average)						
		Cyclist		Equestrians		
B5269 Thistleton Road	Eastbound	42		0		
	Westbound	50		0		
	Two-way	92		0		
B5269 Lodge Lane	Eastbound	19		0		
	Westbound	28		0		
	Two Way	47		0		

B5269 Preston Road	Northbound	20	2		
	Southbound	13	0		
	Two Way	33	2		
Higham Side Road	Northbound	29	0		
	Southbound	26	0		
	Two Way	55	0		
Pedestrians (12 hour Weekday Average)					
		Children	Adults	Adults with dog	Total Pedestrians
B5269 Thistleton Road	Eastbound	*	*	*	0
	Westbound	*	*	*	1
	Two-way	*	*	*	1
B5269 Lodge Lane	Eastbound	0	3	0	3
	Westbound	0	4	0	4
	Two Way	0	7	0	7
B5269 Preston Road	Northbound	0	3	1	4
	Southbound	0	0	0	0
	Two Way	0	3	1	4
Higham Side Road	Northbound	0	1	0	1
	Southbound	0	1	0	1
	Two Way	0	2	0	2

* roads have footways and only total pedestrians surveyed rather than more detailed breakdown provided for roads with no footways

Table 1.3 Blue Route via Clifton and Dagger Road – Observed Data used for the Environmental Transport Assessment

12 hr Average Weekday Traffic Flows (07:00-19:00)						
Road	Direction	Total Vehicles	HGV			HGV %
			OGV 1	OGV2	Total HGV	
Higham Side Road	Northbound	541	50	8	58	10%
	Southbound	535	56	5	61	14%
	Two Way	1076	106	13	119	12%
Salwick Road	Northbound	265	21	7	28	11%
	Southbound	244	24	5	29	12%
	Two Way	509	45	12	57	11%
Dagger Road	Northbound	265	21	5	26	10%
	Southbound	245	29	4	34	14%
	Two Way	510	50	10	60	12%
Station Road	Northbound	440	32	8	40	9%
	Southbound	382	32	9	41	11%
	Two Way	822	64	17	81	10%
Clifton Lane	Northbound	1155	93	16	109	9%
	Southbound	1183	93	17	110	9%
	Two Way	2338	187	33	219	9%
12hr Average Weekday Tractors (included within and not additional to the HGV flows)						
		Neutral Month Tractors		Harvest Tractors		
Higham Side Road	Northbound	6		3		
	Southbound	5		2		
	Two Way	12		5		
Salwick Road	Northbound	6		4		
	Southbound	6		3		
	Two Way	12		7		

Dagger Road	Northbound	12	8			
	Southbound	17	4			
	Two Way	29	12			
Station Road	Northbound	3	5			
	Southbound	4	2			
	Two Way	6	7			
Clifton Lane	Northbound	3	3			
	Southbound	2	2			
	Two Way	5	5			
Accidents over 5 years						
	Slight	Serious	Fatal	Total		
Higham Side Road	0	0	0	0		
Salwick Road	2	0	0	2		
Dagger Road	0	0	0	0		
Station Road	1	1	0	2		
Clifton Lane	7	0	0	7		
Pedestrians				Cyclists	Equestrians	Total
B5269 Thistleton Road	0	1	0	1		
Salwick Road	0	0	0	0		
Dagger Road	0	0	0	0		
Station Road	0	1	0	1		
Clifton Lane	0	0	0	0		
Cyclists and Equestrians (12 hr Weekday Average)						
		Cyclists		Equestrians		
Higham Side Road	Northbound	29	0			
	Southbound	26	0			
	Two Way	55	0			
Salwick Road	Northbound	30	0			
	Southbound	21	0			
	Two Way	51	0			
Dagger Road	Northbound	22	0			
	Southbound	16	0			
	Two Way	38	0			
Station Road	Northbound	30	0			
	Southbound	21	0			
	Two Way	51	0			
Clifton Lane	Northbound	25	0			
	Southbound	14	0			
	Two Way	39	0			
Pedestrians (12 hr Weekday Average)						
		Children	Adults	Adults with dog	Total Pedestrians	
Higham Side Road	Northbound	0	1	0	1	
	Southbound	0	1	0	1	
	Two Way	0	2	0	2	
Salwick Road	Northbound	0	3	0	3	
	Southbound	0	3	1	4	
	Two Way	0	6	1	7	
Dagger Road	Northbound	0	1	0	1	
	Southbound	0	2	0	2	
	Two Way	0	3	0	3	

Station Road	Northbound	*	*	*	10
	Southbound	*	*	*	13
	Two Way	*	*	*	22
Clifton Lane	Northbound	*	*	*	18
	Southbound	*	*	*	12
	Two Way	*	*	*	30

* roads have footways and only total pedestrians surveyed rather than more detailed breakdown provided for roads with no footways

Table 1.4 24hr AADT and 18hr AAWT Baseline Traffic Flows used for the Air Quality and Noise Impact Assessments

Link	Direction	24hr AADT			18hr AAWT		
		Total Vehs	HGV	HGV %	Total Vehs	HGV	HGV %
B5269 East of Elswick	Eastbound	1,565	126	8%	1,574	146	9%
	Westbound	1,555	164	11%	1,558	180	12%
	Two Way	3,121	290	9%	3,132	326	10%
Roseacre Road	Northbound	359	25	7%	375	30	8%
	Southbound	336	20	6%	341	24	7%
	Two Way	695	45	6%	717	53	7%
Higham Side Road	Northbound	592	56	9%	616	64	10%
	Southbound	588	57	10%	613	67	11%
	Two Way	1,180	113	10%	1,229	131	11%
Salwick Road	Northbound	294	25	9%	310	30	10%
	Southbound	269	25	9%	286	32	11%
	Two Way	564	50	9%	596	62	10%
Dagger Road	Northbound	289	23	8%	309	28	9%
	Southbound	263	30	12%	286	36	13%
	Two Way	552	54	10%	595	64	11%
Station Road	Northbound	501	39	8%	520	44	9%
	Southbound	436	41	9%	459	47	10%
	Two Way	937	80	9%	979	91	9%
Clifton Lane	Northbound	1,264	96	8%	1,389	119	9%
	Southbound	1,208	96	8%	1,357	119	9%
	Two Way	2,471	192	8%	2,746	238	9%
B5269 Lodge Lane	Eastbound	749	77	10%	809	95	12%
	Westbound	810	80	10%	882	96	11%
	Two Way	1,559	157	10%	1,691	190	11%
B5269 Preston Road	Northbound	595	49	8%	654	57	9%
	Southbound	546	44	8%	589	54	9%
	Two Way	1,140	93	8%	1,243	110	9%

2 EMBEDDED MITIGATION

2.1 The updated ES transport assessment takes into account mitigation measures that have been incorporated in the Project as part of the design process, measures that are considered standard practice within the construction industry as well as experience gained from the implementation of Preston New Road. Together these measures are termed “Embedded Mitigation”. This mitigation is distinct from additional mitigation which is applied following the identification of potentially significant impacts. These embedded mitigation measures incorporated into the design are summarised below.

HGV Cap

2.2 It is proposed to limit HGVs to and from the Site to a maximum of 50 two-way HGV movements per day (25 HGVs in each direction). It is proposed to utilise three HGV Routes to access the Site. Therefore, the combined total of HGV movements using all three routes on any day will not exceed 50 two-way HGV movements.

HGV Delivery Hours

2.3 HGVs will be permitted to access and egress the Site on weekdays between 07:30 – 18:30.

2.4 It is proposed that there will be no HGV deliveries to or from the Site on a Saturday or Sunday except in an operational emergency and agreed in advance with the police. This is to reduce the impact of the project on vulnerable users that use the roads at weekends for leisure activities (i.e. cycle clubs, equestrians, ramblers etc). No HGV deliveries will take place on public holidays.

2.5 In ‘exceptional circumstances’, and following discussion with Lancashire Police, up to a maximum of nine single convoy deliveries or removals may be made outside of the specified hours provided they are carried out only in relation to the following work phases:

- c) Drilling of each of the four exploration wells;
- d) Hydraulic fracturing of each of the exploration wells;
- e) Flaring of gas during the initial flow test of each well;
- f) Installation of the gas pipeline and connection to the national grid.

2.6 Exceptional circumstances are defined in Section 3 of the draft Traffic Management Plan included as **Appendix C**.

DHFCS Inskip Route

- 2.7 The Secretary of State for Defence has agreed that Cuadrilla may route HGVs through the DHFCS Inskip facility. The DHFCS Inskip route enables HGVs to bypass the village of Wharles.
- 2.8 It is anticipated that use of the DHFCS Inskip part of the Red and Blue HGV Routes would be covered by an appropriate planning condition and Cuadrilla is prepared to commit to use of the DHFCS Inskip route for HGVs during all phases of the project other than the very low traffic during the extended flow test (EFT) phase, when HGVs would route via Wharles. HGVs would be limited to up to 6 two-way HGVs per day (i.e. 3 HGVs in and 3 HGVs out) via Wharles during the EFT phase.

Management of Roseacre HGVs

- 2.9 The Site Management Team will be fully aware of the timing and routes of all HGVs accessing/departing the Site. As such, the timing of HGV movements generated by the Site can be managed to mitigate the potential of HGVs encountering each other on the local road network. The details of the management of deliveries are set out in the draft Traffic Management Plan included as **Appendix C**. This is a draft document and is subject to further discussion and agreement with Lancashire County Council. However, a key principle is that a HGV will not be released onto one of the proposed HGV Routes to access the surrounding A roads whilst another HGV is travelling on that same HGV Route from the surrounding A roads.

Mobilisation/Demobilisation

- 2.10 Cuadrilla also proposes to limit the number of times mobilisation and demobilisation occurs over the course of the Project to no more than twice for the drilling rig and no more than twice for the hydraulic fracturing equipment. This will reduce the number of times that the peak HGV traffic flows are experienced.

Additional Mitigation

- 2.11 In most instances, the embedded mitigation will be sufficient to prevent any significant impacts from occurring. Where this is not the case the assessment process sets out additional mitigation to mitigate impacts. This is described later in this report.

3 ENVIRONMENTAL ASSESSMENT METHODOLOGY

- 3.1 The environmental transport impact assessment methodology employed in this section is informed by:
- The Guidelines for the Environmental Assessment of Road Traffic published by the Institute of Environmental Assessment in 1993 (now Institute of Environmental Management and Assessment (IEMA));
 - Volume 11 of the Design Manual for Road and Bridges (DMRB) (DfT 2008) - Environmental Assessment.
- 3.2 The IEMA guidelines advise the use of a 'check-list' of likely effects covering noise, vibration, visual impacts, severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation, accidents and safety, hazardous loads, air pollution, dust and dirt, ecological impact and heritage and conservation areas.
- 3.3 The guidelines acknowledge that for many developments, some of the impacts listed may not be relevant. For example, it is stated that most developments will not result in an increase in the number of movements of hazardous / dangerous loads.
- 3.4 This assessment deals only with those transport impacts likely to be relevant to the proposed development. It is not anticipated that the development will generate any hazardous or dangerous loads and therefore this element has not been included within the assessment. The transport impacts considered within this section comprise:
- Severance;
 - Driver delay;
 - Pedestrian delay;
 - Pedestrian amenity;
 - Fear and intimidation; and
 - Accidents and safety.
- 3.5 Within this assessment, the future baseline traffic conditions are compared with the future 'baseline plus development' traffic conditions to assess the impact of the proposed development traffic using EIA criteria.
- 3.6 Following the assessment of impacts, additional transport mitigation measures are described which assist in mitigating the potential impacts of the proposed development. An assessment of the residual impacts following implementation of these mitigation measures is then provided.

Assessing Significance

Screening Process

- 3.7 Within the IEMA guidance, two broad rules are suggested that can be used as a screening process to limit the scale and extent of the assessment:
- Rule 1: include highway links where traffic flows would increase by more than 30% (or the number of heavy goods vehicles would increase by more than 30%);
 - Rule 2: include any other specifically sensitive areas where traffic flows have increased by 10% or more.
- 3.8 Where the predicted increase in traffic flows is lower than the above thresholds, the IEMA guidelines suggest the significance of the effects can be stated to be negligible and further detailed assessments are not warranted. Furthermore, increases in traffic flows below 10% are generally considered to be insignificant in environmental terms given that daily variations in background traffic flow may vary by this amount.

Defining the Magnitude of Effects

- 3.9 To assist with the judgement of magnitude of impact, reference will be made to the IEMA guidelines. This guidance sets out consideration, and in some cases thresholds, in respect to changes in the volume and composition of traffic to facilitate a subjective judgement of traffic impact and significance. These thresholds are guidance only and provide a starting point by which a detailed analysis will inform a subjective analysis of the impact magnitude.
- 3.10 It is important to note that the impacts assessed are temporary, not permanent, and this affects the significance attached to them.
- 3.11 The following paragraphs describe the relevant factors in predicting the magnitude of change for each of the impacts considered in the ES assessment.

Severance

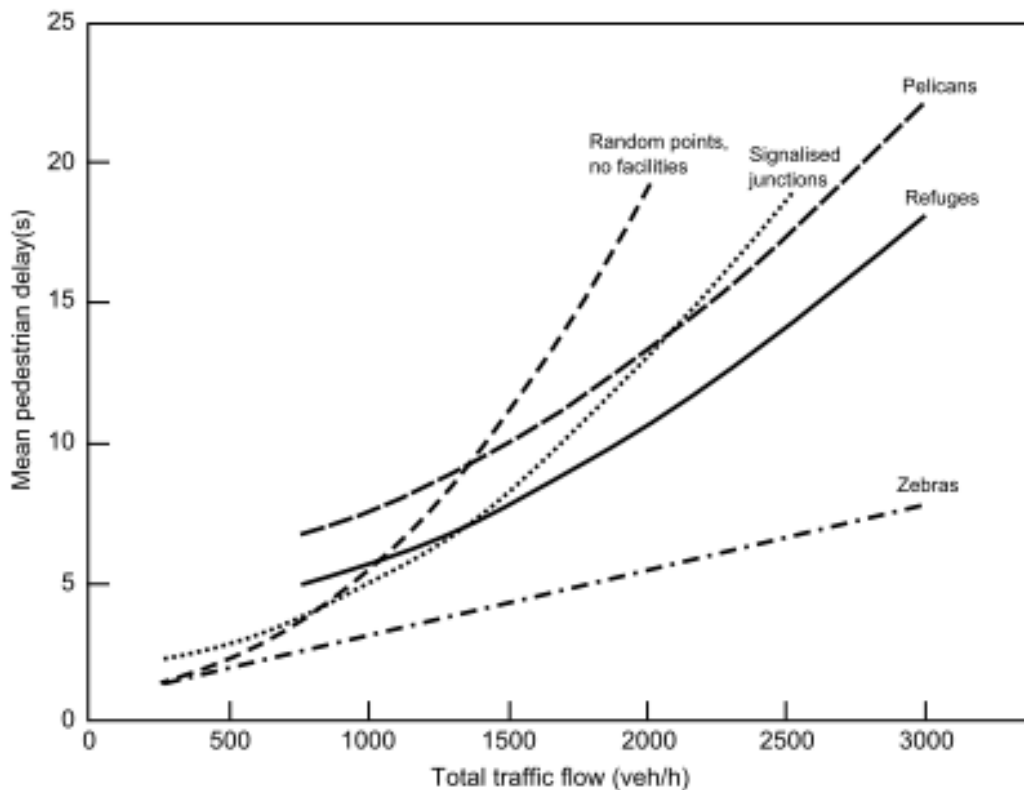
- 3.12 Severance is defined as the perceived division that can occur within a community when it becomes separated by a major traffic artery. It describes a series of factors that separate people from places and other people. Such division may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself.
- 3.13 The measurement and prediction of severance is difficult, but relevant factors include road width, traffic flow, speed, the presence of crossing facilities and the number of movements across the affected route.

- 3.14 IEMA guidelines refer to the Department of Transport's 'Manual of Environmental Appraisal', which suggests that changes in traffic flow of 30%, 60% and 90% would be likely to low, medium and high magnitude of impact on severance, respectively. It is advised that these broad indicators should be used with care and regard paid to specific local conditions.

Pedestrian Delay

- 3.15 IEMA guidelines note that changes in the volume, composition and or speed of traffic may affect the ability of people to cross roads. Typically, increases in traffic levels result in increased pedestrian delay, although increased pedestrian activity itself also contributes. The guidelines do not set any thresholds, recommending instead that assessors use their judgement to determine the significance of the impact.
- 3.16 The IEMA guidelines refer to a report published by the Transport Research Laboratory (TRL SR356, Goldschmidt, 1976) as providing a useful approximation for determining pedestrian delay. The TRL research concluded that mean pedestrian delay was found to be 8 seconds at flows of 1,000 vehicles per hour and below 20 seconds at 2,000 vehicles per hour for various types of crossing condition. This research has been reproduced in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 8. Figure 1 of Part 8 provides predictive mean pedestrian delay based on empirical data taking into account traffic flow and a range of parameters such as crossing width and vehicle speeds. This figure is shown in **Figure 3.1** below. The x axis is total traffic flow (veh/hr) and the y axis is mean pedestrian delay (seconds).

Figure 3.1 - Mean pedestrian delays associated with different road crossing situations



Pedestrian Amenity

- 3.17 IEMA guidelines define pedestrian amenity as the relative pleasantness of a journey and can include fear and intimidation if they are relevant. As with pedestrian delay, amenity is affected by traffic volumes and composition along with pavement width and pedestrian activity. The guidelines suggest thresholds of significance would be where the traffic flow is halved or doubled.

Fear and Intimidation

- 3.18 IEMA guidelines note that a further impact traffic may have on pedestrians is fear and intimidation. The impact of this is dependent upon the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths.
- 3.19 In the absence of commonly agreed thresholds, the IEMA guidelines provide a set of thresholds that could be used as a first approximation of the likelihood of fear and intimidation. The thresholds define the degree of hazard to pedestrians by average traffic flow, 18 hour HGV flow and average speed (mph) over an 18 hour day.

Driver Delay

- 3.20 IEMA guidelines note that driver delay can occur at several points on the network, although the effects are only likely to be significant when the traffic on the highway network is predicted to be at or close to the capacity of the system.

Accidents and Safety

- 3.21 IEMA guidelines do not include any definition in relation to accidents and safety, suggesting that professional judgement would be needed to assess the implications of local circumstance, or factors which may increase or decrease the risk of accidents. A safety assessment has been undertaken and has been used to derive the magnitude of the effect of the Roseacre Wood development on accidents and safety.

Criteria for Magnitude of Impact

- 3.22 For those links that are not screened out of the assessment using Rules 1 and 2, the criteria set out in **Table 3.1** has been used to determine the magnitude of impacts. However, the absolute level of an impact is also important (e.g. the total flow of traffic or HGVs on a link) and judgement is made on this in the analysis.

Table 3.1 – Magnitude of Impact Criteria

Impact	Magnitude of Impact			
	Very Low	Low	Medium	High
Severance	Change in total traffic or HGV flows of less than 30%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of 60-90%	Change in total traffic or HGV flows over 90%
Pedestrian Delay	Two way traffic flow < 1,400 vehicles per hour	A judgement based on the road links with two way traffic flow exceeding 1,400 vehicles per hour in context of the individual characteristics		
Pedestrian Amenity	Change in total traffic or HGV flows < 100%	A judgement based on the routes with >100% change in context of their individual characteristics		
Fear and Intimidation	18hr Ave of <600 veh/hr and <10 mph, <1,000 HGVs in 18 hr	18hr Ave of 600-1,200 veh/hr and 10-15 mph, 1,000-2,000 HGVs in 18 hr	18hr Ave of 1,200-1,800 veh/hr and 15-20 mph, 2,000-3,000 HGVs in 18 hr	18hr Ave of 1,800+ veh/hr and 20+ mph, 3,000+ HGVs in 18 hr
Driver Delay	A judgement based on analysis of Ratio of Flow to Capacity (RFC) of road links			
Accidents and Safety	A judgement based on quantitative analysis			

Significance of Impacts

- 3.23 The overall significance of an impact is determined by combining the site-specific sensitivity of the receptor and magnitude of effect. The impact significance matrix is illustrated in **Table 3.2**.

Table 3.2 – Impact Significance

Sensitivity of Receptor	Magnitude			
	High	Medium	Low	Very Low
High	Major	Major or Moderate	Moderate or Slight	Negligible
Medium	Major or Moderate	Moderate or Slight	Slight	Negligible
Low	Moderate or Slight	Slight	Slight	Negligible
Very Low	Negligible	Negligible	Negligible	Negligible

- 3.24 Potential impacts are therefore concluded to be of negligible, slight, moderate or major significance, and have been determined by professional judgement by an experienced transport consultant. Moderate and major significance effects (highlighted in grey in Table 3.2) are considered to be significant in EIA terms.

4 ENVIRONMENTAL TRANSPORT EFFECTS

4.1 This section summarises the environmental transport impact assessment of the proposed HGV Routing Strategy for Roseacre Wood.

Sensitivity Receptors

4.2 The sensitivity of a road can be defined by the vulnerability of the user groups who may use it, e.g. elderly people or children. A sensitive area may be where pedestrian activity is high, for example in the vicinity of a school or where there is already an existing accident issue. It should be noted that the sensitivity of the receptor is judged on the sensitivity of road users. It also takes account of the existing nature of the road e.g. an existing “A” road is likely to have a lower sensitivity than a minor residential road. **Table 4.1** below provides a summary of the types of receptors and the sensitivity of each one.

Table 4.1 – Sensitivity of Receptors

Receptor Sensitivity	Receptor Type
High	Receptors of greatest sensitivity to traffic flow: schools, colleges, playgrounds, accident clusters, retirement homes, urban/residential roads without footways that are used by pedestrians.
Medium	Traffic flow sensitive receptors: doctors’ surgeries, hospitals, shopping areas with roadside frontage, recreation facilities, cycle routes and roads used by pedestrians with narrow footways.
Low	Receptors with some sensitivity to traffic flow: places of worship, public open space, tourist attractions and roads with adequate footway provision.
Very Low	Receptors with very low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions.

4.3 A desktop exercise augmented by site visits has been undertaken to identify the sensitive receptors on roads to be used by HGVs. These roads have been assessed and assigned sensitivity primarily based on the criteria set out in **Table 4.1**, the level of vulnerable users and the assessors experience and judgement.

4.4 **Table 4.2** below summarises the sensitivity receptor assessment and the sensitivity that has been assigned to each road link to be used by HGVs to access the Site. Only the weekday has been considered when assigning sensitivity to the links as, as part of the embedded mitigation set out in Section 2, there will be no HGV deliveries on a Saturday

or Sunday, unless in the event of an operational emergency and with prior approval from the police.

Table 4.2 – Road Link Sensitivity

Road	Sensitive Receptor	Weekday Pedestrians (0700-1900)	Weekday Cyclists (0700-1900)	Individual Receptor Sensitivity	Road Sensitivity (based on highest individual receptor sensitivity)
B5269 Thistleton Road and Elswick High St	Burton House Stores	0	92	Medium	Medium
	The Ship pub			Low	
	Cycle route			Medium	
Roseacre Rd	No footways	5	88	Low	Medium
	Used by cyclists			Medium	
Higham Side Road	Inskip pre-school	2	55	High	High
	No footways			Low	
	Used by cyclists			Low	
Salwick Rd between Inskip Rd and Dagger Rd	No footways	7	51	Low	Low
	Used by cyclists			Low	
Dagger Rd	No footways	3	38	Low	Low
	Used by cyclists			Low	
Station Rd	Oakfield House School	22	51	High	High
	Keyes Barn School			High	
Clifton Lane and Lodge Lane	playground	30	39	High	High
	Used by cyclists			Low	
B5269 Lodge Lane	Used by cyclists	7	47	Low	Low
	No footways in part			Low	
	Church			Low	
B5269 Preston Road	Used by cyclists	4	33	Low	High
	No footway in parts			Low	
	Church			Low	
	Inskip St Peters Primary School			High	

Traffic Link Screening

- 4.5 **Tables 4.3 to 4.5** below summarise the traffic link screening for each of the proposed HGV Routes by applying Rules 1 and 2 of the screening process to the 12 hour weekday vehicle and HGV flows.
- 4.6 The screening has been undertaken based on 50 two-way HGV movements per day being generated by the Site at the peak construction phase. It is proposed that any of the three HGV Routes could be used for up to 50 two-way HGV movements per day but that the combined total HGV movements on all three routes would be no greater than 50 two-way HGV movements per day. Based on this, 50 two-way HGV movements have been assigned to each of the three HGV Routes as a worst-case scenario.
- 4.7 Those links that are highlighted in green have been screened out of the assessment. Those links highlighted in orange have triggered Rule 1 and those highlighted in red have triggered Rule 2.

Table 4.3 – Traffic Link Screening – Green Route via Elswick and Roseacre

Road	Link Sensitivity	Green Route					
		2017 Base		2017 Base + Dev		% Impact	
		12hr Weekday Vehicles	%HGV	12hr Weekday Vehicles	%HGV	% Veh	%HGV
B5269 Thistleton Road	Medium	2644	11%	2694	13%	2%	17%
Roseacre Road	Medium	628	8%	678	14%	8%	104%

Table 4.4 – Traffic Link Screening – Red Route via Elswick and Inskip

Road	Link Sensitivity	Red Route					
		2017 Base		2017 Base + Dev		% Impact	
		12hr Weekday Vehicles	%HGV	12hr Weekday Vehicles	%HGV	% Veh	%HGV
B5269 Thistleton Road	Medium	2644	11%	2694	13%	2%	17%
Higham Side Road	High	1076	11%	1126	15%	5%	42%
B5269 Lodge Lane	Low	1480	12%	1530	15%	3%	28%
B5269 Preston Road	High	1096	9%	1146	13%	5%	48%

Table 4.5 – Traffic Link Screening – Blue Route via Clifton and Dagger Road

Road	Link Sensitivity	Blue Route					
		2017 Base		2017 Base + Dev		% Impact	
		12hr Weekday Vehicles	%HGV	12hr Weekday Vehicles	%HGV	% Veh	%HGV
Higham Side Road	High	1076	11%	1126	15%	5%	42%
Salwick Road	Low	509	11%	559	19%	10%	88%
Dagger Road	Low	510	12%	560	20%	10%	84%
Station Road	High	822	10%	872	15%	6%	62%
Clifton Lane	High	2338	9%	2388	11%	2%	23%

Impact Assessment

- 4.8 For those links that have not been screened out of the assessment in **Tables 4.3 to 4.5** (those highlighted in orange and red) the criteria set out in **Table 3.1** earlier in this section has been used to determine the magnitude of impacts.
- 4.9 Moderate and major significance effects (highlighted in orange in the tables within this section) are considered to be significant in EIA terms and are considered further in terms of absolute level of an impact (e.g. the total HGVs on a road) and potential mitigation measures.

Severance

- 4.10 The IEMA guidance sets out indicators for determining the significance of severance based on changes in traffic flow of less than 30%, 30%-60%, 60%-90% and greater than 90% which are considered to be very low, low, medium and high magnitude of impact, respectively. A summary of severance impact assessment for each of the proposed HGV Routes is included in **Tables 4.6 to 4.8** below. Those links for each route that were sifted out in the initial Rule 1 and Rule 2 sift are not included in the following assessment.

Table 4.6 – Green Route - Severance Assessment

Green Route - Severance						
Road	Baseline Daily HGVs	Increase in Daily HDVs	% Increase in HDV	Sensitivity	Magnitude of Impact	Impact Significance
B5269 Thistleton Road	Screened Out					Negligible
Roseacre Road	48	50	104%	Medium	High	Major

- 4.11 Roseacre Road has a medium sensitivity as a result of the level of cyclists using the road (i.e. 88 cyclists over an average 12 hour weekday).
- 4.12 Roseacre Road between Elswick and the Site entrance has no footways along the road with the exception of the section within Elswick. At the point that the vulnerable user survey was undertaken there were no footways and only 5 pedestrians were observed to be walking along the road over a 12 hour period. There are no community facilities along the link and a small number of residential properties/farms along the link within Roseacre.

4.13 The IMEA guidance provides guidance on severance effects:

“Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. It can also relate to quite minor traffic flows if they impede pedestrian access to essential facilities. Severance effects could equally be applied to residents, motorists or pedestrians.”

4.14 The total traffic increase on Roseacre at peak construction (all vehicles) as a result of Roseacre Wood would only be 8% (i.e. from 628 two-way vehicles to 678 two-way vehicles). Even with the development traffic, this provides an average vehicular flow of 57 two-way vehicles an hour or circa 1 vehicle per minute. It is considered that this low level of traffic would not create a difficulty for pedestrians to cross the road. In addition, the observed traffic count data shows that OGV2 vehicles on the Roseacre Road link have an average speed of 27-31 mph. It is therefore considered that the severance effect of the increase in OGV2s would be **slight adverse**.

Table 4.7 – Red Route - Severance Assessment

Red Route - Severance						
Road	Baseline Daily HGVs	Increase in Daily HDVs	% Increase in HDV	Sensitivity	Magnitude of Impact	Impact Significance
B5269 Thistleton Road	Screened Out					Negligible
B5269 Lodge Lane						Negligible
B5269 Preston Road	103	50	48%	High	Low	Moderate
Higham Side Road	119	50	42%	High	Low	Slight

4.15 B5269 Preston Road has a high sensitivity as a result of Inskip St Peters primary school. There is a footway on the southern side of the road that connects the school to Inskip village to the east. There are no footways to the west of the school.

4.16 In the context of the surrounding road network, B5269 Preston Road currently carries a reasonable level of traffic per average 12 hr weekday (i.e. 1,096 two-way vehicles, of which 103 are two-way HGVs). The addition of the Roseacre traffic is expected to add up to 5% of traffic at peak times of the project and less at lower traffic generation phases.

4.17 Notwithstanding this, given the presence of the school, and the increase in HGVs along the route, it is considered that vulnerable users may experience a perceived increase in

severance as a result of the increase in OGV2s on the road. Additional mitigation of the OGV2s is therefore proposed. Roseacre Wood HGVs would not route via B5269 Preston Road during the school drop off and pick up hours (i.e. 08:00-09:00 and 15:00-16:00). This restriction will only be in place during school term time. This will reduce the impact of severance on B5269 Preston Road to **slight adverse**.

Table 4.8 – Blue Route - Pedestrian Severance Assessment

Blue Route - Severance						
Link	Baseline Daily HGVs	Increase in Daily HDVs	% Increase in HDV	Sensitivity	Magnitude of Impact	Impact Significance
Higham Side Road	119	50	42%	High	Low	Slight
Salwick Road	57	50	88%	Low	Medium	Slight
Dagger Road	60	50	84%	Low	Medium	Slight
Station Road	81	50	62%	High	Medium	Moderate
Clifton Lane	219	50	23%	High	Very Low	Negligible

4.18 The sensitivity receptors on Station Road that result in the high sensitivity are two schools:

- Oakfield House School, a primary school for children with special educational needs; and
- Keyes Barn School, a school for boys aged 5-12 with Social, Emotional and Mental Health difficulties (SEMH).

4.19 These are specialist schools for children with special educational needs and, based on telephone conversations with both schools, all of the pupils travel to/from school by vehicle. None of the children walk or cycle to school.

4.20 Given this, the sensitivity of this link should be downgraded from high to low, which would result in a **slight adverse** impact.

Driver Delay

4.21 In order to assess the potential effect of the increase in traffic on the highway network as a result of the development traffic the following exercise has been undertaken:

- Estimate the capacity of each road to be used by HGVs, based on the capacity calculations contained in Annex D of DMRB TA 46/97. Capacity is the maximum hourly lane throughput and is calculated as $Capacity = (A - B * Pk\%H)$ where A = 1380 for 7.3m wide single carriageways and B = 15 and Pk%H is the percentage of

HGVs in the peak hour. The 'A' value has been adjusted based on the average carriageway width of roads along each HGV Route as they roads are less than 7.3m wide.

- Calculate the ratio of flow to capacity (RFC) of each link to ascertain the spare capacity on each link when the peak construction traffic (50 two-way HGVs) is assigned to it.

4.22 The assessment is included within **Table 4.9** and demonstrates that all of the links have an RFC of 11% or less, with the addition of the peak construction traffic. It is therefore considered that the roads to be used by HGVs currently operate and would continue to operate with a lot of spare capacity and that the impact of the development on driver delay would be **negligible**. This has been augmented by site visits of the proposed HGV Routes.

Table 4.9 Driver Delay and Flow Capacity

Road	Average Road Width	'A' value based on carriageway width ratio to 7.3m	Link Capacity			Base + Dev AM Peak Hour Flow (two-way) veh	Base + Dev PM Peak Hour Flow (two-way) veh	AM Peak RFC	PM Peak RFC
			Peak Hour HGVs	Link Capacity (Single Lane)	Link Capacity (Two Way)				
B5269 East of Elswick	7.22	1365	13%	1363	2726	296	292	11%	11%
Roseacre Road	5.20	983	9%	982	1963	86	98	4%	5%
Higham Side Road	5.51	1042	13%	1040	2079	135	148	6%	7%
Salwick Road	5.51	1042	13%	1040	2079	83	76	4%	4%
Dagger Road	5.22	987	13%	985	1970	77	76	4%	4%
Station Road	6.51	1231	10%	1229	2458	102	101	4%	4%
Clifton Lane	7.27	1374	9%	1373	2746	284	234	10%	9%
B5269 Lodge Lane	4.6	870	12%	868	1736	178	182	10%	10%
B5269 Preston Road	4.6	870	9%	868	1736	140	149	8%	9%

4.23 Further to the above analysis, the junction of the A585 Fleetwood Road and Thistleton Road has been examined in more detail. The junction forms part of the Strategic Road Network (SRN) and has a protective right-turn ghost island and left turn deceleration lane on the A585. The junction has good visibility in all directions and is considered to be suitable for use by HGVs. The proposed HGV delivery hours of the project are weekdays 07:30 – 18:30. The HGV delivery hours will coincide with the weekday AM and PM peak hours. However, the HGVs would be generated throughout the day and not concentrated around the peak hours. As such, the forecast traffic generated by the development represents a very small proportional increase on the existing flows at this junction. Therefore, it is considered that no discernible impact upon driver delay would arise and the impact would be **negligible**.

Pedestrian Delay

- 4.24 The IEMA guidelines refer to a report published by the Transport Research Laboratory (TRL SR356, Goldschmidt, 1976) as providing a useful approximation for determining pedestrian delay. The TRL research concluded that mean pedestrian delay was found to be 8 seconds at flows of 1,000 vehicles per hour and below 20 seconds at 2,000 vehicles per hour for various types of crossing condition. This research has been reproduced in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 8.
- 4.25 The baseline traffic data for each link has been interrogated to derive the weekday network peak hour of the study area. The network peak hour is 16:00-17:00 as demonstrated in **Table 4.10** below, which sums all two-way traffic flows on each link within the study area for each hour of the average weekday.

Table 4.10 – Derivation of Weekday Network Peak Hour

Time	Sum of All Baseline Vehicles Proposed to be used by HGV Routes
00:00-01:00	35
01:00-02:00	18
02:00-03:00	19
03:00-04:00	17
04:00-05:00	30
05:00-06:00	80
06:00-07:00	413
07:00-08:00	924
08:00-09:00	1157
09:00-10:00	767
10:00-11:00	701
11:00-12:00	729
12:00-13:00	815
13:00-14:00	804
14:00-15:00	857
15:00-16:00	1097
16:00-17:00	1263
17:00-18:00	1131
18:00-19:00	860
19:00-20:00	534
20:00-21:00	361
21:00-22:00	251
22:00-23:00	177
23:00-00:00	89

4.26 **Table 4.11** below summarises the baseline weekday peak hour two-way vehicle flows for each link. In order to provide a highly robust assessment of pedestrian delay 50% of the peak daily two-way HGV flow of 50 HGV movements has been applied to each link assuming that they would all route along the links within a single hour. In reality, the HGVs would be distributed throughout the day. The development flows have then been added to the baseline flows to provide Base + Development traffic flows (two-way) for each link in the peak hour of 16:00 – 17:00.

Table 4.11 – Weekday Peak Hour Flows by Link

Route	Road	Link Sensitivity	Two-way Vehicles		
			Baseline Traffic Flow Peak Hour (1600-1700)	Roseacre Traffic (50% Daily traffic within a single hour)	Base + Dev Traffic
Green Route	B5269 Thistleton Road	Medium	Screened Out		
	Roseacre Road	Medium	76	25	101
Red Route	B5269 Thistleton Road	Medium	Screened Out		
	B5269 Lodge Lane	Low	Screened Out		
	B5269 Preston Road	High	119	25	144
	Higham Side Road	High	112	25	137
Blue Route	Higham Side Road	High	112	25	137
	Salwick Road	Low	64	25	89
	Dagger Road	Low	64	25	89
	Station Road	High	102	25	127
	Clifton Lane	High	276	25	301

4.27 **Table 4.11** demonstrates that the road with the highest peak hour vehicular flows is Clifton Lane, with a two-way flow of 276 vehicles. There are no controlled pedestrian crossing facilities on Clifton Lane and therefore, based on **Figure 3.1**, pedestrians currently may experience a delay of 1-2 seconds to cross the road.

4.28 Even if 25 two-way HGVs were assigned to this link in a single hour, which is far more concentrated than the actual vehicular profile, then the traffic flow would only increase to 301 two-way vehicles per hour. Based on **Figure 3.1**, there would be no discernible difference in the delay for pedestrians to cross the road, with and without the development traffic.

4.29 Based on this assessment, it is considered that the Roseacre Wood development would have a **negligible** impact on pedestrian delay.

Pedestrian Amenity

- 4.30 IEMA guidelines define pedestrian amenity as the relative pleasantness of a journey and can include fear and intimidation if they are relevant. As with pedestrian delay, amenity is affected by traffic volumes and composition along with pavement width and pedestrian activity. The guidelines suggest thresholds of significance would be where the traffic flow is halved or doubled.
- 4.31 **Table 4.12** summarises the percentage increase in traffic for the average weekday (12 hour weekday from 07:00-19:00). This is based 50 two-way development HGVs being assigned to each link.

Table 4.12 – Pedestrian Amenity Assessment (12 hr Weekday Traffic)

Route	Road	Link Sensitivity	Two-way Vehicles			Percentage Change
			Baseline Traffic Flow (0700-1900)	Daily Dev Traffic	Base + Dev Traffic	
Green Route	B5269 Thistleton Road	Medium	Screened Out			
	Roseacre Road	Medium	628	50	678	8%
Red Route	B5269 Thistleton Road	Medium	Screened Out			
	B5269 Lodge Lane	Low	Screened Out			
	B5269 Preston Road	High	1096	50	1146	5%
	Higham Side Road	High	1076	50	1126	5%
Blue Route	Higham Side Road	High	1076	50	1126	5%
	Salwick Road	Low	509	50	559	10%
	Dagger Road	Low	510	50	560	10%
	Station Road	High	822	50	872	6%
	Clifton Lane	High	2338	50	2388	2%

- 4.32 **Table 4.12** demonstrates that over the course of the day the maximum increase in daily traffic would be 10% on Salwick Road and Dagger Road. All other links would have less than 10% increase in traffic.
- 4.33 It is considered that the low percentage increase in traffic on all links proposed to be used by HGVs would result in a **slight adverse** impact on pedestrian amenity.

Fear and Intimidation

- 4.34 IEMA guidelines note that a further impact traffic may have on pedestrians is fear and intimidation. The impact of this is dependent upon the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths.

- 4.35 In the absence of commonly agreed thresholds, the IEMA guidelines provide a set of thresholds that could be used as an approximation of the likelihood of pedestrian fear and intimidations. The thresholds define the degree of hazard to pedestrians by average traffic flow, 18 hour HGV flow and average speed (mph) over an 18 hour day.
- 4.36 A very low level of fear and intimidation is if a road link has less than an 18 hour average flow of 600 vehicles per hour and less than 1,000 HGVs in the 18 hour period. The threshold used to assess a low magnitude of fear and intimidation is taken as a link having an 18 hour average flow of 600-1,200 vehicles per hour and 1,000-2,000 HGVs in the 18 hour period. The threshold used to assess a medium magnitude of fear and intimidation is taken as a link having an 18 hour average flow of 1,200-1,800 vehicles per hour and 2,000-3,000 HGVs in the 18 hour period. A high magnitude of fear and intimidation is taken as a link having an 18 hour average flow of over 1,800 vehicles per hour and over 3,000 HGVs in the 18 hour period.
- 4.37 All of the links within the study area have been assessed using these thresholds to determine what the level of fear and intimidation would be with the increase in traffic flows as a result of the Roseacre Wood project and the results are summarised in **Table 4.13** below.

Table 4.13 - Fear and Intimidation Magnitude of Impact

Route	Road	Base + Development				
		18hr AAWT Vehicles	Average Hourly Vehicular Traffic	Magnitude of Impact (Vehicles)	18 hr AAWT HGVs	Magnitude of Impact (HGVs)
Green Route	B5269 Thistleton Road	Screened Out				
	Roseacre Road	767	43	Very Low	103	Very Low
Red Route	B5269 Thistleton Road	Screened Out				
	B5269 Lodge Lane	Screened Out				
	B5269 Preston Road	1293	72	Very Low	160	Very Low
	Higham Side Road	1279	71	Very Low	181	Very Low
Blue Route	Higham Side Road	1279	71	Very Low	181	Very Low
	Salwick Road	646	36	Very Low	112	Very Low
	Dagger Road	645	36	Very Low	114	Very Low
	Station Road	1029	57	Very Low	141	Very Low
	Clifton Lane	2796	155	Very Low	288	Very Low

- 4.38 Given that the magnitude of impact is very low for all of the roads, the significance of the impact on fear and intimidation is **negligible**, regardless of the sensitivity of the road.

Accidents and Safety

4.39 This section considers the accident and safety effects of the proposed HGV Routes. The assessment considers the potential highway safety concerns associated with each route during the 12 hour weekday assessment period (07:00 – 19:00) of the Site. There will be no HGV deliveries to Site on weekends except in emergencies and with the prior approval of the police. As such, only the 12 hour weekday period has been considered within this assessment

Green Route – via Elswick and Roseacre

4.40 There have been no accidents involving a HGV along the Green Route in the last five years.

4.41 No fatal accidents have occurred along the Green Route in the last five years. During this period, one serious accident occurred and five slight accidents. The serious accident, which occurred at the A585 Fleetwood Road/B5269 Thistleton Road priority junction, was the result of a vehicle pulling out from Thistleton Road in front of a motorcycle, causing the motorcycle to lose control.

4.42 Two of the accidents which resulted in a slight injury involved a vulnerable user. The first slight accident, which occurred close to the junction of Roseacre Road/Sycamore Close, was the result of a child running into the road and colliding with an oncoming vehicle. The second slight accident occurred at the Thistleton Road/Meagles Lane junction and involved a cyclist. The accident was the result of a car pulling out of Meagles Lane, failing to see and subsequently colliding with an oncoming cyclist.

4.43 From a review of the accident data there does not appear to be any recurring causation factors or concentration of accidents at a particular location on the Green Route.

4.44 There is an average of 92 two-way cyclists over the 12 hour weekday period, 0 equestrians and 1 pedestrian using B5269 Thistleton Road section of the Green Route (refer to **Table 1.1**). The observed pedestrian data reflects the position of the survey location to the west of Elswick. It is acknowledged that more pedestrians would be anticipated within the centre of Elswick, where footways are provided on both sides of the High Street. There is an average of 88 two-way cyclists over the 12 hour weekday period, 0 equestrians and 5 pedestrians using the Roseacre Road part of the Green Route.

4.45 **Table 1.1** also indicates that 259 OGV1s and 30 OGV2s were observed using the B5269 Thistleton Road during the 12 hour weekday period and 42 OGV1s and 6 OGV2s using Roseacre Road. Of the 289 two-way HGVs using B5269 Thistleton Road, there are an

average of 15 two-way tractors (neutral month) and 85 two-way tractors during the harvest period. For Roseacre Road, of the 48 two-way HGVs, 22-23 two-way movements are undertaken by tractors.

- 4.46 Assuming a worst case that all of the peak 50 two-way OGV2 are assigned to the Green Route, the OGV2 would increase to a maximum of 80 two-way OGV2 per day (40 OGV2 in each direction) on B5269 Thistleton Road and 56 two-way OGV2 per day (28 OGV2 in each direction) on Roseacre Road.
- 4.47 The speed data summarised within **Table 4.14** indicates that average observed speeds are significantly lower than the permitted speed limit (derestricted single carriageway) at the location of the surveys for both B5269 Thistleton Road and Roseacre Road. The 85th percentile speeds are also lower than the speed limit for all roads on the Green Route. The data indicates that OGV2s have the lowest observed average speed on both these roads, with an average speed of 22-31 mph compared to the speed limit for HGVs over 7.5 tonnes of 50mph.

Table 4.14: Green Route – Average and 85th Percentile Vehicle Speeds

Link	Direction	Average Speed (mph) 12 hour Weekday (07:00 – 19:00)			85 th Percentile Speeds (mph)
		CAR/LV	OGV1	OGV2	All Vehicles
B5269 Thistleton Road	Eastbound	26	24	22	31
	Westbound	29	30	25	34
Roseacre Road	Northbound	33	35	31	45
	Southbound	34	35	27	45

- 4.48 Swept path analysis of the Green Route has been undertaken to establish which parts of the route may be too narrow for two OGV2s (16.5m 6 axle articulated vehicle) to pass. **Drawing 172806/R/G01** shows the extent of the route and references which drawings to refer to for the swept path analysis. Drawings 172806/R/G02 to 172806/R/G10 are included as **Appendix D**.
- 4.49 A summary of the drawings for the Green Route is as follows:
- **Junction of A585/B5269 Thistleton Road (Drawing 172806/R/G02):** the swept path analysis demonstrates that an OGV2 can safely turn into and out of this junction from all directions.
 - **Junction of B5269 Thistleton Road (Drawing 172806/R/G02):** the assessment demonstrates that OGV2s travelling from the A585 along B5269 eastbound would need to encroach onto the opposite side of the carriageway to turn left. In rural road networks such as this it is common for HGVs to encroach onto the opposite

carriageway to travel through a junction. HGV drivers are experienced in undertaking manoeuvres such as this and do so at slow speed.

- **B5269 between Thistleton and Elswick (Drawing 172806/R/G03):** the assessment shows that OGV2s have sufficient carriageway width to pass along this stretch of road. There are two bends along this stretch of roads whereby two OGV2 would not be able to pass at the same time. The first bend shown on Drawing 172806/R/G03 is approximately half way between Elswick and Thistleton. There is good forward visibility between oncoming OGV2. There is also a potential HGV overrun area around the bend. The second bend shown on Drawing 172806/R/G03 is at the approach into Elswick from the west. Two HGVs (i.e. not just OGV2 but also OGV1) cannot pass around the bend at the same time. There is an average of 289 HGVs per 12 hour weekday using this bend and there have been no accidents recorded in the last 5 years at this junction involving any type of vehicle.
- **Roseacre Road, Elswick (Drawing 172806/R/G04):** the assessment shows that at the junction of Elswick High Street and Roseacre Road, the OGV2 turning left from Roseacre Road would need to give way to oncoming OGV2 before making the manoeuvre. There have been no accidents at this junction in the last 5 years.
- **Roseacre Road (Drawings 172806/R/G04 – G10):** a series of passing places are proposed along Roseacre Road and the proposed location and design of the passing places are shown on the drawings.

Red Route – via Elswick and Inskip

- 4.50 There have been no accidents involving a HGV along the Red Route in the last five years.
- 4.51 No fatal accidents have occurred along the Red Route in the last five years. During this period, one serious accident occurred and six slight accidents. The serious accident (same as for the Green Route) occurred at the A585 Fleetwood Road/B5269 Thistleton Road priority junction and was the result of a vehicle pulling out from Thistleton Road in front of a motorcycle, causing the motorcycle to lose control.
- 4.52 Two of the accidents which resulted in a slight injury involved a vulnerable user. The first slight accident occurred at the Thistleton Road/Meagles Lane junction and involved a cyclist. The accident was the result of a car pulling out of Meagles Lane, failing to see and subsequently colliding with an oncoming cyclist. The second slight accident occurred on B5269 Lodge Lane and involved a cyclist. The accident was the result of a tractor travelling slowly through temporary lights at the same time as a cyclist cycling through the coded off area. The cyclist misjudged the space and the tractor trailer caught the cyclist and the cyclist fell into the groundworks.

- 4.53 From a review of the accident data there does not appear to be any recurring causation factors or concentration of accidents at a particular location on the Red Route.
- 4.54 The highest number of cyclists along the Red Route was observed on B5269 Thistleton Road (92 two-way cyclists over the 12 hour weekday period). No equestrians were observed on the Red Route. Pedestrian flows were observed to be low, with the highest observed pedestrian flows to be 7 pedestrians on Lodge Lane over a 12 hour period. However, the observed pedestrian data reflects the position of the survey location, particularly in Elswick and Inskip and it is acknowledged that more pedestrians would be anticipated within the centre of Elswick and Inskip, where footways are provided.
- 4.55 **Table 1.2** also indicates that the highest number of HGVs on the Red Route was observed on B5269 Thistleton Road (259 OGV1s and 30 OGV2s over 12 hours). The highest number of tractors was also observed at this location of the Red Route. Of the 289 two-way HGVs using B5269 Thistleton Road, there are an average of 15 two-way tractors (neutral month) and 85 two-way tractors during the harvest period.
- 4.56 The speed data summarised within **Table 4.15** indicates that average observed speeds are significantly lower than the permitted speed limit (derestricted single carriageway) at the location of all of the surveys on the Red Route. The 85th percentile speeds are also lower than the speed limit for all roads on the Red Route. The data indicates that OGV2s have the lowest observed average speed on all of the roads on the Red Route, with average speeds of 22-40 mph compared to the speed limit for HGVs over 7.5 tonnes of 50mph.

Table 4.15: Red Route – Average and 85th Percentile Vehicle Speeds

Link	Direction	Average Speed (mph)			85 th Percentile Speed
		12 hour Weekday (07:00 – 19:00)			(mph)
		CAR/LV	OGV1	OGV2	All Vehicles
B5269 Thistleton Road	Eastbound	26	24	22	31
	Westbound	29	30	25	34
B5269 Lodge Lane	Eastbound	33	33	31	42
	Westbound	35	33	32	43
B5269 Preston Road	Eastbound	34	32	30	43
	Westbound	31	29	26	38
Higham Side Road	Northbound	40	38	36	57
	Southbound	41	41	40	56

- 4.57 Swept path analysis of the Red Route has been undertaken to establish which parts of the route may be too narrow for two OGV2s (16.5m 6 axle articulated vehicle) to pass. **Drawing 172806/R/R01** shows the extent of the route and references which drawings to

refer to for the swept path analysis. Drawings 172806/R/R02 to 172806/R/R11 are included as **Appendix E**.

4.58 A summary of the drawings for the Red Route is as follows:

- **Junction of A585/B5269 Thistleton Road (Drawing 172806/R/R02):** same comments as for Green Route
- **Junction of B5269 Thistleton Road (Drawing 172806/R/R02):** same comments as for Green Route
- **B5269 between Thistleton and Elswick (Drawing 172806/R/R03):** same comments as for Green Route
- **B5269 Lodge Lane west (Drawing 172806/R/R04):** the assessment shows that there is sufficient carriageway width on B5269 Lodge Lane to accommodate two OGV2 working. There is a short section of 70m of slightly reduced carriageway width (typically 5.3m) whereby OGV2 would need to slow down and give way to each other. There is good forward visibility to enable this to happen safely. The surveys show that 177 two-way HGVS use this stretch of road during a 12 hour weekday and there are no recorded accidents involving HGVs.
- **B5269 Lodge Lane east (Drawing 172806/R/R05):** the assessment shows that there is good inter-visibility on a double bend on Lodge Lane. There have been no accidents involving HGVs passing at this double bend. There has been one slight accident involving a car travelling around the double bend and the slippery road conditions resulted in the car crashing into a tree. No additional mitigation is proposed beyond the embedded mitigation.
- **Junction of B5269 Lodge Lane /B5269 Preston Road (Drawing 172806/R/R06):** the assessment shows that OGV2s would need to give way to each other at the junction of B5269 Lodge Lane and Preston Road. Whilst this is considered safe practice, given the proximity of the junction to the bend on Preston Road, it is proposed to provide an overrun strip on Preston Road to provide a greater area for HGVs to turn.
- **B5269 Preston Road (Drawings 172806/R/R07 and R08):** the assessment shows a series of proposed passing places to enable two-way OGV2 working along this stretch of Preston Road. Existing hardstanding areas are also proposed to be used as passing places.
- **B5269 Preston Road, Inskip (Drawing 172806/R/R09):** the assessment shows that this stretch of Preston Road is capable of two-way OGV2 working. There is a bend in Preston Road within Inskip that has poor forward visibility around the bend. There have been no accidents at this location involving any types of vehicles, including

HGVs despite 177 two-way HGVs using Preston Road per day. Notwithstanding this, a convex mirror could be installed at this bend to facilitate visibility around the bend.

- **Junction of Preston Road/Higham Side Road (Drawing 172806/R/R09):** the assessment shows that HGVs turning left from Higham Side Road into Preston Road would need to encroach the opposite side of the road. Drivers would have good visibility on Preston Road before making this manoeuvre.
- **Higham Side Road (Drawing 172806/R/R10 and R11):** the assessment shows a series of proposed passing places along Higham Side Road to enable two-way OGV2 working.

Blue Route – via Clifton and Dagger Road

- 4.59 There have been no accidents involving a HGV along the Blue Route in the last five years.
- 4.60 No fatal or serious accidents have occurred along the Blue Route in the last five years. During this period, eight slight accidents occurred.
- 4.61 Of the eight slight accidents only one involved a vulnerable user. A cyclist was riding her bike as part of a large group and the group stopped sharply for a vehicle exiting the Hand and Dagger junction. The cyclist collided with other cyclists in front of her causing scratches and bruises to her legs.
- 4.62 From a review of the accident data there does not appear to be any recurring causation factors or concentration of accidents at a particular location on the Blue Route.
- 4.63 The highest number of cyclists along the Blue Route was observed on Higham Side Road (55 two-way cyclists over the 12 hour weekday period). No equestrians were observed on the Blue Route. Pedestrian flows were observed to be low on the northern part of the route (i.e. to the north of the Hand and Dagger junction the peak pedestrian flow was 7 two-way pedestrians in 12 hours). Pedestrian activity is greater on the southern part of the Blue Route, with a peak of 30 two-way pedestrians on Clifton Lane over a 12 hour period. Greater pedestrian flows correspond to a higher concentration of population and a greater level of infrastructure is provided (i.e. footways on at least one side of the road).
- 4.64 **Table 1.3** also indicates that the highest number of HGVs on the Blue Route was observed on Clifton Lane (187 OGV1s and 33 OGV2s over 12 hours). The highest number of tractors was observed on Dagger Road (of the 60 two-way daily HGVs, 29 were tractors in the neutral period and 12 in the harvest period).

4.65 The speed data summarised within **Table 4.16** indicates that average observed speeds are significantly lower than the permitted speed limit (derestricted single carriageway) at the location of all of the surveys on the Blue Route. The 85th percentile speeds are also lower than the speed limit for all roads on the Blue Route. The data indicates that OGV2s have the lowest observed average speed on all of the roads on the Blue Route, with average speeds of 18-40 mph compared to the speed limit for HGVs over 7.5 tonnes of 50mph.

Table 4.16: Blue Route - Average and 85th Percentile Vehicle Speeds

Link	Direction	Average Speed (mph)			85 th Percentile Speed (mph)
		12 hour Weekday (07:00 – 19:00)			All Vehicles
		CAR/LV	OGV1	OGV2	
Higham Side Road	Northbound	40	38	36	57
	Southbound	41	41	40	56
Salwick Road	Northbound	39	37	33	53
	Southbound	39	36	32	51
Dagger Road	Northbound	21	20	18	27
	Southbound	23	20	20	29
Station Road	Northbound	36	37	35	47
	Southbound	36	38	32	48
Clifton Lane	Northbound	31	29	28	39
	Southbound	28	29	27	37

4.66 Swept path analysis of the Blue Route has been undertaken to establish which parts of the route may be too narrow for two OGV2s (16.5m 6 axle articulated vehicle) to pass. **Drawing 172806/R/B01** shows the extent of the route and references which drawings to refer to for the swept path analysis. Drawings 172806/R/B02 to 172806/R/B14 are included as **Appendix F**.

4.67 A summary of the drawings for the Blue Route is as follows:

- **Junction of A583/Lodge Lane (Drawing 172806/R/B02):** the swept path analysis demonstrates that an OGV2 can safely turn into and out of this junction from all directions.
- **Lodge Lane, Clifton (Drawing 172806/R/B03):** the assessment shows that Lodge Lane can accommodate two-way OGV2 working. There is a pinch point where the carriageway narrows to 5.63m but this is for a very short section and HGVs have good forward visibility to slow and give way to each other.
- **Clifton Lane (Drawing 172806/R/B04):** the assessment highlights a potential pinch point on Clifton Lane around the bend immediately to the north of Meadow Close. HGVs have good forward visibility to slow and give way to each other.

- **Station Road southern section (Drawing 172806/R/B05):** the assessment identifies a potential pinch point on Station Road. Given the short distance over which an OGV2 would straddle the centreline, it is proposed to install signage alerting vehicles to the upcoming bend in the road and the potential for oncoming vehicles to be travelling in the middle of the carriageway. The proposed signage and potential locations is shown on the drawing. Low observed speeds would allow OGV2 to give way.
- **Station Road south of railway station (Drawing 172806/R/B06):** the assessment identifies a slight kink in the road, whereby HGVs may need to slow down and give way to each other. HGVs are afforded good forward visibility.
- **Station Road north of railway station (Drawing 172806/R/B07):** the assessment shows that two-way working of OGV2 around the bends to the north of Salwick station is not possible. However, 120m of forward visibility can be achieved between oncoming OGV2s. Appropriate signage is already in place in the northbound direction but no signage warning of the bends in the road is provided in the southbound direction. Additional signage is proposed to be provided.
- **Station Road (Drawing 172806/R/B08):** the assessment shows that two-way working of OGV2 at the bend to the north of Salwick station is not possible. However, circa 50m of forward visibility can be achieved between oncoming OGV2s, which will enable HGVs to give way to each other around the bend.
- **Station Road south of Hand and Dagger junction (Drawing 172806/R/B09):** the assessment shows a narrow section of road just to the south of the Hand and Dagger junction. There is good forward visibility. Signage is proposed to be provided.
- **Junction of Station Road/Treales Road at Hand and Dagger (Drawing 172806/R/B10):** assessment shows OGV2s turning left from Station Road into Treales Road will encroach onto the opposite side of the carriageway. Likewise, OGV2 turning at the Dagger Road/Treales Road junction will encroach the opposite side of the carriageway. There is good visibility and there have been no accidents at this junction involving HGVs.
- **Dagger Road (Drawing 172806/R/B11 and B12):** a series of passing places are proposed along Dagger Road. In addition, it is proposed to provide temporary traffic signals on a section of Dagger Road that does not have sufficient width for two HGVs to pass or sufficient verge width to provide passing places. The traffic signals would only be activated when two HGVs are travelling on Dagger Road at the same time and in the opposite direction. The proposed layout and passing places at either end of the temporary traffic signals is shown in Drawing 172806/R/B12.
- **Salwick Road (Drawing 172806/R/B13):** a series of passing places are proposed along Salwick Road to enable OGV2 to pass safely.

- **Junction of Salwick Road / Inskip Road (Drawing 172806/R/B14):** the assessment shows that the junction of Salwick Road and Inskip Road can operate for two OGV2s. Left turning OGV2 would be able to give way to right turning OGV2 or OGV2 can manoeuvre past each other at the junction.

Drilling Mobilisation and Demobilisation Swept Path Analysis

- 4.68 As set out in Section 1, for the drill mobilisation and demobilisation there will be a need for a small number of deliveries to be made on larger articulated low loader vehicles.
- 4.69 Separate swept path analysis has been undertaken for the junctions on the HGV Routes using a 7-axle articulated low loader vehicle. The road links between the junctions have not been assessed as the roads would be cleared ahead of these deliveries being made.
- 4.70 Drawings 172806_AT_G01 – G03, 172806_AT_R01 – R03 and 172806_AT_B01 – 04 included in **Appendix G** show the swept path analysis. The assessment demonstrates that a 7 axle articulated low loader can manoeuvre through all of the junctions on the HGV Routes. The vehicles would be escorted along the HGV Routes.

Summary of Environmental Transport Effects

Summary of Mitigation

- 4.71 A summary of the proposed mitigation in addition to the embedded mitigation is as follows:
- **Green Route:** passing places to be provided on Roseacre Road
 - **Red Route:** passing places to be provided on B5269 Preston Road and Higham Side Road as well as a convex mirror at a bend on Preston Road. Roseacre Wood HGVs will not route via the Red Route during the school drop off and pick up hours (i.e. 0800-0900 and 1500-1600) in order to avoid the school sensitive hours.
 - **Blue Route:** additional warning signage to be provided on Station Road. Passing places to be provided on Dagger Road and Salwick Road. Temporary traffic signals to be provided on a section of Dagger Road, which would only be activated when two OGV2 travel along Dagger Road in opposite directions.

Summary of Residual Effects

- 4.72 All of the environmental transport effects are either not significant or, where they are significant can be managed and mitigated. A summary of the residual transport effects are:

- **Severance:** The effects of the HGV Routes on severance on the roads to be used by HGVs are concluded to be **slight adverse**.
- **Driver Delay:** The effects of the HGV Routes on driver delay on the roads to be used by HGVs are concluded to be **negligible**.
- **Pedestrian Delay:** The effects of the HGV Routes on pedestrian delay on the roads to be used by HGVs are concluded to be **negligible**.
- **Pedestrian Amenity:** The effects of the HGV Routes on pedestrian amenity on the roads to be used by HGVs are concluded to be **negligible**.
- **Fear and Intimidation:** The effects of the HGV Routes on fear and intimidation on the roads to be used by HGVs are concluded to be **negligible**.
- **Accidents and Safety:** The effects of the HGV Routes on accidents and safety on the roads to be used by HGVs are concluded to be **slight adverse**.