Project:	**LATIS Lot 4: A9 Outline Business Case**	Job No:	**60430762/A9.007**
Subject:	**A9 Corridor Freight Assessment**		
Prepared by:		Date:	**12 March 2014**
Checked by:		Date:	**20 March 2014**
Verified by:		Date:	**21 March 2014**
Approved by:		Date:	**21 March 2014**

Review / Revision History:
If or when there are approved changes to the Client's brief, or as required at other times by the IMS procedures, etc., this Technical Note must be revised and the revision number updated.

Revision No.	Date of Revision:	Description of Revision:	Revision Made By:	Approved by:
1	02/07/2014	Updated to incorporate client comments and an assessment of modal split between road and rail following upgrades to both		
2	27/01/2015	Update to include industry survey and second SGVC		
3	25/09/2015	Restructured into note plus appendix		

1. Introduction

This note summarises the findings from AECOM's analysis of various data sources regarding freight movements on the A9 and the Highland Main Line (HML) between Perth and Inverness. The purpose is to identify any implications for the outline business case for the dualling of the A9 by investigating the current state of freight traffic along the Perth to Inverness Corridor. The study has been carried out in conjunction with a similar review of the A96 and a review of Lorry Parking provision on the A9 and the reports, although separate, should be viewed as complementary.

Following this introductory section this note is structured as follows:
2 – Review of Key Industry Types using the A9 corridor
3 – Analysis of Existing Data on Freight Movements
4 – Results of the Analysis of the Specialised Goods Vehicle Counts
5 – Value of Goods on the A9 corridor
6 – Overview of Rail Freight
7 – Modal Shift between Road and Rail
8 – Conclusion

A wide range of public and private stakeholders have been consulted during this study. For example information was requested from the Forestry Commission related to forest product movements beyond that contained in the "Upsticks" timber study. The Highland Council, HITRANS, TACTRAN and Highlands and Islands Enterprise (HIE) were all consulted to ensure that all of the major freight generators/attractors were included. Importantly this included expected changes in industry such as the planned growth of biomass, forest

products and whisky production. In connection with this we have engaged with industry and reviewed reports relating to these key sectors. The comments and views have been used to build up a picture of issues and freight movements in the area and the key sectors are briefly discussed in Section 2.

AECOM reviewed existing literature and a summary can be found in Appendix 1. We have reviewed existing data relating to freight movements and this is discussed in Section 3 with more detail provided in Appendix 2.

New data was collected by undertaking Specialised Goods Vehicle Counts (SGVC) on the A9 in both the winter and summer. The objective of the SGVCs were to not only understand the characteristics of the freight traffic on the A9 but to establish what proportion thereof was travelling long distance along the road. The results from these surveys are discussed in Section 4 and in more detail in Appendix 3 and 4.

Figure 1.1 – SGVC Count being undertaken (September 2014)

In Section 5 an analysis is made of the freight moving on the A9 which converts HGV flows into estimates of tonnage and value of the goods. Although it is based on a “snap-shot” of freight traffic observed during the SGVCs, it provides a useful indicator as to the importance of the corridor.

This freight review is multimodal in nature and includes within Section 6 discussions regarding rail freight on the HML in terms of volume and value and Section 7 where we examine the factors affecting modal switch. For rail issues two different departments within Network Rail were consulted to discuss relevant developments and rail traffic flows by product type. This helped develop an understanding of capacity versus demand. Volumes were estimated and representatives from five rail operators were consulted (Freightliner, Russells, WH Malcolm, DB Schenker, Direct Rail Services). Railfreight Group, a trade association that represents the interests of all major rail freight operators in the UK were also consulted.

The final section of this Technical Note pulls together the main points from the analysis and consultations. For A9 road issues concerning parking and rest area provision the FTA, RHA, key hauliers and drivers operating vehicles on the route were consulted and these results are provided in a separate technical note.

2. Review of Key Sectors using the A9

Within the area covered by this study there are a number of identified key sectors which are of regional, national and international importance. These include:

- *Forestry Products*: there are numerous managed forests and several sawmills in the regions served by the A9. Many of these latter facilities are located north of the Cromarty Firth on the upper reaches of the A9 and on the A96 between Inverness and Keith. As much of this timber is used for construction throughout the United Kingdom, significant amounts are moved south through the A9 corridor. Whilst most of this is transported by road, there has been a move to utilise empty rail freight capacity by some in the industry in addition to use of the port at Inverness for coastal and export shipping.
- *Construction and Building Sector*: This sector tends to be a barometer of the wider economy and there is reasonable activity in this sector currently.
- *Energy*: Related to the timber industry, a large amount of wood product is utilised as biomass for power generation further south. One haulier consulted sent approximately 15 vehicles a day south full of sawmill residue. In addition, whilst some firms (such as Tesco) receive their fuel shipments via Inverness Harbour, others (such as Morrisons) use tankers travelling up the A9 to supply their stores. There are also other companies, such as JET, which distribute fuel to a number of locations throughout the Highlands and Perthshire, whose vehicles use the A9 daily.
- *Food:* This sector is already strong in the region with manufacturers such as Baxters and Walkers producing food which is exported all round the world. In addition there are local fisheries and food processors.
- *Whisky*: There are a large number of distilleries in a region famous for its whisky output. Approximately 85% of Scotch malt whisky is produced within the broader HITRANS area, and it is a key contributor to freight flows. There have been attempts previously to reduce the amount of road freight generated by the industry. “Lifting the Spirit” (a trial which ran in 2013) explored the logistics of transporting the bulk spirit south by rail rather than road to the bottling and storing locations which tend to be located in the Central Belt. It is also important to consider the movement of barley, draff, pot ale, dark grain and fuel to and from distilleries and associated plants. Previous research has concluded that much of this travels by the A9 (“Spirit of the Highlands”, 2011). As such the A9 is crucial to the functioning of one of Scotland’s most iconic industries.
- *Tourism*: The region is popular with tourists, with a large number of movements on the corridor attributed to tourists during the summer season. Furthermore, these tourists affect freight movements through adjustments in tourist-related industries such as catering and linen provision. Across the Highlands and the Perth and Kinross areas, this industry is a key employer, responsible for approximately 21,000 jobs (Business Register and Employment Survey 2012).
- *Parcels & Retail Distribution*: As the principle link between Inverness and the Central Belt, large amounts of retail and parcel trunking utilise the A9 from larger distribution centres located to the south. Both Tesco on the A9 corridor and ASDA on the A90 route between Aberdeen and Central Belt have sought to reduce their use of road freight by using rail alternatives.

An awareness of the importance which these industries have in the region and the role they play in generating and attracting freight traffic on the A9 corridor is developed within the remainder of this note.

3. Analysis of Existing Data on Freight Movements

The A9 dualling corridor runs between Perth and Inverness and includes the HML. Railway freight traffic is significantly easier to quantify as existing data from operators and infrastructure bodies is accessible. This section focuses on creating a picture of road freight traffic along the corridor.

Figure 3.1 – A9 and HML (September 2014)

There has been a population growth in parts of Northern Scotland, and this is a significant factor in increased demand for not only travel but also consumer goods, and therefore inbound freight volumes to the area. Between the 2001 and 2011 Censuses, the population of the Inner Moray Firth increased by 14.8% and the Highland & Moray Council areas by 11.1% and 7.3% respectively. Looking at Scotland as a whole, Highland and Aberdeenshire had the strongest population growth (in % terms) of all the local authorities in Scotland. HIE's expectation is for this trend to continue over the long term given major economic factors such as growth in energy-related manufacturing activity including wind farms, marine power and production of biomass, the increasing volume of timber coming to maturity in the north of Scotland over the next decade, growth in the offshore oil industry supply chain, and the continuing expansion of whisky distilling capacity boosted by exports to countries such as China. As such the movement of freight on the A9 corridor is going to continue to grow both in value and importance.

In order to determine the nature and variety of freight movements on the A9, five existing datasets were analysed (findings for each can be found in appendix 2). Reports which were analysed are as follows:

- Transport Scotland Weigh-in-Motion (WiM) Sensor Data
- Transport Scotland Automated Traffic Count (ATC) Data
- UK Department for Transport (DfT) Annual Traffic Survey Data
- Video data from the A9 Turning Study
- Roadside Interview Data

In addition to the named sources above, a number of relevant reports and existing briefings regarding key industries and transport movements along the relevant trunk roads were analysed These included, but were not limited to:

- HITRANS – “Upsticks”: Timber Transport Study (2013)
- HITRANS – “Spirit of the Highlands” – Whisky Logistics Study (2011)
- HITRANS – Lorry Parking Strategy (2011)
- TACTRAN – Overnight Lorry Parking Study (2009)
- TACTRAN – Regional Transport Strategy (2008)
- HITRANS – Regional Transport Strategy (2008)
- HITRANS – A9 Perth to Inverness Economic Appraisal Study (2007)

The relevant findings from the reports above can be found in appendix 1.

Figure 3.2 shows a Morrison’s petrol tanker heading north and a grain tipper belonging to Barhaul travelling south. Both of these vehicles are 6 axle 44 tonne GVW articulated lorries and are typical of the freight movements on the A9.

Figure 3.2 Lorries passing on the A9 (February 2014)

Summary

The background literature provided a framework within which the freight data on the A9 could be analysed. The various data sources were each considered separately before the findings were collated to provide an overall understanding of freight traffic on the A9 corridor. The findings have been supplemented with the collection of Specialised Goods Vehicle Counts (SGVCs) as described in the next section.

4. Results of the Analysis of the SGVC

To further develop the findings derived from existing datasets, AECOM undertook two SGVCs in winter and late summer 2014. The two counts took place on Wednesday 12th February, 2014 and Thursday September 11th, 2014 are discussed separately below. On both occasions, SGVCs were scheduled to cover the period from 07:00am to 19:00pm. The SGVCs took place at the same two sites on single carriageway sections of the A9, near Aviemore at the intersection of the A95 and just south of Pitlochry near lay-by 31.

As shown in Figure 4.1, there is an uneven carriageway surface due to turning traffic from the A9 on to the A95 just north of Aviemore.

Figure 4.1 – Junction of A9/A95

4.1 Methodology of the SGVC

The SGVC has been devised by AECOM to record specific details about HGVs such as the registration, the body type, the company, the vehicle size and any other relevant observable details. Data was recorded manually and then entered into a spreadsheet. Once all the data was collated, it was checked to ensure consistency and then analysed. For clarity, the definitions used in this note are listed below:

HGV	Heavy Goods Vehicle: greater than 7.5 tonnes in size
LGV	Light Goods Vehicle: less than 7.5 tonnes in size

4.2 Data Analysis (February SGVC)

The SGVC team recorded 1,586 freight vehicle movements during the February SGVC. Due to adverse weather conditions the February 2014 SGVC covered the following time period.

- 0800hrs – 1600hrs at Pitlochry;
- 0700hrs – 1600hrs at Aviemore (earlier start feasible at Aviemore due to light levels) There was a major road traffic incident on the A9 between Aviemore and Pitlochry that occurred at about 14:30. This resulted in the A9 being closed by the police. This meant that HGV matching became impossible and caused the premature conclusion of the count. The data still provided a reasonable “snap-shot” of traffic on the day

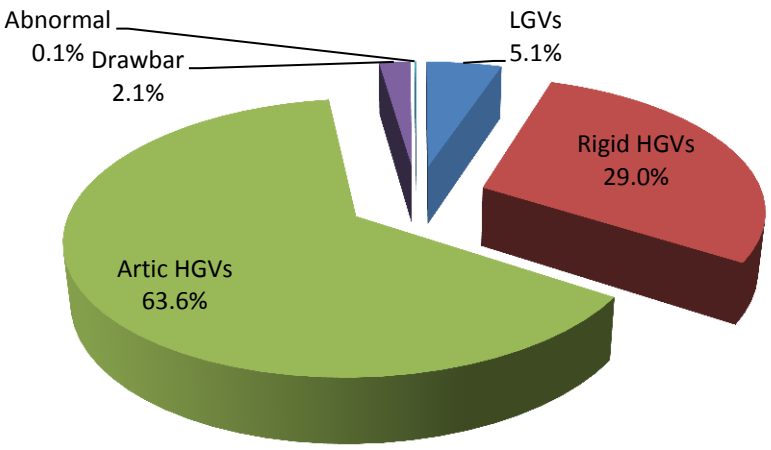


Figure 4.2: Freight Vehicle Types

Overall articulated HGVs make up 64% of the total, rigid HGVs 29% and drawbar HGVs 2%. Specifically, 56% of the freight vehicles are 6 axled articulated HGVs. These are the largest standard type of HGV on UK roads and are commonly observed on key freight arterial roads such as the A9. The maximum gross weight of a 6 axled articulated HGV is 44 tonnes.
The top 10 body types observed are shown in Figure 4.3.

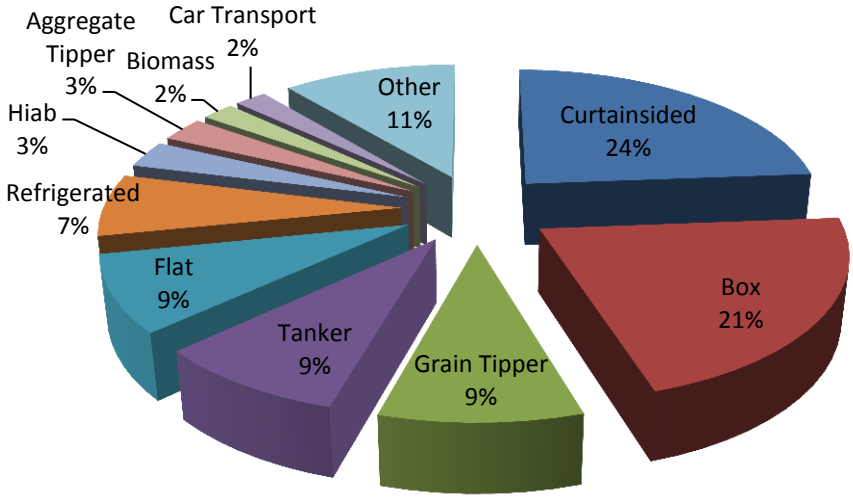


Figure 4.3: Top 10 Freight Vehicle Body Types

The two most observed body types were curtainsided and box freight vehicles (24% and 21% respectively). These are common body types and are typical choices for trunk haulage. Approximately 9% of the body types observed are grain tippers which highlights the rural agricultural industry that is located in the area and also the fact that these vehicles are used to deliver barley to the breweries/distilleries. There were also a number of tankers observed which were in some cases moving food products associated with the whisky industry. Another body type of note were the biomass trailers transporting biomass from the source to point of use.

The top 10 most observed industries make up 90% of all the freight vehicles observed and are shown in Figure 4.4.

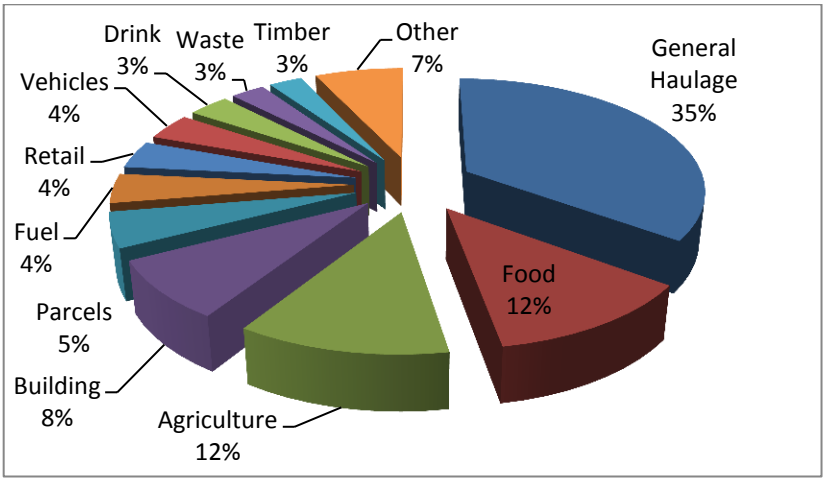


Figure 4.4: Top Industry Types

Figure 4.4 shows that 12% were moving products associated with the food industry, 12% were moving products associated with agriculture (and livestock) and 8% were moving building products.

Not every vehicle has a company name (or livery) displayed on the vehicle. A total of 1,074 freight vehicles had their company identified. Table 4.1 shows the Top 20 Companies that were counted in the SGVC.

Table 4.1: Top 20 Companies

Rank	Name	Number	Rank	Name	Number
1	Stevenson	31	11	TNT	11
2	McPherson	29	12	Graham	10
3	Carntyne	18	13	Co-op	9
4	Grant	17	14	John Mitchell	9
5	Royal Mail	16	15	Seacliffe	9
6	Breedon Aggregates	13	16	Craigs	8
7	Craib	13	17	Hermes	8
8	Bulmans Bulk	12	18	Ian Roger	8
9	Ferguson	12	19	James Innes	8
10	ASDA	11	20	Jenkinson	8

The Top 20 companies made up 24% of all vehicles that belonged to an identified company. This shows that the freight vehicles operating on the A9 are from a diverse range of companies. Reviewing Table 4.1 shows that some of these companies are household names such as Royal Mail, ASDA, TNT and the Co-op. Others like Carntyne, Stevenson and McPherson are large regional hauliers. Several of these hauliers are specialists in their field, for example McPherson have the contract on behalf of Chivas Brothers (the whisky maker).

As an alternative statistic, the upper quartile (105 companies) represented 57% of vehicles belonging to an identified company.

HGV Matching Exercise

Due to an accident and road closure in the afternoon; data was adjusted to account for the drop in matches observed. The data analysis was based on the adjusted figures as they give a better representation of freight movements than the overall data set which was affected by the road closure.

The data was reviewed and the registrations of the freight vehicles were matched. A freight vehicle was matched if it was observed at both Pitlochry and Aviemore (or vice versa) whilst travelling in the same direction (eg northbound or southbound) and 56% of vehicles were matched. A marginally higher proportion of articulated and drawbar HGVs are used to travel between Pitlochry and Aviemore (74%) than generally observed (66%) as these vehicles are used mostly on long distance journeys.

33% of the matched freight vehicles were moving general haulage; 14% were moving products associated with the food industry, 10% were moving products associated with agriculture and 7% were moving building products. Around 8% were moving parcels and this percentage of long distance movements is almost double their overall count quotient showing that most of this traffic is likely to be travelling from the Central Belt parcel hubs to Inverness.

Local Traffic

17% of freight vehicle traffic at Pitlochry was undertaking local movements. 8% of freight vehicle traffic at Aviemore was undertaking local movements.

Freight Vehicle Movements on the A9

The direction of the freight vehicles were observed. The average number of freight vehicles per hour are in Appendix 3. The number of freight vehicle movements per hour is fairly balanced when compared with its opposing flow movement with a small bias towards southerly movements. The southern end of the study area around Pitlochry is the busier section of road with 10-15% more freight traffic observed.

Findings from the February SGVC:

- 56% of freight vehicles observed were the large 6 axled articulated HGVs demonstrating that a significant proportion of road freight is long and medium haul, often transporting heavy loads**.**
- 71% of freight vehicles were involved in the Top 5 observed industries, with general haulage the most commonly observed industry type
- Pitlochry and the region south of Aviemore is an attractor/generator of freight serving the forestry, tourism, aggregates, agricultural and waste sectors
- 50% of all freight vehicles observed at Pitlochry were observed again at Aviemore and this volume represents the longer distance end-to-end movements which is typically made up of maximum weight trunking vehicles
- Less than 1% of freight vehicles were foreign registered and this is less than the 3% UK average, probably due to the distance from Mainland Europe

4.3 Data Analysis (September SGVC)

A second count was carried out on Thursday 11th September 2014. The SGVC team recorded 2,412 freight vehicles throughout the 12 hour count period between 07:00 and 19:00. Of these vehicles, 1,132 were observed at Aviemore and 1,280 were at Pitlochry. This means that 13% more freight vehicles were seen at the southern end of the corridor on a pro-rata basis.

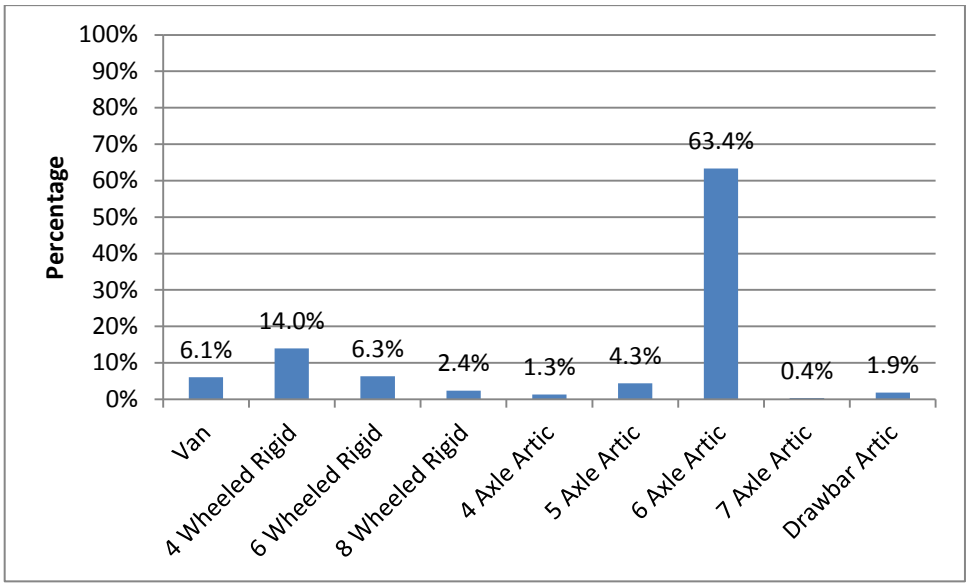


Figure 4.5: Freight Vehicle Types

Figure 4.5 shows a breakdown of freight vehicles counted by type. Articulated HGVs account for 69% of the total, rigid HGVs 23% and LGVs 6%. Of all vehicles counted, 6 axle articulated HGVs were the most common, accounting for 63% of the total count. These are the largest standard type HGV in the UK and have a maximum gross weight (MGW) of 44 tonnes.

Four wheeled rigid vehicles were the second most observed vehicle type and accounted for 14% of vehicles, while six wheeled rigid vehicles made up 6%. These vehicles are toward the smaller end of the HGV scale with four wheeled vehicles having a MGW of 18 tonnes while for six wheeled variations it is 26 tonnes. Drawbar combinations and abnormal vehicles were less commonly observed accounting for 1.8% and 0.3% respectively.

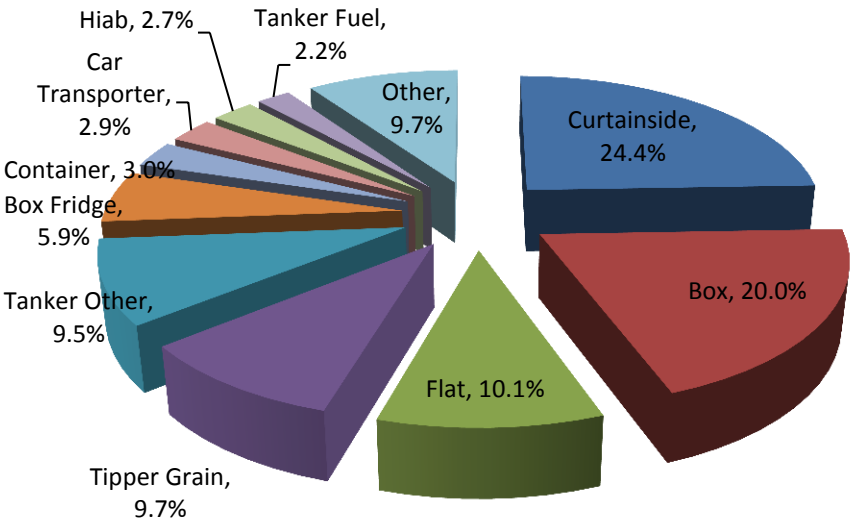


Figure 4.6: Freight Vehicle Body Types

In total, 23 different body types were observed during the count. Curtainside and box type vehicles were the most commonly observed accounting for 24% and 20% respectively. These are common body types and are typical choices for both trunk haulage and local activity. Approximately 10% of vehicles observed were grain tippers, this highlights the rural agricultural industry which is located locally and is higher than would be expected nationally. There were also a number of tankers observed transporting food and drink products such as vegetable oil and bulk whisky.

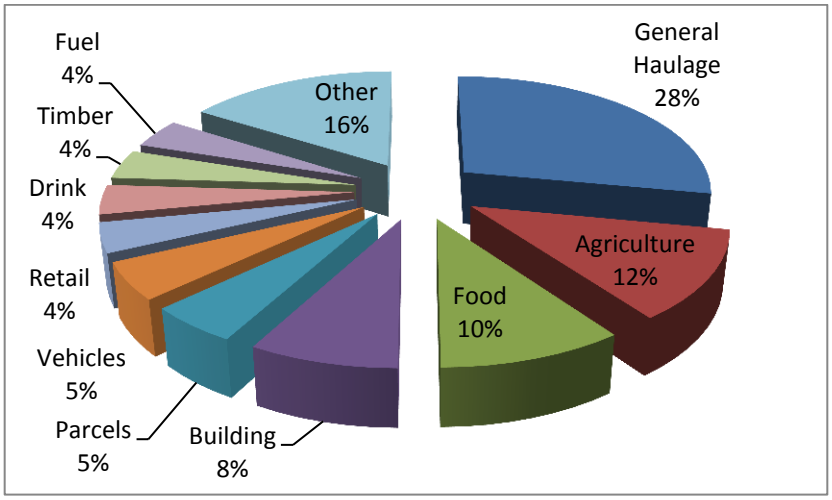


Figure 4.7: Top Industry Types

In total, 21 different industry types were observed during the SGVC. Figure 4.7 shows that 28% of all freight vehicles were observed as being general haulage. The most commonly observed specific industries were: agriculture 12%, food 10%, building 8% and parcels 5%.

In total 1,771 freight vehicles had their company identified which is equal to 74% of all freight vehicles recorded. The Top 20 companies identified in Table 4.2 account for 27% of all vehicles that belong to an identified company. This statistic shows that there is a diverse range of vehicles operating on the A9 ranging from large companies such as TNT, Royal Mail

and ASDA to large regional hauliers such as Stevenson, Mitchell and Craib. Some of the hauliers are specialists in particular fields, for example McPherson are contracted to move products on behalf of the whisky producer, Chivas Brothers and Craib is a well-known Aberdeen based haulier that moves many types of goods including Baxters Soups from Fochabers, Moray.

Table 4.2: Top 20 Companies

Rank	Company	Count	Rank	Company	Count
1	McPherson	59	13	Bulmans	16
2	Stevenson	48	14	Tesco	15
3	Mitchell	29	14	Chivas	15
4	Craib	27	16	Andrew Black	14
4	Royal Mail	27	16	Abbey	14
6	Breedon	25	16	White	14
7	Carntyne	21	19	Simpsons Malt	13
7	Mcleod	21	19	TNT	13
9	Grant	20	19	ECM	13
10	ASDA	19	19	Fisher Laundry	13
11	Steven	18	19	Grahams	13
11	Campbells	18			

There are a number of hauliers in the September Top 20 that were not in the equivalent list in February. Andrew Black, a Scottish Regional haulier specialise in general cargo and grain. There was an active harvest of crops especially in the Pitlochry area during the count. Abbey is a specialist tanker operator moving various liquids including vegetable oil and food grade produce. ECM is the largest car carrier company who are based in Carlisle but were moving new and used cars. It tended to move new vehicles northbound and secondhand vehicles south. Fisher Laundry was very active with rigid vehicles serving the hotel trade especially around Pitlochry. This company based in Cupar, Fife has a 60% share of the Scottish hotel linen rental market.

As an alternative statistic, the upper quartile (126 companies) represented 63% of all vehicles belonging to an identified company.

HGV Matching Exercise

The data was reviewed and the registrations of freight vehicles were matched. Vehicles were matched if they were observed at both Pitlochry and Aviemore (or vice versa) whilst travelling in the same direction. Around half of all recorded freight vehicles were matched between Pitlochry and Aviemore, or vice-versa, the percentage of all freight vehicles recorded in September (52%) is similar to February (56%). 76% of matched freight vehicles were articulated vehicles and specifically 69% were the larger 6 axle type. This would be expected as larger articulated vehicles are most likely to be used for long distance, trunk journeys.

General Haulage has the largest share at 16% but this is less than in the overall count where it accounted for 28% suggesting that these companies are delivering to intermediate destinations. Similarly agricultural industry vehicles account for 5% of matched vehicle industry type which is less than half of the agricultural share overall. This suggests that some agricultural movements are localised e.g. only observed at Aviemore (or Pitlochry). This is also true for the Timber vehicles which account for 2% of matched movements but 4% of movements overall. This is consistent with what we would be expected due to harvesting of grain in September and the presence of local forestry clearance.

The Top Twenty companies account for 38% of matched freight vehicles which were linked to a company. Detailed findings of this exercise are in appendix 4.

Freight Vehicle Movements on the A9

The direction of freight vehicles was observed. The average number of freight vehicles per hour are shown in Appendix A4 the following tables: A4.T5 and A4.T6. It was noted that one third of freight vehicles that travel along the study stretch of the A9 were observed to turn onto or turn from the A95. During the September SGVC, 208 freight vehicles travelled to the A95 and 241 freight vehicles travelled from the A95, showing a slight southbound bias. Table A4.T3 (see appendix 4) shows the number and percentage of matched freight vehicles using the A95 as opposed to the absolute numbers which were mentioned above. Table A4.T4 (see appendix 4) shows the Top Ten companies observed using the A95 which are predominantly local/Scottish hauliers which service industries in Speyside such as the whisky industry.

Findings from the September SGVC:

- **63% of freight vehicles observed were 6 axle articulated HGVs demonstrating that a significant proportion of road freight is long and medium haul, often transporting heavy loads.**
- **59% of northbound freight vehicles at Aviemore have passed through/come from Pitlochry again demonstrating that a majority of road freight is using the A9 for trunking purposes and not localised short trips**
- **Less than 1% of vehicles observed were foreign registered, reflective of the study areas distance from the European mainland and foreign competition**
- **One third of vehicles travelling along the A9 between Pitlochry and Aviemore use the A95**
- **Pitlochry has 13% more freight vehicle traffic than Aviemore**
- **Freight traffic at Pitlochry peaks northbound between 7am and 8am whilst southbound it is more spread throughout the afternoon**

4.4. Comparison of the SGVC Counts

During the February SGVC count 1,586 freight vehicles were observed; 805 at Pitlochry and 781 at Aviemore while in September 2,412 freight vehicles were observed; 1,280 at Pitlochry and 1,132 at Aviemore. On both occasions, Pitlochry was the busier count site.

Table 4.5- Comparison of February and September SGVCs

Date	Hours Observed	Number of Freight Vehicles
February SGVC	8	1,587
September SGVC	12	2,412
February SGVC adjusted*	12*	2,381*

*Values adjusted by adding 50% due to differences in hours of observation

Table 4.5 shows that adjusted values for February are in line with September SGVC observations in terms of total freight vehicles.

The key sectors using the A9 for freight were similar in February and September. Freight vehicles serving the agricultural, food, drink (including whisky), post and timber industries were prominent in both counts. The most observed companies in February and September were broadly similar as: McPherson, Stevenson, Carntyne, Royal Mail, ASDA and Breedon appeared in the "Top 10" for both counts. Less than 1% of freight vehicles observed during both counts were foreign registered. In September 16 freight vehicles linked to the tourism industry were observed.

In terms of vehicle type, 6 axle articulated vehicles were most commonly observed in both counts. In February 56% of all freight vehicles were 6 axle articulated vehicles compared with 63% in September, thus averaging 60% overall. In both February and September, almost half of all freight vehicles had box or curtainside body types, which are typically associated with trunking movements.

Although air quality and hence vehicle emissions is not perceived to be a problem on rural sections of the A9, one of the outcomes of the study was a record of the age of the observed vehicle fleet and hence an ability to estimate the engine rating. From this it could be possible to estimate pollutants generated from freight movements. Between February and September there has been a small change in the Euro engine rating of freight vehicles using the A9 and overall it is an improvement. In February, 80% of vehicles were rated Euro 4 or above and in September, this had risen to 82%. More details can be found in Appendix 4.

5. Value of Goods on the A9

Utilising the data gathered in sections 3 and 4 of this report it has been possible to make an estimate of the value of freight moving by road on the A9. The value of freight has been calculated using the method in Figure 5.1. Figures regarding laden factors and empty running percentages were taken into account, making it possible to estimate approximately the amount of goods transported on the A9 on a given day by both direction and industry type.

There are more vehicles that head south than north along the A9 trunk road, however they tend to be empty when compared against vehicles heading north, resulting in a higher tonnage northbound. This complements the anti-clockwise movement of lorries noted within the data analysis via the A90 and A95 namely that many are full leaving the central belt and empty returning. The tonnages arrived at through these calculations are shown in Table 5.1.

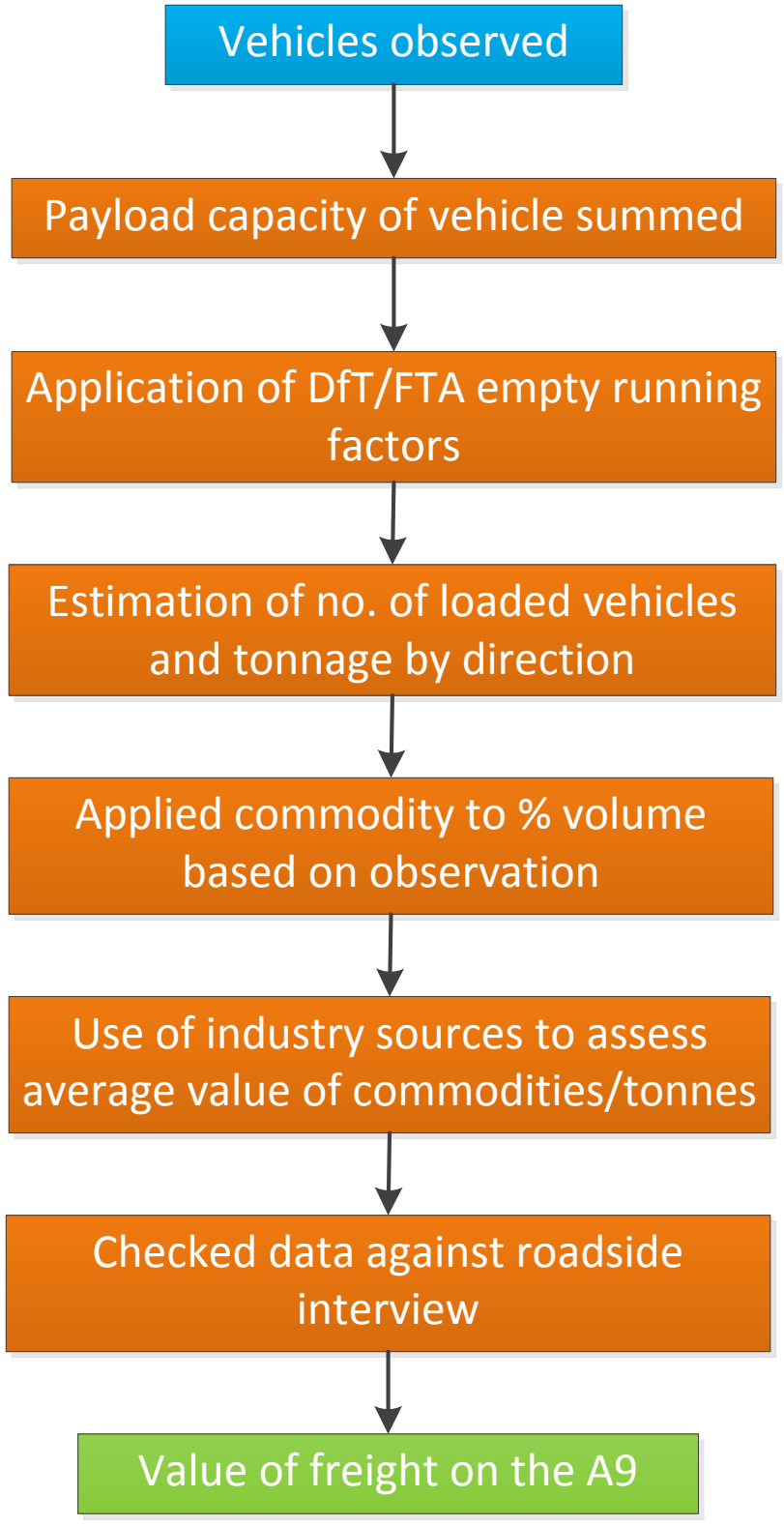


Figure 5.1: Value of goods on the A9 calculation process

Table 5.1: Tonnage of Selected Sectors on the A9 in a 24 Hour Period

	Northbound	Southbound	Total	Percentage
Automotive	517	125	642	1.98%
Grain	2,948	2,339	5,288	16.29%
Aggregates	1,503	336	1,838	5.66%
Retail	542	228	770	2.37%
General & Container	8,531	6,261	14,792	45.57%
Waste	77	482	559	1.72%
Parcels	1,340	313	1,653	5.09%
Logs	196	193	389	1.20%
Whisky	-	658	658	2.03%
Oil	618	64	683	2.10%
Biomass	-	688	688	2.12%
Timber	80	900	980	3.02%
Other	1,785	1,735	3,521	10.85%
Total	**18,137**	**14,323**	**32,460**	**100.00%**

Using this estimate of total tonnage it is then possible to arrive at a valuation of these goods through use of average market values for each commodity (these values are shown in Table A5.T3 in the Appendix). Due to the varied nature of freight transport, some loads cannot be classified as belonging to any particular sector. Some carriers will consolidate multiple (and different) consignments onto a single lorry – commonly called groupage. Where this occurs it is difficult for roadside observers to distinguish and classify the resultant lorry and its heterogeneous load. The industries and items more commonly consolidated in this way have been valued and weighted by AECOM to arrive at an estimated average value for a lorry classified as “General Haulage”. This process was informed by the data gathered from the roadside interviews. This averaging process should be considered when reviewing the tables. With regards to whisky shipments the value used is prior to the addition of duty, if the value included duty then this would be a very significant economic flow. The resultant values are indicated in Table 5.2.

In addition table A5.T3 in appendix 5 provides information about the source of the valuation data. Rail valuation data has provided much of the backbone of this, alongside industry consultation. This is still suitable for a road-based study as the value of the commodity per tonne remains the same; by whichever mode it is being moved.

Table 5.2: Value of Selected Sectors on the A9 in a 24 Hour Period

	Northbound	Southbound	Total	Percentage
Automotive	£7,753,717	£1,871,660	£9,625,378	15.11%
Grain	£589,665	£467,858	£1,057,524	1.66%
Aggregates	£30,058	£6,712	£36,769	0.06%
Retail	£1,625,409	£684,007	£2,309,416	3.63%
General & Container	£25,593,011	£18,782,963	£44,375,974	69.68%
Waste	£1,535	£9,649	£11,185	0.02%
Parcels	£1,340,149	£313,078	£1,653,226	2.60%
Logs	£7,826	£7,729	£15,555	0.02%
Whisky	£0	£2,631,668	£2,631,668	4.13%
Oil	£822,449	£85,491	£907,941	1.43%
Biomass	£0	£20,645	£20,645	0.03%
Timber	£55,884	£629,937	£685,821	1.08%
Other	£178,523	£173,538	£352,061	0.55%
Total	**£37,998,228**	**£25,684,935**	**£63,683,162**	**100.00%**

Summary

The indicative estimate of a day's volume moving on the A9 between Pitlochry and Aviemore is 32,000 tonnes and the value is £64 million. Grossing this up assuming the "snap-shot" is representative, equates to the road carrying almost 10 million tonnes a year with an annual value of freight moved on the A9 to be approaching £20 billion. An assumption is made that different industries work five, six or seven day weeks, 300 operational days provides a working average. The tonnage and value totals thus calculated are shown in Appendix 5 Table A5.T1 and A5.T2.

6. Overview of Rail-freight

As part of this review of freight on the corridor between Perth and Inverness this section covers the potential for existing road freight to switch to using rail freight or the reverse and the implications for the A9 OBC.

6.1 Route Characteristics

The railway between Perth and Inverness is mostly a passenger railway on single track with passing loops often at stations. The Strategic Transport Projects Review (STPR) recommendation for the HML is for an improved passenger based service aiming at achieving a fastest journey time of 2 hours 45 minutes with an average journey time of 3 hours, a regular hourly service and improved opportunities for freight. The aim is that the hourly passenger service from the Central Belt to Inverness will be in place by 2019 which will require additional train paths. There are currently around three freight trains a day running on the line amongst passenger trains and details of these are outlined later in this section. The only main freight terminal open on the Perth-Inverness line is at Inverness.

6.2 Rail Constraints

There are a number of infrastructural constraints that exist which limit the use of rail, these include the following:

- Train length is an issue as freight trains on the HML are shorter than on much of the rest of the UK network for signalling and loop length reasons. This means trains are limited to 300m compared to 500-550m on much of the rest of the network unless a through path is obtained. Longer trains will reduce unit costs and make rail more competitive/financially sustainable.
- There is currently not a large amount of spare capacity but the upgrade scheme aspires to free up to 5 additional train paths per day in total.
- Stobart currently run a daily intermodal service between Mossend and Inverness. JG Russell Ltd is exploring the introduction of a second daily service again likely to be for mainly retail goods but require a suitable train path that meets the needs of their customers.
- DRS own the Inverness terminal which is operated by Russells. It is open access but has a length restriction of around 360 metres so when trains over the normal 300m length are run they have to split on arrival.
- It is thought there is sufficient terminal capacity at Inverness for an extra service.
- The gauge is cleared to Network Rail's designation depending on wagons (see Figure 6.1) but can accept freezer boxes on certain wagons such as Davis flats which are in use elsewhere on the UK network. The HML is mainly cleared to W8 gauge.
- Maintenance is done at night using a 4 hour window fitted around sleeper trains. The route can also be used as a diversionary route for freight from the Central Belt to Aberdeen whilst maintenance is being conducted on the Perth-Aberdeen Line.

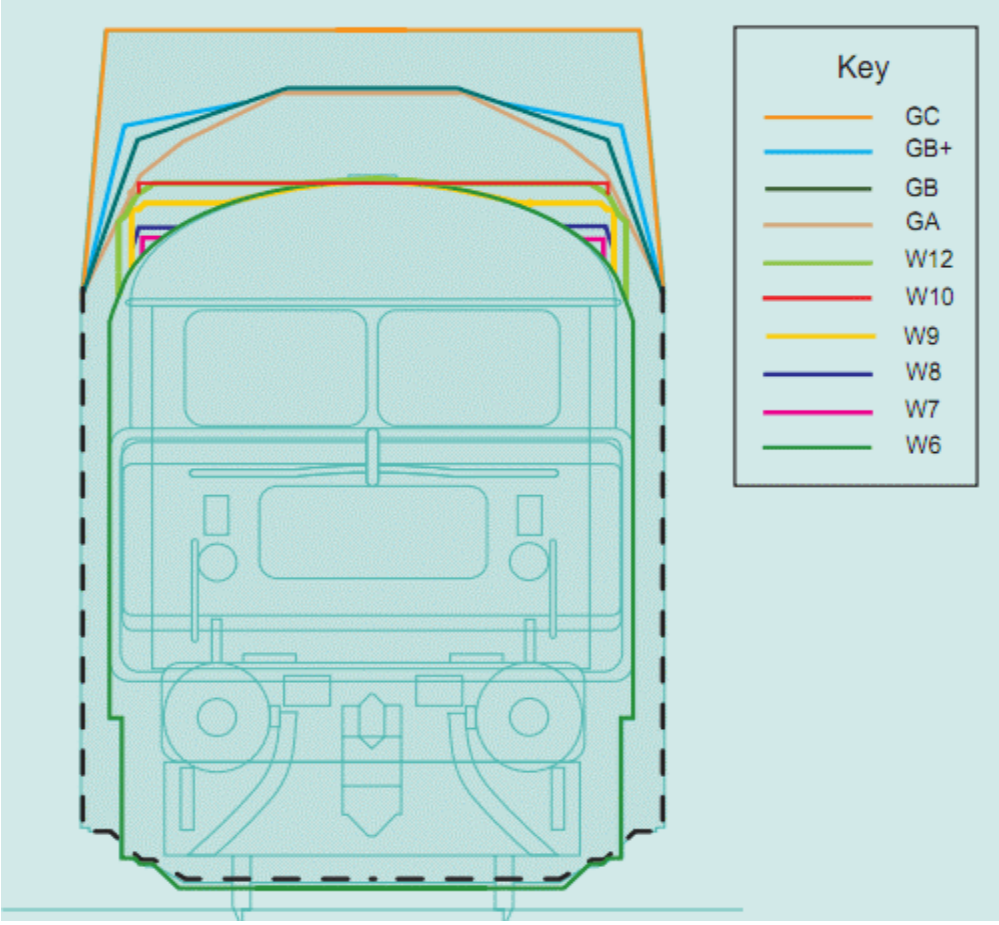


Figure 6.1: Gauge Clearance in the UK

6.3 Requirements of Rail Freight Customers

In connection with their planning for the next five years Network Rail organised a meeting in October 2013 with its freight customers including local and national companies many of whom have interest in movements to the Highlands. They came up with a list of requirements aimed at achieving more efficient freight operations, including

- Improvements to journey times; users want to travel between the Central Belt and Inverness in less than 3.5 hours;
- Gauge enhancements of the routes;
- Extend operational hours to cater for night and weekend services. Customers want railway lines to be open 24/7;
- Better capacity with more freight train paths; the HML upgrade scheme aims to provide up to an additional 5 freight train paths;
- Longer trains to improve productivity. The Daventry-Central Belt intermodal service carries 38 swapbodies (curtainsided containers that can easily be transferred from rail to road) whereas the current maximum on HML is only 20 units; and
- Plan to alternate maintenance possessions so that trains can travel north at night either via Inverness or Aberdeen.

The concept of more night time services has not yet proven popular but there is an existing path for a freight train at night in the northbound direction. The paths are allocated to train companies depending upon traffic.

6.4 Rail Freight currently on the HML

The line carries a limited amount of freight but has been used for more products in the past. Current daily services include an intermodal train in each direction in addition to less frequent pipe, cement, oil or nuclear flask trains. As these only run once or twice a week they represent, on average, a third daily train. Thus, on average, there are 3 freight trains in total using the HML per day, (in total rather than 3 in each direction).

The main characteristics of rail freight movements are further outlined below:

- Movement of bulk and bagged cement by Lafarge from Dunbar to Inverness. It is understood from Freightliner that the frequency of the service is approximately twice a week and runs in response to the success of the construction industry. 5,570 tonnes of bagged cement were moved in 2012-13 which was enabled by a Scottish Government Freight Facilities Grant (FFG);
- GB Oils send fuel to Lairg from Grangemouth (6,873 tonnes in 2012-13) on one train every two weeks this was also enabled by a Scottish Government FFG;
- Spent nuclear fuel in flasks from Georgemas to Sellafield operates on an as required basis by DRS;
- Pipes to Georgemas Junction in response to customer demand; and
- Stobart's Tesco service operated by DB Schenker from Mossend to Inverness (6 days a week 20 boxes a day) – also FFG and Mode Shift Revenue Support (MSRS) enabled. This service returns with between 7 and 10 boxes of chip-board for Central Belt and England from Norbord. The remaining units generally contain empty cages. The swapbody units are unloaded at the Inverness terminal and are delivered to the Tesco stores by JG Russell transport. There is often space on this service for other users, with Stobart Rail indicating that this spare capacity varies between 2 – 6 boxes. Each container takes a lorry trip off of the road.

The biggest growth in rail freight in the UK has been in the movement of intermodal units. Class 4 trains (intermodal) are capable of running at 75mph whilst HGVs are limited to 56mph on motorways, 50mph on dual carriageways and 40mph on single carriageways. Domestic intermodal has been led by retailers wanting to use non road modes for environmental reasons, but also reliability reasons. Asda in conjunction with Craibs have operated a service from the Central Belt to Aberdeen for a number of years. The final leg to the stores is done by road. In more recent years Tesco has taken some space on the Aberdeen service.

It should be noted that average speed cameras became operational on the single carriageway sections of the A9 between Perth and Inverness and on the dual carriageway sections between Perth and Dunblane on October 28th 2014. The new system is an interim safety measure until the entire A9 is upgraded to dual carriageway. At the same time, the speed limit for heavy goods vehicles (HGVs) on the A9 was raised from 40mph to 50mph. The speed limit pilot project will operate alongside safe driving campaigns involving both speeding and overtaking. The speed limits for all other categories of vehicles remain the same on the A9.

6.5 Potential Rail Freight for the HML

In theory there should be another daily inter-modal service operating between Coatbridge and Inverness (the FFG funding of the Inverness Needlefield inter-modal rail freight facility was based on 2 daily services between Central Scotland and Inverness). JG Russell started a second daily service in 2009, but it ceased in 2010 - since then the service has been unable to compete successfully with road as demand has not been sufficient to make a second train viable. Rail freight produces 76 per cent less carbon than road freight and opportunities to maximise this benefit can be realised by running longer freight trains. The green agenda is prompting many "blue-chip" companies such as Unilever, Nestle, Tesco and Asda to consider where modal switch fits into their supply chains.

One of the more likely types of traffic for rail is to consider sending distillery produce in tanktainers by train. HITRANS led a “Lifting the Spirit” trial recently which has had mixed feedback. It was an operational success but not a commercial success. Network Rail brought the Elgin yard back into use and allocated a train path for the whisky. The trial whisky train ran from Elgin via Aberdeen due to availability of train paths and for gauge clearance reasons. A reach-stacker was hired by JG Russell for the purpose of loading and this has since been returned. The Lifting the Spirit trial spread over 10 weeks and the results and an environmental report will be issued in due course The report estimated that there is a 0.5 tonne of saving of CO_2 per lorry load and £200 of societal benefits for each load that switches mode to rail based on DEFRA CO_2 factors. The trial saw the operation of 10 trains and although the trains ran on time they didn’t see the volume expected and never got above 6 tankers per train. The trial successfully brought forward a range of issues and problems which were solved and demonstrated that rail freight was an operationally viable option for the transport of whisky (in addition to identifying some other potential markets). However, in the longer term the service needs to run on a commercial basis.

The concept of sending temperature controlled goods in containers by rail was piloted by Safeway a decade ago but currently the standard 2.6m wide refrigerated boxes cannot traverse the HML route unless on specialised wagons meaning there are restrictions on the size and availability of temperature controlled containers that can be transported. There are significant flows of temperature controlled goods by road but it remains to be seen whether this traffic can be converted to rail and run in a similar way to the ambient goods using a daily intermodal train consisting of swapbodies. Some of these units could be backloaded to the Central Belt perhaps (for example) with fish products.

During a presentation on Opportunities for Rail at the March 2014 Railfreight Group conference it was reported that some of the major offshore services companies that operate out of Aberdeen are fairly advanced in plans to start using Scrabster, and trialling rail as well as road transport to Caithness from Aberdeen / Grangemouth. (Apparently re-supply of one vessel can involve up to 20 containers of goods to be supplied - including equipment, fuels and specialist oils, food & drink, etc.). Although this traffic may not use the HML regularly it could use the route during maintenance possessions on the route via Aberdeen.

Another type of traffic that could return to rail is the transport of logs. There are flows of logs south of the border from Carlisle, Exeter and South Wales to Kronospan, Chirk in Mid Wales. Network Rail has occasionally allowed lineside loading in Scotland but it does use up a lot of capacity. Although there are significant flows of logs by road on the A96 corridor many of the flows are of a relatively short distance and it may not be economic to use rail. However with an increasing volume of timber coming to maturity in the north of Scotland over the next decade and the fact there are some rail connected yards in the area, should rail become an option, then these could be brought back into use. There have been a number of applications for grant funding made to the Scottish Government for the movement of round logs by rail along the A9 corridor. Apart from the movement of logs south from Kinbrace for a short period over 10 years ago the other projects have not developed into viable services.

6.6 Future Developments and the High Level Output Specification

As far as the future is concerned the Scottish Minister's High Level Output Specification (HLOS) includes a number of enhancement schemes to improve rail services across Scotland. The rail industry tends to work in 5 year periods for its planning and investment called Control Periods. The announced capacity enhancements will contribute towards achieving the long term predicted growth in the railways and includes both the Aberdeen to Inverness Rail Line Improvements (Phase 1 - £280m in the HLOS document) and the Highland Main Line Improvements (Phase 2 - £121m). Since the original drafting of the HLOS document the Office of Rail Regulation (ORR) Final Determination capped the cost of Phase 1 at £191m although it is has now been established the total cost of Phase One is £170m and the Determination cap for Phase 2 of HML is £117m.

The HLOS objectives are also to encourage rail freight and reduce emissions and there is a ring fenced fund of £31 million specified in the HLOS for Control Period 5 (2014-19) to fund improvements identified through the Scotland Freight Joint Board. The main focus of the group is to:

- improve productivity
- allow focused input from the freight industry into the development of the railway
- promote rail freight
- explore opportunities to reduce whole industry costs
- promote collaborative working
- provide a strategic and high level overview of safety, performance and security.

Significant infrastructure enhancements are planned on the HML to facilitate the service enhancements. The work is being carried out in phases between 2011 and 2025 and aims to achieve improvements to the service frequency and journey times between Inverness and the Central Belt. Without significant enhancement of the amount of double line on these routes, the timetable will limit the gains to be made in terms of journey time (as for every train that requires to be 'crossed', additional time is introduced to the journey). Network Rail is working on timetable development to identify where infrastructure interventions are required including additional passing loops/double tracking to improve journey times.

Network Rail's current forecasts are that freight tonne-kilometres will grow by 18 per cent between 2011/12 and the end of 2019. In England and Wales the Government and industry are aligned with the objective of promoting a Strategic Freight Network (SFN). This is defined as 'a core network of trunk freight routes, capable of accommodating more and longer freight trains, with a selective ability to handle wagons with higher axle loads and greater loading gauge.' The benefits of these improvements to the core network should enable greater use of the Scottish core network too, although further investment to ensure commensurate improvements to Scottish infrastructure may be required.

The Freight Working Group has identified a number of proposals which will contribute to the Strategic Freight Network goals. They include two with particular relevance to the A9 corridor;

- **Inverness Yard**, improve capacity and flexibility where the freight operator and ScotRail operations co-exist in close proximity. DRS own the Inverness terminal which is operated by JG Russell. It is open access but has a length restriction of around 360 metres so some trains have to split on arrival.
- **Elgin to Inverness gauge improvement**, increasing the gauge clearance from W7 to W8 providing enhanced capability. The plans to increase the gauge to Elgin in CP5 are as part of the Strategic Freight Network (SFN). The route from the Central Belt to Elgin via Aberdeen was partially enhanced a few years ago. This enhancement is yet to generate significant flows of additional traffic although future growth should not be ruled out.

In summary the Perth to Inverness rail corridor is only carrying a limited amount of freight and there is currently spare capacity which is not being utilised but there is some potential for it to do more in the future. For rail to be fully utilised good connectivity to the central belt and beyond is vital.

6.7 Value of Rail Freight and Modal Share

In a similar way to the calculations carried out to assess the tonnage and value of goods moved through the A9 corridor by road, it is possible to estimate the amount and value of goods transported by train along the Highland Main Line. Although few of the services run daily, it is possible to average these so that a 24 hour tonnage total can be reached. The southbound intermodal total takes into account the movement of manufactured product from some sawmills in the Inverness region. This is indicated in table A6.T1 appendix 6.

At present, the estimate of rail freight on the HML in a 24hour period is 1,064 tonnes valued at £1.7m. This values a tonne of railfreight on this route at £1,600. This is higher than on some rail routes due to having 70% of volume as intermodal retail goods rather than bulk raw materials which are the traditional type of commodity moved by rail. In a year this equates to approximately 300,000 tonnes with a value of £500 million.

Under a moderate change scenario this total is 2,060 tonnes and under the larger change scenario the total rail freight tonnes increase to 4,854 tonnes see table below. Further information on the value and tonnages of rail freight can be found in appendix 6. It is assumed that there will be some growth across industries already utilising rail freight, plus use from the whisky and logging industry.

Table 6.1: Current Tonnage of Rail Freight on HML in a 24 Hour Period

	Northbound	Southbound	Total
Current level	690	374	1,064
Moderate change	1,248	812	2,060
Larger change	2,966	1,888	4,854

If the total level of freight moved along the corridor by both rail and road were the same as that currently observed, the resultant modal split is as laid out in table 6.2. For further information see appendix 6.

Table 6.2: Modal Share with Increased Rail Usage (24 Hour Period)

	Current Levels		Moderate Change		Large Change	
	Tonnage	Share	Tonnage	Share	Tonnage	Share
Road	32,460	96.83%	31,522	93.87%	29,061	85.69%
Rail	1,064	3.17%	2,060	6.13%	4,854	14.31%

7. Modal Shift between Road and Rail

Together, the package of improvements to the A9 Corridor (both on the trunk road and on the Highland Main Line) will affect the modal distribution of freight movements and this is assessed below, under the following headings:

- Policy
- Maximum Permitted Speed Assumptions
- Journey Time
- Reliability
- Nature of Goods
- Critical Mass
- Complexities of Rail Freight
- Funding

Policy

Current EU, UK and Scottish Government Policy all support the movement of freight journeys from road to rail where possible. The EU has set targets that half of all medium length journeys are undertaken on rail by 2050, alongside creating a carbon market to try and introduce price incentives to encourage this. However the EU also acknowledges that multi-modal solutions are harder to encourage when distances are below approximately 300km. In the longer-term this policy direction (along with any other changes in policy more generally) may have an impact on the comparative costs of rail and road freight; whilst corporate social responsibility will continue to encourage rail use – as evidenced currently by Tesco.

Maximum Permitted Speed Assumptions

At present, with the introduction of the speed limit pilot in combination with the implementation of Average Speed Cameras, HGVs can go at speeds of up to 50 mph on single carriageway sections of the A9. Empirical evidence collected prior to the implementation of the 50mph pilot, showed that the majority of HGVs on the route were already travelling at speeds of approximately 50 mph. The DfT have found that approximately 85% of lorries are driven faster than 50mph on dual carriageways, whilst over 75% exceed the 40mph single carriageway limit on average across the UK. Once the A9 dualling programme is in place, national speed limits will apply which, for a dual carriageway, would be 50 mph for HGVs.

Journey Time

It is not envisaged that actual journey times for HGVs will come down significantly; current assumptions are that fewer than 10 minutes will be saved in journey times between Perth and Inverness. This is therefore not thought to have a substantial impact on the economics of rail versus road freight, as the savings (of at best twenty minutes on a round trip) will not allow for a step change in utilisation of assets. Neither the truck nor the driver will be able to conduct further or extra business as a result; and so costs and profits will remain approximately the same. A time saving of over 30 minutes is considered to represent a step change as the driver may be able to do more work such as additional drops. It should be noted that journey time savings for vans may prove higher than this benchmark, although rail freight is competing against large lorry-loads rather than smaller vans, and so as such this is not considered to have a significant impact on modal share.

Reliability

The A9 dualling programme should assist in improving the road's reputation for reliability, which is currently a known problem for the route, particularly during the autumn and winter months when the number of incidents that cause delays and blockages can peak. This is particularly of concern for the

large number of articulated lorries using long stretches of the route for trunking purposes (see Section 5).

From industry knowledge and consultation it is understood that unreliability is a factor in several industries such as parcels and the food sector, exploring the potential for rail freight, in an attempt to avoid late or "non-deliveries". If reliability is significantly improved then this will mean that road freight remains 'the easiest option' and any incentive to explore the complexities of rail freight are reduced if road is "guaranteed" to get through.

The railway currently carries a limited share of freight, although in the past it has transported a wider range of goods. As earlier stated, what freight is moved on the line consists of an intermodal train in each direction and then weekly or fortnightly cement, pipe, oil or nuclear flask trains. As these only run once or twice a week they add up to about a 3rd train. Thus, on average, there are 3 freight trains in total using the Highland Main Line per day, (rather than 3 in each direction).

Although the nature of improvements planned for the Highland Main Line are being developed, they are understood to create a greater number of train paths and longer trains (through the creation of more signalling blocks and improving passing loops). In addition to increasing capacity on the railway, this will also offer lower costs per tonne (through increased train length – assuming that the demand can be procured to fill it) and may also, depending on available train paths for freight, possibly offer more convenient timing for deliveries to terminals.

The award of the ScotRail franchise to Abellio offers an opportunity to increase capacity for rail freight on the Highland Main Line too, as the use of short High Speed Train sets which can travel faster than the current rolling stock may offer the opportunity for more freight train paths on the railway. Furthermore, the HST vehicles themselves, unlike the current Diesel Multiple Unit fleet, have capacity in the power cars which could be used for some parcels or other small items of freight.

Nature of Goods

Certain goods are well suited for rail travel; large bulky items or intermodal containers for example, as demonstrated by the current daily intermodal train for Tesco and the cement and pipe trains. Other goods are similarly taken by rail, such as the nuclear waste train, due to security concerns. It is unlikely that the nuclear waste or the large, bulky cement and pipe trains will switch to road as a result of the A9 road upgrade. Furthermore, the beneficial impact on reputation from the Tesco "Less CO_2" trains as opposed to several lorries means that the intermodal train will probably continue without change mainly due to a Transport Scotland subsidy bringing the cost of rail in line with road. It is expected that if the road journey is improved then road costs will reduce and potentially the subsidy which makes up the difference between road and rail may need to be increased to maintain the environmental benefits of using rail.

Critical Mass

Even in instances where the load is suitable for rail transport, there is also the issue of ensuring a large and reliable supply of the goods. Unlike a single lorry, which can be hired in part or in full, for consignments varying from individual parcels up to 28 tonne loads, with the haulier or intermediary undertaking consolidation as required, the amounts required for rail freight are significantly larger. On the railways there is a need to ensure large tonnages in order to make the train economical, especially with the decline in the UK of mixed rail freight local pick-up services. It is estimated that a minimum of 20 wagons carrying at least 40 twenty foot equivalent units (TEU) worth of goods are needed in order to make a regular, viable route for the rail freight company whilst ensuring competitive costs for the individual container consignments. Small and medium enterprises struggle to create these volumes; the only current service on the Highland Main Line being the Stobart daily ambient freight train to Inverness, which delivers supplies to Tesco stores in the north of Scotland.

Complexities of Rail Freight

Having sufficient volume to achieve an economic train load is just one of the complexities which face a firm or a group of firms endeavouring to utilise rail freight in the United Kingdom. These complexities put off many firms, in particular smaller or medium size enterprises, from taking this option further. Another requirement, given the current train pathing system in the UK, is the need for a regular flow in order to make the allocation of the train path cost-effective. The train paths allocated also limit delivery windows, sometimes to inconvenient times – particularly for smaller firms. Aside from large firms with significant, regular flows, and plentiful staff to ease rota scheduling for awkward delivery times, these are also disincentives.

Compared to making a simple direct telephone or electronic contact with a road haulier when a shipper wants to move something from A to B, engaging with the rail freight sector can be significantly more daunting and complicated. Factors such as train paths, location of terminals, types of wagon, gauge issues, frequency, critical mass and last mile road delivery as well as an awareness of different companies in the market and an appreciation of the lack of the ability to get instant prices all need to be understood.

Another complexity (at least until the upgrade is complete) is the size and nature of both the Highland Main Line itself and the Inverness Terminal. Freight trains on the HML are shorter than on much of the rest of the UK network for signalling and loop length reasons unless a through path is obtained. This means trains are limited to 300m compared to 500-550m on much of the rest of the network, meaning that each container-load costs significantly more than on other parts of the network as it bears a greater share of the cost. Similarly, length limitations at the Inverness terminal (c.360m) mean that should a through path be obtained for a longer train, it would still need to be split for unloading and loading at the northern terminal, adding to time and cost. This latter aspect is not currently understood to form part of the current Highland Main Line improvement scheme but has been highlighted by the Freight Working Group.

Funding

In a bid to encourage firms to overcome these complexities the Scottish Government operates the Mode Shift Revenue Support and Freight Facilities Grant scheme which funds the additional operating and capital costs respectively of rail freight so that there is no cost differential between road and rail freight for users. The Eddie Stobart Tesco service attracted Freight Facilities Grant funding to enable its launch and also receives ongoing Mode Shift Revenue Support funding. Assuming there are no changes to this policy there is unlikely to be a shift away from rail travel (as it has not become any more inconvenient in absolute terms) although it should be noted that the improvements in road journey times may push up the cost of the subsidy.

In addition to the ongoing subsidy, it is assessed that any future shifts to rail freight may also require further government support; particularly in terms of the Freight Facilities Grant (as evidenced by the “Lifting the Spirit” trial) or revenue support.

Estimate of HML and A9 dualling interaction regarding rail freight

An estimate has been made as to the resulting volumes and modal shares in the future situation in 2025 with both the Do Something-Road Scheme (dualling) and Do Something-Rail scenario i.e. HML improvements. The population and Gross Domestic Product (GDP) in the Highlands are expected to grow year on year to 2025. Based on an assumption that local GDP will grow by 2%,(government forecasts only go 5 years into the future but are between 2%-2.5%) a conservative estimate is that road freight growth is compounded at 1% annually as freight growth follows the trend in the economy but at a lower level than the GDP rate due to the service sector not moving much freight. In order to estimate the modal split between road and rail along the Highland Main Line, we have assumed that

there is no growth in rail freight. The reason we have taken this view is that whilst we have factored into consideration improvement works across the road and rail network including the dualling of the A9 and continued government support towards rail, the net reduction in journey times and improved reliability on road are likely to dampen interest in new companies exploring modal shift from road to rail. So the average daily flow of HGVs in each direction is expected to grow from 700 to 781 by 2025. As rail freight is anticipated to remain constant rail's approximate market share on the corridor will drop slightly.

Clearly if interested stakeholders work together and rail is able to win business especially in industries such as whisky, energy, parcels and forestry the sector could grow but it needs carefully planned interventions to overcome certain barriers and stimulate a modal shift.

Table 7.1: Modal share to 2025

	Modal Share		Number of lorries (5 Day Weekly Average)
	Rail	Road	
2014	3.00%	97.00%	700
2015	2.97%	97.03%	707
2016	2.94%	97.06%	714
2017	2.91%	97.09%	721
2018	2.89%	97.11%	728
2019	2.86%	97.14%	736
2020	2.83%	97.17%	743
2021	2.80%	97.20%	750
2022	2.78%	97.22%	758
2023	2.75%	97.25%	766
2024	2.72%	97.28%	773
2025	2.70%	97.30%	781

8. Conclusions and Implications

This section considers the implications of this freight analysis, on both the Outline Business Case and scheme design development.

Important role of the A9 corridor - volume

The A9 corridor is the main freight artery connecting the Central Belt to the Highlands and Islands with around 700 HGVs travelling at least part of the route in each direction on a daily basis. A cross-section of freight traffic on the route shows that it carries a disproportionately high percentage of 44 tonne Gross Vehicle Weight articulated vehicles and this should be factored into the outline design of the route. This vehicle mix is consistent with some of the UK's major trunking routes including roads from commercial ports. This evidence confirms that the A9 is an important commercial route serving the economy with an estimated 32,000 tonnes moving daily on the Perth to Inverness corridor which equates to over 10million tonnes per year. The HML carries approximately three freight trains per day which equates to 300,000 tonnes of freight annually.

Value of Goods

An estimation of the value of different industry sectors that use the A9 was carried out, parcels, retail, general haulage and container traffic are estimated to provide 65% of the approximately £64million moved on the A9 in the course of a 24 hour period. The value equates to over £19bn per annum. Freight on the HML has a value of approximately £500 million annually.

Industry Types

An analysis of the goods vehicles observed to be using the A9 corridor has shown that there are 20 different industry types. The key industries (in terms of freight) identified as a result of the SGVCs (with the exception of General Haulage) were food, drink (including whisky), agriculture, the shipment of parcels and retail goods along with building materials demonstrating the variety of goods being transported along the corridor. The freight flows from the five key growth sectors identified in relation to the A9 dualling programme are:

- Food & Drink – 16% includes food retail, food manufacture and whisky trade
- Life Sciences – Tends to be served by light vans and the parcel sector
- Energy – 4% includes oil and gas tankers and biomass vehicles
- Tourism – 1%-2%, more vehicles in hotel trade in summer
- Forestry – 4% includes logs, timber and forest products

HGV Traffic

The northern end of the corridor carries fewer freight vehicles and this is especially the case north of the A9/A95 junction. Freight traffic is greater at the south of the study area near Pitlochry with an average of 700 HGVs on a typical weekday compared to Aviemore in the north where there is an average of 640 HGVs over the same period. Going further north the volume of goods vehicles drops to around 420 beyond Aviemore with a third of freight turning off to use the A95.

General traffic is heavily subject to seasonality and can be 50-60% higher in summer compared to winter months. Freight and HGV traffic is not subject to as significant seasonal variation but still can vary by 20-40%. The late summer peak may in part be due to the agricultural harvest but may also be attributable to the tourism industry, which is an important part of the economy along the entire study corridor. This is demonstrated by the fact that goods vehicles in the hotel and linen services sector appear in the Top 20 companies identified in the summer SGVC.

User Time and Cost Savings

The user time savings for general traffic following introduction of the A9 dualling have been calculated at around 20 minutes on a one-way journey between Perth and Inverness. Due to HGVs having a lower speed limit and also due to in-vehicle speed-limiters it is expected that the time saving for HGVs will be of the order of 20 and 30 minutes on a return trip between Perth and Inverness. The cost of running a freight vehicle per hour varies depending on a number of factors including driver wages, size of vehicle, depreciation costs, distance moved and hence fuel cost and typically an average HGV operates at around £30/hour. So for every round trip made operators are likely to benefit by £10. Assuming part of this saving is passed on to customers then typically this could represent a 3% saving in transport costs which will benefit the wider economy.

Lower Driver Frustration

Car drivers can become frustrated if their journey is delayed by travelling behind slower moving traffic. This frustration is not limited to car drivers and in fact professional lorry drivers faced with typically long working days, similarly become frustrated if they are delayed by slower moving trucks. This is compounded by the fact that there are few places where it is safe for a HGV to overtake another lorry on the single carriageway sections of the A9 as they require a longer gap. The dual carriageway will definitely lead to fewer stressed lorry drivers. This might seem a trivial issue but it is not especially when there are more lorry drivers leaving, than joining, the industry and stress levels are a contributory factor. The average age of lorry drivers is estimated to be approaching 50 and many young people do not want long hours of work and stress caused by driving.

Safety Benefits

The frustration mentioned above can lead to motorists mis-judging the speed of on-coming traffic and making dangerous overtaking manoeuvres resulting in a higher level of incidents on single carriageways. When freight vehicles are involved in incidents the outcome is often of a serious nature and may result in serious injuries or fatalities. HGVs greater than 7.5 tonnes gross weight have been involved in 12% of accidents but importantly 23% of fatal accidents on the A9 and this latter percentage is double their proportion of traffic and much higher than for the remainder of the trunk road network in North West Scotland. As dual carriageways are generally safer there are benefits of the dualling programme in having fewer accidents which result in closing the road completely and/or long delays due to single file working. A safer road means fewer aborted trips and lost days per vehicle. Assuming vehicle revenue is approximately £400 per day then if 700 HGVs are seriously affected by one road closure this can equate to a loss of £280,000 per major incident.

Less lost time due to platooning

Apart from the journey time savings motorists will enjoy by having no platoons there is a small time saving to be had by the relatively modest proportion of HGVs that used to pull into laybys to allow other traffic by and this cumulatively could have delayed the truck driver by 10 minutes over a complete round trip. If about 10% of HGV drivers did this then over the year this would cost the industry £104,580.

Wider secondary benefits

There are secondary benefits to “end-users” in terms of route reliability and businesses receiving more goods on time and the positive implications of this e.g. retailers avoid empty shelfs and lost sales.

Findings about Road Freight in the A9 Corridor

Data Analysis

- The A9 is a key freight arterial route and every day there are (on average) a total of 1,300 lorry movements recorded moving 32,000 tonnes.
- The A9 does not operate in isolation and is often used in conjunction with the A95, A96 and A90.
- On these roads the data indicates a slight, but noticeable imbalance consistent with a higher number of vehicles operating an anti-clockwise circuit from the Central Belt up to Aberdeen and returning via the A9
- HGV related freight traffic, is less seasonal than more general traffic on the A9 and HGV flows are only 20-30% higher in the summer
- Key industries include the movement of food and drink, agricultural goods, as well as retail, industrial equipment and general haulage
- The amount of freight traffic utilising the A9 declines steadily the further north you travel

SGVC Findings

- Eight out of the top ten hauliers observed in February were in the top ten in September showing a consistency in vehicle movements
- Half of all freight vehicles observed at Pitlochry were seen at Aviemore
- 70% of all freight vehicles observed at Aviemore were seen at Pitlochry
- Approximately one third of HGV traffic observed on the A9 at Aviemore used the A95
- A significant number of freight vehicles observed were travelling to/from intermediate destinations between Pitlochry and Aviemore
- Less than 1% of freight vehicles were foreign registered

Volume and Value Estimates

- Approximately 32,000 tonnes of freight is estimated to be moving on the A9 every day and this equates to 10 million tonnes annually
- The value of an average tonne of freight on the A9 is estimated to be £2,000
- The payload on the vehicles is estimated to be £64m each day or almost £20billion in a year
- Delays caused by problems on the A9 are likely to have an impact on the working capital tied up in the goods on the vehicles especially if a delivery is not made on the correct day

Freight Traffic Forecasts

A forecast of future year (2025) freight volumes and modal shares with both the Do-Something road scheme (A9 dualling) and Do-Something rail scheme (HML improvements) has been undertaken based on reasoned assumptions. The population and Gross Domestic Product (GDP) in the Highlands are expected to grow year on year to 2025. Based on an assumption that local GDP will grow by 2%,(government forecasts only go 5 years into the future but are between 2%-2.5%) a conservative estimate is that road freight growth is compounded at 1% annually as freight growth follows the trend in the economy but at a lower level than the GDP rate due to the service sector not moving much freight. The average daily flow of HGVs in each direction is expected to grow from a current base of around 700 to 781 by 2025.

The HML

The Perth to Inverness rail corridor (HML) is carrying a limited amount of freight, 3% of the market by volume which equates to 32 HGV movements in each direction. As rail freight is anticipated to remain fairly constant, rail's market share on the corridor will drop very slightly. An upgraded HML could improve use for freight traffic and hypothetically, reduce the number of lorries on the A9 trunk road. Looking at an optimistic scenario this is considered to be potentially an increase of up to 15% on today's levels. This equates to an additional 108 lorries removed from the A9 trunk road each way on any given day. The optimistic scenario is of course dependent upon a number of incentives and factors combining. Realistically the shorter journey times and improved reliability and resilience offered by the A9 dualling are going to lessen the potential switch from road to rail and all other things being equal, are likely to constrain future rail freight growth.

In conclusion assuming both the A9 dualling and HML improvements go ahead then little change is expected in the current modal share of road and rail on the corridor. The freight industry will benefit from the infrastructure improvements on this vital corridor and this gain will help the wider economy.

Findings about Rail Freight in the A9 Corridor

- Rail currently has an estimated modal share of approximately 3% on the corridor based on volume and this compares to 5% on a UK basis
- There is over 1,000 tonnes of goods moving daily on HML and it is valued at around £1.7 million with an average tonne valued at around £1,600
- This equates to 300,000 tonnes per annum with a value of £500 million
- There is potential for growth in rail freight provided a number of key operational barriers can be overcome
- The HITRANS' "Lifting the Spirit" project has demonstrated that some of the issues preventing the more widespread use of rail freight can be overcome and be accommodated within the current infrastructure
- 70% of the current freight tonnage on the HML is related to intermodal use, which is related to the Stobart/Tesco partnership and is therefore vulnerable to the actions of one company.

Project:	**LATIS Lot 4: A9 Outline Business Case**	Job No:	**60430762/A9.007**
Subject:	**A9 Corridor Freight Assessment**		
Prepared by:		Date:	**12 March 2014**
Checked by:		Date:	**20 March 2014**
Verified by:		Date:	**21 March 2014**
Approved by:		Date:	**21 March 2014**

Review / Revision History:
If or when there are approved changes to the Client's brief, or as required at other times by the IMS procedures, etc., this Technical Note must be revised and the revision number updated.

Revision No.	Date of Revision:	Description of Revision:	Revision Made By:	Approved by:
1	02/07/2014	Updated to incorporate client comments and an assessment of modal split between road and rail following upgrades to both		
2	27/01/2015	Update to include industry survey and second SGVC		
3	25/09/2015	Restructured into note plus appendix		

LIST OF APPENDICIES

Appendix 1: Literature Review

In this literature review section of the Appendix we summarise various documents studied.

HITRANS – "Upsticks": Timber Transport Study (2013)

This report aimed to establish the number of timber trucks operating within the Highland regional area and their usage of the public road network. The report established that whilst timber traffic is heaviest on the A9 towards the northern end of the study area, a significant number of logging and timber vehicles make daily trips as far south as Dalwhinnie, the A889 and the regional boundary with Perth and Kinross. As such, it appears that timber is an important component of road freight in the area.

HITRANS – "Spirit of the Highlands" – Whisky Logistics Study (2011)

This report seeks to understand freight movements related to the distilling industry, HITRANS commissioned this study to assess the 77 malt whisky distilleries which lie within the HITRANS area. It found that the key corridors of whisky movement are the A9 and the A95. In particular the report modelled that over 47,000 trips per year on the A9 (south of the A95) are related to the whisky industry, whilst on the A9 (north of the A95) the number is almost 35,000. These movements have been predicted to grow to approximately 59,000 and 43,000 respectively if distilleries in the area continue to increase production. As such these movements will form an integral part of the freight traffic on the A9, particularly south of Aviemore and the A95.

HITRANS – Lorry Parking Strategy (2011)

This report assessed the current capacity of lorry parking on the A9 and recommended a series of improvements, including improved and enlarged parking facilities in Inverness and improved signage along the length of the A9 within the HITRANS area.

TACTRAN – Overnight Lorry Parking Study (2009)

Similarly, for the TACTRAN area, this study established the extent of overnight parking on the road network, and recommended improved Lorry park design (in line with the European SETPOS project), increased capacity and security at existing sites and improved information for lorry drivers.

TACTRAN – Regional Transport Strategy (2008)

The A9 is an important component of the road network in the TACTRAN area, and as such issues and problems with the road affect not only freight but also significant commuter flows. Furthermore, problems with the provision of rail services affect both passenger and freight users. Within the TACTRAN area, there are no rail freight terminals which severely limit the potential for regional freight movements to use an alternative to the A9 trunk road.

HITRANS – Regional Transport Strategy (2008)

HITRANS covers the northern section of the study area; their strategy notes the issues with regard to congestion on the northern end of the A9 (around Inverness and the junction of the A96). Furthermore, it underlines the region's commitment to shifting freight from the A9 corridor onto water and, particularly, rail modes.

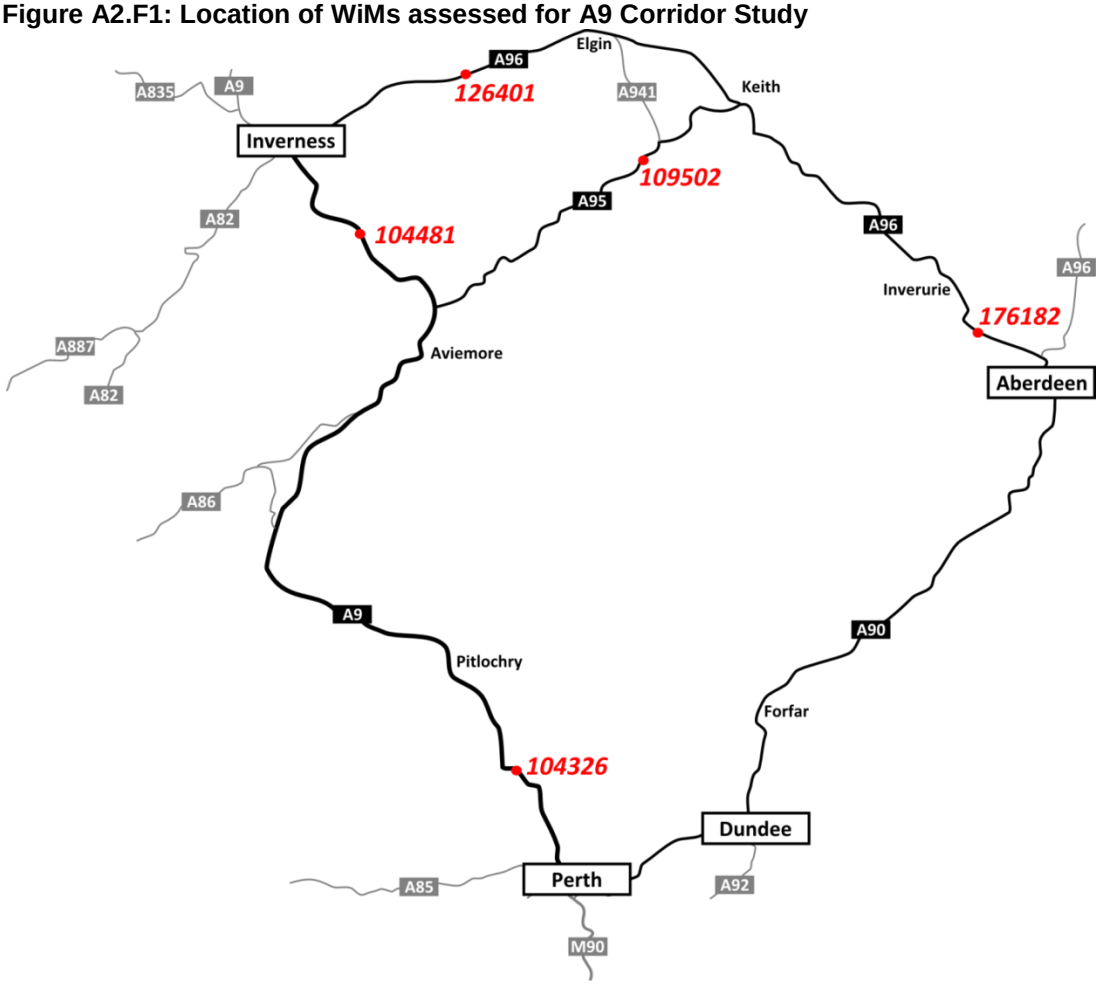
Appendix 2: Historical Dataset Analysis

This appendix examines five different sets of data to develop an understanding of freight movements along the A9

Transport Scotland WiM Sensor Data

AECOM analysed data from two WiM sensors on the A9; A9 104481 - Tomatin and 104326 - Birnam. This offered a "north" and "south" reading on the A9 throughout from April 2008 through to the end of 2012 to be created, and compared. Further analysis also utilised WiMs 176182 (to the west of Aberdeen) and 126401 – Brodie on the A96, as well as WiM 109502 on the A95 (Ballindalloch). Data from these points was assessed to provide a representative picture of the freight traffic at various points on the A9 corridor, and to fully understand its flows and composition. A diagram of the WiMs locations is provided in Figure A2.F1. Although measurements were taken throughout Scotland, only those directly affecting the A9 are considered in this note. Furthermore, the 5-day weekly average of the data was used in order to allow a representative set of data to be analysed.

Figure A2.F1: Location of WiMs assessed for A9 Corridor Study



Direction of Flow

The analysis of the WiMs data shows that as well as the A9 providing a key route for trunking freight between the central belt and Inverness there is a noticeable imbalance, with 10% more freight vehicles heading south on the A9 than north. This is mirrored by larger numbers of goods vehicles heading north on the A90 towards Dundee and Aberdeen and then west on the A96 towards Inverness. A proportion of this traffic appears to head south via the A95, therefore missing Elgin and Inverness, heading back southwards to re-join the A9 near Aviemore. This is demonstrated by the table A2.T1 below. These figures are representative of the larger sample which has been analysed

and selected as they offer the most complete set of data available at the time the analysis was conducted.

A2.T1: Number of HGVs by direction at Selected WiM Sensors (5 Day Monthly Average 2010)

	A96 (176182)		***A95 (109502)***		***A9 Birnam (104326)***	
	East	**West**	East	**West**	North	**South**
January	462	**556**	144	**184**	493	**532**
February	505	**561**	178	**223**	597	**643**
March	520	**586**	211	**281**	677	**732**
April	510	**583**	207	**273**	699	**753**
May	544	**617**	226	**293**	664	**731**
June	571	**634**	208	**267**	662*	**735***
July	497	**599**	160	**208**	660	**739**
August	533	**611**	200	**233**	689	**774**
September	578	**681**	210	**244**	733	**802**
October	562	**647**	232	**243**	642	**704**
November	479	**568**	204	**284**	667	**724**
December	436	**590**	-	**-**	495	**535**
Average	*516*	***603***	*198*	***248***	*640*	***700***

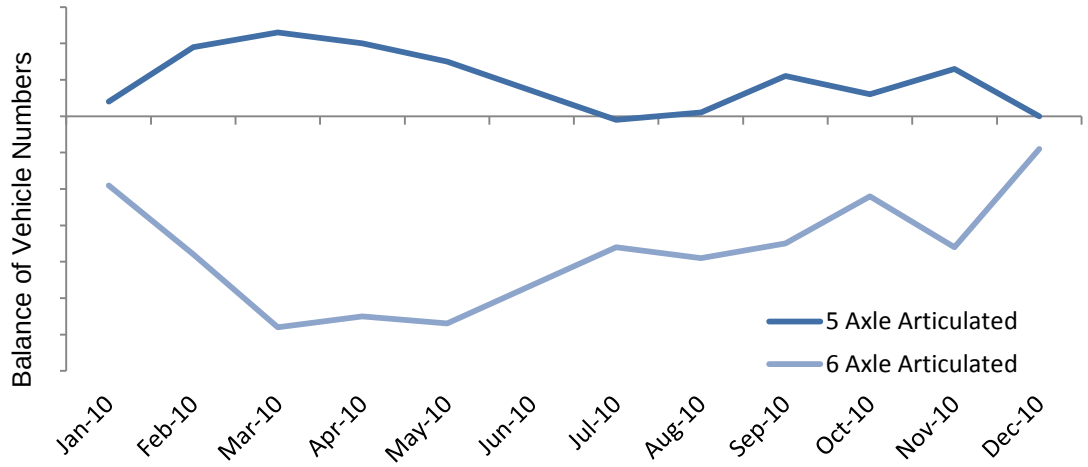
*This data has been averaged from the adjacent data due to the WiM only taking 14 days' worth of readings in this month

Combining this information with the traffic count data, it suggests that there is a larger anti-clockwise pattern to the way freight traffic moves around this part of Scotland, with a significant proportion presumably leaving the Central Belt in the morning to head up to Dundee and Aberdeen, before returning, either via the A95 or the A96 to the A9 corridor and heading south. The bias towards southbound freight traffic has possible implications for the A9 dualling in terms of junction design, road wear and capacity.

Types of Vehicles

The summer tourist market is served by more additional vans than HGVs, with more food and hotel related service vehicles. The WiMs data can give an indication as to the number of 5 axle or 6 axle articulated vehicles and hence their payloads. As an example, figure A2.F3 shows selected data from WiMs sensor 104326 (Birnam) at the southern end of the A9.

Figure A2.F2: Balance of 5 Axle and 6 Axle Vehicles on the A9 at Birnam



In figure A2.F2, Southbound vehicles were taken away from Northbound vehicles for each month, resulting in the balance. Thus there is an imbalance of 5 axle articulated vehicles (as registered by the WiM system) heading north, and a noticeably large number of 6 axle figures heading south.

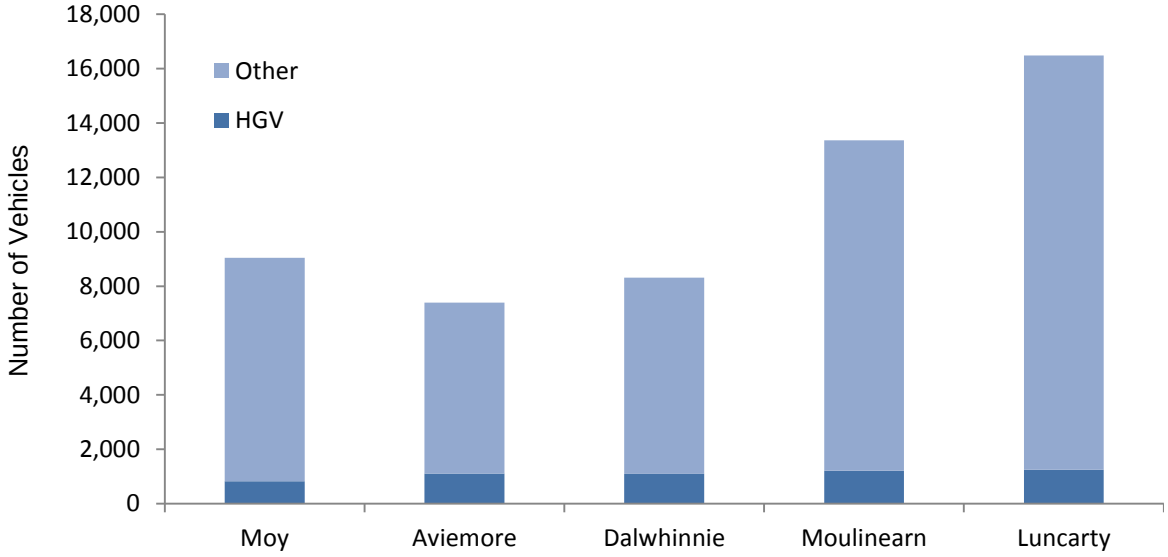
Furthermore, there appears to be some correlation between the peaks and troughs, with more 6 axle vehicles heading south at the same time as more 5 axle vehicles are heading north.

Transport Scotland Automated Traffic Count (ATC) Data

Further to the above WiMs data, a wider range of counters were utilised to provide secondary readings (where WiMs were present nearby) in order to ensure a robust dataset. Furthermore, there were several locations where automated traffic counts, were installed on roads where WiMs were not located (JTC00064 Powrie and JTC00152 Inchmartine on the A90 for example). These provided confirmation of the anti-clockwise route that was discussed in the section above regarding the WiMs data.

In particular, the number of these counting stations on the A9 allowed a more detailed analysis of axle counts (and how they change) along the length of the A9, as opposed to the north and south readings from the WiM data. It is on these readings that the rest of this section focuses. However, these vehicle counters still only offer a very broad level of data analysis. In particular, it should be noted that conclusions within this section apply only to the larger OGV2 class of HGVs. The sensors do not differentiate between vans and larger, rigid freight vehicles. For clarity, therefore, only the data referring to classification "E5 – HGV" from the sensors has been utilised. This does, however, mean that a significant proportion of freight traffic will have been missed (see Table A2.T3 for an indication of how much freight traffic is classified as OGV1). Furthermore, whilst the date range again spans from approximately 2007/8 to 2012, there are gaps in some of the data. These were compensated for where possible by assessing the supporting or comparable data from nearby counts or other years.

Figure A2.F3 : Automated Traffic Counts from North to South on the A9 (5 Day Monthly Average across 2011)



As can be seen from A2.F3 above, there is approximately twice as much traffic north of Perth (Luncarty) as there is at Aviemore and Dalwhinnie. Whilst general car traffic increases again (presumably traffic commuting to and from Inverness) north Aviemore, freight traffic continues to decline (see A2.T2 below).

Table A2.T2: HGVs counted on A9 (both directions) from North to South by ATCs (Average across 2011)

Moy	Aviemore	Dalwhinnie	Moulinearn	Luncarty
822	1,109	1,092	1,211	1,246

Whilst HGVs (as a percentage of general traffic) peaks at Aviemore in all seasons, it is a notably larger component in the first and fourth quarters than during the summer. Broadly speaking, freight is approximately 9% of all traffic at the southern end of the A9, peaking at roughly 15% at Aviemore and then dropping to around a tenth of traffic to the south of Inverness. The ATC data thus provides a more nuanced picture of the composition of traffic on the A9 and how it changes based both on location and season.

DfT Annual Traffic Survey Data

The DfT carries out annual traffic surveys at the same points (or similar) every year. The data that is readily accessible starts in 2000, allowing long-term trends to be assessed. However, it is important to note that this data is only from one day every year, and so as such may contain some exceptional datapoints which do not accurately reflect the conditions of that year. It is, however, possible (over the entirety of the available time-series) to assess overall trends from the period 2000 – 2012.

Three of the four DfT datapoints assessed in the course of this study noted a large increase in the number of freight vehicles utilising the A9 corridor from 2008 (all of those north of Pitlochry). Furthermore, the data collected reinforces that collected from Traffic Scotland, emphasising the anti-clockwise freight movements observed elsewhere. All of the counts south of Aviemore have clear southbound bias, whilst that north of the A95 junction has a slight northbound tendency, suggesting that significant amounts of traffic are joining the A9 southbound from the A95 (linking back to the evidence in A2.T2).

Furthermore, as the counts were conducted manually, the axle and vehicle classifications are typically more reliable than those drawn from the automated systems. These provide some interesting insights into the composition of freight traffic on the A9.

Table A2.T3: Percentage of HGVs counted as OGV1 or OGV2 (of total) by DfT Traffic Surveys

	Traffic Survey Point Reference Number (North to South)							
	20726 (north of A95 junction)		20727 (south of Aviemore)		50748 (south of A889 junction)		30729 (north of Dunkeld)	
Year	**OGV1**	**OGV2**	**OGV1**	**OGV2**	**OGV1**	**OGV2**	**OGV1**	**OGV2**
2000	43%	57%	37%	63%	42%	58%	53%	47%
2001	43%	57%	36%	64%	43%	57%	55%	45%
2002	58%	42%	34%	66%	44%	56%	56%	44%
2003	53%	47%	34%	66%	48%	52%	56%	44%
2004	46%	54%	43%	57%	48%	52%	55%	45%
2005	43%	57%	48%	52%	48%	52%	47%	53%
2006	43%	57%	47%	53%	48%	52%	47%	53%
2007	43%	57%	47%	53%	47%	53%	46%	54%
2008	52%	48%	43%	57%	41%	59%	44%	56%
2009	55%	45%	35%	65%	37%	63%	44%	56%
2010	54%	46%	35%	65%	37%	63%	46%	54%
2011	53%	47%	37%	63%	37%	63%	47%	53%
2012	43%	57%	35%	65%	35%	65%	45%	55%

It can be seen from the table that at the northern and southernmost counting points considered, the number of smaller vehicles (OGV1) is a higher proportion of traffic (43% to 58%) than towards the middle of the corridor (34% - 48%). This is presumably due to a larger number of smaller lorries conducting delivery rounds for the Inverness area to the north and Perth and its environs to the south.

Roadside Interview Data

Transport Scotland carried out a series of roadside interviews on the A9 over several days at the beginning of September 2012. HGVs were among those stopped and asked for further information about their journey. Data collected included how full the HGV was, what type of goods it was carrying

and where it had been/was going. It also established how often the freight vehicles used the A9 corridor. This provides some important contextual information about the nature of truck movements on the A9. Average sample rates are around 12%. As such, the database that has been created of origins and destinations offers some example routes which utilise the A9, although in some instances 10% or so of the interviews have been rejected as having been illogical in terms of their location and the destinations served. However, the O-D matrix of routes that can be created from the data offers some understanding of the use of A9 corridor. However, a larger scale of data is needed to better frame this information.

This source provides some useful information about the types of industry transporting goods along the A9 corridor to provide some context for the study. Of 420 survey responses, 194 answered either "Other" (147) or chose not to provide an answer (47). However, the remaining 226 are ranked by frequency in A2.T4 which includes lorries which were empty at the time of the survey:

Table A2.T4 : Industries using A9 Corridor based on RSI data

Industry	Frequency
Foodstuffs & Animal Fodder	57
Minerals & Building Materials	45
Leather/Textile/Manufactured Articles	32
Machinery/Transport Products	25
Metal Products	19
Ores & Mineral Waste	15
Petroleum Products	15
Chemicals	10
Agricultural Products & Live Animals	6
Fertilisers	2
Total	**226**

The data also provides information about the frequency of journeys on the A9, and whether or not there are a large number of repeat users on the corridor. Of the 201 hauliers who answered both industry type and frequency of using the A9, 58% (116) used it more than 3 times a week, indicating that there is a large amount of freight traffic which utilises the A9 regularly. This is further developed in Table A2.T5.

Table A2.T5 : Industries using A9 Corridor and Frequency based on RSI data

	Frequency				
Industrial Sector	> 3 times a week	> once a week	> once a month	> once a year	< once a year
Foodstuffs & Animal Fodder	34	2	3	1	1
Minerals & Building Materials	22	10	6	3	0
Leather/Textile/Manufactured Articles	19	5	4	1	2
Machinery/Transport Products	11	4	7	2	1
Metal Products	6	5	3	3	1
Ores & Mineral Waste	8	3	2	2	0
Petroleum Products	7	4	3	0	0
Chemicals	5	1	2	0	0
Agricultural Products & Live Animals	4	1	0	1	0
Fertilisers	0	1	1	0	0
Total	**116**	**36**	**31**	**13**	**5**

As can be seen, all of the identified sectors (apart from fertilisers) have the highest number of reports in the "greater than 3 times a week" column, and so this finding can be taken as a guide across all industrial sectors. Indeed, 75% of drivers questioned used the route more than once a week and over 90% of the drivers used the route at least once a month.

Appendix 3: SGVC count February 2014

This appendix provides the findings from the Specialised Goods Vehicle Count (SGVC) survey undertaken Wednesday 12 February 2014. A further SGVC survey was undertaken in September 2014 which is detailed in Appendix 4.

A3.1 Methodology of the SGVC

The SGVC has been devised by AECOM to record specific details about HGVs such as the registration, body type, company, vehicle size and any other relevant observable details. The advantage of the SGVC over using remote cameras is that staff on the ground are better able to capture this data off fast-moving vehicles, whereas cameras often fail to provide pictures of suitable resolution or clarity. On both occasions, SGVCs were scheduled to cover the period from 0700hrs to 1900hrs.

The SGVC took place at the two sites on single carriageway sections of the A9, near Aviemore at the intersection of the A95 and just south of Pitlochry near lay-by 31.

Data was recorded manually and then entered in an Excel Spreadsheet. Once all the data was collated, it was checked to ensure consistency and then analysed.

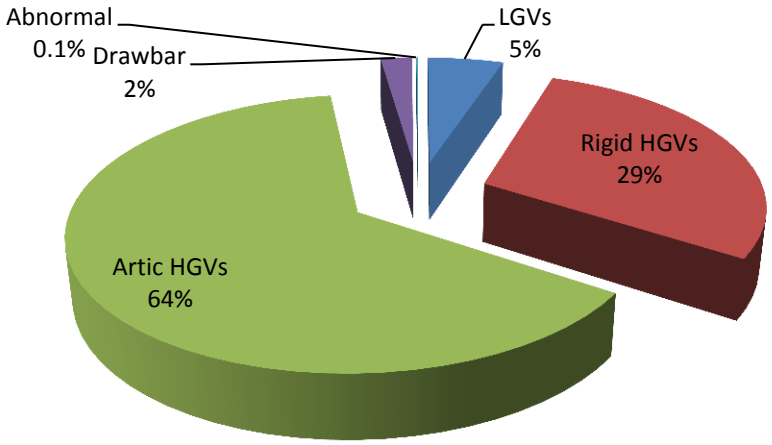
A3.2 Data Analysis (February SGVC)

The SGVC team recorded 1,586 freight vehicle movements during the February SGVC. Due to low light levels and a major road traffic incident on the date of the survey the following survey times were achieved:

- 0800hrs – 1600hrs at Pitlochry;
- 0700hrs – 1600hrs at Aviemore (earlier start feasible at Aviemore due to light levels)

The major road traffic incident occurred on the A9 between Aviemore and Pitlochry at about 1430hrs. This resulted in the A9 being closed by the police which meant that HGV matching became impossible and caused the premature conclusion of the count – it had been intended to survey until 1900hrs at both sites. The data still provided a good “snap-shot” of traffic on the day

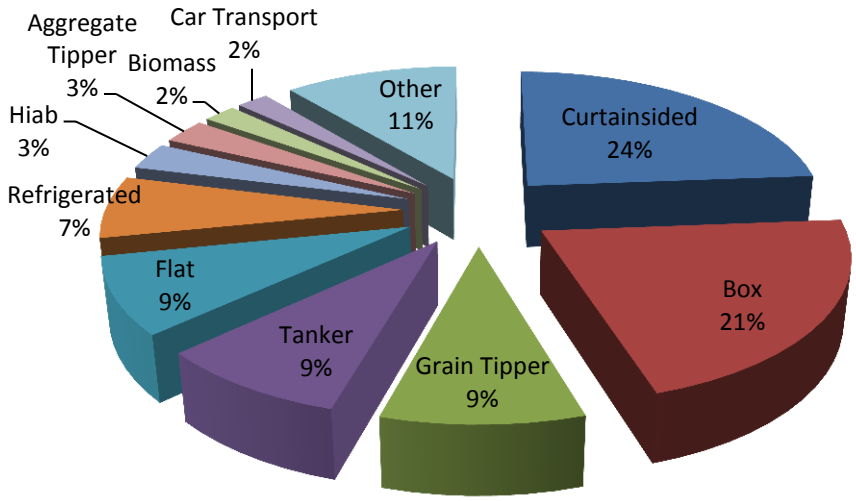
Figure A3.F1: Freight Vehicle Types



Overall articulated HGVs make up 64% of the total, rigid HGVs 29% and drawbar HGVs 2%. Specifically, 56% of the freight vehicles are 6 axled articulated HGVs. These are the largest standard type of HGV on UK roads and are commonly observed on key freight arterial roads. The maximum gross weight of a 6 axled articulated HGV is 44 tonnes. 4 wheeled and 6 wheeled rigids are the next most observed HGV type at 17% and 9% respectively. These vehicles are at the smaller end of the vehicle types with 4 and 6 wheeled rigids having a maximum gross weight typically of 18 and 26 tonnes respectively.

Thirty separate body types were observed during the SGVC. The top 10 most observed body types make up 88% of all the freight vehicles observed. The top 10 body types are shown in Figure A3.F2.

Figure A3.F2: Top 10 Freight Vehicle Body Types



The two most observed body types were curtainsided and box freight vehicles (24% and 21% respectively). These are common body types and are typical choices for trunk haulage. Approximately 9% of the body types observed are grain tippers which highlights the rural agricultural industry that is located in the area and also the fact that these vehicles are used to deliver barley to the breweries. There were also a number of tankers observed which were in some cases moving food products associated with the whisky industry.

In total 34 separate industry types were observed during the SGVC with the key industries showing in Figure A3.F3

Figure A3.F3: Top 10 Industry Types

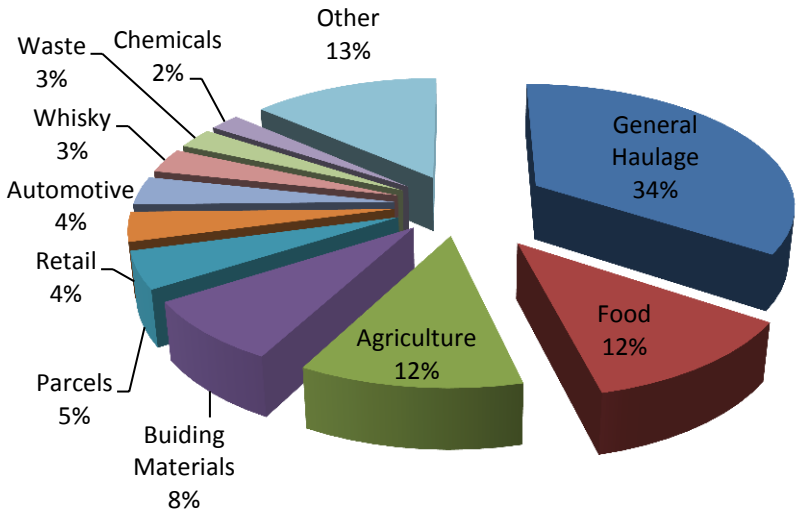


Figure A3.F3 shows that 34% of all freight vehicles were moving general haulage. 12% were moving products associated with the food industry, 12% were moving products associated with agriculture (and livestock) and 8% were moving building products.

A total of 1,074 freight vehicles had their company identified. Not every vehicle has a company name (or livery) displayed on the vehicle. Table A3.T1 shows the Top 20 Companies that were counted in the SGVC.

Table A3.T1: Top 20 Companies

Rank	Name	Number	Rank	Name	Number
1	Stevenson	31	11	TNT	11
2	McPherson	29	12	Graham	10
3	Carntyne	18	13	Co-op	9
4	Grant	17	14	John Mitchell	9
5	Royal Mail	16	15	Seacliffe	9
6	Breedon Aggregates	13	16	Craigs	8
7	Craib	13	17	Hermes	8
8	Bulmans Bulk	12	18	Ian Roger	8
9	Ferguson	12	19	James Innes	8
10	ASDA	11	20	Jenkinson	8

The Top 20 companies make up 24% of all vehicles that belonged to an identified company. This shows that the freight vehicles operating on the A9 are from a diverse range of companies. Reviewing Table A3.T1 shows that some of these companies are household names such as Royal Mail, ASDA, TNT and the Co-op. Others like Carntyne, Stevenson and McPherson are large regional hauliers. Several of these hauliers are specialists in their field, for example McPherson have the contract to move products on behalf of Chivas Brothers (the whisky maker).

Figure A3.F4 : Freight Vehicle Euro Engine Type

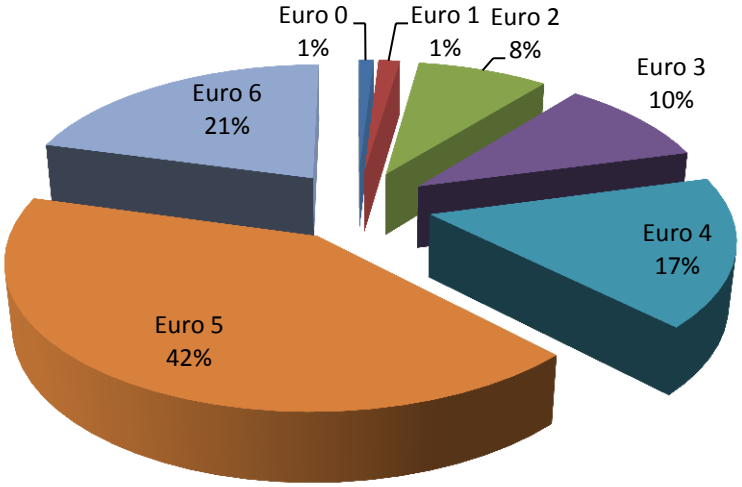


Figure A3.F4 shows the Euro Engine types of the freight vehicles. The ratings have been introduced in stages and from the 31st December 2013, Euro 6 has been mandatory for all newly registered vehicles. This was worked out by determining the year of manufacture according to the number plate on the freight vehicle. Figure A3.F4 shows that 42% of freight vehicles have Euro 5 engines. The higher the Euro Engine rating, the fewer emissions the vehicle will emit. 80% of freight vehicles are Euro 4 rating or better.

HGV Matching Exercise

This section discusses the matching process of comparing vehicles at the two sites for the February count. The data was reviewed and the registrations of the freight vehicles were matched. A freight vehicle was matched if it was observed at both Pitlochry and Aviemore (or vice versa) whilst travelling in the same direction (eg northbound or southbound). This would indicate whether the freight vehicle has travelled between Pitlochry and Aviemore (or vice versa).

Table A3.T2 summarises the adjusted freight vehicle matches for both sites in both directions:

Table A3.T2 – Summary of Adjusted Freight Vehicle Matches for All Sites (Both Directions)

Site	Adjusted Freight Vehicle Matches	% Matched	Adjusted Freight Vehicle Total
Northbound Pitlochry	149	56%	265
Northbound Aviemore	159	75%	210
Southbound Pitlochry	170	41%	411
Southbound Aviemore	160	62%	259
Total	**638**	**56%**	**1,145**

Note: the process for deriving the 'adjusted' fgures is presented further on

Local Traffic

Some of the HGV traffic at Pitlochry and Aviemore only had its registration matched at one location (i.e. it was recoreded more than once in the survey at the same survey site). For this reason it was classed as local traffic. Not all freight vehicle registrations could be successfully matched but it was considered local traffic if it was in an industry that would undertake local services, such as refuse vehicles, gritters and council utility vehicles.

Table A3.T3 summarises these local HGV movements:

Table A3.T3: Local Freight Vehicle Movements

Site	Local Freight Vehicle Recordings	% Recorded	HGV Total
Local Pitlochry Freight Vehicle Traffic	136	17%	804
Local Aviemore Freight Vehicle Traffic	53	8%	706
Total	**189**	**13%**	**1,586**

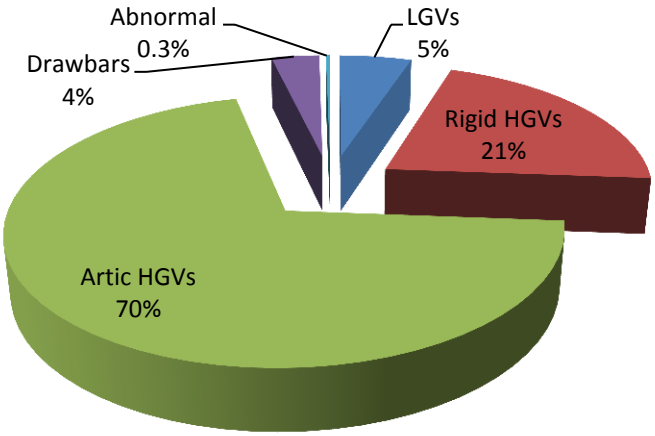
Table A3.T3 suggests that 17% of freight vehicle traffic at Pitlochry is undertaking local movements. It also suggests that 8% of freight vehicle traffic at Aviemore is undertaking local movements.

The remaining movements are unmatched and therefore deemed unknown movements. The sample size of matched freight vehicle registrations can only be considered as a snapshot.

Pitlochry-Aviemore Matched Freight Vehicle Analysis

The following section considers the attributes and characteristics of the matched freight vehicles either running between Pitlochry and Aviemore or vice versa (ie not local traffic or unknown movements). All references to movements between Pitlochry and Aviemore are considered bidirectional (ie Aviemore to Pitlochry as well).

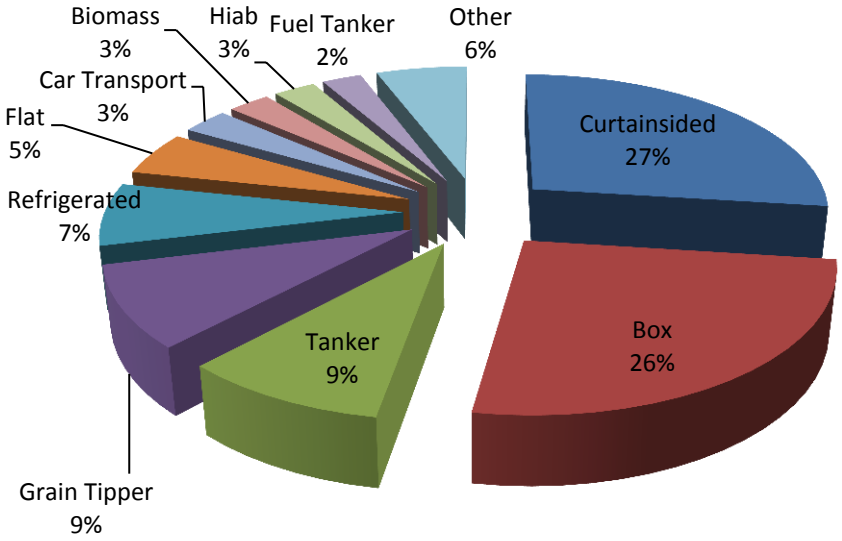
Figure A3.F5 : Matched Freight Vehicle Types



Articulated HGVs make up 70% of the total matched trips which is marginally higher than the percentage of articulated HGVs observed overall (64%). These vehicles are typically used more on long distance journeys.

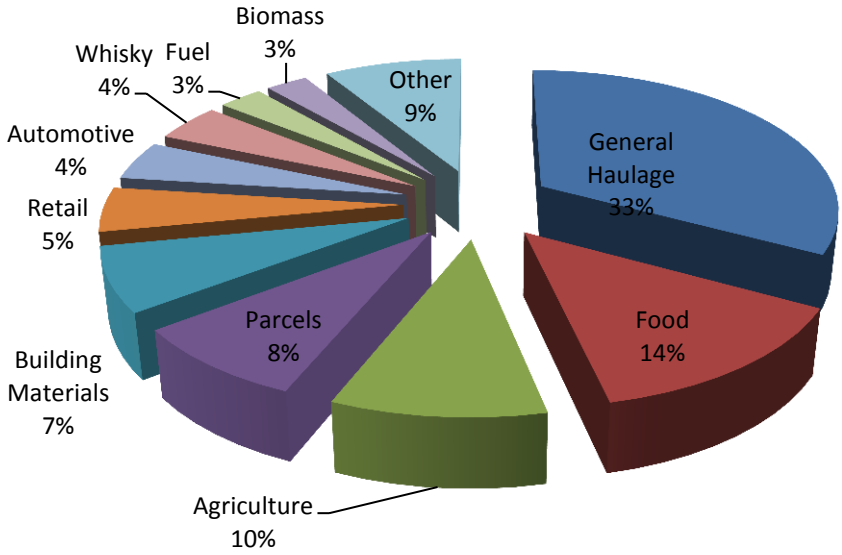
A total of 17 different body types are observed completing a movement between Pitlochry and Aviemore (compared to 30 generally). The matched top 10 freight vehicle body types are shown in Figure A3.F6.

Figure A3.F6: Matched Top 10 Freight Vehicle Body Types (Pitlochry to Aviemore both directions)



The two most observed body types were curtainsided and box HGVs (27% and 26% respectively). These are common body types and are typical choices for trunk haulage. 9% of body types were grain tippers which highlights the rural agricultural industry that is located in the area. There were also a number of tankers observed which were in some cases moving food products associated with the whisky industry. The freight vehicle body types are very similar in composition to general observations made.

Figure A3.F7: Matched Top 10 Industry Types



A total of 20 separate industry types were observed completing a movement between Pitlochry and Aviemore during the SGVC. This compares to the 34 observed generally. The disparity between the matched HGVs and those generally observed HGVs suggests that some of the industries that are missing from the matched HGVs are undertaking localised movements. The top 10 industries are shown in Figure A3.F7. and make up 91% of all the matched freight vehicles observed.

Figure A3.F7 shows that 33% of the matched freight vehicles were moving general haulage; 14% were moving products associated with the food industry, 10% were moving products associated with agriculture (and livestock) and 7% were moving building products. Around 8% were moving parcels

and letters. Although the main industries do not differ between the matched HGVs and those in general, the composition does vary slightly.

Not every freight vehicle had a company name (livery) displayed on the vehicle. Table A3.T4 shows the Top 20 Companies.

Table A3.T4: Matched Top 20 Freight Vehicles Companies

Rank	Name	Number	Rank	Name	Number
1	McPherson	18	11	John Mitchell	6
2	Royal Mail	14	12	Co-Op	6
3	Carntyne	12	13	Craib	6
4	Stevenson	10	14	Hermes	6
5	ASDA	10	15	Niven	6
6	Grant	10	16	Polypipe	6
7	Bulmans Bulk	8	17	Stobart	6
8	Ian Roger	8	18	Tesco	6
9	Seacliffe	8	19	Brenntag	4
10	TNT	8	20	Caldeonian Logistics	4

Table A3.T4 shows the Top 20 companies which make up 28% of all matched freight vehicles belonging to an identified company. This shows that the matched freight vehicles operating on the A9 are from a diverse range of companies.

The following sections consider the matching exercise in more detail including a breakdown by hour and an explanation of how the 'adjusted' figures were determined.

Northbound flow
A3.T5 shows the Northbound (Pitlochry to Aviemore) movements of freight vehicles.

Table A3.T5: Matched Freight Vehicles Northbound (Pitlochry to Aviemore)

Hour	Pitlochry			Aviemore		
	Matched Freight Vehicles	% Matched	Total Freight Vehicles	Matched Freight Vehicles	% Matched	Total Freight Vehicles
07:00-08:00	N/A	N/A	N/A	0	0%	35
08:00-09:00	36	56%	64	0	0%	51
09:00-10:00	30	65%	46	21	60%	35
10:00-11:00	30	49%	61	29	78%	37
11:00-12:00	23	53%	43	22	79%	28
12:00-13:00	30	59%	51	30	81%	37
13:00-14:00	13	29%	45	31	74%	42
14:00-15:00	0	0%	47	26	84%	31
15:00-16:00	0	0%	22	2	50%	4
Total	**162**	**43%**	**379**	**162**	**54%**	**300**

A3.T6 shows the number of matched freight vehicles that were observed at Pitlochry and then shows what percentage these were of the total freight vehicle traffic observed at Pitlochry. For example between 08:00 and 09:00 at Pitlochry there were 36 matched freight vehicles and this was 56% of the total number of freight vehicles observed during this hour. A3.T8 also shows the same for the count site at Aviemore.

Reviewing the northbound freight vehicle movements at Pitlochry reveals that there was high proportion of matches in the morning but this dropped in the afternoon. The afternoon drop in matches is due to the road traffic incident that occured at around 14:30. The incident prevented freight

vehicles completing through movements to Aviemore and these movements would take around 1 hour 30 minutes to complete. This means that any freight vehicles observed after 13:00 at Pitlochry are unlikely to be observed at Aviemore.

Reviewing the northbound freight vehicle movements at Aviemore reveals that there is a high proportion of matches after 09:00. There were few matches between 07:00 and 09:00 because of the delayed start to the recording at Pitlochry due to bad light. A freight vehicle observed at 08:00 at Pitlochry would be seen approximately 09:30 at Aviemore.

The hours where few or no freight vehicle matches can be made are having a skewed effect on the percentage of total matches. If these hours were removed to allow for an adjusted matching period the figures are shown in Table A3.T6.

- For northbound Pitlochry freight vehicle traffic the period 13:00-16:00 is discounted from the total
- For the northbound Aviemore freight vehicle traffic the periods 07:00-09:00 and 15:00-16:00 is discounted from the total

Table A3.T6: Matched Freight Vehicles Northbound (Pitlochry to Aviemore) Using Adjusted Data[2]

Hour	Pitlochry			Aviemore		
	Matched Freight Vehicles	% Matched	Total Freight Vehicles	Matched Freight Vehicles	% Matched	Total Freight Vehicles
07:00-08:00	N/A	N/A	N/A	N/A	N/A	N/A
08:00-09:00	36	56%	64	N/A	N/A	N/A
09:00-10:00	30	65%	46	21	60%	35
10:00-11:00	30	49%	61	29	78%	37
11:00-12:00	23	53%	43	22	79%	28
12:00-13:00	30	59%	51	30	81%	37
13:00-14:00	N/A	N/A	N/A	31	74%	42
14:00-15:00	N/A	N/A	N/A	26	84%	31
15:00-16:00	N/A	N/A	N/A	N/A	N/A	N/A
Adjusted Total	**149**	**56%**	**265**	**159**	**75%**	**210**

Table A3.T6 shows that 56% of northbound freight vehicle traffic at Pitlochry carries on through to Aviemore. A3.T6 also shows that 75% of freight vehicle traffic travelling northbound at Aviemore has come from Pitlochry. The conclusions from this analysis are:

- Around 1 in 2 northbound freight vehicles at Pitlochry continue their journey up the A9 to Aviemore
- 3 in 4 northbound freight vehicles at Aviemore have come from Pitlochry
- These observations suggest that 44% of the northbound freight vehicles passing the Pitlochry count site are intended for destinations at Pitlochry and intermediary settlements before Aviemore

Note – the difference in the proportion of matched freight vehicles between the two count sites at Pitlochry and Aviemore is because of the different number of total freight vehicles observed at the sites. Pitlochry was a busier count site for freight vehicle traffic, which gives the calculation a larger denominator, hence a different proportion.

[2] With regard to both Table A3.T5 (Northbound) and Table A3.T7 (Southbound) it must be noted that whilst the original totals matched at both count locations, due to the adjustment for the road closure this is no longer the case.

Southbound flow
A3.T7 shows that southbound (Aviemore to Pitlochry) movements of freight vehicles:

Table A3.T7: Matched Freight Vehicles Southbound(Aviemore to Pitlochry)

Hour	Aviemore			Pitlochry		
	Matched Freight Vehicles	% Matched	Total Freight Vehicles	Matched Freight Vehicles	% Matched	Total Freight Vehicles
07:00-08:00	25	71%	35	N/A	N/A	N/A
08:00-09:00	16	50%	32	16	31%	54
09:00-10:00	29	66%	44	13	33%	39
10:00-11:00	31	66%	47	27	50%	54
11:00-12:00	33	67%	49	26	44%	59
12:00-13:00	26	50%	52	38	58%	67
13:00-14:00	14	25%	55	28	39%	71
14:00-15:00	0	0%	52	22	36%	66
15:00-16:00	0	0%	40	4	29%	14
Total	**174**	**43%**	**406**	**174**	**42%**	**425**

Reviewing the southbound freight vehicle movements at Aviemore reveals that there is a high proportion of matches in the morning but this drops in the afternoon. The afternoon drop in matches is due to the road traffic incident that occured at around 14:30. The incident prevented freight vehicles completing through movements to Pitlochry and these movements would take around 1 hour 30 minutes to complete. This means that any freight vehicles observed after 13:00 at Aviemore are unlikely to be matched at Pitlochry.

Reviewing the southbound freight vehicle movements at Pitlochry reveals that there is a solid proportion of matches throughout the day. The matching at Pitlochry drops during the final hour (15:00) due to the road traffic incident at 14:30 closing the A9.

Again, creating an adjusted matching period the revised figures are shown in A3.T8

- For southbound Aviemore freight vehicle traffic the period 13:00-16:00 is discounted from the total
- For the southbound Pitlochry freight vehicle traffic the period 15:00-16:00 is discounted from the total

Table A3.T8: Matched Freight Vehicles Southbound (Aviemore to Pitlochry) Using Adjusted Data

Hour	Aviemore			Pitlochry		
	Matched Freight Vehicles	% Matched	Total Freight Vehicles	Matched Freight Vehicles	% Matched	Total Freight Vehicles
07:00-08:00	25	71%	35	N/A	N/A	N/A
08:00-09:00	16	50%	32	16	30%	54
09:00-10:00	29	66%	44	13	33%	39
10:00-11:00	31	66%	47	27	50%	54
11:00-12:00	33	67%	49	26	44%	59
12:00-13:00	26	50%	52	38	57%	67
13:00-14:00	N/A	N/A	N/A	28	39%	71
14:00-15:00	N/A	N/A	N/A	22	33%	66
15:00-16:00	N/A	N/A	N/A	N/A	N/A	N/A
Adjusted Total	**160**	**62%**	**259**	**170**	**41%**	**411**

Table A3.T8 shows that 62% of southbound freight vehicle traffic at Aviemore carries on through to Pitlochry. It also shows that 41% of freight vehicle traffic travelling southbound at Pitlochry has come from Aviemore. The conclusions from this analysis are:

- Around 3 in 5 southbound freight vehicles at Aviemore continue their journey down the A9 to Pitlochry
- 2 in 5 southbound freight vehicles at Pitlochry have come from Aviemore
- These observations suggest that the 58% of freight vehicles have come from origins at Pitlochry and intermediary settlements south of Aviemore

Freight Vehicle Movements on the A9

The direction of the freight vehicles were observed and the average number of freight vehicles per hour. Table A3.T9 shows that the average hourly flow of freight vehicles is fairly even in both directions and table A3.T10 shows that turning traffic from the A95 is 19% of the total hourly average and to the A95 is 16%. This suggests that about 1 in 5 freight vehicles at this site use the A95.

Table A3.T9: Average Number of Freight Vehicles per Hour at Pitlochry

		To		
		Inverness	**Perth**	**Total**
From	**Inverness**		55	55
	Perth	53		53
	Total	53	55	108

Table A3.T10: Average Number of Freight Vehicles per Hour at Aviemore

		To			
		A95	**Inverness**	**Perth**	**Total**
From	**A95**		2	14	16
	Inverness	3		29	32
	Perth	11	26		37
	Total	14	28	43	85

For each point along the A9 the number of freight vehicle movements per hour is fairly balanced when compared with its opposing flow movement with a small bias towards southerly movements. It also supports the freight vehicle matching exercise conclusion that suggests Pitlochry is the busier site and a number of freight vehicles are not travelling the length of the A9 and could be travelling to destinations south of Aviemore.

A3.F8 Average freight vehicle movements per hour

During the February SGVC, 100 freight vehicles travelled from the A95 and 82 freight vehicles travelled to the A95. Of these, a number were also seen at Pitlochry (see A3.T11)

Table A3.T11: Vehicles using the A95

Matched Freight Vehicles at Aviemore	Total Matchings	Subtotal Matchings Using A95	Percentage Using A95
Northbound from Pitlochry	162	47	29%
Southbound towards Pitlochry	174	60	34%
Total	**336**	**107**	**32%**

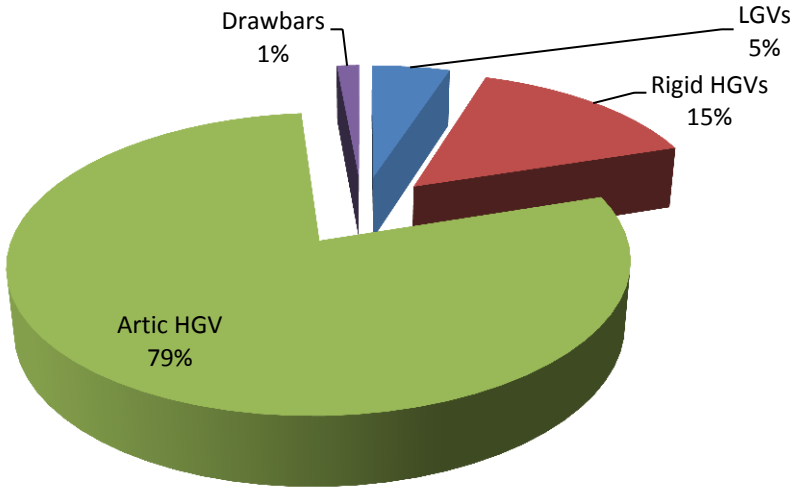
This suggests that a third of freight vehicles that travelled along the length of the A9 observed during the SGVC will turn off towards or turn off from the A95, emphasising the importance of this road and its industries to an understanding of A9 freight traffic as a whole.

Table A3.T12: Companies observed using the A95

Company	Number	Company	Number
Stevenson	10	James Innes	3
McPherson	7	Anderson	2
Craib	5	Chivas	2
Bulmans Bulk	4	Howie	2
Carntyne	4	Other	72
Grant	4	**Total**	**115**

A3.T12 shows that the top 10 companies oberved using the A95 are 37% of all freight vehicles with a company identified. Some of these companies are involved in the industries that can be found along the A95 such as the Whisky Industry.

Figure A3.F9: Freight Vehicle Types Using the A95



A3.F9 illustrates that 79% of freight vehicles using the A95 are artic HGVs. This suggests that large, bulk movements are being conducted.

Figure A3.F10 : Top 5 Industry Types of Freight Vehicle Using the A95

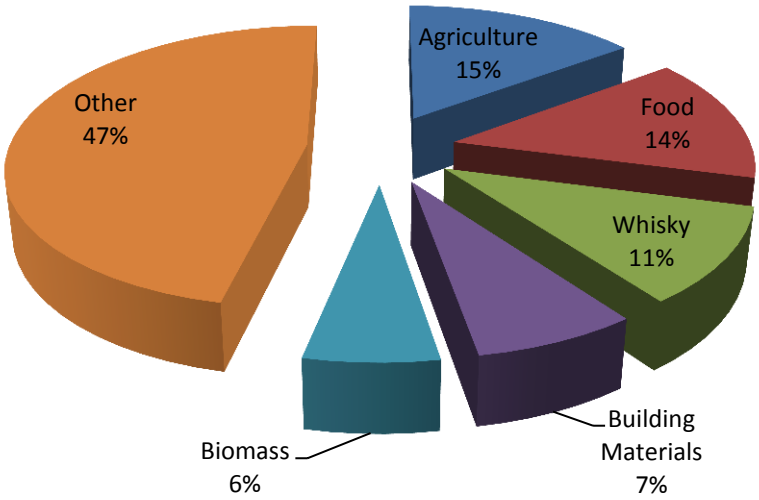


Figure A3.F10 shows that the major industries (excluding general haulage) of freight vehicles using the A95 are agriculture, food, building materials, biomass and whisky. Some of these industries, in particular agriculture and biomass source their raw materials from along the A95. There are a number of distilleries located along the A95 which will be attractors and generators of freight vehicle movements.

Findings from the February SGVC:

- 56% of freight vehicles observed were the large 6 axled articulated HGVs demonstrating that a significant proportion of road freight is long and medium haul, often transporting heavy loads**.**
- 72% of freight vehicles were involved in the Top 5 observed industries, with general haulage the most commonly observed industry type
- Pitlochry and the region south of Aviemore is an attractor/generator of freight serving the forestry, tourism, aggregates, agricultural and waste sectors
- 50% of all freight vehicles observed at Pitlochry were observed again at Aviemore and this volume represents the longer distance end-to-end movements which is typically made up of maximum weight trunking vehicles
- Less than 1% of freight vehicles were foreign registered and this is less than the 3% UK average, probably due to the distance from Mainland Europe

Appendix 4: SGVC count September 2014

This appendix provides the findings from the Specialised Goods Vehicle Count (SGVC) survey undertaken on Thursday 11 September 2014.

A4.1 Methodology of the SGVC

The SGVC has been devised by AECOM to record specific details about HGVs such as the registration, body type, company, vehicle size and any other relevant observable details. The advantage of the SGVC over using remote cameras is that staff on the ground are better able to capture this data off fast-moving vehicles, whereas cameras often fail to provide pictures of suitable resolution or clarity. On both occasions, SGVCs were scheduled to cover the period from 0700hrs to 1900hrs.

The SGVC took place at the two sites on single carriageway sections of the A9, near Aviemore at the intersection of the A95 and just south of Pitlochry near lay-by 31.

Data was recorded manually and then entered in an Excel Spreadsheet. Once all the data was collated, it was checked to ensure consistency and then analysed

A4.2 Data Analysis (September SGVC)

The SGVC team recorded 2,412 freight vehicles throughout the 12 hour count period between 07:00 and 19:00. Of these vehicles, 1,132 were observed at Aviemore and 1,280 were at Pitlochry. This means that 13% more freight vehicles were seen at the southern end of the corridor.

Figure A4.F1: Freight Vehicle Types

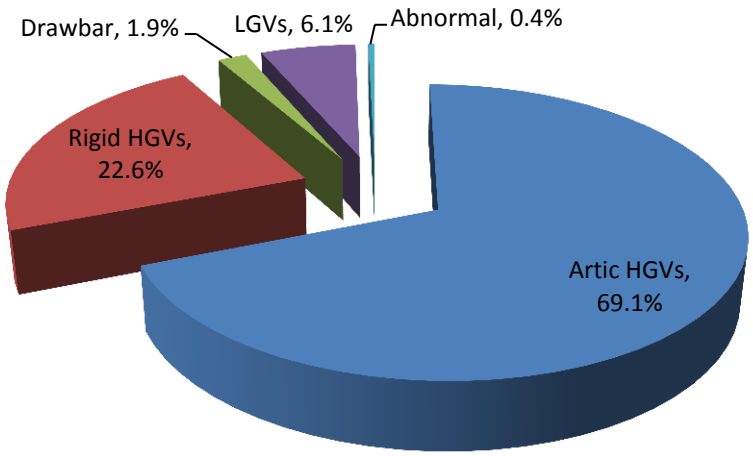


Figure A4.F1 shows a breakdown of freight vehicles counted by type. Articulated HGVs account for 69% of the total, rigid HGVs 23% and LGVs 6%. Of all vehicles counted, 6 axle articulated HGVs were the most common, accounting for 63% of the total count. These are the largest standard type HGV in the UK and have a maximum gross weight of 44 tonnes.

Four wheeled rigid vehicles were the second most observed vehicle type and accounted for 14% of vehicles, while six wheeled rigid vehicles made up 6%. These vehicles are toward the smaller end of the HGV scale with four wheeled vehicles having a maximum gross weight of 18 tonnes while for six wheeled variations it is 26 tonnes. Drawbar combinations and abnormal vehicles were less commonly observed accounting for 1.8% and 0.3% respectively.

In total, 23 different body types were observed during the count. Curtainside and box type vehicles were the most commonly observed accounting for 24% and 20% respectively. These are common body types and are typical choices for both trunk haulage and local activity. Approximately 10% of vehicles observed were grain tippers, this highlights the rural agricultural industry which is located locally and is higher than would be expected nationally. There were also a number of tankers observed transporting food and drink products such as vegetable oil and bulk whisky.

Figure A4.F2: Freight Vehicle Body Types

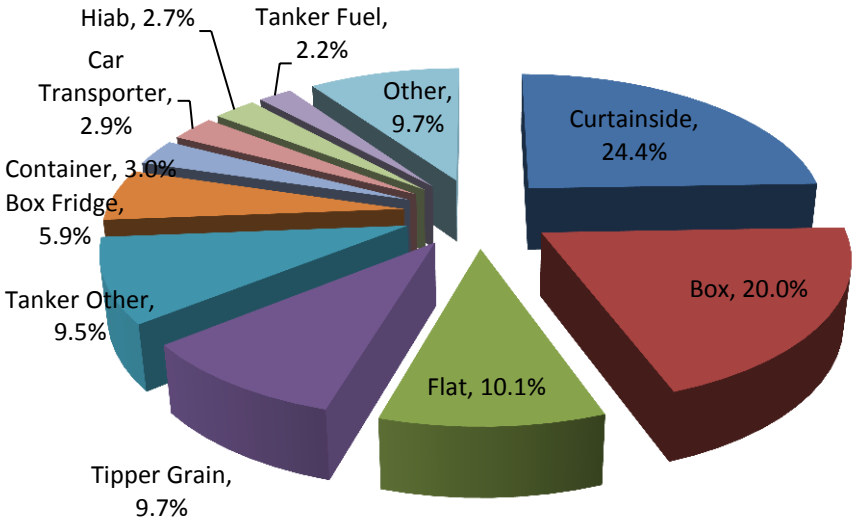
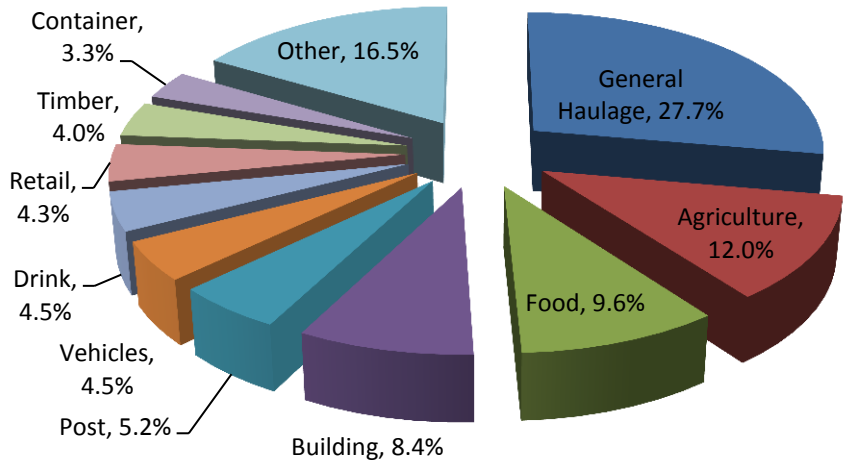


Figure A4.F3: Top 10 Observed Industry Types



In total, 21 different industry types were observed during the SGVC. Figure A4.F3 shows that 28% of all freight vehicles were observed as being general haulage; this includes a large number of road haulage companies where the specific loads cannot be determined from the livery alone. The most commonly observed specific industries were: agriculture 12%, food 10%, building 8% and post 5%.

In total 1,771 freight vehicles had their company identified which is equal to 74% of all freight vehicles recorded. The Top 23 companies identified in Table A4.T1 account for 27% of all vehicles that belong

to an identified company. This statistic shows that there is a diverse range of vehicles operating on the A9 ranging from large companies such as TNT, Royal Mail and ASDA to large regional hauliers such as Stevenson, Mitchell and Craib. Some of the hauliers are specialists in particular fields, for example McPherson are contracted to move products on behalf of the whisky producer, Chivas Brothers and Craib is a well-known Aberdeen based haulier that moves many types of goods including Baxters Soups from Fochabers, Moray.

Table A4.T1: Top 23 Companies

Rank	Company	Count	Rank	Company	Count
1	McPherson	59	13	Bulmans	16
2	Stevenson	48	14	Tesco	15
3	Mitchell	29	14	Chivas	15
4	Craib	27	16	Andrew Black	14
4	Royal Mail	27	16	Abbey	14
6	Breedon	25	16	White	14
7	Carntyne	21	19	Simpsons Malt	13
7	Mcleod	21	19	TNT	13
9	Grant	20	19	ECM	13
10	Asda	19	19	Fisher Laundry	13
11	Steven	18	19	Grahams	13
11	Campbells	18			

There are a number of hauliers in the September SGVC Top 20 that were not in the equivalent list in February. Andrew Black is a Scottish Haulier specialising in general cargo and grain. There was an active harvest of crops especially in the Pitlochry area during the count. Abbey is a specialist tanker operator moving various liquids including vegetable oil and food grade produce. ECM is the largest car carrier company who are based in Carlisle but were moving new and used cars. Fisher Laundry was very active with rigid vehicles serving the hotel trade especially around Pitlochry. This company based in Cupar, Fife has a 60% share of the Scottish hotel linen rental market.

Figure A4.F4: Freight Vehicle Euro Engine Classification

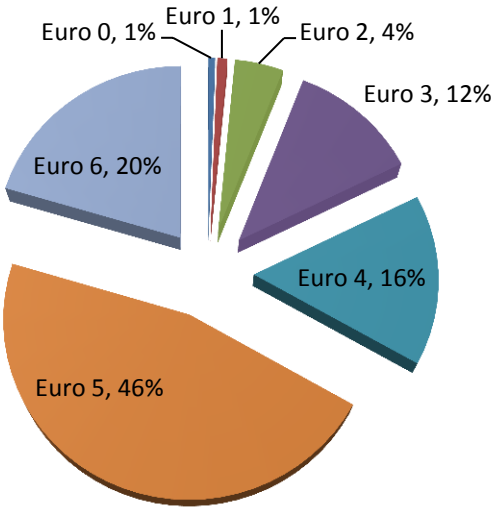


Figure A4.F4 shows the Euro Engine Type for the freight vehicles. This was calculated by determining the year of manufacture according to the number plate of the freight vehicle. The higher the Euro Engine rating, the fewer pollutants the vehicle produces. During the SGVC 47% of freight vehicles counted had Euro 5 engines, while 21% were Euro 6. Overall, 82% of vehicles were rated Euro 4 or

better. It was not possible to determine the Euro Engine type for vehicles with foreign or private registration numbers.

HGV Matching Exercise

The data was reviewed and the registrations of freight vehicles were matched. Vehicles were matched if they were observed at both Pitlochry and Aviemore (or vice versa) whilst travelling in the same direction. This gave an indication as to whether the freight vehicle had travelled between Pitlochry and Aviemore (or vice versa). .

Summary of Matches for all Sites

Table A4.T2 provides a summary of matched vehicles at both sites and in both directions.

Table A4.T2: Matched Freight Vehicles Northbound and Southbound

Site	Freight Vehicle Matches	Percentage Matched	Total Freight Vehicles
Northbound Pitlochry	265	48%	555
Northbound Aviemore	315	43%	725
Southbound Pitlochry	265	51%	520
Southbound Aviemore	315	51%	612
Total	**1,160**	**48%**	**2,412**

Table A4.T2 shows that 48% of all recorded freight vehicles were matched between Pitlochry and Aviemore, or vice-versa.

Comparison between SGVC Matches in February and September

Table A4.T3 below shows the adjusted freight vehicle matches from the SGVC count in February 2014. Values were adjusted due to lower than expected freight vehicle recordings caused by low light in the morning and snowfall and a collision leading to road closure in the afternoon. A comparison of the Tables A4.T2 and A4.T3 shows that the percentage of all freight vehicles recorded in September is similar to February (56%).

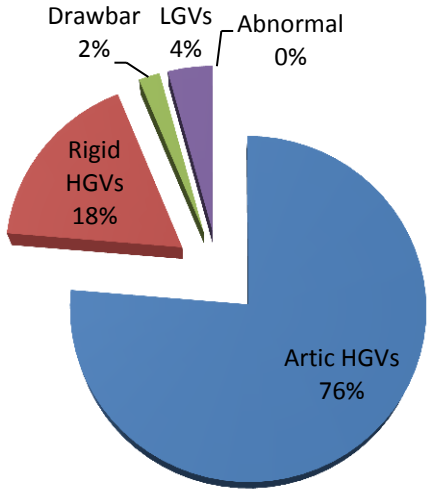
Table A4.T3: Matched Freight Vehicles Northbound and Southbound (February)

Site	Adjusted Freight Vehicle Matches	% Matched	Adjusted Freight Vehicle Total
Northbound Pitlochry	149	56%	265
Northbound Aviemore	159	77%	210
Southbound Pitlochry	170	42%	411
Southbound Aviemore	160	62%	259
Grand Total	**638**	**56%**	**1,145**

Pitlochry-Aviemore Matched Freight Vehicle Analysis

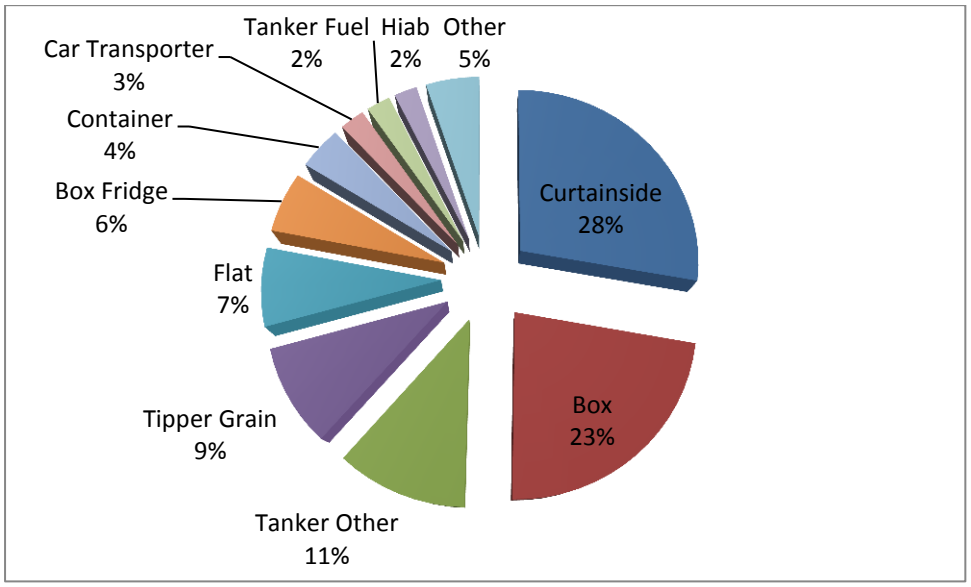
This section considers the attributes and characteristics of the matched freight vehicles running between Pitlochry and Aviemore, or vice-versa. All references between Pitlochry and Aviemore are considered bidirectional (i.e. Aviemore to Pitlochry as well).

Figure A4.F5: Matched Freight Vehicle Types



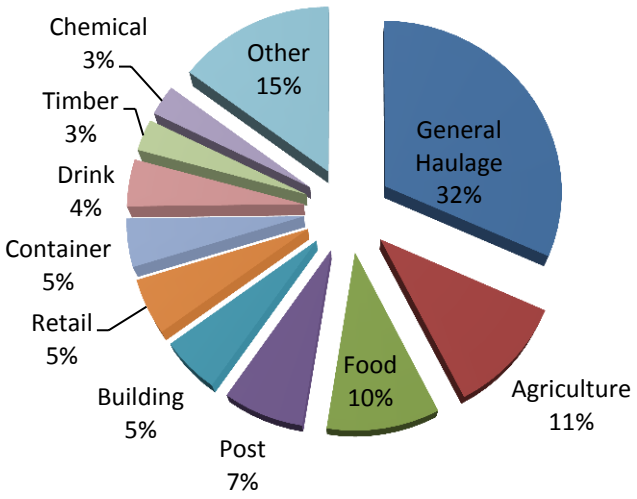
76% of matched freight vehicles were articulated vehicles and specifically 69% were the larger 6 axle type. This is a 7% larger proportion than for all freight vehicles observed. This would be expected as larger articulated vehicles are most likely to be used for long distance, trunk journeys.

Figure A4.F6: Matched Freight Vehicle Body Type



There were 19 different vehicle body types observed completing a movement between Pitlochry and Aviemore compared with 23 body types for all observed freight vehicles. Figure A4.F6 shows that Curtainside and Box bodies were the most common body type and accounted for over half of all matched vehicles. Overall the body types observed for matched vehicles are very similar to all freight vehicles observed. Collectively one fifth of matched vehicles were tankers (11%) and grain tippers (9%) which serve local agricultural and drinks industries.

Figure A4.F7 Matched Freight Vehicles Industry Type (Top 10)



There were 21 different industry types observed between Pitlochry and Aviemore during the SGVC which is equal to the number observed generally.

General Haulage has the largest share at 32% but this is less than in the overall count where it accounted for 28%. Similarly agricultural industry vehicles account for 11% of matched vehicle industry type which is less than half of the agricultural share overall. This suggests that some agricultural movements are localised e.g. only observed at Aviemore (or Pitlochry). This is also true for the Timber vehicles which account for 3% of matched movements but 4% of movements overall. This is consistent with what we would be expected due to harvesting of grain in September and the presence of local forestry clearance.

Table A4.T4: Matched Freight Vehicle Companies (Top 21)

Rank	Company	Count	Rank	Company	Count
1	Stevenson	34	12	TNT	10
2	McPherson	32	12	Bulmans	10
3	Mitchell	26	12	Grahams	10
4	Carntyne	17	12	Royal Mail	10
5	Craib	16	12	Tuffnells	10
6	Andrew Black	14	17	Grant	9
6	Steven	14	18	Co-Op	8
6	Mcleod	14	18	Stobart	8
9	Campbells	12	18	Tesco	8
10	White	12	18	Ecm	8
10	Abbey	12			

*There were a further 11 companies where 8 vehicles were matched

Table A4.T4 shows the top twenty one companies observed on matched vehicles between Pitlochry and Aviemore. In total, 250 different companies were identified on matched freight vehicles. The top twenty one companies account for 38% of matched freight vehicles which were linked to a company. Many of the companies listed in Table A4.T4 are the same including large national organisations such as Royal Mail and large local hauliers such as McPherson.

A4.3 Matching Data Analysis (September SGVC)

This is the HGV Matching Exercise for the September count. The data was reviewed and the registrations of freight vehicles were matched. Vehicles were matched if they were observed at both Pitlochry and Aviemore (or vice versa) whilst travelling in the same direction. This gave an indication as to whether the freight vehicle had travelled between Pitlochry and Aviemore (or vice versa).

Northbound Flow
A4.T5 shows northbound movement of matched freight vehicles at Pitlochry and Aviemore as a percentage of all northbound freight vehicles. For example between 08:00 and 09:00, there were 26 matched freight vehicles at Pitlochry and this represented 51% of all vehicles observed at Pitlochry during that hour. The right hand side of A4.T5 also shows the same information for the Aviemore count site.

Table A4.T5: Matched Freight Vehicles Northbound (Pitlochry to Aviemore/A95)

Hour	Pitlochry			Aviemore		
	Matched Freight Vehicles	% Matched	Total Freight Vehicles	Matched Freight Vehicles	% Matched	Total Freight Vehicles
07:00-08:00	54	53%	102	N/A	N/A	N/A
08:00-09:00	26	51%	51	30	58%	52
09:00-10:00	36	58%	62	35	74%	47
10:00-11:00	36	64%	56	33	67%	49
11:00-12:00	22	47%	47	33	63%	52
12:00-13:00	19	43%	44	32	60%	53
13:00-14:00	14	50%	28	24	44%	55
14:00-15:00	17	46%	37	17	49%	35
15:00-16:00	20	69%	29	20	61%	33
16:00-17:00	12	40%	30	9	50%	18
17:00-18:00	8	23%	35	20	57%	35
18:00-19:00	N/A	N/A	N/A	11	61%	18
Total	**264**	**51%**	**521**	**264**	**59%**	**447**

Table A4.T5 shows that 51% of northbound freight vehicle traffic at Pitlochry carries on through to Aviemore and 59% of freight vehicle traffic travelling northbound at Aviemore has come from Pitlochry. From this data it can be concluded that:

- 1 in 2 freight vehicles at Pitlochry continue their journey up the A9 to Aviemore
- 3 in 5 freight vehicles at Aviemore have come from Pitlochry

Note- the difference in the proportion of matched freight vehicles between the two count sites at Pitlochry and Aviemore is due to the different number of total freight vehicles observed at the two sites. In this case, Pitlochry was the busier count site for freight vehicle traffic.

Southbound Flow
A4.T6 shows the southbound movement of matched freight vehicles as a percentage of all southbound freight vehicles.

Table A4.T6: Matched Freight Vehicles Southbound (Aviemore/A95 to Pitlochry)

Hour	Aviemore			Pitlochry		
	Matched Freight Vehicles	% Matched	Total Freight Vehicles	Matched Freight Vehicles	% Matched	Total Freight Vehicles
07:00-08:00	25	53%	47	N/A	N/A	N/A
08:00-09:00	17	59%	29	10	22%	46
09:00-10:00	24	57%	42	16	48%	33
10:00-11:00	28	47%	59	26	45%	58
11:00-12:00	39	64%	61	21	35%	60
12:00-13:00	35	53%	66	31	43%	72
13:00-14:00	39	62%	63	29	43%	68
14:00-15:00	30	68%	44	51	52%	98
15:00-16:00	38	58%	66	32	43%	74
16:00-17:00	38	56%	68	33	53%	62
17:00-18:00	2	6%	31	38	55%	69
18:00-19:00	N/A	N/A	N/A	28	62%	45
Total	**315**	**55%**	**576**	**315**	**46%**	**685**

A4.T6 shows that 55% southbound freight traffic at Aviemore continues to Pitlochry and 46% of freight vehicle traffic travelling southbound at Pitlochry has come from Aviemore. From this data it is possible to conclude that:

- Over 1 in 2 southbound vehicles at Aviemore continue their journey to Pitlochry
- Over 2 in 5 southbound freight vehicles at Pitlochry have come from Aviemore

Note- the difference in the proportion of matched freight vehicles between the two count sites at Pitlochry and Aviemore is due to the different number of total freight vehicles observed at the two sites. In this case, Pitlochry was the busier count site for freight vehicle traffic.

Freight Vehicle Movements on the A9

The direction of freight vehicles was observed. The average number of freight vehicles per hour are shown in the following tables:

Table A4.T7: Average Number of Vehicles per Hour at Pitlochry

	To		
From	Inverness	Perth	Total
Inverness		60	60
Perth	46		46
Total	46	60	106

Table A4.T7 shows the average number of vehicles per hour at Pitlochry for both directions. The table shows that freight vehicle traffic flow is slightly heavier southbound (56%) than northbound (44%).

Table A4.T8: Average Number of Vehicles per Hour at Aviemore

	To			
From	A95	Inverness	Perth	Total
A95		2	19	20
Inverness	2		33	35
Perth	14	25		40
Total	16	27	51	94

Table A4.T8 shows that at Aviemore traffic from the A95 makes up 21% of the total hourly average while traffic to the A95 is 17%.

A4.F8 Average Freight Vehicle Movements per Hour

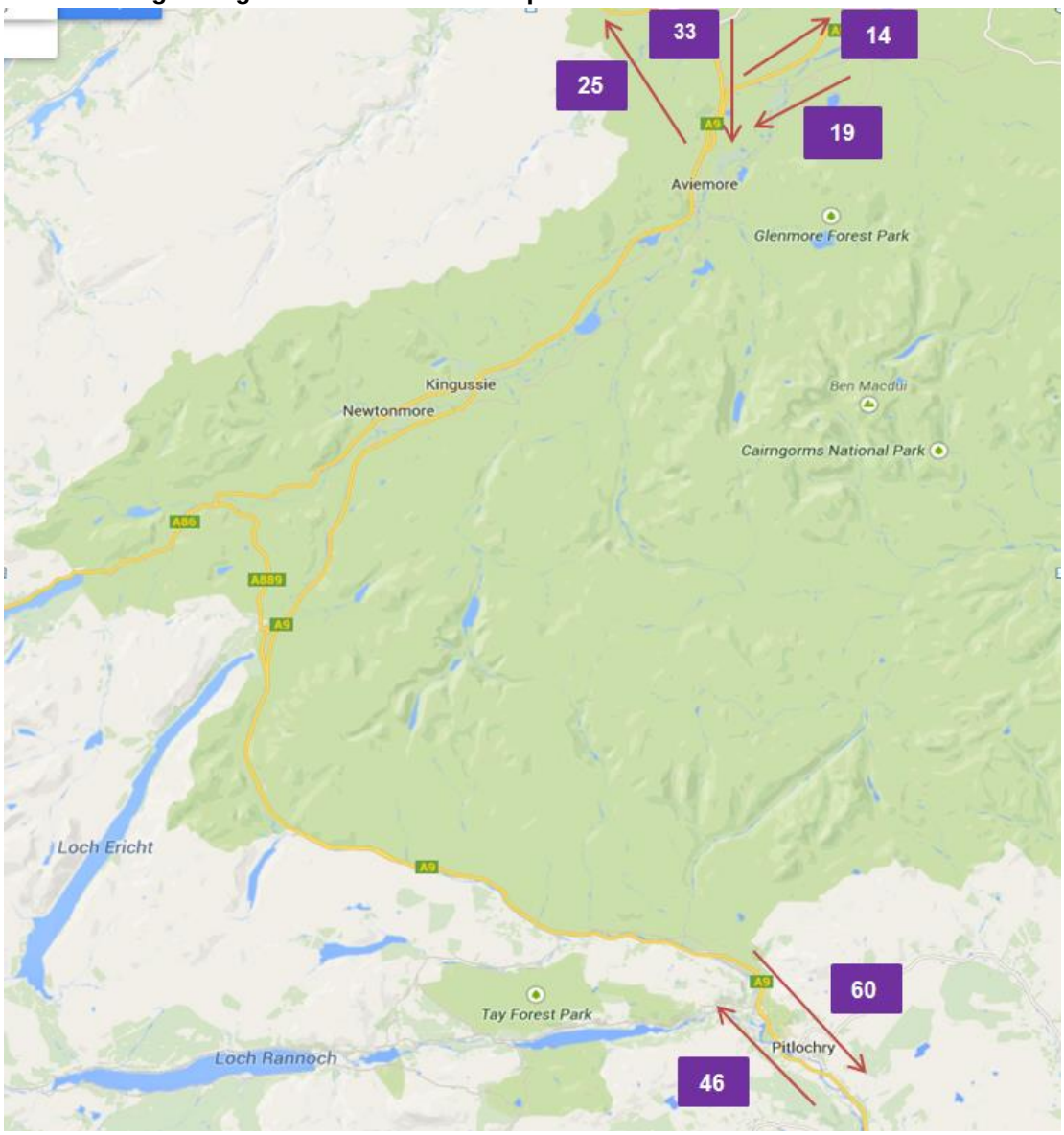


Figure A4.F8 shows that for each point along the A9 the number of freight vehicle movements per hour has a slight bias to southbound movements when compared with its opposing flow movement. There are believed to be two reasons behind this slight southbound bias, the first is that it is believed that a number of northbound freight vehicles travel up the A9 early in the morning (before 07:00am) and hence would not be recorded in the 12 hour survey period. The second reason is the anti-clockwise delivery pattern discussed in Appendix 2.

Figure A4.F8 suggests that Pitlochry is a busier site for freight traffic than Aviemore and that a number of freight vehicles at Pitlochry are not travelling the length of the A9 and could be travelling to destinations before Aviemore. One third of freight vehicles that travel along the study stretch of the A9 will turn onto or turn from the A95, emphasising the importance of this road to A9 freight traffic as a whole.

Table A4.T9: Vehicles matched using the A95

Matched freight vehicles at Aviemore	Subtotal Matchings using A95	Total Matchings	Percentage using A95
Northbound from Pitlochry	73	264	28%
Southbound towards Pitlochry	118	315	37%
Total	**191**	**579**	**33%**

Table A4.T10 shows the Top Ten companies observed using the A95. The Top Ten companies are predominantly local/Scottish hauliers which service industries along the A95 such as the whisky industry.

Table A4.T10: Companies Observed using the A95

Company	Number	Company	Number
McPherson	29	Bulmans	9
Stevenson	25	Carntyne	8
Mitchell	11	Chivas	7
Grant	11	Malcolm	7
Craib	10	White	6
		Total	**123**

A4.F9 shows that almost three quarters of freight vehicles using the A95 are articulated HGVs. This suggests that large bulk movements are being carried out in the area. This is supported by the fact that 71% of all vehicles using the A95 are the largest 6 axle articulated HGVs.

Figure A4.F9: Freight Vehicle Types Using the A95

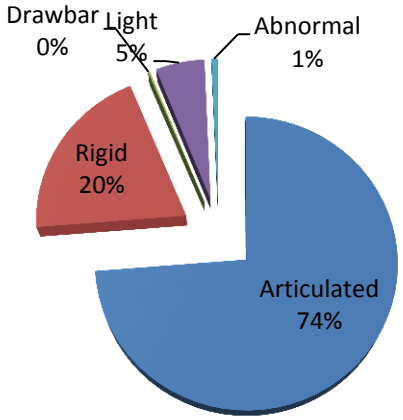


Figure A4.F10: Freight Vehicle Industry Types on the A95

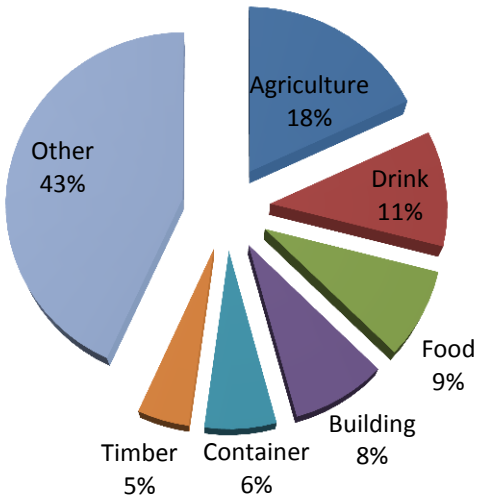


Figure A4.F10 shows the major industries of freight vehicles on the A95 (excluding general haulage which accounts for 20% of all A95 freight traffic). The major industries are agriculture/grain, drink (including whisky), food, building, containers and timber/logs. These industries accounted for 62% of all freight vehicle traffic on the A95.

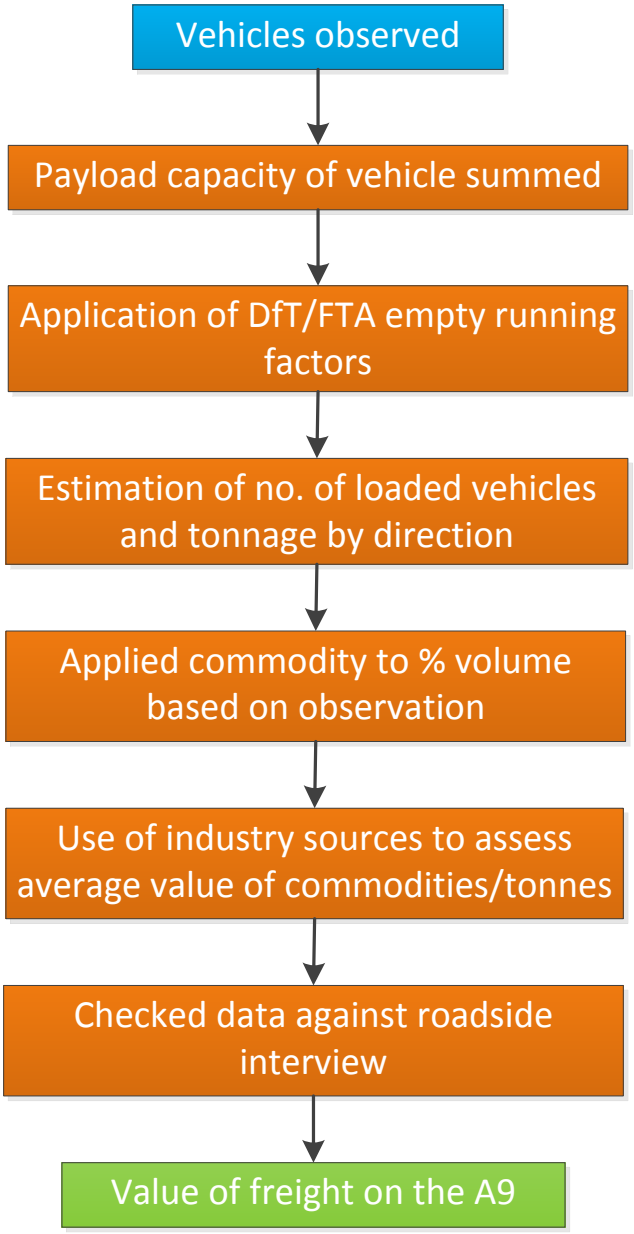
Findings from the September SGVC:

- 63% of freight vehicles observed were 6 axle articulated HGVs demonstrating that a sigifcant proportion of road freight is long and medium haul, often transporting heavy loads.
- 59% of northbound freight vehicles at Aviemore have passed through/come from Pitlochry again demonstrating that a majority of road freight is using the A9 for trunking purposes.
- Less than 1% of vehicles observed were foreign registered, reflective of the study area's distance from the European mainland and foreign competition.
- One third of vehicles travelling along the A9 between Pitlochry and Aviemore use the A95.
- Pitlochry has 13% more freight vehicle traffic than Aviemore.
- Freight traffic at Pitlochry peaks northbound between 7am and 8am and southbound it is more spread throughout the afternoon.

Appendix 5: Value of Goods Transported on the A9

This appendix presents the breakdown of tonnage and values calculated for the various goods being transported along the corridor on an annual basis. The approach adopted for this exercise is shown in Figure A5.F1. The source of commodity valuation is also presented in Table A5.T3. The exercise is based on observed traffic, consultation, industry knowledge and expert judgement.

Figure A5.F1 – Value of Good on the A9 calculation process



This process has provided an indicative estimate of a day's volume moving on the A9 between Pitlochry and Aviemore of 32,000 tonnes with a value of £64 million. Grossing this up assuming the "snap-shot" is representative, equates to the road carrying almost 10 million tonnes a year with an annual value of freight moved on the A9 to be approaching £20 billion. An assumption is made that different industries work five, six or seven day weeks, 300 operational days provides a working average. The annual tonnage and value totals thus calculated are shown in Table A5.T1 and A5.T2.

Table A5.T1: Tonnage of Selected Sectors on the A9 in a Given Year

	Northbound	Southbound	Total	Percentage
Automotive	155,074	37,433	192,508	1.98%
Grain	884,498	701,788	1,586,286	16.29%
Aggregates	450,864	100,673	551,537	5.66%
Retail	162,541	68,401	230,942	2.37%
General & Container	2,559,301	1,878,296	4,437,597	45.57%
Waste	23,031	144,742	167,773	1.72%
Parcels	402,045	93,923	495,968	5.09%
Logs	58,699	57,965	116,663	1.20%
Whisky	-	197,375	197,375	2.03%
Oil	185,515	19,284	204,799	2.10%
Biomass	-	206,450	206,450	2.12%
Timber	23,950	269,973	293,923	3.02%
Other	535,569	520,615	1,056,184	10.85%
Total	**5,441,088**	**4,296,916**	**9,738,004**	100%

Table A5.T2: Value of Selected Sectors on the A9 in a Given Year

	Northbound	Southbound	Total	Percentage
Automotive	£2,326,115,242	£561,498,113	£2,887,613,355	15.11%
Grain	£176,899,628	£140,357,513	£317,257,141	1.66%
Aggregates	£9,017,286	£2,013,453	£11,030,739	0.06%
Retail	£487,622,677	£205,202,038	£692,824,714	3.63%
General & Container	£7,677,903,346	£5,634,888,792	£13,312,792,138	69.68%
Waste	£460,628	£2,894,835	£3,355,463	0.02%
Parcels	£402,044,610	£93,923,321	£495,967,930	2.60%
Logs	£2,347,941	£2,318,590	£4,666,531	0.02%
Whisky	£0	£789,500,377	£789,500,377	4.13%
Oil	£246,734,777	£25,647,419	£272,382,196	1.43%
Biomass	£0	£6,193,494	£6,193,494	0.03%
Timber	£16,765,260	£188,980,981	£205,746,241	1.08%
Other	£53,556,943	£52,061,458	£105,618,401	0.55%
Total	**£11,399,468,337**	**£7,705,480,385**	**£19,104,948,722**	100%

Table A5.T3: Source of Commodity Valuation Data

Commodity	Value (per tonne)	Source
Automotive	£15,000	ORR: Rail Freight user Values of Time & Reliability (2009)
Grain	£200	UK Commodity Market Average Price
Aggregates	£20	ORR: Rail Freight user Values of Time & Reliability (2009)
Retail	£3,000	ORR: Rail Freight user Values of Time & Reliability (2009)
General & Container	£3,000	ORR: Rail Freight user Values of Time & Reliability (2009)
Waste	£20	Based on Development of ORR and Consultation
Parcels	£1,000	Freight Best Practice Parcel Benchmarking Analysis
Logs	£40	Consultation with Industry
Whisky	£4,000	Consultation with Industry
Oil	£1,330	ORR: Rail Freight user Values of Time & Reliability (2009)
Biomass	£30	Consultation with Industry
Timber	£700	Consultation with Industry
Other	£100	A low value was applied to this category to prevent skewing of results.

Appendix 6: Overview of Rail Freight

In this section the current estimates of rail freight flows are averaged to a standard weekday. Standard valuations are applied to obtain an estimated value. Three future scenarios for the rail sector are then considered; no growth, moderate growth and high growth. The scenarios are hypothetical and are intended only to offer some insight on the potential scale of opportunities available.

Table A6.T1 : Current Tonnage of Rail Freight on HML in a 24 Hour Period

	Northbound	Southbound	Total	Percentage
Intermodal	440	330	770	72.37%
Oil	30	-	30	2.82%
Cement	176	-	176	16.54%
Waste	-	44	44	4.14%
Pipes	44	-	44	4.14%
Total	**690**	**374**	**1,064**	**100%**

From the calculations undertaken (utilising the same bases assumptions as for road freight) it is suggested that current rail freight levels replace approximately 32 lorries per weekday on the A9 in each direction. This number of lorries accounts for backloading where appropriate. With the exception of waste, which is challenging to accurately value (and has thus been discounted from the valuation calculations) this can then be turned, as for road freight, into a value figure (see Table A6.T2).

Table A6.T2 : Current Value of Rail Freight on HML in a 24 Hour Period

	Northbound	Southbound	Total
Intermodal	£1,320,000	£338,800	£1,658,800
Oil	£39,900	£0	£39,900
Cement	£12,320	£0	£12,320
Waste	£0	£0	£0
Pipes	£30,800	£0	£30,800
Total	**£1,403,020**	**£338,800**	**£1,741,820**

These figures assess the modal split for freight traffic on the A9 corridor. Rail is responsible for moving approximately 3.17% of all freight by tonnage or 2.66% by value. Across the UK, rail handles approximately 5% of freight by tonnage (DfT, 2012) and using this as a benchmark average demonstrates that there is potential to increase rail's modal share on the route.

The values have been grossed to provide annual figures as shown in Table A6.T3 and Table A6.T4.

Table A6.T3 : Tonnage of Rail Freight on HML in a Year (Current Levels)

	Northbound	Southbound	Total
Intermodal	132,000	99,000	231,000
Oil	9,000	-	9,000
Cement	52,800	-	52,800
Waste	-	13,200	13,200
Pipes	13,200	-	13,200
Total	**207,000**	**112,200**	**319,200**

Table A6.T4 : Value of Rail Freight on HML in a Year (Current Levels)

	Northbound	Southbound	Total
Intermodal	£396,000,000	£101,640,000	£497,640,000
Oil	£11,970,000	£0	£11,970,000
Cement	£3,696,000	£0	£3,696,000
Waste	£0	£0	£0
Pipes	£9,240,000	£0	£9,240,000
Total	**£420,906,000**	**£101,640,000**	**£522,546,000**

Future Developments

Based on a range of hypothetical scenarios it is possible to assess the potential impact on rail freight based on the removal/reduction of barriers. The scenarios have been termed “Moderate Change” and “Large Change”.

In both of these scenarios, the planned improvements for the Highland Main Line are assumed to be in place. The additional train paths and improved line speeds will reduce journey times, enable more convenient delivery times and allow the formation of longer trains, lowering the cost per tonne of movement.

The moderate growth strategy assumes the possibility of 5 additional train paths in each direction per day to be dedicated to rail freight on the Highland Main Line, as a result of the improvement works. Furthermore, it assumes that the Scottish Government continues to promote rail freight use, and support modal shift at financial levels similar to the current situation. The increased usage is also assumed to lower costs through improved utilisation of the terminal at Inverness.

Under these conditions it is assumed there is some growth across industries already utilising rail freight, plus use from the whisky industry and some interest from the logging industry to transport roundwood. These results are shown in Table A6.T5 (tonnage) and Table A6.T6 (value).

Table A6.T5: Tonnage of Rail Freight on HML in a 24 Hour Period ("Moderate Change")

	Northbound	Southbound	Total
Intermodal	880	440	1,320
Oil	60	-	60
Cement	220	-	220
Waste	-	44	44
Pipes	88	-	88
Forestry	-	88	88
Whisky	-	240	240
Total	**1,248**	**812**	**2,060**

This moderate change scenario would be the equivalent of 60 lorries. This number of lorries accounts for backloading where appropriate. This represents an almost doubling of rail freight tonnage.

Table A6.T6: Value of Rail Freight on HML in a 24 Hour Period("Moderate Change")

	Northbound	Southbound	Total
Intermodal	£2,640,000	£668,800	£3,308,800
Oil	£79,800	£0	£79,800
Cement	£15,400	£0	£15,400
Waste	£0	£0	£0
Pipes	£61,600	£0	£61,600
Forestry	£0	£3,520	£3,520
Whisky	£0	£960,000	£960,000
Total	**£2,796,800**	**£1,632,320**	**£4,429,120**

Under the "Large Change" scenario, the barriers to rail freight are assumed to be further reduced. In addition to the planned improvements (such as longer trains), significant extra capacity for rail freight is provided, enabling a total of 10 train paths a day in each direction. In addition, aggressive marketing and promotion is made by the rail freight sector, supported by the Scottish Government. Subsidy and Freight Facility Grants towards terminal upgrades where suitable have made rail freight a more attractive option, whilst either an industry or government-led body succeed in further easing the complexities of arranging transport by train for the end user.

Furthermore, industries with suitable cargo are actively looking to reduce road freight and utilise rail where possible in their operations, primarily to lower their carbon footprint, but with the confidence that the cost, service and reliability offered by rail is as good as that of road freight. This scenario enables a further increase in use by existing industries as well as a shift from some in the parcel industry to rail rather than road trunking from the Central Belt to Inverness.[3]

[3] Extrapolating from the data in the SGVC, there is a minimum of approximately 25 large parcel lorries a day undertaking trunking movements the length of the study area. 20 loads worth are therefore re-allocated to the hypothetical multi-user express parcel train. This is currently being trialled by TNT between Rugby and London Euston (2014) and continues to be part of London-Glasgow Royal Mail rail services.

It is estimated under the hypothetical 'Large Change' scenario that with an extra 10 train paths a day in each direction the following figures may be reached (Table A6.T7 and Table A6.T8):

Table A6.T7 : Tonnage of Rail Freight on HML in a 24 Hour Period ("Large Change")

	Northbound	Southbound	Total
Intermodal	1,760	660	2,420
Oil	150	-	150
Cement	440	-	440
Waste	-	88	88
Pipes	176	-	176
Forestry	-	440	440
Whisky	-	480	480
Parcels	440	220	660
Total	**2,966**	**1,888**	**4,854**

This would be the equivalent of 141 lorries on the A9 in each direction, and represent a percentage uplift of 456% over current levels for rail. This number of lorries accounts for backloading where appropriate. This is, however, an optimistic scenario built on a large number of assumptions.

Table A6.T8 : Value of Rail Freight on HML in a 24 Hour Period("Large Change")

	Northbound	Southbound	Total
Intermodal	£5,280,000	£1,328,800	£6,608,800
Oil	£199,500	£0	£199,500
Cement	£30,800	£0	£30,800
Waste	£0	£0	£0
Pipes	£123,200	£0	£123,200
Forestry	£0	£17,600	£17,600
Whisky	£0	£1,920,000	£1,920,000
Parcels	£440,000	£220,000	£660,000
Total	**£6,073,500**	**£3,486,400**	**£9,559,900**

It should be reiterated that these are hypothetical estimates based on the data within this report and do not take into account growth in the total amount of freight.[4] However, it is clear that increased rail use for freight purposes has the potential to reduce the amount of freight traffic on the A9. Taking the average across the year for the number of HGVs on the A9 (1,323) the removal of 60 lorries is around 5% of HGV traffic and the removal of 140 lorries under the "Large Change" scenario is equivalent to approximately 11% of HGVs. These numbers reflect only the movement of tonnage from road to rail, and therefore should be read as approximately 60 or 140 large (OGV2) lorries or equivalent.

By way of comparison the rail routes offering an alternative to the A75 corridor from Carlisle to Stranraer and the A77 corridor from the Central Belt to Stranraer carry no rail freight at all. Similarly the important A55 route from England to Holyhead for ferry services to Ireland carries little regular freight whereas the A14 corridor from Felixstowe to the Midlands has a significant amount of rail freight operating. Indeed rail now has about a 28% market share of freight moving to and from the Port of Felixstowe.

[4] There is a slight growth in freight from current levels in the changed scenarios due to the growth of existing rail freight users, however there is no account taken of growth in the amount of freight that is currently transported by road.