TimberLINK Environmental Benefits Review



Final Report

Prepared for

Forestry Commission Scotland

by

Transport & Travel Research Ltd

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Author(s)	Sofia Girnary, Tristan Brightman
Quality Control	Chris Douglas
Project Manager	Sofia Girnary
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CONTENTS

1. EXECUTIVE SUMMARY 1

2. INTRODUCTION 4

2.1 Study Aims 4

3. TIMBERLINK IN CONTEXT 6

3.1 The TimberLINK service 6
3.2 Local environmental issues 7
3.3 Regional environmental issues 7
3.4 Climate change 8

4. STUDY METHODOLOGY 9

4.1 The approach 9
4.2 Data review and collection 10
4.2.1 Operational information 10
4.2.2 Supporting information 12
4.3 Stakeholder consultation and fieldwork 13

5. IMPACT ASSESSMENTS 15

5.1 Carbon reduction and fuel use 15
5.1.2 Fuel use 15
5.1.3 Carbon reduction 16
5.2 Disruption to local communities 19
5.2.1 Noise 19
5.2.2 Air quality 22
5.2.3 Visual intrusion 26
5.2.4 Local amenity 26
5.2.5 Regeneration 27
5.3 Regional impacts 29
5.3.1 Road damage 29
5.3.2 Congestion 32
5.3.3 Tourism 35

6. THE ENVIRONMENTAL VALUE OF THE TIMBERLINK PROJECT 37

6.1 Sensitive Lorry Miles 37
6.2 Mode Shift Benefit values 39
6.3 An Environmental Value for the TimberLINK project 42

7. EXPANSION OF THE TIMBERLINK SERVICE 45

8. CONCLUSIONS AND RECOMMENDATIONS 48

8.1 Conclusions 48

8.2 Recommendations 49

A1 APPENDIX 1 - SAMPLE QUESTIONNAIRES 2

A1.1 ABP Questionnaire 2
A1.2 FOREST ENTERPRISE 11
A1.3 COMMUNITY COUNCILS 21
A1.3.1 In the Port Towns 21
A1.3.2 In the towns on the alternative road haulage route 28
A1.4 PIER OPERATORS 34
A1.5 CUSTOMERS 37
A1.6 HAULIERS 39
A1.7 SHIPPING 48
A1.8 VISIT SCOTLAND 51
A1.9 OTHER CONSULTEES 59

A2 APPENDIX 2 – CARBON CALCULATION METHODOLOGY 70

A3 APPENDIX 3 - ROAD DAMAGE CALCULATION METHODOLOGY 71

1. EXECUTIVE SUMMARY

TimberLINK is a coastal shipping service, established to transport timber from four ports in Argyll (Ardrishaig, Campbeltown, Portavadie and Sandbank) to the port of Troon in Ayrshire. The timber is then transported onward to local wood processing plants. The aim of this report is to review the environmental benefits of the TimberLINK service, with the overall objective of ascertaining the full environmental benefits or dis-benefits of the service compared to the alternative road haulage options.

Carbon reduction and fuel use

Climate Change is one of the biggest challenges facing mankind today. For this reason, reducing the emission of greenhouse gases is an important environmental activity. The TimberLINK service reduces the amount of CO_2 that is emitted compared to the alternative road haulage option. This reduction varies from year to year with the amount of timber shipped and the change in the distribution of timber between the origin points and between the destinations. The maximum carbon saving is seen in 2009/10, when the service is estimated to save 1245 tonnes of carbon dioxide, equivalent to 10.0kg CO_2 saved per tonne of timber transported.

Local Impacts

The operation of the TimberLINK service leads to a variety of direct and indirect local environmental impacts. The local environmental impacts of the TimberLINK service include both the impacts of the timber trucks delivering timber to the ports and the impacts of the operation of the service at the ports. The local environmental impacts to other communities along the road haulage route that would have occurred in the absence of the TimberLINK service have also been considered. The local environmental impacts have been considered at the 'port communities' at each of the TimberLINK ports, namely Ardrishaig, Campbeltown, Portavadie, Sandbank and Troon; and each of the main 'road communities' that the alternative road haulage route would pass through, namely Lochgilphead, Inveraray and Arrochar. Local environmental impacts include impacts on air quality, noise, visual intrusion, local amenity and regeneration.

The TimberLINK service carries a range of local impacts, both positive and negative. On the positive side the service takes timber trucks away from the roads that run through small rural communities, reducing severance in these communities. In addition timber operations are thought to improve the economy of the local area, increasing revenue in local shops. However, some visual intrusion is caused by the bark that is sometimes left scattered around the roads near the piers. The impacts on noise and air quality were found to be minor. A similar number of people are likely to be annoyed due to noise regardless of whether the timber is shipped through TimberLINK or the alternative road route. In terms of air quality, although emissions from the traffic to the piers and from Troon affects more people than the alternative option, there is a greater reduction in pollutant concentrations for those people living along the alternative road haulage route.

The service also has a potential impact on regeneration in the pier towns and in Troon. This impact is not currently thought to be large. Regeneration plans may

include increasing the maritime leisure use of the waterfront in the town. This potential conflict is currently well managed: a log retrieval service operated to remove stray logs from the water was mentioned by several consultees as an important factor in this.

Regional Impacts

Timber transport operations also influence environmental impacts on a regional scale, over a broader area than the individual communities affected. The TimberLINK service is perceived to play a role in mitigating these impacts. The regional impacts include road damage, congestion and tourism.

It was found that the TimberLINK service reduces maintenance costs by a significant amount on the roads that would otherwise be used to transport the timber. This amount varies by road, and also by the characteristics of existing truck traffic. Using a reasonable estimate of the existing truck characteristics, the reduction in damage caused by vehicles is estimated at an average of 3.4%.

One of the most valuable impacts of removing lorries from the roads is reduced congestion. A total benefit via removing congestion of £884,045 was estimated for 2009/10, but the actual benefit is likely to be higher than this, due to the nature of the roads on which the alternative route would operate.

There is also a regional impact on tourism. Consultation with Visit Scotland and with other consultees has revealed that the piers and boat are attractive to tourists, with people stopping to watch operations. In addition there is thought to be a large benefit to tourism from removing timber lorries from roads, improving the experience of visitors to Argyll. A negative impact on tourism is the visual impact of the bark left on roads near the piers on loading days. Visit Scotland were very positive about the TimberLINK service and its benefits to tourism and stated that they “really want the service to be sustained”.

Environmental Value

The environmental benefit accruing from the TimberLINK project over the four years ranged from £481,874 for 2008/09 up to £873,346 for 2009/10. This is a lower estimate of the value, as there are several benefits which could not be reliably monetised, but which are thought to have significant impact. The figure does not include tourism or the increased impact of congestion on narrower than typical roads. The environmental benefit varies depending on the port used, and an upper and lower bound for the service have been calculated to allow for this variation. Using the predicted timber volume for 2009/10 gives an upper bound of £1,158,959 and a lower bound of £641,737. The total benefit per tonne of timber transported ranges from £4.28/tonne to £9.27/tonne.

Expanding the service

The study team were asked to include an assessment of the potential effects on the local and national environment of expanding the service to operate from Creetown and the Isle of Mull. A potential benefit has been found for the Isle of Mull service, but it is less significant than for the existing operations. Expansion to Creetown was found to offer no environmental benefits.

Conclusions and Recommendations

The outcomes of the study show that there is a significant net environmental benefit resulting from the operation of the TimberLINK service. Furthermore there is a very high level of acceptance and support for the service in the area; this support includes stakeholders involved in operating and using the service; local communities and the tourism industry. The study has shown, however, that there are some local environmental costs within the port communities. There are few complaints about the service, however in light of the potential to increase timber transport in the future it is worth addressing these issues to reduce these negative impacts. Measures to mitigate against these impacts might include:

- Increase timber storage at the piers to reduce queuing trucks.
- Negotiate agreed loading hours at each pier to allow local residents to discuss their views and raise any concerns.
- Tidy up bark that has fallen from timber trucks.
- Maintain the log retrieval service that removes stray logs from the water.
- Consider conducting route feasibility studies to investigate routes for extending the service.

2. INTRODUCTION

This report has been produced by Transport & Travel Research Ltd (TTR) on behalf of Forestry Commission Scotland. The report reviews the environmental benefits of the TimberLINK service, with the overall objective of ascertaining the full environmental benefits/dis-benefits of the service compared to the alternative road haulage options

2.1 Study Aims

The key requirements for the study are outlined below, together with a reference to the relevant section of the document where the information can be found.

- Quantify the overall carbon reduction resulting from the TimberLINK service compared with road haulage to the same end users, expressed per tonne of timber transported – Section 5.1.

- Calculate a point whereby the carbon benefit from timber transport by road is equal to that from timber transport by sea for this service. (In effect giving a breakeven point at which the TimberLINK service becomes environmentally negative) – Section 5.1.

- Consider, and quantify where possible, the increased disruption to local communities in and around the specific Argyll Ports of Ardrishaig, Campbeltown, Portavadie and Sandbank due to the running of the TimberLINK contract. Also quantify any additional disruption to the town of Troon.
  This was to gauge the perceived relationship between the TimberLINK operation and the local communities affected, taking into account:
  - the potential increased noise pollution from cranes, lorries and ships
  - the impact on the local air quality around the ports
  - the potential visual intrusion of the operation with more frequent lorries loading and unloading

  - Sections 5.2.1, 5.2.2, 5.2.3 and 5.2.4.

- Consider and quantify, where possible, the increased disruption to other communities through which road bound timber would flow were the TimberLINK operation to cease - Sections 5.2.1, 5.2.2, 5.2.3, 5.2.4 and 5.2.5.

- Consider and quantify, where possible, the amount of damage to Argyll and Ayrshire's local rural road network caused by the operation of the TimberLINK service compared with the reduced damage to the national road network – Section 5.3.1.

- Consider and quantify, where possible, the benefits/dis-benefits to tourism by the reduced lorry movements /miles as a result of the TimberLINK service – Section 5.3.3.

- Consider and quantify, where possible, the increase/reduction in the amount of traffic congestion on both the Argyll and Ayrshire rural roads due to the running of the TimberLINK contract – Section 5.3.2

- Quantify the reduction in the use of fossil fuels by the running of the TimberLINK service, expressed as overall litres/tonnes of fuel saved – Section 5.1.

- Calculate an environmental value of removing over 1 million lorry miles per annum from the public roads – Section 6.

The secondary, additional outputs from the project were to:

- Comment on the possible effects on the local and national environment should the TimberLINK service be expanded to cover a) more ports in Argyll and b) other areas of the West Coast of Scotland such as Fort William and Dumfries and Galloway – Section 7.

- Assess the potential conflict which the lorry movements create between the regeneration projects which are being put in place in each of the TimberLINK ports to improve the local built environment and the wider environmental benefits of this service – Section 5.2.5.

3. TIMBERLINK IN CONTEXT

3.1 The TimberLINK service

TimberLINK is a coastal shipping service, established to transport timber from four ports in Argyll (Ardrishaig, Campbeltown, Portavadie and Sandbank) to the port of Troon in Ayrshire. The timber is then transported onward to local wood processing plants such as Caledonian Paper in Irvine, Egger at Auchinleck and Wilson's Sawmill in Troon. Occasionally timber is shipped directly to the port of Ayr, however for the purposes of this study it has been assumed that all timber is taken to Troon.

The service, which commenced in Spring 2000, is operated by Associated British Ports (ABP) with subsidy of up to £1million per annum from the Scottish Executive. The majority of the timber is transported using a 65 metre-long, 1,400 tonne ship called the Red Baroness, owned by Coast Line Shipping. The vessel is chartered to the TimberLINK service to transport timber from Argyll to Troon, with a cargo capacity of up to 1,200 tonnes (equivalent to between 40 and 50 lorry loads) sailing on the route two to three times weekly. Timber is sometimes transported using other ships – namely the Fingal, Boisterous and Red Baroness – however the characteristics of the Red Baroness were used for the purposes of this study.

TimberLINK was established as essentially an environmentally friendly freight transport initiative. The TimberLINK service is a prime example of modal shift of freight from road transport to a more sustainable mode, in this case, short-sea coastal shipping.

Freight modal shift away from road to more environmentally friendly modes is one of the key objectives of Scotland's National Transport Strategy and its associated *Freight Action Plan for Scotland: 'Preparing for Tomorrow, Delivering Today'.*

Action 15 in the Freight Action Plan highlights the Scottish Executive's willingness to continue to develop incentives, such as Freight Facilities Grants and Waterborne Freight Grants, to promote innovative solutions to moving freight by rail and sea.

In February 2000, the Scottish Executive awarded a Freight Facilities Grant of £4.4 million to help ABP develop TimberLINK. The annual subsidy of up to £1million allows the continuation of the service, which would otherwise not be economically viable.

Scottish ports, harbours and marine freight can potentially offer an environmentally friendly and sustainable alternative to road freight transport for certain types of traffic (including timber), reducing freight transport's undesirable impacts on the environment.

This study aims to determine the extent of this environmental benefit specifically for the TimberLINK service.

3.2 Local environmental issues

The operation of the TimberLINK service leads to a variety of direct and indirect local environmental impacts. The local environmental impacts of the TimberLINK service include both the impacts of the timber trucks delivering timber to the ports and the impacts of the operation of the service at the ports. The local environmental impacts to other communities along the road haulage route that would have occurred in the absence of the TimberLINK service have also been considered.

The local environmental impacts have been considered at the 'port communities' – the TimberLINK ports, namely Ardrishaig, Campbeltown, Portavadie, Sandbank and Troon – and each of the main 'road communities' that the alternative road haulage route would pass through, namely Lochgilphead, Inveraray and Arrochar.

Local environmental impacts include impacts on:

- Air quality: The quality of the air we breathe has an impact on human health and poor air quality can cause or worsen conditions such as heart disease and asthma. It is estimated that approximately 24,000 people in the UK die prematurely each year due to the effects of poor air quality.
  Air quality is determined by measuring the type and quantity of different pollutants in the air. The UK National Air Quality Strategy sets limits for the quantity of a number of pollutants, known as air quality objectives. Most exceedences of these air quality objectives are due to emissions from traffic of the pollutants nitrogen dioxide (NO_2) and particulates (PM_{10}).
- Noise: The World Health Organisation has acknowledged that persistently high levels of community noise can have an impact on health. As stated by the WHO "noise can cause hearing impairment, interfere with communication, disturb sleep, cause cardiovascular and psycho-physiological effects, reduce performance, and provoke annoyance responses and changes in social behaviour"[1]. Noise is a very subjective issue and experiences and acceptance of the noise levels can vary between individuals and communities.
- Visual intrusion: The TimberLINK service operates in an area renowned for its scenery and it is therefore important to consider the impact of the timber transport operations on the visual landscape.
- Local amenity: Local amenities are considered to be those things that improve the life of the community and make a place more comfortable or easier to live in.
- Regeneration: There are regeneration plans in place in some of the TimberLINK ports and the study will consider whether there are any conflicts between these plans and the operation of the TimberLINK service.

3.3 Regional environmental issues

Timber transport operations also influence environmental impacts on a regional scale, over a broader area than the individual communities affected. The TimberLINK service is perceived to play a role in mitigating these impacts. The regional impacts include:

[1] http://www.who.int/mediacentre/factsheets/fs258/en/

- Road damage: Vehicles cause damage to the roads they travel on, and the amount of damage will impact on the quality of the road and the maintenance needed.
- Congestion: Traffic congestion occurs when traffic volumes and/or speeds are such that the interaction between vehicles interferes with the speed of the traffic. This can result in frustration and delay, and can lead to a worsening of some other impacts, such as noise and air quality.
- Tourism: Argyll and Bute is a major tourist destination with attractions including the natural landscape, local heritage and history and local specialities, such as Loch Fyne Oysters and whisky distilleries. Tourism is a major contributor to the local economy.

3.4 Climate change

Climate change is a global, rather than a local or regional issue. Increased emissions of greenhouse gases will have an impact on a local and a global scale. Globally it is thought that the impacts of climate change would include rising sea levels, flooding, droughts, food shortages, increased disease, water shortages and a loss of tropical forests. In the UK, it is thought that climate change will lead to "warmer, wetter winters and hotter, drier summers, with more drought, more intense heat waves, flooding and sea level rise"[2].

The Climate Change Act 2008 sets targets for UK carbon emissions, and in working towards achieving these there is likely to be an increasingly greater policy emphasis on carbon reduction.

This project will involve carrying out an environmental benefit assessment of the TimberLINK service to compare the carbon reduction of the TimberLINK service with the alternative road haulage option.

[2] http://actonco2.direct.gov.uk/actonco2/home/climate-change-the-facts/The-effect-of-climate-change-on-the-UK.html

4. STUDY METHODOLOGY

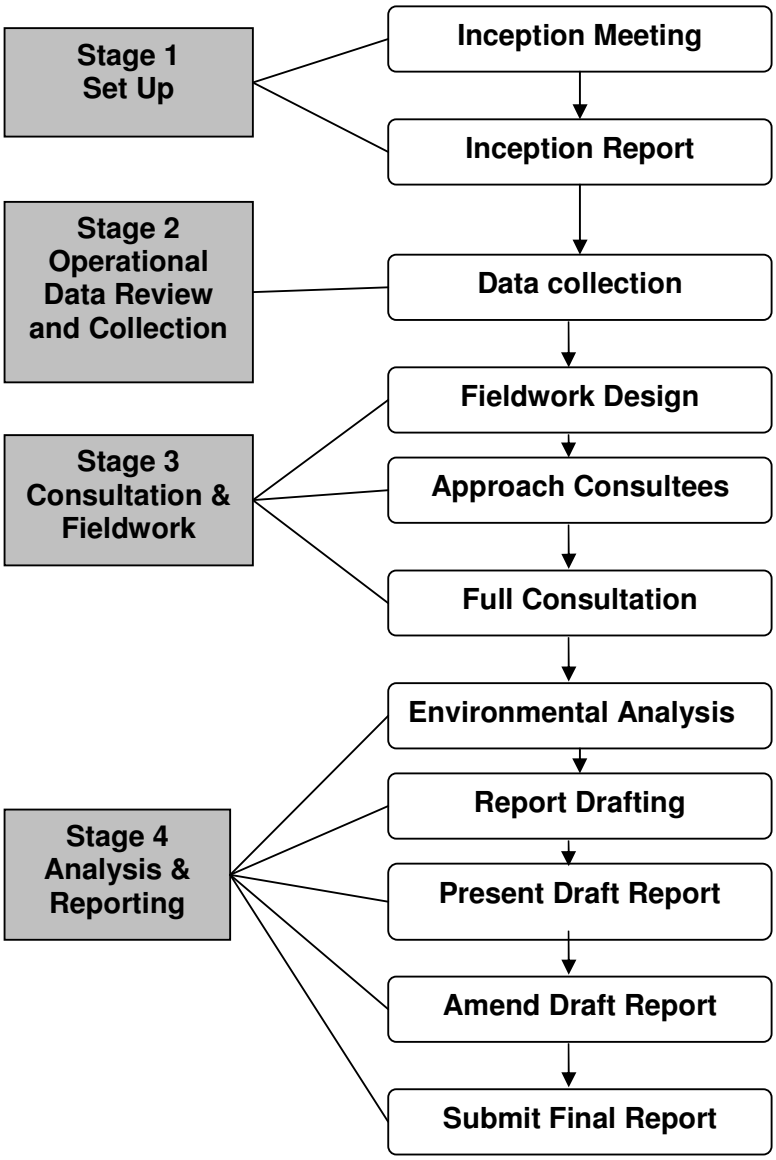
4.1 The approach

The study was conducted in 4 stages:

- Set Up (Stage 1)
- Operational Data Review and Collection (Stage 2)
- Consultation & Fieldwork (Stage 3)
- Analysis & Reporting (Stage 4)

These 4 stages, illustrated in Figure 3.1 below, were overseen throughout the course of the project by a core element of project management activity.

Figure 4.1: Study approach – overview



4.2 Data review and collection

At the outset of the project, immediately following the inception meeting, the data needed for the study were identified and reviewed. Data were collected as part of the consultation exercise described below.

Data collected included detailed operational information on the TimberLINK service and the alternative road haulage option and supporting information from external sources.

The data collected included logistical data, such as routes taken by the timber trucks, and annual data, such as the volumes of timber transported. Data were collected for four time periods to allow a comparison between years.

- 2006/07 (April 2006 – March 2007)
- 2007/08 (April 2007 - March 2008)
- 2008/09 (April 2008 - March 2009)
- 2009/10 (April 2009 - March 2010).

The 2009/10 figures are projected. Calculations assume that the proportions of timber from each port and to each customer will remain the same as for the operation for the year to date.

4.2.1 Operational information

Details of the operational data collected for the study are given in Table 4.1: below, together with the source of the data.

Table 4.1: TimberLINK operation data

Operational data	Data source
TimberLINK operational data	
The average distances travelled for the road leg from forest to pier at each of the ports of Ardrishaig, Campbeltown, Portavadie and Sandbank.	Forest Enterprise.
The routes/roads taken by the timber trucks as they enter and leave each of the ports.	Forest Enterprise
The average distances travelled for the road leg from Troon pier to processor.	Route information was provided by John Scott Transport and distances calculated using route planning software.
The number of trucks per day/week travelling into and out of each port.	Associated British Ports (ABP)
The nautical miles travelled by the Red Baroness to operate the TimberLINK service.	Associated British Ports (ABP)

The number of sailings from each port, and the average quantity of timber transported on each sailing from each port	Associated British Ports (ABP)
Fuel use data: Timber truck (litres/mile) Timber vessel (litres/nautical mile) Loading/unloading equipment	 Associated British Ports (ABP) Associated British Ports (ABP) John Scott Transport
Alternative road haulage route data	
The routes that would be taken and distances travelled for the road haulage from forest to processor	Route information was provided by ABP and distances calculated using route planning software.
The number of trucks per day/week that would have travelled along the route – including outbound (loaded) and inbound (empty) trucks.	Forest Enterprise Associated British Ports (ABP)

A summary of the key operational data used in the study is given in Table 4.2: and Table 4.3: below. In Table 4.2 'road leg 1' is the journey made from the forest to the pier in order to access the TimberLINK service, and 'road leg 2' is the journey from the port of Troon to the customer. Table 4.3 shows the data for the alternative road haulage option. This journey has been divided into two road legs. All journeys go through Tarbet and so, to allow easier data manipulation, data are presented for the journey from each port area to Tarbet (road leg 1) and from Tarbet to each of the customers (road leg 2).

Table 4.2: Key operational data for the TimberLINK service

Route	Avg dist. (km)	Total timber (tonnes)				Number of trips by timber truck/ship (one way)			
		2006/07	2007/08	2008/09	2009/10	2006/07	2007/08	2008/09	2009/10
Road leg 1									
Forest - Ardrishaig	15	80801	81450	64404	41049	3232	3258	2576	1642
Forest - Campbeltown	18	11731	16297	5939	67360	469	652	238	2694
Forest - Portavadie	7	2052	508	6583	0	82	20	263	0
Forest - Sandbank	17	6131	10549	8720	16591	245	422	349	664
Road leg 2									
Troon - Caledonian	11	25166	32960	30559	34183	1007	1318	1222	1367
Troon - Adam Wilson & Sons	0	49474	46860	36855	56382	1979	1874	1474	2255
Troon - Mairs	6	2035	1735	1490	2613	81	69	60	105
Troon - Egger	41	23550	26865	16743	31821	942	1075	670	1273
Shipping leg									
Ardrishaig - Troon	74	80801	81450	64404	41049	67	68	54	34

Campbeltown - Troon	63	11731	16297	5939	67360	10	14	5	56
Portavadie - Troon	56	2052	508	6583	0	2	1	5	0
Sandbank - Troon	57	6131	10549	8720	16591	5	9	7	14

Table 4.3: Key operational data for the alternative road haulage route

Route	Avg dist. (km)	Total timber (tonnes)				Number of trips by timber truck (one way)			
		2006/ 07	2007/ 08	2008/ 09	2009/ 10	2006/ 07	2007/ 08	2008/ 09	2009/ 10
Road leg 1									
Ardrishaig area to Tarbet	80	80801	81450	64404	41049	3232	3258	2576	1642
Campbeltown area to Tarbet	158	11731	16297	5939	67360	469	652	238	2694
Portavadie area to Tarbet	78	2052	508	6583	0	82	20	263	0
Sandbank area to Tarbet	61	6131	10549	8720	16591	245	422	349	664
Road leg 2									
Tarbet - Caledonian	93	25166	32960	30559	34183	1007	1318	1222	1367
Tarbet - Adam Wilson & Sons	111	49474	46860	36855	56382	1979	1874	1474	2255
Tarbet - Mairs	93	2035	1735	1490	2613	81	69	60	105
Tarbet - Egger	111	23550	26865	16743	31821	942	1075	670	1273

Note that the 'in-forest' distance travelled by the timber trucks have not been included in the comparisons, as these will be approximately the same regardless of whether the timber is taken to a port or via the alternative road route.

4.2.2 Supporting information

Data from a number of other sources were also used, details of the data used and the data source are given in Table 4.4: below.

Table 4.4: Data and data sources used in the study

Data	Source
Population data for port communities and road	General register office for Scotland, except for Portavadie and Arrochar where local sources were used. Details of the population data used are presented in Table 5.11:

communities	
Road traffic and shipping CO_2 emission factors	*Defra's "2008 Guidelines to Defra's GHG Conversion Factors: Methodology Paper for Transport Emission Factors, July 2008* http://www.defra.gov.uk/environment/business/reporting/pdf/passenger-transport.pdf
Air quality calculations	Design Manual for Roads and Bridges (DMRB) Air Quality Spreadsheet tool http://www.highways.gov.uk/business/238.aspx
Air quality monitoring data	2009 Updating and Screening Assessment Argyll and Bute Council http://www.argyll-bute.gov.uk/pdffilesstore/usareport2009 2009 Updating and Screening Assessment South Ayrshire Council http://www.south-ayrshire.gov.uk/environmentalhealth/publichealth/airqualitylive.aspx
Noise calculations	Road noise calculated using Calculation of Road Traffic Noise (CRTN), DfT, 1988 http://resource.npl.co.uk/acoustics/techguides/crtn/ Noise nuisance calculated using DMRB http://www.standardsforhighways.co.uk/dmrb/vol11/section3/11s3p07.pdf
Mode shift benefit values	http://www.dft.gov.uk/pgr/freight/railfreight/modeshiftben/ Technical paper: http://www.dft.gov.uk/adobepdf/165226/443908/msbtechpaper.pdf
Sensitive Lorry Miles	Sensitive Lorry Miles Evaluation Report http://www.dft.gov.uk/pgr/freight/railfreight/slmp/sensitivelorrymilesevaluatio.pdf Maps and values: Environmental Benefit Calculator - http://www.dft.gov.uk/eb-calculator
Annual Average Daily Traffic counts (AADTs) for trunk roads	http://www.dft.gov.uk/matrix/MapXtreme/NewMap.htm

4.3 Stakeholder consultation and fieldwork

Consultation with stakeholders was carried out both to collect quantitative data from the individuals and organisations involved in operating the TimberLINK service, and to better understand in a qualitative way how the service impacts on various stakeholders, including local residents and tourists.

Consultation questionnaires were produced to collect data and opinions from the following groups of stakeholders:

- Associated British Ports (TimberLINK service operators).
- Hauliers.

- TimberLINK customers.
- Pier operators.
- Community Councils – both for communities at the ports and those located along the alternative road haulage routes.
- Other interested parties.

Copies of the questionnaires used are included in Annex A. In addition, other organisations were contacted to discuss the impact of specific aspects of the service including Visit Scotland, Highlands and Islands Enterprise (HIE) and the local authorities.

Stakeholder organisations were contacted by letter by the client and informed about the environmental assessment. The project team then arranged interviews with the stakeholders. Face to face meetings were carried out with the following key stakeholders:

- Associated British Ports, operators of the TimberLINK service.
- British Waterways, operators of Ardrishaig pier
- John Scott Transport, hauliers with responsibility for managing the loading and unloading of the timber vessel.
- Forest Enterprise Scotland, managing body for the forest estate.

The remainder of the interviews were conducted over the telephone.

The consultations allowed the collection of quantitative data concerning the operation of the TimberLINK service (and the potential road freight alternative). This included, for example, details of the volume of timber shipped from each of the piers, the volume received by each of the customers, the capacity and fuel efficiency of both the vessel and the timber trucks, and the hours at which timber is allowed to be loaded/unloaded at each of the ports/piers. The consultation exercise also provided information on the likelihood of future variation in the volumes of timber to be harvested and the locations of timber harvesting in relation to the piers. Any potential future changes could impact on the assessment of future environmental benefits.

The consultations also allowed the collection of qualitative data concerning the impact of the service at a community level. Understanding the views of various stakeholders on the project, and how it impacted them on a day to day basis means that a more informed conclusion can be drawn from the study.

Consultees were asked about the impact of the service, both in general and across specific categories of questions relevant to the environmental impact including local amenity, noise, visual intrusion, congestion, air quality, and tourism. In particular, the questionnaires directed to the community councils addressed these issues in detail.

The consultation responses have therefore provided valuable input both to the data collection process and to the identification and discussion of local environmental impacts.

5. IMPACT ASSESSMENTS

5.1 Carbon reduction and fuel use

The net carbon reduction from the operation of the TimberLINK service was calculated by deducting the carbon emissions due to the operation of the TimberLINK service from those of the alternative road haulage operation.

The trip data presented in Section 4.2 was used together with fuel use data to calculate the fuel use from each leg of the journey, and the corresponding carbon emissions. The fuel use data and CO_2 emissions factors used are given in Table 5.1: below.

Table 5.1: Fuel use data and CO_2 emission factors used in the study

Transport mode	Fuel use	CO_2 emission factor[3]
Timber truck	0.36 litres/km[4]	0.889 kg/km
Shipping	18.18 litres/nautical mile[5]	20 g/tonne km
Loading/unloading	35 litres/hour	2.68 kg/litre

5.1.2 Fuel use

A summary of the fuel used in operating the TimberLINK service, and that would be used by timber trucks operating on the alternative road haulage route, is given in Table 5.2: below, together with the net reduction in fossil fuel as a result of the TimberLINK operation.

Table 5.2: Fuel use comparison for the TimberLINK service and the alternative road haulage option (DfT data)

Route (including outward and return journey)		Total fuel (litres)			
		2006/07	2007/08	2008/09	2009/10
TimberLINK	Road legs	81175	91975	66799	109446
	Shipping leg	117640	125877	98351	134730
	Loading/ unloading	47000	50775	39968	58333
	Total	245815	268627	205119	302509
Alternative road haulage option		560376	609276	462036	810269
Total net fuel reduction		**314561**	**340649**	**256917**	**507760**

[3] 2008 Guidelines to Defra's GHG Conversion Factors: Methodology Paper for Transport Emission Factors, July 2008, http://www.defra.gov.uk/environment/business/reporting/pdf/passenger-transport.pdf
[4] Transport Statistics Bulletin Road Freight Statistics 2008, Department for Transport, October 2009
[5] Data supplied by ABP

The transport fuel use data presented in above are taken from DfT freight data. Fuel use data for the timber trucks supplied by ABP, based on experience of timber truck operations in the area, suggests that the timber trucks in the area use a greater amount of fuel. To provide a comparison between the DfT values and the experience based estimate, the fuel use comparison has also been carried out assuming a fuel use of 0.52 litres/km. The fuel use comparison is shown in Table 5.3:

Table 5.3: Fuel use comparison for the TimberLINK service and the alternative road haulage option (Experience based data)

Route (including outward and return journey)		**Total fuel (litres)**			
		2006/07	**2007/08**	**2008/09**	**2009/10**
TimberLINK	Road legs	117253	132853	96488	158089
	Shipping leg	117640	125877	98351	134730
	Loading/ unloading	47000	50775	39968	58333
	Total	281893	309505	234807	351152
Alternative road haulage option		809432	880066	667385	1170388
Total net fuel reduction		**527539**	**570561**	**432578**	**819236**

The experience based figures suggest a greater fuel saving than that calculated using the DfT data, with the saving calculated from the experience based data being around 60% greater.

5.1.3 Carbon reduction

The carbon emissions by port for timber transport via the TimberLINK service and by the alternative road haulage route are presented in Table 5.4: and Table 5.5: below. Note that the values given include emissions from both the outward and return journey, and that the values for the TimberLINK service include emissions from the loading and unloading of the timber.

Carbon emissions have been calculated using the Defra emissions factors presented in Table 5.1: These are derived from the type of vehicle and the distance travelled, and are therefore not directly linked to fuel consumption. Further details of the methodology used to calculate the carbon emissions are given in Appendix 2.

Table 5.4: CO_2 emissions from timber transport via the TimberLINK service

Timber source	**Total CO_2 (tonnes)**				**CO_2 (kg) per tonne timber transported**			
	2006/ 07	**2007/ 08**	**2008/ 09**	**2009/ 10**	**2006/ 07**	**2007/ 08**	**2008/ 09**	**2009/ 10**
Ardrishaig	500	510	397	257	6.2	6.3	6.2	6.3
Campbeltown	69	98	35	404	5.9	6.0	5.9	6.0
Portavadie	10	3	32	0	4.9	5.0	4.8	-
Sandbank	35	60	49	95	5.6	5.7	5.6	5.7

Total	**614**	**671**	**513**	**756**	**6.1**	**6.2**	**6.0**	**6.0**

Table 5.5: CO_2 emissions from timber transport via the alternative road haulage route

	Total CO_2 (tonnes)				**CO_2 (kg) per tonne timber transported**			
Timber source	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2006/07**	**2007/08**	**2008/09**	**2009/10**
Ardrishaig	1065	1069	843	541	13.2	13.1	13.1	13.2
Campbeltown	220	305	111	1264	18.7	18.7	18.7	18.8
Portavadie	27	7	85	0	13.1	13.0	13.0	-
Sandbank	72	124	102	196	11.8	11.8	11.7	11.8
Total	**1384**	**1505**	**1141**	**2001**	**13.7**	**13.8**	**13.3**	**16.0**

The tables above show that for all four years investigated the total carbon emissions from transporting timber via the TimberLINK service were lower than they would have been were the timber to be transported by the alterative road haulage route. In 2006/07 the emissions from the road haulage route would have been 2.3 times higher than those due to the TimberLINK service. This ratio falls to 2.2 in 2007/08 and 2008/09 and increases to 2.6 for 2009/10. This increase is due to the increase in the proportion of timber shipped from Campbeltown; the greatest reduction in CO_2 per tonne of timber transported is when operating the service from Campbeltown, because of the long journey distance by road from Campbeltown to the processors.

Table 5.6: below gives details of the net carbon reduction due to the operation of the service, broken down by port. This table gives the total reduction for the service, taking into account the empty truck and vessel return journeys and the emissions from loading and unloading at the ports.

Table 5.6: Net CO_2 emissions reduction generated by the TimberLINK operation

	Total reduction in CO_2 emissions (tonnes)				**Reduction in CO_2 (kg) per tonne timber transported**			
Timber source	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2006/07**	**2007/08**	**2008/09**	**2009/10**
Ardrishaig	565	559	446	284	7.0	6.9	6.9	6.9
Campbeltown	151	207	76	860	12.8	12.7	12.8	12.8
Portavadie	17	4	54	0	8.2	8.1	8.1	-
Sandbank	38	64	53	101	6.2	6.0	6.1	6.1
Total	770	834	628	1245	7.6	7.7	7.3	10.0

This table shows that the greatest carbon saving due to the operation of the TimberLINK service was in 2009/10. A total of 1,245 tonnes of carbon were saved, equivalent to 10.0kg CO_2 per tonne of timber transported. These carbon savings are equivalent to a reduction of approximately 1,400,000 timber lorry km for the year 2009/10, or a reduction of approximately 11 timber lorry km per tonne of timber

transported. This is an equivalent carbon saving as would be made by reducing passenger car kilometres by approximately 7,196,500 km[6].

Table 5.7: below gives the breakeven point at each port whereby the carbon emissions for transporting each tonne of timber would be equal by road or via TimberLINK. These figures have been calculated by comparing the reduction in emissions per tonne timber transported via the TimberLINK service with those from the alternative road haulage route.

Table 5.7: The carbon breakeven point for the TimberLINK service

Timber source	Breakeven capacity	Breakeven capacity - timber (tonnes)
Ardrishaig	47%	564
Campbeltown	32%	384
Portavadie	38%	456
Sandbank	48%	576

The figures show the percentage capacity for the timber vessel above which transporting the timber by boat is more carbon efficient. For example, if the timber barge were to sail from Ardrishaig less than 47% full it would be more carbon efficient for the timber to be transported by the alternative road haulage route, whereas if it were to sail more than 47% full, transport via the TimberLINK service would be more carbon efficient.

The breakeven point for the service as a whole for each year is given in Table 5.8: below, calculated as a weighted average over all four ports.

Table 5.8: The carbon breakeven point for the TimberLINK service by year

Year	Breakeven capacity – weighted average	Breakeven capacity - timber (tonnes)
2006/07	45%	540
2007/08	45%	540
2008/09	45%	540
2009/10	39%	468

This shows that the service has a greater efficiency in 2009/10; this is due to the shift towards shipping a greater proportion of timber from Campbeltown.

[6] Estimated using an average CO_2 emission factor for a passenger car of 173g/km.

5.2 Disruption to local communities

5.2.1 Noise

Noise is a very subjective issue and experiences and acceptance of the noise levels can vary. In considering the noise impact of the TimberLINK service a combination of noise estimates and consultation feedback has been used, to get a full picture of the impacts within the local community.

In estimating the noise nuisance associated with the TimberLINK service within the port communities the noise from both timber trucks travelling into and out of the ports, and from cranes and ships when loading and unloading the timber have been taken into account. The noise nuisance from timber trucks in the communities along the alternative road haulage route (the 'road communities') has also been estimated, to allow a comparison between the two options.

Road traffic noise
Road traffic noise with and without the TimberLINK service in place has been calculated within the port based and road based communities. Details of road traffic noise within each community are given in Table 5.9: below. These noise calculations have been carried out for 2008/09, using 2008 road traffic data for the region. Road traffic noise was calculated using the Calculation of Road Traffic Noise (CRTN) model[7], which uses information about the vehicle flow, speed and proportion of heavy vehicles to calculate the noise level at a distance of 10 metres from the carriageway.

World Health Organisation guidance[8] states that "general daytime outdoor noise levels of less than 55 dB (A) L_{eq} are desirable to prevent any significant community annoyance". The table shows that the road noise level in each of the communities considered is high enough to cause some level of annoyance within the community and therefore the percentage and number of people within each community (both the road and port communities) bothered by the road traffic noise has also been included in Table 5.9: The percentages of people bothered were calculated using the Design Manual for Roads and Bridges (DMRB) guidelines[9], whereby a logarithmic curve is used to estimate the change in the percentage of people 'bothered very much or quite a lot' by traffic noise with an increase in noise**.** Local population data, presented in detail in Table 5.11:

The addition of TimberLINK timber trucks has very little impact on noise levels within the port communities. The increase in road noise resulting from the operation of the service is estimated to lead to 2 more people being bothered by road noise than were the service not in operation. Table 5.9: also shows that, were the alternative road haulage route to be used, the addition of TimberLINK timber trucks along these road routes would have very little impact on noise levels within the road communities. The additional timber trucks would lead to 2 more people being bothered by road traffic noise than are currently bothered by road traffic noise – the

[7] http://resource.npl.co.uk/acoustics/techguides/crtn/
[8] Environmental Health Criteria 12 - Noise. World Health Organisation, 1980.
[9] http://www.standardsforhighways.co.uk/dmrb/vol11/section3/11s3p07.pdf

same increase in the number of people bothered as is currently estimated for the port communities.

It is worth noting that the greatest impact on road noise within the port communities is in Ardrishaig. However, if timber were to be transported by the alternative road haulage route some of the timber trucks would pass through Ardrishaig on the A83, and this community would therefore still experience the impacts of additional road traffic noise from timber haulage.

Views on noise impacts were collected in the consultation exercise. Sandbank Community Council mentioned that the timber traffic does bring some road noise, however they also acknowledged that other vehicles use these roads to supply the supermarkets and that this would also contribute to traffic noise. The consultation feedback also mentioned the noise from empty logging vehicles departing the village

> *"There is occasionally a rattle from the log retaining uprights and noise from gear changes at Rankin's Brae and then in negotiating Sandbank High Road (Steep Hill)".*

Elsewhere, although traffic levels on the A82 were mentioned repeatedly, there was no specific mention of noise problems from the traffic.

Table 5.9: The road traffic noise impact of the TimberLINK service

Locations	WITH TimberLINK					WITHOUT TimberLINK				
	Traffic 18-hr	% hgv	dB(A)	% people bothered	number bothered [10]	Traffic 18-hr	% hgv	dB(A)	% people bothered	number bothered
Port communities										
Ardrishaig	1888	8.3	61.7	16	99	1874	7.6	61.5	15	97
Campbeltown	1625	7.2	60.8	14	217	1624	7.2	60.8	14	217
Sandbank	3639	6.0	63.9	20	104	3638	5.9	63.9	20	104
Portavadie	NO DATA					NO DATA				
Troon	7224	4.1	66.4	25	1077	7222	4.0	66.4	25	1077
Road communities										
Lochgilphead	5501	5.8	65.7	23	165	5517	6.0	65.7	23	165
Inveraray	2072	7.7	62.0	16	50	2088	8.4	62.1	16	51
Arrochar	3784	6.1	64.2	20	60	3803	6.6	64.3	20	61

[10] The relationship between traffic noise and perceived traffic noise – or the percentage of people 'bothered' - is derived in the DMRB guidelines from a number of empirical studies

Noise from port operations

Information on timber loading and unloading times at each port was collected during the consultation exercise and these are presented in Table 5.10: below.

Table 5.10: Port operational hours

Location	Loading times
Ardrishaig	6.30am to 9pm (weekdays) 7am to 9pm (weekends)
Campbeltown	7am to 10pm
Sandbank	7am to 10pm
Portavadie	7am to 10pm
Troon	7am to 10pm

The default loading hours for most ports are 7am to 10pm, however at Ardrishaig British Waterways have agreed the loading hours in consultation with the local councils and community councils. There have been no complaints in Ardrishaig about the noise of timber operations at the pier since 2002.

At the other ports the consultation feedback suggests that the only complaints about the noise are complaints about early loading at the piers. In Campbeltown there are around 1-2 complaints about the noise of early loading each year, from the retirement home near the pier. In Sandbank the consultation feedback from the Community Council indicated that residents felt they experienced 'some noise' from 4am to 10pm, however the feedback indicated that noise levels are about the same as before the TimberLINK service began. The following comment was offered on noise levels at Sandbank:

"This is influenced by householders proximity to the berth and the frequency of shipping visits. It is considered there is not a massive noise problem, examples of noise include the hollow ringing as logs are craned and then dropped into the ships holds - on a quiet evening/early morning the noise can travel about 1km (estimate). There are other noise-generating activities and background noise in the village therefore on the whole it is considered that there is no appreciable change."

The project team were advised that in order to reduce the disturbance from unloading at Troon John Scott Transport have invested in kit with a higher handling capacity, meaning that the boats can be unloaded more quickly.

5.2.2 Air quality

The impact of the TimberLINK operation on the local air quality has been estimated using the DMRB Air Quality Spreadsheet tool. The tool calculates the concentration of pollutants at properties close to a road, based on the number of vehicles on the road and the distance of properties from the centre of the road. Details of the population data used and the numbers of people affected are given in Table 5.11: below. In all cases the estimate of the proportion of the population on route has been made based on mapping data and aerial photography for the area and is a

conservative (over)estimate. The distance from the centre of the road to the nearest properties has also been estimated from aerial photography.

Table 5.11: Data used in estimating air quality impacts

Locations	Population (approx)	Percentage of population on route	Population affected	Distance from road centre (m)
Port communities				
Ardrishaig	1250	50%	625	5
Campbeltown	5040	30%	1512	10
Sandbank	1060	50%	530	7
Portavadie	358	50%	179	5
Troon	14510	30%	4353	15
Road communities				
Lochgilphead	2370	30%	711	5
Inveraray	620	50%	310	7
Arrochar	1000	30%	300	10

The calculation of air quality impact for Troon takes into account both the trucks that travel from Troon pier with TimberLINK loads and those that would travel into Troon (to reach Adam Wilson & Sons) were the alternative road haulage route to be used. The timber trucks travel from Troon pier out to the customers via Barassie shorefront and on to the A78 at Auchengate. If timber were to be brought in via the alternative road haulage route it would enter Troon via the same route. The net result is that the total impact of TimberLINK equals the impact of timber destined for all other customers minus the impact of timber travelling to Adam Wilson & Sons.

The increase in concentrations of NO_2 and PM_{10} in each community has been calculated, both for the TimberLINK operation and for the alternative road haulage route. The data are presented in Table 5.12: below, together with the percentage increase this represents in each community. Monitoring data for the area, collected in 2008, has been used to calculate the percentage increases. For NO_2 a concentration of 14ug/m^3 has been assumed, and for PM_{10} a concentration of 17ug/m^3 has been assumed. The estimated concentration for PM_{10} is based on data collected in Troon and Tarbert (south of Ardrishaig on the A83) as these are the only PM_{10} monitoring data recorded. The Tarbert monitoring was carried out due to concerns over PM_{10} emissions from fuel burning, therefore a concentration of 17ug/m^3 it is likely to be a conservative estimate for the area in general.

Table 5.12: shows that the timber traffic leads to a larger increase in pollutant concentrations in communities along the alternative road haulage route than along the routes into and out of the port communities. However the total population affected by emissions from timber traffic within the port communities is estimated to be 7199, compared with 1321 people affected along the alternative road haulage route.

It should be noted, however, that Local Authority air quality assessments in the area have identified no air quality problems and that there are no declared AQMAs (air quality management areas). NO_2 is not considered to be harmful to human health

below the annual average air quality objective of 40ug/m^3, and therefore the concentrations considered in this study are of no concern. The annual average air quality objective for PM_{10} is 18ug/m^3, although there is considered to be no safe limit for human health. However, the increases in pollutant concentrations calculated in this study for both options (TimberLINK and the alternative road haulage option) are minimal – a maximum of 1.68% for NO_2 and 0.18% for PM_{10}.

This quantitative assessment is supported by the views collected in the qualitative consultation exercise. All consultees were asked about the impacts on air quality of the service and no concerns were raised.

Table 5.12: Air quality impacts of the TimberLINK service and the alternative road haulage option-NO_2

	Increase in annual NO2 concentrations (ug/m3)				% increase NO2			
Locations	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2006/07**	**2007/08**	**2008/09**	**2009/10**
Port communities								
Ardrishaig	0.193	0.199	0.151	0.085	1.38	1.42	1.08	0.61
Campbeltown	0.029	0.043	0.017	0.122	0.21	0.30	0.12	0.87
Sandbank	0.009	0.003	0.018	0	0.07	0.02	0.13	0
Portavadie	0.017	0.032	0.026	0.041	0.12	0.23	0.18	0.29
Troon	0.003	0.034	0.026	0.025	0.02	0.24	0.19	0.18
Road communities								
Lochgilphead	0.212	0.234	0.163	0.203	1.51	1.67	1.16	1.45
Inveraray	0.206	0.228	0.158	0.198	1.47	1.63	1.13	1.42
Arrochar	0.207	0.235	0.178	0.206	1.48	1.68	1.27	1.47

Table 5.13: Air quality impacts of the TimberLINK service and the alternative road haulage option – PM10

	Increase in annual PM10 concentrations (ug/m3)				% increase PM10			
Locations	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2006/07**	**2007/08**	**2008/09**	**2009/10**
Port communities								
Ardrishaig	0.022	0.026	0.018	0.009	0.13	0.15	0.10	0.06
Campbeltown	0.003	0.005	0.002	0.014	0.02	0.03	0.01	0.08
Sandbank	0.001	0.000	0.002	0	0.00	0.00	0.01	0
Portavadie	0.002	0.003	0.002	0.004	0.01	0.02	0.01	0.02
Troon	0.000	0.004	0.003	0.002	0.00	0.02	0.01	0.01
Road communities								
Lochgilphead	0.025	0.031	0.019	0.025	0.15	0.18	0.11	0.15
Inveraray	0.024	0.030	0.018	0.024	0.14	0.18	0.11	0.14
Arrochar	0.025	0.031	0.021	0.026	0.15	0.18	0.12	0.15

5.2.3 Visual intrusion

Comments on visual intrusion in the port communities were invited as part of the consultation exercise. Two issues were mentioned and both of these were raised by more than one consultee.

A general comment made by consultees was that the timber operations at the piers do not intrude on the visual landscape and are actually viewed positively by local residents and visitors who enjoy the sight and spectacle of the timber vessel and the timber loading operation. Some of the port communities – for example Sandbank – historically have a degree of industrialisation and therefore the population is accustomed to it.

In terms of negative impacts, at both Ardrishaig and at Sandbank the issue was raised that sometimes bark debris would fall from lorries and end up on roads, in gutters, or on the footpaths.

5.2.4 Local amenity

Local amenities are considered to be those things that improve the life of the community and make a place more comfortable or easier to live in. The consultation responses generally present a positive attitude towards the TimberLINK operation – both in improving the amenity within the port communities and within the road communities.

The consultation response received from Arrochar and Tarbet Community Council clearly indicates that the A83 and A82 present significant barriers to local amenity within this community. Any reduction in the number of timber trucks passing along these roads, such as that brought about by the operation of the Timber LINK service, is very welcome. The response indicates that the community feels 'cut in half' by the A82 and A83 and that there are major issues with vehicle movements and parking in the area. Without the TimberLINK service these impacts would be more severe.

In Ardrishaig the refurbishment of the pier square, and the addition of new lighting and a pedestrian route, was undertaken by British Waterways as part of the renovation of the pier for TimberLINK.

Consultees also mentioned the positive impact of the timber operations in terms of increased trade in local shops and increased local employment. It was noted that there was a high degree of community acceptance towards the service because most people know somebody who is employed by the timber industry. Additionally transporting timber over short local distances was thought to give local lorries more job security due to committed short runs.

One problem encountered in the past has been conflict arising due to logs in the water and the potential damage this can cause to yachts. In response to this a log retrieval service has been put in place and this has addressed the issue.

5.2.5 Regeneration

Ardrishaig

There is a regeneration masterplan in place for Ardrishaig waterfront[11]. The project partners for this are British Waterways Scotland, Argyll and Bute Council, and HIE Argyll and the Islands.

The masterplan praises the harbour area and pier square, stating that it is "a strong character area with a distinct waterfront character which is hard and workmanlike.", but notes that the timber loading pier and the rest of the working harbour is "not an attractive area although the boatyards are interesting and valuable elements to have on a waterfront."

One of the key issues for the town is noted to be better public access linkage along the waterfront. Desires to improve the utility of pier square with a range of uses might conflict with any desire to construct a storage facility by the pier to increase the capacity of Ardrishaig pier to accept timber. During the consultation exercise British Waterways noted that without such a storage facility the safe operating capacity of the pier at Ardrishaig is 140,000t, and that the pier is currently operating at capacity. Mitigating this possible impact is the potential for alternate piers to be set up to cope with expansion in capacity – Furnace has been discussed as a potential site.

The final masterplan includes scope for both expansion of the timber service and improving other uses for the waterfront side by side. Forest Enterprise is also looking for alternate sites for a pier near Ardrishaig in the event that the regeneration does clash with expansion or operation of the TimberLINK service.

In terms of deprivation, the masterplan considers that the only area in which Ardrishaig could be considered deprived is in geographical access. It is not expected that TimberLINK will have any impact on this.

While there may be some conflict between competing uses of the waterfront at Ardrishaig, it appears that the town is capable of hosting both an increase in timber traffic and other uses (such as a marina). Operators of the TimberLINK service have highlighted that the timber operation and a marina are able to co-exist elsewhere without any problems, for example at Troon and Sandbank.

Campbeltown

There is a regeneration plan in place for Campbeltown[12] and it is also part of the CHORD project, which is a regeneration program worth more than £30 million affecting five towns in Scotland.

[11] http://www.argyll-bute.gov.uk/content/planning/developmentprojects/towncentreregen/ardrishaigregenerationmasterplan/3265358

[12] http://www.argyll-bute.gov.uk/content/planning/regenerationprojects/chordprogramme/chordcampbeltown/chordcampbeltownlochmarina/campbeltownmarinaprogress/

There are three regeneration projects under the CHORD banner in Campbeltown – the Marina Regeneration Project, the Townscape Heritage Initiative, and the Kinloch Road Regeneration Project. Of these the Marina project is most relevant to TimberLINK – as the Marina will have to co-exist with timber traffic, although the Kinloch road runs near to the pier whereas the timber traffic will travel along the A83.

The plan for the redevelopment of Campbeltown marina is to grow it from 40 berths to 145, while keeping it as a "transit" marina – i.e. one with no permanent berthing. However the opportunity for a commercial marina has not been totally ruled out. Further details on the marina redevelopment are scarce, as the project is in a very early stage. The initial feasibility study is due to be completed by summer 2010.

Examples from other towns involved in the TimberLINK operation - most notably Troon - suggest that there is no reason why a marina can not co-exist in close proximity to a functioning timber pier.

The Campbeltown and Kintyre Strategy[13] points out that the local economy is relatively self contained, and as such suffers from shocks and benefits from positive economic developments more than a more integrated economy might do. This document, published in late 2005, suggests that Campbeltown has experienced "a modest revival after a prolonged decline". As such it might be expected that the removal of employment opportunities from the town would have a greater than normal impact on the regeneration of the town.

Portavadie

The main development in Portavadie in recent years was the construction of the marina. This 230 berth marina officially opened in summer 2009, having been in development since 2007.

The geographical lay out of Portavadie is such that the marina and timber pier are not directly adjacent, though they are still close to each other. Still, experience in other towns suggests that the TimberLINK service and leisure marina should be able to co-exist successfully – there does not appear to be any limiting effect of the TimberLINK activities on regeneration in the town.

Sandbank

Highlands and Islands Enterprise (HIE) have advised that a development project is in place to expand the marina; however no documentation is currently available. The timber operation and marina facilities operate successfully together in several locations and therefore there is no reason to anticipate that the TimberLINK service will cause any disruption to the marina development.

Sandbank Community Council has stated that the greatest impact of TimberLINK is probably on other boat owners and small businesses operating within the marina – they think that the impact on village residents is small. Historically there have been some concerns within the local community about developments at Sandbank marina, however residents have emphasised that they support the marina in principle, and

[13] http://www.argyll-bute.gov.uk/content/planning/developmentprojects/2156307/2156316

these concerns were not raised by the Community Council during the consultation process.

One proposed development that it has been noted might cause disruption to the town is the development of a two berth timber facility at the Robertson's Yard end of the marina. This is most likely to cause noise and light problems, but these may have knock on effects on local business.

Troon
There are no specific regeneration plans for Troon; however there is a regeneration masterplan for the Irvine Bay area approximately 10 km to the north of Troon. The plan has been developed by the Irvine Bay regeneration company, created in October 2006. The company's objective is to shape creation of physical conditions and local infrastructure that will lead to the regeneration of the Irvine Bay area. There are no obvious conflicts between the regeneration plan and the TimberLINK operation.

Troon is a good example of a marina and timber pier operating in close proximity – in fact the timber ships must pass the marina to leave the port. No consultees mentioned any negative aspects of this arrangement, and in fact several positive comments on how the two activities co-exist were received.

It is not felt that activity within the dedicated port would hamper regeneration in the town were regeneration plans to be put in place.

5.3 Regional impacts

5.3.1 Road damage

Removing timber trucks from the roads, via the operation of the TimberLINK service, will have led to a decrease in the damage done to the roads. Damage to roads can reasonably be proxied by infrastructure maintenance costs for a given section of road. For public roads this is a public expense, and any reduction in road damage can therefore be assessed as a benefit of the TimberLINK service.

The roads along the alternative road haulage route (by which the timber trucks would travel in the absence of the TimberLINK service) currently carry up to about 10% heavy vehicle traffic. Transporting TimberLINK timber by road instead of by ship would increase the proportion of heavy vehicle traffic on these roads, and hence increase the maintenance costs of the road infrastructure. By considering the proportion of traffic that is composed of heavy vehicles, and the increase in this proportion that would result in the absence of the TimberLINK service it is possible to estimate the savings in maintenance costs that have resulted from the operation of the TImberLINK service.

Road damage has been calculated using the 'fourth power law', which states that damage caused by vehicles increases as the fourth power of axle weight. The methodology used to calculate the reduction in road damage resulting from the operation of the TimberLINK service is described in more detail in Appendix 3.

The type of truck that uses a particular link has a large influence on the damage to the road, and so the maintenance saving will vary depending on the 'average' type of truck on the roads. To allow for this, three scenarios have been considered in order to give a range of estimated road damage impacts. The three scenarios cover a range of vehicle weights for the heavy vehicle component of the traffic. Each scenario assumes that the average truck on the road links is of a particular weight:

Scenario 1 All non-TimberLINK trucks are 7.5t two box vans;
Scenario 2 All non-TimberLINK trucks are all 30t four axle trucks;
Scenario 3 All non-TimberLINK trucks are 44t timber trucks.

Running these scenarios gave a wide range for the estimated savings in maintenance costs that have resulted from the operation of the TimberLINK service.

Reduction in road damage due to the TimberLINK service

Table 5.14: below shows the road sections on which the minimum and maximum impacts for the timber traffic on road maintenance costs were found, and the estimated impacts on these stretches of road. It also shows the weighted average, which describes the total percentage increase in maintenance costs that would be expected were the TimberLINK service to cease.

Table 5.14: Percentage increase in road maintenance costs expected due to increased timber traffic if TimberLINK were not in operation

	Scenario 1. 7.5t, 2 axle	Scenario 2. 30t, 4 axle	Scenario 3 44t, 6axle	Road
Minimum impact	0.4%	0.5%	0.3%	19.3 km of A86 leading to Egger
Maximum impact	329.1%	10.5%	7.6%	2.7 km of A83 Ardrishaig to Lochgilphead
Weighted average	102.9%	3.4%	2.5%	All Involved Roads (approx. 386 km)

The minimum impact was found on the A86 leading into Egger. This road is already reasonably well used by traffic and would only carry a small portion of the timber trucks. In practice, this small amount of damage is already caused by trucks travelling to Egger from the port of Troon where the TimberLINK service docks – so the service does not impact further on road damage along this stretch of road.

The greatest impact in all cases was found on the A83 between Ardrishaig and Lochgilphead. A significant number of timber lorry trips would be generated along this relatively quiet road if the TimberLINK service were to cease.

The overall impacts for the service range from an increase in maintenance costs of 2.5% to 102.9% were the TimberLINK service to cease. Scenario 2 represents the most likely heavy vehicle traffic composition for the area, and therefore the saving in road maintenance costs due to the operation of the TimberLINK service is estimated to be 3.4%.

Road damage from existing TimberLINK operations

The maintenance savings from the TimberLINK service removing timber trucks from the road must be balanced against the damage caused by trucks which currently carry timber to and from the piers and port. Annual average daily traffic information is not available for the towns themselves therefore an estimate of the traffic on the trunk road through each town has been made using AADT counts for the links either side of the town.

There are no AADT data for links near Portavadie and therefore no analysis has been carried out at Portavadie. The estimated impact on road infrastructure maintenance costs in each of the three other pier towns, and in Troon, is given in the Table 5.15: below:

Table 5.15: Percentage increase in road maintenance costs due to TimberLINK

	Scenario		
Location	1. 7.5t, 2 axle	2. 30t, 4 axle	3 44t, 6axle
Campbeltown	27.2%	1.2%	0.9%
Ardrishaig	78.1%	10.2%	7.6%
Sandbank	22.8%	0.9%	0.7%
Troon (B749)	37.4%	1.9%	1.4%

This has been derived using the current traffic data for the same three scenarios as before:

Scenario 1 All non-TimberLINK trucks are 7.5t two box vans;
Scenario 2 All non-TimberLINK trucks are all 30t four axle trucks;
Scenario 3 All non-TimberLINK trucks are 44t timber trucks.

and then calculating the damage both with and without the TimberLINK trucks. This is likely to be an overestimate of the savings because these routes would almost certainly carry some timber traffic even if the TimberLINK service did not exist.

Net reduction in road damage

Together the three trunk roads through the pier towns total 2.3 km in length, and the stretch of the B479 is approximately 5 km long. The 2% increase in damage caused in these towns is insignificant compared to the maintenance savings of 3.4% across the alternative road haulage route (approximately 386 km).

Average road maintenance costs per kilometre, estimated using DfT data[14], have been used to estimate the total value of the reduction in road damage due to the operation of the TimberLINK service. Using a value for the annual average road maintenance cost of approximately £15,000 per km, together with the 3.4% reduction calculated above, gives an estimated annual saving on road maintenance costs of £195,000, due to the operation of the TimberLINK service. Note that this calculation is an estimate based on average figures and the actual costs for the area may be significantly different.

14

http://www.dft.gov.uk/pgr/statistics/datatablespublications/tsgb/2009edition/sectionsevenroadsandtraffic.pdf

5.3.2 Congestion

The DfT have put together a set of Mode Shift Benefit (MSB) values designed to help assess the benefits of removing lorries from roads, and instead moving freight by water or rail. The Mode Shift Benefit values, which will be adopted in 2010, include a consideration of the impact of congestion. These MSB values indicate that congestion caused by heavy goods vehicle traffic contributes the largest proportion of the costs allocated for each type of road. In fact, the costs of congestion are often higher than the total MSB value, as the final MSB figure is net of the costs of alternative freight transport, and of the taxes lost by discouraging lorry transport on roads:

- For low value motorways congestion accounts for 24.1p per mile, or about 344% of the final value.
- For A roads congestion accounts for 75.9p of a 74p per mile value, or about 103%.
- For B roads congestion contributes about 60% of the final value, 85.2p of a 143p per mile value.

Using these mode shift benefit values it is possible to find a value for congestion. This is a generic value, representing the impact of congestion on a typical A road, B road, or Motorway – the actual value for specific roads may vary from this figure.

The estimates for the value of the congestion avoided by removing timber lorries from the roads via the TimberLINK service is given in Table 5.16: below: The value of congestion avoided is highest in 2009/10 because of the greater volume of timber shipped in this period. The values given take into account the trucks travelling on both the outward and return journeys.

Table 5.16: Value of congestion avoided due to TimberLINK

Road type	value/km (pence)	congestion related benefit (£)			
		2006/07	2007/08	2008/09	2009/10
A-road	47	589,204	643,548	484,026	879,878
Motorway	15	52,754	57,066	45,080	65,793
B-road	53	518	128	1,660	0
Total value		**642,476**	**700,742**	**530,766**	**945,671**

The figures above do not take account of the increased costs of congestion in the pier and port towns due to timber trucks delivering or collecting timber from the TimberLINK boat. The cost of the congestion caused by TimberLINK, calculated using the same methodology, is given in Table 5.17: below, together with the net congestion related benefit (£) of operating the TimberLINK service.

Table 5.17: Value of congestion caused due to TimberLINK

Road type	congestion related cost (£)			
	2006/07	2007/08	2008/09	2009/10
A-road	24,630	30,074	24,370	33,303
B-road	20,960	24,104	15,574	28,323
Total value	**45,590**	**54,178**	**39,944**	**61,626**
Net congestion benefit of TimberLINK	**596,886**	**646,564**	**490,820**	**884,045**

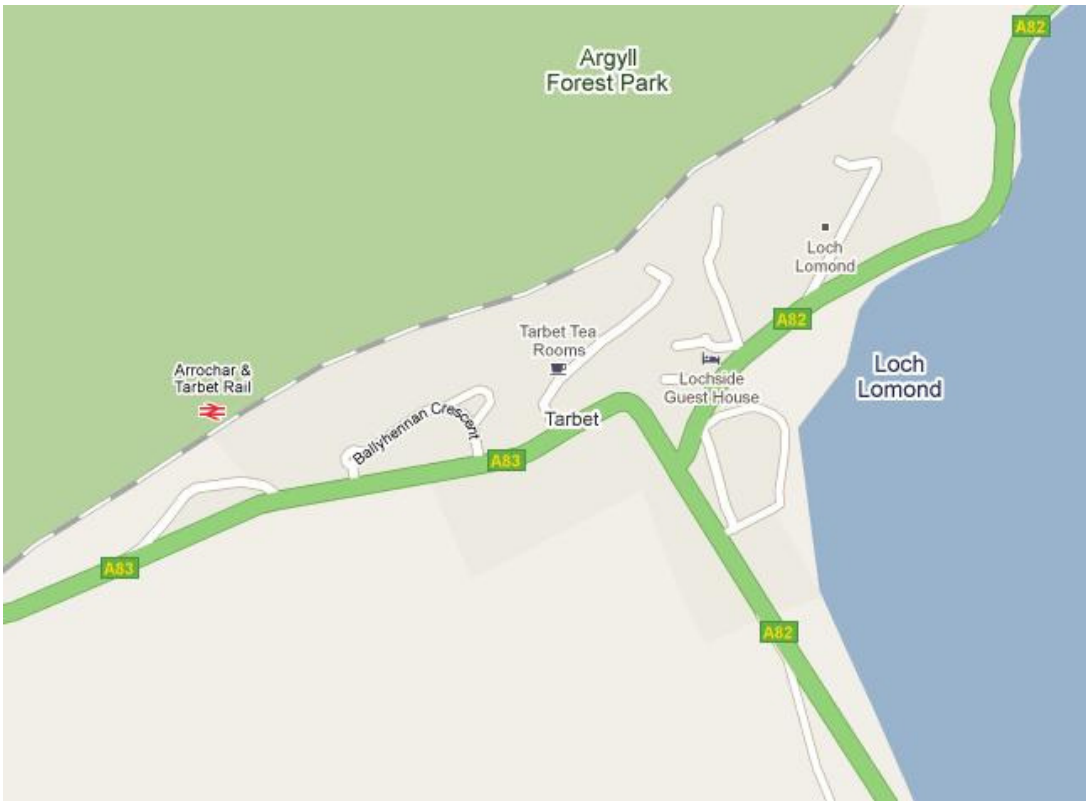
There are certain aspects of the roads that would be affected by the TimberLINK service that are significantly different from an 'average' road. It is difficult to include these in an estimate of the financial impact of congestion caused by timber traffic; however they should be taken into account when considering the appropriateness of the values calculated above, and are therefore discussed below.

Community Severance:

There are several communities along the alternative road transport route that are bisected by that route. A good example is that of Arrochar and Tarbet. The Arrochar and Tarbet Community Council told us that

"the road goes straight through [the town]…*the community is cut in half by the A83 and A82. More lorries on that road will be bad".*

The extent to which the roads divide the community at Tarbet can be seen in the map below.



Increased congestion in such locations would have a significant effect on the communities in towns such as Tarbet, and removing lorries from these roads is a valuable positive impact of TimberLINK. However, there is nothing to suggest that the impact in Tarbet in particular should be more severe than impacts experienced by other small towns in similar situations elsewhere, so the generic figure for congestion will adequately represent this cost.

Tourism

Visit Scotland have said during the consultation that

"The whole of Argyll is a tourist area",

and that there is a

"huge beneficial effect to removing the lorries".

The roads around Argyll carry a much greater proportion of tourist traffic than an 'average' road, and timber lorries on these roads are a significant dis-benefit to tourism. Visit Scotland have stated that tourists are

"more likely to return if [they are] *not stuck behind lorry loads".*

As such it is likely that the impact of congestion on repeat visits and the attractiveness of the area as a tourism destination is underestimated by the generic figure.

Increased impacts on air quality and noise

It is also worth noting that congestion has an impact on greenhouse gas emissions, air quality and noise, which are all factored in to the generic figure. These impacts are not just composed of emissions from the lorries themselves but also from the other vehicles which are forced to wait in traffic congestion caused by the presence of the lorries.

There is no reason to believe that the impact on air quality or noise along the alternative road transport route in Argyll should be greater or less than the generic impact, however there may be an impact within the port communities due to queuing trucks.

Queuing trucks on delivery days

The trucks used to transport the timber by road would run fairly evenly over time. The trucks delivering timber to the piers do not spread out over time, but instead all arrive on the same day. There are reports of trucks queuing in the towns to unload timber. This is a particular problem in Ardrishaig, where the pier often operates at, or close to, its maximum capacity.

When these truck deliveries are clumped together in this way, it places significantly more strain on the infrastructure that they are using. Several trucks all arriving at once is likely to be more damaging than the same number of trucks spread over a longer period of time. Traffic can slow to standstill, causing further emissions and inconvenience.

Although the amount of additional damage caused by the clustering of delivery trucks is not easily quantifiable, it is almost certainly significant. This issue is reflected in comments received from consultees highlighting the problems caused by this rush of trucks in a single day.

5.3.3 Tourism

Comments on the impacts of the TimberLINK project on tourism, both within the port communities and in the region as a whole, were invited as part of the consultation exercise. In particular, the impacts of the service on tourism were discussed with Visit Scotland, the national tourism organisation for Scotland.

The Loch Lomond & The Trossachs area was granted National Park status in July 2002 to "safeguard an area of outstanding and diverse landscapes, habitats and communities, parts of which were coming under severe visitor and recreational pressures"[15]. This designation will serve both to promote this area as a tourist destination and to protect it against the increased pressures that may bring. During consultation, the National Parks Authority expressed their support for the TimberLINK service, stating that they were very much in favour of initiatives to get timber trucks off the roads within the National Park, particularly as there are two forest parks within the National Parks boundary and that the volumes of timber transported out of and through these is likely to increase in the future.

The alternative road transport route that would be used in the absence of the TimberLINK service passes through the National Park on the A83 from Inveraray to Talbot and then on the A82 down the west edge of Loch Lomond. Visit Scotland said that the most noticeable impact of the TimberLINK service was the removal of timber lorries from the tourist roads to the north and east of Glasgow. Visit Scotland felt that this would have an impact on return tourism, as

"visitors are more likely to come back if they don't spend their trip stuck behind a lorry".

The other impact mentioned by Visit Scotland, and a number of other consultees, was that of the timber piers. These were mentioned as a positive feature of the project, forming part of the attraction for tourists rather than conflicting with it. It was noted that people like to see a working harbour and take time to watch the working piers operate.

Pleasure yachting is an important part of the tourism industry in the Argyll area. The other main impact on tourism that has been noted by consultees is the potential conflict on marinas where timber operations are carried out at the same site. However, comments were always accompanied with reference to how well managed the potential conflict was, particularly mentioning the "log retrieval service" which ensures that the water around the timber handling facilities is kept clear of stray logs which occasionally slip into the water. Left un-dealt with these could present a serious hazard to yacht and other waterborne traffic. The development and expansion of marina facilities is a key part of the regeneration plans for the port areas and as such it is important that potential conflicts between these two uses are carefully managed.

[15] http://www.lochlomond-trossachs.org

A negative impact that has been mentioned by consultees which has a potential effect on tourism is the bark debris which is sometimes left on the roads near the port facility after a timber ship has left. Although minor, this still has an effect on the attractiveness of the area.

The overall view prevailing among the people and organisations involved in the consultation is that removing the TimberLINK service would have a significant net negative effect on tourism in the area.

Visit Scotland were very positive about the TimberLINK service and its benefits to tourism and stated that they “really want the service to be sustained”.

6. THE ENVIRONMENTAL VALUE OF THE TIMBERLINK PROJECT

An environmental value for the TimberLINK service has been calculated, taking into account the factors analysed and discussed above.

A starting point for this value has been to estimate the benefit using two existing tools that analyse the benefits of removing lorries from the road network.

- Sensitive Lorry Miles (SLM). The SLM calculation methodology, produced by the DfT, quantifies the benefit of shifting freight from road to rail or water. This method was used in the past for calculating grants for schemes that remove lorries from the road, including Freight Facilities Grant (FFG) and the Rail Environmental Benefit Procurement Scheme (REPS) and the Waterborne Freight Grant (WFG).
- Mode Shift Benefit Values. The Mode Shift Benefit Values are the DfT's replacement for Sensitive Lorry Miles, following a review of the previous methodology, and will come into effect from 2010. They are designed to help assess the benefits of removing lorry miles from roads, and instead moving freight by water or rail.

Section 6.1 assesses the historical benefit based on the Sensitive Lorry miles methodology. Section 6.2 estimates the benefits using the new MSB methodology, to assess how benefits would be assessed in future. Both of these methodologies are based on 'average' roads, and therefore in Section 6.3 an analysis of these values is combined with factors to describe the local situation, and an overall Environmental Value for the TimberLINK service is calculated.

6.1 Sensitive Lorry Miles

Sensitive Lorry Miles values consider the net value of removing a lorry from the road network. They take into account the effects on congestion, accidents, noise, pollution, climate change, infrastructure and other road costs (a catch all category of smaller but significant factors, such as reduced cycling caused by fear of accidents with lorries, water pollution, and so on), as well as factoring in the costs of transport by rail or water, and the loss in tax revenues.

These values are designed to represent the average benefit – they make assumptions about the nature of the shipping/rail journey that replaces the lorry traffic and the length of the shipping leg and distribution legs, and apply an average value to both the congestion on a particular type of road and the characteristics of the lorry.

Only certain defined categories of road are considered. The road categories recognised in calculating Sensitive Lorry Mile values are:

- Low Congested Motorway
- Medium Congested Motorway
- High Congested Motorway
- Conurbation – Trunk and Principal

- Conurbation – Other
- Rural and Urban – Trunk and Principal
- Rural and Urban – Other

Roads that are significantly different from the average road in a particular category may not be allocated values that accurately reflect the benefits of removing lorry freight. The situation on the west coast of Scotland may not be typical, and so the benefit suggested by the Sensitive Lorry Mile values will not necessarily be a true reflection of the benefits accrued in the real world. The SLM values provide a useful 'broad brush' picture of what the benefits are, assessed under DfT guidelines.

Table 6.1: shows the overall benefits of removing lorry miles from the road network through the TimberLINK project, as calculated using the Sensitive Lorry Mile values. Each lorry would travel back along the same route after making the delivery so the final SLM value for the trucks is twice that of a single leg.

Table 6.1: Overall benefit of shifting lorry miles via the TimberLINK project

Road leg	Benefit per Lorry (£)	Benefit per year			
		2006/07	2007/08	2008/09	2009/10
Campbeltown to Ardrishaig	26.34	12,360	17,170	6,258	70,971
Ardrishaig to Inveraray	13.94	51,596	54,504	39,223	60,449
Inveraray to J A83 A815	5.83	21,578	22,795	16,404	25,281
Portavadie to J A815 A886	13.42	1,101	273	3,534	0
Sandbank to J A815 A886	8.32	2,040	3,509	2,902	5,521
J A815 A886 to J A83 A815	5.13	1,679	2,268	3,140	3,404
J A83 A815 to M898	22.33	89,958	97,178	76,500	111,650
M898 to J24 of M8	1.26	5,051	5,464	4,317	6,300
M8 J24 to J4 M77	2.09	8,379	9,064	7,160	10,450
J4 M77 to J A77 A71	6.81	27,301	29,533	23,330	34,050
J A77 A71 to Caledonian and Mairs	4.41	4,798	6,120	5,653	6,491
J A77 A71 to Adam Wilsons	6.07	12,012	11,378	8,948	13,690

J A77 A71 to Egger (A76)	6.38	6,010	6,856	4,273	8,121
Total Benefit (one way) (£)	**-**	**243,865**	**266,111**	**201,642**	**356,378**
Total Benefit (both ways) (£)	**-**	**487,731**	**532,222**	**403,285**	**712,755**
Total benefit £ per tonne of timber transported	**-**	**4.8**	**4.9**	**4.7**	**5.7**

The total benefit of shifting lorry miles is highest in 2009/10 because of the greater volume of timber shipped in this period. The benefit per tonne of timber transported is also highest for 2009/10 – this is because a greater proportion of the lorry miles 'saved' would have been travelled on rural trunk roads, and there is a greater value to removing these lorry miles than those travelled on uncongested motorways.

It is worth noting that in the Mode Shift Benefit methodology, which will replace Sensitive Lorry Miles from April 2010, the guide recommends separate evaluations by mode where the road and water trips vary by more than 10%. This would apply to TimberLINK.

The SLM values do not necessarily accurately represent the specific situation in Argyll and the TimberLINK project, however they are still illustrative of the benefits that might be accrued through the removal of timber trucks from the roads as a result of the project. The scale of these numbers is a strong suggestion that there is a significant environmental benefit as a result of the TimberLINK service.

6.2 Mode Shift Benefit values

The Mode Shift Benefit (MSB) values are the replacement for Sensitive Lorry Miles that will come into effect from 2010. They are designed to help assess the benefits of removing lorry miles from roads, and instead moving freight by water or rail.

They consist of four values, each of which is an estimate of the benefit of removing one lorry mile from a generic "average" road of a given type. The four types of road recognised in the Mode Shift Benefit values are:

- High value motorway
- Low value motorway
- A roads
- Other roads (B, C and Unclassified)

The values are derived by examining the benefits accrued from various factors, such as congestion, noise, air quality; as well as both the dis-benefits of rail or water freight, and the reduced tax revenue resulting from discouraging lorry freight.

Part of the methodology for Mode Shift Benefits involves the assumption that the alternative rail or water legs are similar in length to the road leg which is being replaced. In TimberLINK this is not the case, which means that all of the values

based on the Mode Shift Benefit values will be underestimates of the benefit of TimberLINK.

It is also necessary to calculate the impact of the distribution legs – that is, the journey that the freight takes by road to reach the rail or water terminus. This has been done for all of the values given in this report.

Estimates have been prepared of the MSB values for the TimberLINK service – that is, what the MSB methodology evaluates the benefit of the shift in freight transport patterns caused by the TimberLINK project to be. These values are shown in Table 6.2: and Table 6.3: The values in Table 6.3: are net values, taking into account the dis-benefits of the additional road legs required at either end of the sea shipping. They do not take account of the fact that the sea leg of the TimberLINK service is shorter than the alternative road route – this means they are likely to be underestimates of the true benefit.

Table 6.2: MSB values broken down by factor and road type

	Contribution (pence/km)			Percentage Contribution		
Factor	**Motorways**	**A-roads**	**Other**	**Motorways**	**A-roads**	**Other**
Congestion	15.0	47.2	53.0	344%	103%	60%
Accidents	0.3	3.5	3.5	7%	8%	4%
Noise	3.7	4.5	5.7	86%	10%	6%
Pollution	1.1	2.1	2.4	26%	4%	3%
Climate Change	2.2	2.6	2.6	51%	6%	3%
Infrastructure	2.9	6.7	42.7	67%	15%	48%
Other (road)	4.0	4.0	4.0	91%	9%	4%
Taxation	-21.4	-20.9	-21.6	-493%	-45%	-24%
Rail or Water costs	-3.5	-3.5	-3.5	-81%	-8%	-4%
Total	**4.3**	**46.1**	**88.6**	**100%**	**100%**	**100%**

Table 6.3: MSB values for the TimberLINK service broken down by factor and road type

Factor	Motorways (contribution in £)				A Roads (contribution in £)				Other Roads (contribution in £)			
	2006/07	2007/08	2008/09	2009/10	2006/07	2007/08	2008/09	2009/10	2006/07	2007/08	2008/09	2009/10
Congestion	52,753	57,066	45,080	65,793	564,575	613,473	459,654	846,575	-20,442	-23,976	-13,913	-28,323
Accidents	1,094	1,184	935	1,365	42,399	46,071	34,519	63,577	-1,344	-1,576	-914	-1,862
Noise	13,134	14,207	11,223	16,380	53,557	58,195	43,604	80,308	-2,183	-2,561	-1,486	-3,025
Pollution	3,940	4,262	3,367	4,914	24,547	26,673	19,985	36,808	-912	-1,069	-621	-1,263
Climate Change	7,880	8,524	6,734	9,828	31,241	33,947	25,435	46,846	-1,008	-1,182	-686	-1,396
Infrastructure	10,288	11,129	8,791	12,831	80,335	87,293	65,405	120,461	-16,483	-19,332	-11,219	-22,838
Other (road)	14,009	15,154	11,971	17,472	47,606	51,729	38,759	71,384	-1,536	-1,801	-1,045	-2,128
Taxation	-75,518	-81,692	-64,533	-94,185	-249,930	-271,577	-203,483	-374,768	8,350	9,793	5,683	11,569
Rail or Water costs	-12,477	-13,497	-10,662	-15,561	-42,399	-46,071	-34,519	-63,577	1,368	1,604	931	1,895
Total	**15,322**	**16,575**	**13,094**	**19,110**	**550,442**	**598,116**	**448,148**	**825,383**	**-34,310**	**-40,241**	**-23,352**	**-47,538**

The negative values arise for two reasons. Firstly there is a cost associated with rail and water transport and a cost associated with lost tax revenues, which are shown as a dis-benefit to shifting freight transport to these modes. Secondly the distribution legs between the forests and the piers, and between Troon and the customers, have more lorry miles on 'Other roads' than the replacement timber trucks would, so the contribution from 'Other roads' is negative.

The total Mode Benefit Shift values are given in Table 6.4: below – estimated to be nearly £800,000 benefit in 2009/10. The total benefit of shifting lorry miles is highest in 2009/10 because of the greater volume of timber shipped in this period. The benefit per tonne of timber transported is also highest for 2009/10 – this is because a greater proportion of the lorry miles 'saved' would have been travelled on rural trunk roads, and there is a greater value to removing these lorry miles than those travelled on uncongested motorways.

Table 6.4: Total Mode Shift Benefit values for the TimberLINK service

	MSB values (£)			
Road type	**2006/07**	**2007/08**	**2008/09**	**2009/10**
A Road	550,442	598,116	448,148	825,383
Motorway	15,322	16,575	13,094	19,110
Other	-34,310	-40,241	-23,352	-47,538
Total benefit per year (£)	**531,455**	**574,450**	**437,889**	**796,955**
Total benefit £ per tonne of timber transported	**5.3**	**5.3**	**5.1**	**6.4**

6.3 An Environmental Value for the TimberLINK project

The Mode Shift Benefit values calculated in Section 6.2 above form a useful starting point from which to calculate the environmental value of the TimberLINK service.

There MSB values are based on the assessment of an average situation. There are a number of ways in which the TimberLINK project is likely to vary from this average situation:

Distance travelled
The MSB calculations assume that the distance travelled by rail/ship is equal to the distance previously travelled by road. For the TimberLINK service this is not the case, with the shipping distances being significantly shorter than the road journeys they replace.

To allow for this the Mode Shift Benefit values calculated above have been adjusted to account for the additional distance 'saved' by the shorter operational distance of the TimberLINK service.

The differences in the total net distances travelled each year between the two modes - the road haulage route, and shipping via TimberLINK - have been calculated.

According to the MSB methodology, for each mile that the timber is shipped, a dis-benefit of 5.7p is incurred. The MSB values have therefore been corrected at a rate of 5.7p per mile, to allow for the difference in distance travelled. The adjusted MSB values are presented in Table 6.5: below.

Table 6.5: Mode Shift Benefit values for the TimberLINK service – adjusted to allow for the difference in distance travelled

Road type	MSB values (£)			
	2006/07	2007/08	2008/09	2009/10
Total benefit - unadjusted(£)	531,455	574,450	437,889	796,955
Benefit from additional distance 'saved' (£)	52,881	57,323	43,985	76,391
Total benefit per year (£)	**584,335**	**631,774**	**481,874**	**873,346**
Total benefit £ per tonne of timber transported	**5.83**	**5.83**	**5.63**	**6.99**

Having adjusted the Mode Shift Benefit calculations for distance means that the benefit can be calculated on a port by port basis, as shown in Table 6.6: below.

Table 6.6: Mode Shift Benefit values for the TimberLINK service by port

Road type	MSB values (£)			
	Ardrishaig	Campbeltown	Portavadie	Sandbank
Road distance (km)	18597	26012	18366	16528
Shipping distance (km)	74	63	56	57
Total benefit per ship (£)	**7,453**	**11,126**	**7,584**	**6,429**
Total benefit £ per tonne of timber transported	**6.21**	**9.27**	**6.32**	**5.36**

Tourism

Tourism is one of Scotland's largest business sectors, providing direct employment for 200,000 people and generating visitor spending of more than £4 billion a year[16]. The MSB calculations do not take into account the financial impacts on tourism. The benefits to tourism, whilst not easy to quantify in monetary terms, are thought to be very significant, as discussed in Section 3.3.

Congestion

The MSB values include an estimate of the value of the reduction in congestion as a result of shifting fright from road to an alternative mode. Details of the value the MSB methodology places on congestion are given in Section 5.3.2 of this report. However, the MSB values are calculated based on a typical road of a particular type. The A

[16] http://www.scotland.gov.uk/Topics/Business-Industry/Tourism

roads in the Argyll area are narrow compared to many A-roads, with limited opportunities for overtaking, and therefore the congestion costs are likely to be higher than those accounted for in the MSB calculations. This may not be a significant consideration but is worth bearing in mind when considering the environmental value of the service.

Upper and lower bound

An upper and lower bound for the Environmental Value have been derived by considering the operational situation in which most lorry miles are saved and the operational situation in which least lorry miles are saved.

The upper bound has been calculated assuming that all timber is taken from Campbeltown to Adam Wilson & Sons, and the lower bound has been calculated assuming that all timber is taken from Ardrishaig to Egger. These calculations have been carried out using the predicted timber volume for 2009/10. The upper and lower bound values are given in below.

The table also shows the Environmental Value of the service were the volume of timber to be doubled.

Table 6.7: Upper and Lower bound for the Environmental Value of the TimberLINK service

	MSB values (£)		
Road type	**Upper bound**	**Lower bound**	**Double volume**
Quantity of timber transported (tonnes)	125000	125000	250000
Route	Campbeltown to Adam Wilson & Sons	Ardrishaig to Egger	Campbeltown to Adam Wilson & Sons
Total benefit /year (£)	1,158,959	534,726	2,317,918
Total benefit £ per tonne of timber transported	9.27	4.28	9.27

The table shows that at the current operating capacity (2009/10 data) the maximum environmental value is approximately £1.2 million per year, equivalent to a benefit of £9.27 per tonne of timber transported via the TimberLINK service. The minimum environmental value is less than half of this value - approximately £535,000 per year, equivalent to a benefit of £4.28 per tonne of timber transported via the TimberLINK service.

An increase in the tonnages shipped increases the total value of the service per year, but does not have any impact on the benefit per tonne of timber transported.

7. EXPANSION OF THE TIMBERLINK SERVICE

The TimberLINK service is generally perceived in a positive way by the operators involved in running the service, the customers using the service and the communities in which the service operates. As identified above, the service brings a number of benefits to the environment and local communities. The study team have been asked to consider the impacts of extending the service to cover additional ports. The possible effects on the local and national environment should the TimberLINK service be expanded have been considered for two ports:

- Craignure on the Isle of Mull.
- Creetown, approximately 65 miles to the south of Troon.

No details were available about the sources of timber in each location or the likely proportion of timber that would go to each customer, and therefore the comparison has been made for the port-to-port section of the route only to provide an approximate analysis of the likely benefits and impacts. There is no road route from Craignure on Mull, as all timber would have to leave the island by vessel in order to be taken elsewhere. For the purposes of this comparison the road distance from Oban has been used.

Demand and practicability

Consultees were asked about the possible demand for the extension of the service to the ports under consideration. One of the main customers of the existing TimberLINK service, Adam Wilson and Sons, stated that they were keen to expand their business and that the expansion of TimberLINK could help them to do this. Their mill needs 250,000 tonnes/year to run, and they would like to get as much of this timber through TimberLINK as possible. UPM Kymenne operate a CHP plant at their Caledonian paper site, which takes 300-400,000 tonnes of biomass per year. In the past few months they have begun to use the TimberLINK service to transport biomass from West Argyll, and have stated that any extension of the service would create more opportunity for them to bring fuel from elsewhere on the west coast.

Other potential routes suggested for timber from Mull were Fort William and Inverness. There are local customers, for example the Kilmallie sawmill at Fort William and there is also a new CHP plant in Fort William which might be a suitable destination for brash.

Carbon reduction

The method used in section 5.1 has been applied to timber transport by boat and by road from each of the ports listed above to compare the carbon emissions by road with those by boat for each of the three journeys.

In each case the comparison has been calculated for 1200 tonnes timber – equivalent to 1 vessel load, or 48 truck loads. The total CO_2 saving per vessel load, and the net reduction per tonne of timber transported for each port, is given in Table 7.1: below. Note that the values given include emissions from both the outward and return journey, and that the values for the TimberLINK service include emissions from the loading and unloading of the timber.

Table 7.1: Comparison of CO_2 emissions from timber transport via shipping and road routes

Route	Total CO_2 emissions (tonnes)			Total CO_2 (kg) per tonne timber transported		
	shipping	by road	Total net reduction	shipping	by road	Total net reduction
Craignure - Troon	12838	17165	4327	10.7	14.3	3.6
Creetown - Troon	11055	8926	-2129	9.2	7.4	-1.8

Table 7.2: below gives the breakeven point at each port whereby the carbon emissions for transporting each tonne of timber would be equal by road or via TimberLINK.

Table 7.2: The carbon breakeven point for the TimberLINK service

Route	Breakeven capacity	Breakeven capacity - timber (tonnes)
Craignure - Troon	75%	900
Creetown - Troon	124%	1488

The tables above show that neither of the new routes under consideration would be as carbon efficient as those currently in use, however there would be a carbon benefit on the Craignure – Troon route . For Creetown there is no carbon benefit, as the carbon emissions would be greater if the TImberLINK service were used. This is because the distance travelled by the timber vessel would not be shorter than the road route, and taking this into account, together with the emissions from loading and unloading the vessel, results in a net negative benefit.

Disruption to communities

The analysis of local impacts at each of the TimberLINK ports showed that the operation of the TimberLINK service has very little net impact on the communities at the port locations. If the service were to be extended to cover additional ports it is unlikely that there would be any significant impact on the local community. The local community does suffer some inconvenience due to the service, mostly as a result of trucks queuing to unload. If the service were to be extended then the piers would not necessarily need to be located within community areas. Instead new piers, possibly floating ones, could be built instead and there is potential for these to be away from local communities.

The analysis of regional impacts did identify that the TimberLINK service brought benefits to the road based communities, in terms of a reduction in congestion and possible improvements in tourist access and the tourist experience. There will also be benefits in terms of reduced road damage along existing timber transport routes. Any extension of the service would remove timber trucks from the roads and therefore increase these types of benefit.

Mode Shift Benefit Values

The routes from each of the two expansion ports have been analysed and broken down into road types. From these data Mode Shift Benefit values have been calculated for timber from each of the two ports

As the quantity of timber which would be transported from each port is unknown, these MSB values are presented as values per shipload of timber. The assumption made is that 48 lorry loads constitute one shipload. The additional road links at either end of the journey have been discarded, as it is unlikely that all the customers would expand consumption proportionately should the TimberLINK service expand, and it is felt that apportioning the timber between customers would offer no insight.

Table 7.3: and Table 7.4: below show the total MSB value for the alternate road routes from each of the two potential expansion ports to Troon. The benefit values shown are for 48 lorries performing a two-way trip, from port to Troon and back again.

By scaling up these values based on the amount of timber that would be expected to be transported from each of these ports an estimate of the total MSB value could be found for any proposed scale of timber transport from these ports sufficient that the TimberLINK boat would always sail full.

Table 7.3: The MSB value for Creetown

Creetown	Distance km (one way)	Benefit/mile (pence)	Benefit for 48 lorries
A roads	99.3	74	£4,383
B roads	4.8	143	£412
		Total	**£4,795**

Table 7.4: The MSB value for Oban

Oban	Distance km (one way)	Benefit/mile (pence)	Benefit for 48 lorries
Motorways	43.9	7	£183
A roads	154.0	74	£6,799
B roads	4.8	143	£412
		Total	**£7,394**

The Mode Shift Benefit values are designed to help assess the benefits of removing lorry miles from roads, and instead moving freight by water or rail. Most of the timber from Mull currently goes to the export market - to Scandanavia or Ireland by boat. The prohibitive cost of ferrying the timber off Mull means that this timber does not currently go to the UK market. Therefore although operating the TimberLINK service would give the UK market access to this timber it would not in reality remove any timber lorries from the roads between Oban and Troon and so it may not be appropriate to consider the Mode Shift Benefits in this case.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

Carbon Dioxide

Climate Change is one of the biggest challenges facing mankind today. For this reason, reducing the emission of greenhouse gases is an important environmental activity. The TimberLINK service reduces the amount of CO_2 that is emitted compared to the alternative road haulage option. This reduction varies from year to year with the amount of timber shipped and the change in the distribution of timber between the origin points and between the destinations. The maximum carbon saving is seen in 2009/10, when the service is estimated to save 1245 tonnes of carbon dioxide, equivalent to 10.0kg CO_2 saved per tonne of timber transported.

Local Impacts

The TimberLINK service carries a range of local impacts, both positive and negative. On the positive side the service takes timber trucks away from the roads that run through small rural communities, reducing severance in these communities. In addition timber operations are thought to improve the economy of the local area, increasing revenue in local shops. However, some visual intrusion is caused by the bark that is sometimes left scattered around the roads near the piers. The impacts on noise and air quality were found to be minor. A similar number of people are likely to be annoyed due to noise regardless of whether the timber is shipped through TimberLINK or the alternative road route. In terms of air quality, although emissions from the traffic to the piers and from Troon affects more people than the alternative option, there is a greater reduction in pollutant concentrations for those people living along the alternative road haulage route.

The service also has a potential impact on regeneration in the pier towns and in Troon. This impact is not currently thought to be large. Regeneration plans may include increasing the maritime leisure use of the waterfront in the town. This potential conflict is currently well managed; the log retrieval service was mentioned by several consultees as an important factor in this.

Regional Impacts

It was found that the TimberLINK service reduces maintenance costs by a significant amount on the roads that would otherwise be used to transport the timber. This amount varies by road, and also by the characteristics of existing truck traffic. Using a reasonable estimate of the existing truck characteristics, the reduction in damage caused by vehicles is estimated at an average of 3.4%.

One of the most valuable impacts of removing lorries from the roads is reduced congestion. A total benefit via removing congestion of £884,045 was estimated for 2009/10, but the actual benefit is likely to be higher than this, due to the nature of the roads on which the alternative route would operate.

There is also a regional impact on tourism. Consultation with Visit Scotland, and with other consultees has revealed that the piers and boat are attractive to tourists, with people stopping to watch operations. In addition there is thought to be a large benefit to tourism from removing timber lorries from roads, improving the experience of visitors to Argyll. A negative impact on tourism is the visual impact of the bark left on roads near the piers on loading days. Visit Scotland were very positive about the TimberLINK service and its benefits to tourism and stated that they "really want the service to be sustained".

Environmental Value

The environmental benefit accruing from the TimberLINK project over the four years ranged from £481,874 for 2008/09 up to £873,346 for 2009/10. This is a lower estimate of the value, as there are several benefits which could not be reliably monetised, but which are thought to have significant impact. The figure does not include tourism or the increased impact of congestion on narrower than typical roads. The environmental benefit varies depending on the port used, and an upper and lower bound for the service have been calculated to allow for this variation. Using the predicted timber volume for 2009/10 gives an upper bound of £1,158,959 and a lower bound of £534,726. The total benefit per tonne of timber transported ranges from £4.28/tonne to £9.27/tonne.

Expanding the service

The study team were asked to include an assessment of the potential effects on the local and national environment of expanding the service to operate from Creetown and the Isle of Mull. A potential benefit has been found for the Isle of Mull service, but it is less significant than for the existing operations. Expansion to Creetown was found to offer no environmental benefits. Considerations for any expansion of the project have been highlighted in the recommendations below.

8.2 Recommendations

The outcomes of the study show that there is a significant net environmental benefit resulting from the operation of the TimberLINK service. Furthermore there is a very high level of acceptance and support for the service in the area; this support includes stakeholders involved in operating and using the service; local communities and the tourism industry. The study has shown, however, that there are some local environmental costs within the port communities. There are few complaints about the service, however in light of the potential to increase timber transport in the future it is worth addressing these issues to reduce these negative impacts. Measures to mitigate against these impacts have been included in the study recommendations below.

- **Increase Timber Storage at the piers**

Due to limited storage capacity at the piers timber is usually loaded directly onto the timber vessel, and therefore lines of trucks can be seen in the pier towns on loading days, queuing to deliver timber. Where possible, consideration should be given to

improving and increasing the timber storage at the ports, to allow lorries more time to unload. Spreading out the intensity of the loading activity would reduce queuing and improve the efficiency of the lorry journeys, as they would spend less time in the pier town.

- **Negotiate agreed loading hours at each pier**

A small number of complaints have been received as a result of noise from early loading at the piers. There does not appear to be any issue within the port communities about the noise of timber loading at any other time of the day. In Ardrishaig, British Waterways have negotiated with the local authority and the local community to agree loading hours, and it is recommended that the other port communities follow this example. The existing loading hours at each of the ports do not vary greatly from those agreed at Ardrishaig, however the negotiation process would allow local residents to discuss their views and raise any concerns. This process to agree loading hours would reduce the complaints about early loading, and ensure that the views of local residents were taken into account. The necessity to unload/load timber early in the morning could be reduced if there was additional storage space at the pier (see above).

- **Tidy up Bark**

One of the most frequent complaints was about the occasional times when the streets near the piers were littered with bark after the timber lorries had been through. The presence of discarded bark is an eyesore, and has an impact both on local residents and on the attractiveness of the town as a tourist destination. Consideration should be given to either implementing a control procedure to reduce the amount of bark litter, or a clean-up service immediately after loading.

- **Maintain Log retrieval service**

The log retrieval service has been mentioned by several consultees as an excellent or necessary part of allowing the close cohabitation between the timber pier and the marina. Logs in the water would present a serious hazard to yachts and other waterborne traffic and also provide a source of friction between the marina and the timber port. By maintaining and expanding the service this negative impact will continue to be minimised, and a strong case can be made that a timber pier and a marina can happily coexist, which will reduce the potential impact of TimberLINK on the regeneration plans of the specific communities in which it operates.

- **Extending the Service**

An extension to the service is likely to deliver further environmental benefits however the routes need careful consideration to ensure that they deliver environmental benefits. The routes considered here may not be the most or only routes suitable for an extension of the service, and other routes should be considered. Consideration of other routes could include routes with a different destination – i.e. not operating from Troon. In considering other potential routes for the TimberLINK operation it could be valuable to conduct a route feasibility study. This might include consultation with port operators and the forestry industry, to identify future harvesting locations, and with customers, to identify suitable destinations for the timber, together with an assessment of the environmental benefit of each route.

If the service is expanded, any new piers would be best sited away from communities, to avoid problems caused by early loading and to minimise problems caused by traffic disruption during shipping days.

Appendices

A1 APPENDIX 1 - SAMPLE QUESTIONNAIRES

A1.1 ABP Questionnaire

Section 1: Company Details

Company Name:	
Contact Name:	
Telephone number:	

Section 2: Road Transport from Logging Site to Port

1. For each of the TimberLINK ports, what is the average distance of timber transport from the logging site to the port?

2. By how much does this average distance vary depending on the harvest zone?

3. Is the average distance likely to change in the future as the harvest zones change? If so, what would you estimate the average distance to be over the next 5 years

   [more/less?; how significant are the differences in distance travelled?]

PORT	Current Average Distance	Variation due to logging zone	Likely changes in next 5 years
Ardrishaig			
Campbeltown			
Portavadie			
Sandbank			

4. Describe the route taken to transport the timber from the logging sites to each of the ports

Ardrishaig

Campbeltown

Portavadie

Sandbank

5. What is the total volume of timber transported into each of the ports per week as part of the TimberLINK operation?

6. How many timber trucks travel into each of the ports each per week as part of the TimberLINK operation?

PORT	Volume of timber (tonnes)	Trucks/Week
Ardrishaig		

Campbeltown		
Portavadie		
Sandbank		

7. During what hours is loading/unloading of timber carried out at the ports? (tick all that apply)

	Ardrishaig	Campbeltown	Portavadie	Sandbank
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0800				
0900				
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2200				
2300				

Section 3: Timber transport by sea

8. How much fuel does the ship use per nautical mile? Does this vary when loaded and unloaded?

	Loaded	Unloaded
Fuel Used per nautical mile		

9. For each of the TimberLINK ports, what is the distance travelled by the Red Baroness, when sailing to Troon and back?

10. How much fuel is used on average when making each of these journeys?

PORT	Fuel Used (outward - loaded)	Fuel Used (return - unloaded)	Distance (nautical miles)
Ardrishaig			
Campbeltown			
Portavadie			
Sandbank			

11. How often is timber collected from each port by boat as part of the TimberLINK service?

12. What is the average volume of timber transported per trip?

13. What is the total annual volume transported from each port?

Port	Sailings/Month	Average Load/Sailing	Total volume Tonnes/yr
Ardrishaig			
Campbeltown			
Portavadie			
Sandbank			

14. Do you have any further data about the fuel efficiency, or emissions from the Red Baroness?

Section 4: Road Transport from Troon pier to processor

15. What is the total volume of timber transported into Troon per week as part of the TimberLINK operation?

16. How many timber trucks travel into and out of Troon per week as part of the TimberLINK operation?

PORT	Volume of timber (tonnes)	Trucks/Week
Troon		

17. What is the total volume of timber transported to each processor (tonnes per year or percentage)

Processor	Timber/year

18. For each of the processors to which timber is taken from the Troon pier, what is the average distance of timber transport from the pier to the processor?

19. Describe the routes taken from Troon pier to each of the processors

Processor	Distance from Pier	Route

20. During what hours is loading/unloading of timber carried out at Troon? (tick all that apply)

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2200	
2300	

Section 5: The Alternative Road Haulage Option

21. If the TimberLINK service did not exist, what would the average distance of timber transport by road from forest to the processors be?

Average Distance

22. Would the average distance be likely to change in the future as the harvest zones change? If so, what would you estimate the average distance to be over the next 5 years

(More/less?; how significant are the differences in distance travelled?)

Likely changes in next 5 years

23. Which roads would be used to transport the timber from the forest to the processors if the TimberLINK service did not exist?

24. How many loaded timber trucks would generally travel along these roads per week?

Route/road	Trucks/week

25. Are there any factors that would influence the number of trucks used to replace the Timberlink service with road transport [above a simple calculation of (total timber/truck capacity)]?

    e.g Do trucks ever carry partial loads? Do trucks travel full from one forest zone to one processor or do they drop off and pick up enroute?

26. What is the typical fuel use of the timber trucks (loaded and unloaded)?

	Fuel use (mpg)
Loaded	
Unloaded	

Section 6: Extension of the TimberLINK service

27. If the TimberLINK service were to be extended to operate additional routes, how much timber would be likely to be transported on each of the following routes?

Route	Timber transported (tonnes/year)
Fort William to Troon	
Mull to Troon	
Creetown to Troon	

Section 7: TimberLINK and the local community

28. How do you feel that the operation of the TimberLINK service impacts on the local communities at Ardrishaig, Campbeltown, Portavadie, Sandbank and Troon?

Local amenity	
Noise	

Visual intrusion	
Air quality	
Tourism	
General comments:	

29. Are you aware of any regeneration plans for the local area around the ports? If so, does the TimberLINK operation help these plans? Are there any conflicts between the TimberLINK operation and any regeneration proposals?

General comments:

30. How do you feel that the operation of the TimberLINK service, and the removal of timber trucks from the road, has impacted on the local communities at Lochgilphead, Inverary and Arrochar?

Local amenity	
Noise	
Visual intrusion	
Air quality	
Tourism	
General comments:	

Thank you for your co-operation. Your comments and feedback are greatly appreciated.

A1.2 FOREST ENTERPRISE

Section 1: Company Details

Company Name:	
Contact Name:	
Telephone	

number:	

Section 2: Road Transport from Logging Site to Port

1. For each of the TimberLINK ports, what is the average distance of timber transport from the logging site to the port?

2. By how much does this average distance vary depending on the harvest zone?

3. Is the average distance likely to change in the future as the harvest zones change? If so, what would you estimate the average distance to be over the next 5 years

   [more/less?; how significant are the differences in distance travelled?]

PORT	Current Average Distance	Variation due to logging zone	Likely changes in next 5 years
Ardrishaig			
Campbeltown			
Portavadie			
Sandbank			

4. Please give any details available of future harvesting plans and how the harvest zones are likely to change in future.

5. Describe the route taken to transport the timber from the logging sites to each of the ports

Ardrishaig

Campbeltown

Portavadie

Sandbank

6. What is the total volume of timber transported into each of the ports per week as part of the TimberLINK operation?

7. How many timber trucks travel into each of the ports each per week as part of the TimberLINK operation?

PORT	Volume of timber (tonnes)	Trucks/Week
Ardrishaig		

Campbeltown		
Portavadie		
Sandbank		

8. During what hours is loading/unloading of timber carried out at the ports? (tick all that apply)

	Ardrishaig	Campbeltown	Portavadie	Sandbank
0000				
0100				
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0300				
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0500				
0600				
0700				
0800				
0900				
1000				
1100				
1200				
1300				
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1700				
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1900				
2000				
2100				
2200				
2300				

Section 3: Road Transport from Troon pier to processor

9. What is the total volume of timber transported into Troon per week as part of the TimberLINK operation?

10. How many timber trucks travel into and out of Troon per week as part of the TimberLINK operation?

PORT	Volume of timber (tonnes)	Trucks/Week
Troon		

11. What is the total volume of timber transported to each processor (tonnes per year or percentage)

Processor	Timber/year

12. For each of the processors to which timber is taken from the Troon pier, what is the average distance of timber transport from the pier to the processor?

13. Describe the routes taken from Troon pier to each of the processors

Processor	Distance from Pier	Route

14. During what hours is loading/unloading of timber carried out at Troon? (tick all that apply)

0000	
0100	
0200	
0300	
0400	
0500	
0600	
0700	
0800	
0900	
1000	
1100	
1200	
1300	
1400	
1500	
1600	
1700	
1800	
1900	
2000	
2100	
2200	
2300	

Section 5: The Alternative Road Haulage Option

15. If the TimberLINK service did not exist, what would the average distance of timber transport by road from forest to the processors be?

Average Distance

16. Would the average distance be likely to change in the future as the harvest zones change? If so, what would you estimate the average distance to be over the next 5 years

(More/less?; how significant are the differences in distance travelled?)

Likely changes in next 5 years

17. Which roads would be used to transport the timber from the forest to the processors if the TimberLINK service did not exist?

18. How many loaded timber trucks would generally travel along these roads per week?

Route/road	Trucks/week

19. Are there any factors that would influence the number of trucks used to replace the Timberlink service with road transport [above a simple calculation of (total timber/truck capacity)]?

    e.g Do trucks ever carry partial loads? Do trucks travel full from one forest zone to one processor or do they drop off and pick up enroute?

20. What is the typical fuel use of the timber trucks (loaded and unloaded)?

	Fuel use (mpg)
Loaded	
Unloaded	

Section 6: Extension of the TimberLINK service

21. Is timber currently transported by road from any of the following locations? If so, to what destinations/customers?

	Destinations
Fort William	
Mull	
Creetown	

22. How many loaded timber trucks travel along these routes per week?

23. What is the total volume of timber transported on each route per year?

24. What is the current average distance of timber transport by road from forest to the current processors

	No of trucks/week	Timber transported (tonnes/year)	Current Average Distance
Fort William			
Mull			
Creetown			

25. If the TimberLINK service were to be extended to operate additional routes, how much timber would be likely to be transported on each of the following routes?

Route	Timber transported (tonnes/year)
Fort William to Troon	
Mull to Troon	
Creetown to Troon	

Section 7: TimberLINK and the local community

26. How do you feel that the operation of the TimberLINK service impacts on the local communities at Ardrishaig, Campbeltown, Portavadie, Sandbank and Troon?

Local amenity	
Noise	
Visual intrusion	
Air quality	
Tourism	
General comments:	

27. Are you aware of any regeneration plans for the local area around the ports? If so, does the TimberLINK operation help these plans? Are there any conflicts between the TimberLINK operation and any regeneration proposals?

General comments:

28. How do you feel that the operation of the TimberLINK service, and the removal of timber trucks from the road, has impacted on the local communities at Lochgilphead, Inverary and Arrochar?

Local amenity	
Noise	
Visual intrusion	
Air quality	
Tourism	

General comments:

Thank you for your co-operation. Your comments and feedback are greatly appreciated.

A1.3 COMMUNITY COUNCILS

A1.3.1 In the Port Towns

Section 1: Council Details

Council Name:	
Contact Name:	
Telephone number or email	

Section 2: Introduction

The TimberLINK service, which began operation in Spring 2000, ships timber from four ports in Argyll (Adrishaig, Campbeltown, Portavadie and Sandbank) to the Port of Troon, Ayrshire. The TimberLINK service was established to enable the shift of timber freight from road transport to short-sea coastal shipping.

Section 3: Noise impacts

1. How do you feel that the operation of the TimberLINK service has impacted on the noise levels in your local community?

	Select

Noise levels have increased as a result of the service	
Noise levels are about the same as before the service began	
Noise levels have decreased as a result of the service	
Comments:	

2. Do you feel that there is noise from:

	No	Yes – some noise	Yes – moderate noise	Yes – a lot of noise
Port activities (e.g. loading ships)				
Timber traffic				
Comments:				

3. Who – if anyone - is affected by noise from loading/unloading of timber at the port?

[e.g. just people living very close to the port? Or a larger region? Are any nearby schools or offices/business disturbed? Approx how many people?]

4. During what hours do you feel that there is noise from loading/unloading of timber carried out at the port? (tick all that apply)

Time	No	Yes – some noise	Yes – moderate noise	Yes – a lot of noise
0000				
0100				
0200				
0300				
0400				
0500				

0600				
0700				
0800				
0900				
1000				
1100				
1200				
1300				
1400				
1500				
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1700				
1800				
1900				
2000				
2100				
2200				
2300				

5. Who – if anyone - is affected by noise from timber trucks travelling to and from the port?

[e.g. just people living on specific roads? If so which ones? Are any nearby schools or offices/business disturbed? Approx how many people?]

6. During what hours do you feel that there is noise from timber trucks travelling to and from the port? (tick all that apply)

Time	No	Yes – some noise	Yes – moderate noise	Yes – a lot of noise
0000				
0100				
0200				
0300				
0400				
0500				
0600				
0700				
0800				
0900				
1000				

1100				
1200				
1300				
1400				
1500				
1600				
1700				
1800				
1900				
2000				
2100				
2200				
2300				

Section 4: Traffic impacts on local roads (i.e. within the local community)

7. How do you feel that the operation of the TimberLINK service has impacted on traffic levels on local roads within the village/town?

	Select
Traffic levels have increased as a result of the service	
Traffic levels are about the same as before the service began	
Traffic levels have decreased as a result of the service	
Comments:	

8. How do you feel that the operation of the TimberLINK service has impacted on traffic congestion on local roads within the village/town?

	Select
Congestion has increased as a result of the service	
Congestion is about the same as before the service began	
Congestion has decreased as a result of the service	
Comments:	

Section 4: Traffic impacts on regional roads (i.e. to and from the locality)

9. How do you feel that the operation of the TimberLINK service has impacted on traffic levels on trunk or main roads that are used to travel to and from your village/town?

	Select
Traffic levels have increased as a result of the service	
Traffic levels are about the same as before the service began	
Traffic levels have decreased as a result of the service	
Comments:	

10. How do you feel that the operation of the TimberLINK service has impacted on traffic congestion on trunk or main roads that are used to travel to and from your village/town?

	Select
Congestion has increased as a result of the service	
Congestion is about the same as before the service began	
Congestion has decreased as a result of the service	
Comments:	

Section 5: Other local impacts

11. How do you feel that the operation of the TimberLINK service impacts on the following:

Local amenity	
The visual landscape at the port	
Air quality	
Tourism	
General comments:	

12. Are you aware of any regeneration plans for the local area? If so, does the TimberLINK operation help these plans? Are there any conflicts between the TimberLINK operation and any regeneration proposals?

13. Overall, how do you feel the TimberLINK service is generally viewed by the local community?

	Tick one
Positively	
Mostly positively	
Neither positively nor negatively	
Mostly negatively	
Negatively	
Comments:	

Thank you for your co-operation. Your comments and feedback are greatly appreciated.

A1.3.2 In the towns on the alternative road haulage route

Section 1: Council Details

Council Name:	
Contact Name:	
Telephone number or email	

Section 2: Introduction

The TimberLINK service, which began operation in Spring 2000, ships timber from four ports in Argyll (Adrishaig, Campbeltown, Portavadie and Sandbank) to the Port of Troon, Ayrshire. The TimberLINK service was established to enable the shift of timber freight from road transport to short-sea coastal shipping. Before the service began the timber was taken by road along the A83 and A82 towards Troon.

Section 4: Traffic impacts on local roads (i.e. within the local community)

1. How do you feel that the operation of the TimberLINK coastal shipping service has impacted on traffic levels on local roads within the village/town?

	Select
Traffic levels have increased as a result of the service	
Traffic levels are about the same as before the service began	
Traffic levels have decreased as a result of the service	
Comments:	

2. How do you feel that the operation of the TimberLINK coastal shipping service has impacted on traffic congestion on local roads within the village/town?

	Select
Congestion has increased as a result of the service	
Congestion is about the same as before the service began	
Congestion has decreased as a result of the service	
Comments:	

3. Does your community experience any problems or issues with timber trucks travelling through your town/village? If yes, please explain the nature of these problems.

Comments:

4. Do you feel that the operation of the TimberLINK coastal shipping service has impacted on any of these issues? If so in what way?

Comments:

Section 4: Traffic impacts on regional roads (i.e. to and from the locality)

5. How do you feel that the operation of the TimberLINK service has impacted on traffic levels on trunk or main roads that are used to travel to and from your village/town?

	Select
Traffic levels have increased as a result of the service	
Traffic levels are about the same as before the service	

began	
Traffic levels have decreased as a result of the service	
Comments:	

6. How do you feel that the operation of the TimberLINK service has impacted on traffic congestion on trunk or main roads that are used to travel to and from your village/town?

	Select
Congestion has increased as a result of the service	
Congestion is about the same as before the service began	
Congestion has decreased as a result of the service	
Comments:	

Section 3: Noise impacts

7. How do you feel that traffic noise levels in your local community have changed since the TimberLINK service began operation?

	Select
Noise levels have increased as a result of the service	
Noise levels are about the same as before the service began	
Noise levels have decreased as a result of the service	
Comments:	

8. Before the TimberLINK service began, during what hours did you feel that there was noise from timber trucks travelling through your town/village (tick all that apply)

Time	No	Yes – some noise	Yes – moderate noise	Yes – a lot of noise

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2000				
2100				
2200				
2300				

9. Before the TimberLINK service began who – if anyone - was affected by noise from timber trucks travelling through your town/village

[e.g. just people living on specific roads? If so which ones? Are any nearby schools or offices/business disturbed? Approx how many people?]

10. At the present time during what hours do you feel that there is noise from timber trucks travelling through your town/village (tick all that apply)

Time	No	Yes – some noise	Yes – moderate noise	Yes – a lot of noise
0000				

0100				
0200				
0300				
0400				
0500				
0600				
0700				
0800				
0900				
1000				
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1200				
1300				
1400				
1500				
1600				
1700				
1800				
1900				
2000				
2100				
2200				
2300				

11. At the present time who – if anyone - is affected by noise from timber trucks travelling through your town/village

[e.g. just people living on specific roads? If so which ones? Are any nearby schools or offices/business disturbed? Approx how many people?]

Section 5: Other local impacts

12. How do you feel that the operation of the TimberLINK service impacts on the following within your local community:

Local amenity	
Air quality	
Tourism	
General comments:	

13. Overall, how do you feel the TimberLINK service is generally viewed by the local community?

	Tick one
Positively	

Mostly positively	
Neither positively nor negatively	
Mostly negatively	
Negatively	
Comments:	

Thank you for your co-operation. Your comments and feedback are greatly appreciated.

A1.4 PIER OPERATORS

Section 1: Company Details

Company Name:	
Contact Name:	
Telephone number:	

Section 2: Timber transport into the port

1. What is the total volume of timber transported into each of the ports per week as part of the TimberLINK operation?

2. How many timber trucks travel into each of the ports each per week as part of the TimberLINK operation?

Volume of timber (tonnes)	Trucks/Week

3. During what hours is loading/unloading of timber carried out at the port? (tick all that apply)

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1900	
2000	
2100	
2200	
2300	

Section 3: Timber transport by sea

4. How often is timber collected from the port by boat as part of the TimberLINK service?

5. What is the average volume of timber transported per trip?

Sailings/Month	Average Load/Sailing

Section 4: TimberLINK and the local community

6. How do you feel that the operation of the TimberLINK service impacts on the local community at the port?

Local amenity	
Noise	
Visual intrusion	
Air quality	
Tourism	
General comments:	

7. Are you aware of any regeneration plans for the local area? If so, does the TimberLINK operation help these plans? Are there any conflicts between the TimberLINK operation and any regeneration proposals?

General comments:

Thank you for your co-operation. Your comments and feedback are greatly appreciated.

A1.5 CUSTOMERS

Section 1: Company Details

Company Name:	
Contact Name:	
Telephone number:	

Section 2: Road Transport from Troon pier to processor

1. What is the total volume of timber per year transported to your business from Troon, harbour via the TimberLINK service?

2. How many timber trucks travel from Troon pier to your business each week?

Volume of timber (tonnes)	Trucks/Week

3. What is the average distance from Troon pier to your business?

4. Describe the route taken from Troon pier to your business

Distance from Pier	Route

Section 3: Future plans and the extension of the TimberLINK service

5. What is your likely future demand for timber from the current TimberLINK ports?

   [increase/decrease; how much, for what reasons]
   [ask Caledonian paper about the brash for their CHP plant – likely volumes etc]

6. Do you currently receive timber transported from other sources (aside from via the TimberLINK service to Troon)?

7. If the TimberLINK service were to be extended to operate additional routes, would you have any demand for timber from these locations? If so how much timber would you be likely to receive?

Route	Timber demand (tonnes/year)
Fort William to Troon	
Mull to Troon	
Creetown to Troon	

Section 7: TimberLINK and the local community

8. How do you feel that the operation of the TimberLINK service impacts on the local communities in the Troon area?

Local amenity	
Noise	
Visual intrusion	
Air quality	
Tourism	
General comments:	

<u>Thank you for your co-operation.</u> Your comments and feedback are greatly appreciated.

A1.6 HAULIERS

Section 1: Company Details

Company Name:	
Contact Name:	
Telephone number:	

Section 2: Road Transport from Logging Site to Port

1. For each of the TimberLINK ports, what is the average distance of timber transport from the logging site to the port?

2. By how much does this average distance vary depending on the harvest zone?

3. Is the average distance likely to change in the future as the harvest zones change? If so, what would you estimate the average distance to be over the next 5 years?

   [more/less?; how significant are the differences in distance travelled?]

PORT	Current Average Distance	Variation due to logging zone	Likely changes in next 5 years
Ardrishaig			
Campbeltown			
Portavadie			
Sandbank			

4. Describe the route taken to transport the timber from the logging sites to each of the ports

Ardrishaig

Campbeltown

Portavadie

Sandbank

5. What is the total volume of timber transported into each of the ports per week as part of the TimberLINK operation?

6. How many timber trucks travel into each of the ports each per week as part of the TimberLINK operation?

PORT	Volume of timber (tonnes)	Trucks/Week
Ardrishaig		
Campbeltown		
Portavadie		
Sandbank		

7. During what hours is loading/unloading of timber carried out at the ports? (tick all that apply)

	Ardrishaig	Campbeltown	Portavadie	Sandbank
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0300				
0400				

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0800				
0900				
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1100				
1200				
1300				
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2200				
2300				

Section 3: Road Transport from Troon pier to processor

8. What is the total volume of timber transported into Troon per week as part of the TimberLINK operation?

9. How many timber trucks travel into and out of Troon per week as part of the TimberLINK operation?

PORT	Volume of timber (tonnes)	Trucks/Week
Troon		

10. What is the total volume of timber transported to each processor (tonnes per year or percentage)

Processor	Timber/year

11. For each of the processors to which timber is taken from the Troon pier, what is the average distance of timber transport from the pier to the processor?

12. Describe the routes taken from Troon pier to each of the processors

Processor	Distance from Pier	Route

13. During what hours is loading/unloading of timber carried out at Troon? (tick all that apply)

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0200	
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0400	
0500	
0600	
0700	
0800	
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1400	
1500	
1600	
1700	
1800	
1900	
2000	
2100	
2200	
2300	

Section 4: The Alternative Road Haulage Option

14. If the TimberLINK service did not exist, what would the average distance of timber transport by road from forest to the processors be?

Average Distance

15. Would the average distance be likely to change in the future as the harvest zones change? If so, what would you estimate the average distance to be over the next 5 years

(More/less?; how significant are the differences in distance travelled?)

Likely changes in next 5 years

16. Which roads would be used to transport the timber from the forest to the processors if the TimberLINK service did not exist?

17. How many loaded timber trucks would generally travel along these roads per week?

Route/road	Trucks/week

18. Are there any factors that would influence the number of trucks used to replace the Timberlink service with road transport [above a simple calculation of (total timber/truck capacity)]?

    e.g Do trucks ever carry partial loads? Do trucks travel full from one forest zone to one processor or do they drop off and pick up enroute?

19. What is the typical fuel use of the timber trucks (loaded and unloaded)?

	Fuel use (mpg)
Loaded	
Unloaded	

Section 5: Extension of the TimberLINK service

20. Is timber currently transported by road from any of the following locations? If so, to what destinations/customers?

	Destinations
Fort	

William	
Mull	
Creetown	

21. How many loaded timber trucks travel along these routes per week?

22. What is the total volume of timber transported on each route per year?

23. What is the current average distance of timber transport by road from forest to the current processors

	No of trucks/week	Timber transported (tonnes/year)	Current Average Distance
Fort William			
Mull			
Creetown			

24. If the TimberLINK service were to be extended to operate additional routes, how much timber would be likely to be transported on each of the following routes?

Route	Timber transported (tonnes/year)
Fort William to Troon	
Mull to Troon	
Creetown to Troon	

Section 6: TimberLINK and the local community

25. How do you feel that the operation of the TimberLINK service impacts on the local communities at Ardrishaig, Campbeltown, Portavadie, Sandbank and Troon?

Local amenity	
Noise	
Visual intrusion	

Air quality	
Tourism	
General comments:	

26. How do you feel that the operation of the TimberLINK service, and the removal of timber trucks from the road, has impacted on the local communities at Lochgilphead, Inverary and Arrochar?

Local amenity	
Noise	
Visual intrusion	
Air quality	
Tourism	

General comments:

Thank you for your co-operation. Your comments and feedback are greatly appreciated.

A1.7 SHIPPING

Section 1: Company Details

Company Name:	
Contact Name:	
Telephone number:	

Section 1: Timber transport by sea

1. How much fuel does the ship use per nautical mile? Does this vary when loaded and unloaded?

	Loaded	Unloaded
Fuel Used per nautical mile		

2. For each of the TimberLINK ports, what is the distance travelled by the Red Baroness, when sailing to Troon and back?

3. How much fuel is used on average when making each of these journeys?

PORT	Fuel Used (outward - loaded)	Fuel Used (return - unloaded)	Distance (nautical miles)
Ardrishaig			
Campbeltown			
Portavadie			
Sandbank			

4. How often is timber collected from each port by boat as part of the TimberLINK service?

5. What is the average volume of timber transported per trip?

6. What is the total annual volume transported from each port?

Port	Sailings/Month	Average Load/Sailing	Total volume Tonnes/yr
Ardrishaig			
Campbeltown			
Portavadie			
Sandbank			

7. Do you have any further data about the fuel efficiency, or emissions from the Red Baroness?

Section 2: Extension of the TimberLINK service

8. If the TimberLINK service were to be extended to operate additional routes, what ship(s) would be used to cover these routes? Do you have any further data about the fuel efficiency, or emissions from these ships?

Section 3: TimberLINK and the local community

9. How do you feel that the operation of the TimberLINK service impacts on the local communities at Ardrishaig, Campbeltown, Portavadie, Sandbank and Troon?

Local amenity	
Noise	
Visual intrusion	
Air quality	
Tourism	

General comments:

10. Are you aware of any regeneration plans for the local area around the ports? If so, does the TimberLINK operation help these plans? Are there any conflicts between the TimberLINK operation and any regeneration proposals?

General comments:

Thank you for your co-operation. Your comments and feedback are greatly appreciated.

A1.8 VISIT SCOTLAND

Section 1: Details

Organisation Name:	
Contact Name:	

Telephone number or email	

Section 2: Introduction

TimberLINK is a coastal shipping service, established to transport timber from four ports in Argyll (Ardrishaig, Campbeltown, Portavadie and Sandbank) to the port of Troon in Ayrshire. The timber is then transported onward to local wood processing plants such as Caledonian Paper in Irvine, Egger at Auchinleck and Wilson's Sawmill in Troon.

The service, which commenced in Spring 2000, is operated by Associated British Ports (ABP) with subsidy of up to £1million per annum from the Scottish Executive.

TimberLINK was established as essentially an environmentally friendly freight transport initiative, shipping approximately 100,000 tonnes of timber per annum, resulting in around 8,000 less lorry journeys (roughly 1,000,000 less miles) on busy local roads on the west coast of Scotland.

As part of the environmental benefits review we have been asked to consider, and quantify where possible, the benefits/dis-benefits to tourism as a result of the TimberLINK service.

Section 3: The TimberLINK service

1. Were you aware of the TimberLINK service before Forestry Commission Scotland and TTR contacted you about this study?

Comments:

Section 4: Tourism and traffic

2. Are there any towns, villages or tourist attractions within Argyll and Ayrshire where you feel that traffic levels or congestion are a problem for tourists?

Comments:

3. Do you feel that timber trucks travelling on roads within Argyll and Ayrshire have any impact on tourism in the area? If so, where and what type of impact?

Comments:

4. How do you feel that the operation of the TimberLINK service has impacted on traffic levels on trunk or main roads in Argyll and Ayrshire?

	Select
Traffic levels have increased as a result of the service	
Traffic levels are about the same as before the service began	
Traffic levels have decreased as a result of the service	
Comments:	

5. How do you feel that the operation of the TimberLINK service has impacted on traffic congestion on local roads in Argyll and Ayrshire?

	Select
Congestion has increased as a result of the service	
Congestion is about the same as before the service began	
Congestion has decreased as a result of the service	
Comments:	

6. How do you feel that the operation of the TimberLINK service has impacted on traffic levels on local roads in Argyll and Ayrshire?

	Select
Traffic levels have increased as a result of the service	
Traffic levels are about the same as before the service began	
Traffic levels have decreased as a result of the service	
Comments:	

7. How do you feel that the operation of the TimberLINK service has impacted on traffic congestion on local roads in Argyll and Ayrshire?

	Select
Congestion has increased as a result of the service	

Congestion is about the same as before the service began	
Congestion has decreased as a result of the service	
Comments:	

Section 5: Tourism at the ports

8. Is Ardrishaig a tourist destination?
What is the nature of the tourism in Ardrishaig? [who visits, why, what attractions are there or in the locality etc]
Do you feel that the TimberLINK service has had any impact on the tourist trade in/around Ardrishaig?

9. Is Campbeltown a tourist destination?
What is the nature of the tourism in Ardrishaig? [who visits, why, what attractions are there or in the locality etc]
Do you feel that the TimberLINK service has had any impact on the tourist trade in/around Campbeltown?

10. Is Portavadie a tourist destination?
What is the nature of the tourism in Ardrishaig? [who visits, why, what attractions are there or in the locality etc]
Do you feel that the TimberLINK service has had any impact on the tourist trade in/around Portavadie?

11. Is Sandbank a tourist destination?
What is the nature of the tourism in Ardrishaig? [who visits, why, what attractions are there or in the locality etc]
Do you feel that the TimberLINK service has had any impact on the tourist trade in/around Sandbank?

12. Is Troon a tourist destination?
What is the nature of the tourism in Ardrishaig? [who visits, why, what attractions are there or in the locality etc]
Do you feel that the TimberLINK service has had any impact on the tourist trade in/around Troon?

Section 5: Tourism and regeneration

13. Are you aware of any regeneration plans for the local area at the ports?
14. Will any of these plans promote or increase tourism?
15. If so, does the TimberLINK operation help these plans?
16. Are there any conflicts between the TimberLINK operation and any regeneration proposals?

17. Overall, how do you feel the TimberLINK service is generally viewed by tourists?

	Tick one
Positively	
Mostly positively	
Neither positively nor negatively	
Mostly negatively	
Negatively	
Comments:	

Thank you for your co-operation. Your comments and feedback are greatly appreciated.

A1.9 OTHER CONSULTEES

Section 1: Company Details

Company Name:	
Contact Name:	
Telephone number:	

Section 2: Road Transport from Logging Site to Port

1. For each of the TimberLINK ports, what is the average distance of timber transport from the logging site to the port?

2. By how much does this average distance vary depending on the harvest zone?

3. Is the average distance likely to change in the future as the harvest zones change? If so, what would you estimate the average distance to be over the next 5 years

   [more/less?; how significant are the differences in distance travelled?]

PORT	Current Average Distance	Variation due to logging zone	Likely changes in next 5 years
Ardrishaig			
Campbeltown			
Portavadie			
Sandbank			

4. Describe the route taken to transport the timber from the logging sites to each of the ports

[Note: Take maps for the Face-to-face interviews]

Ardrishaig

Campbeltown

Portavadie

Sandbank

5. What is the total volume of timber transported into each of the ports per week as part of the TimberLINK operation?

6. How many timber trucks travel into each of the ports each per week as part of the TimberLINK operation?

PORT	Volume of timber (tonnes)	Trucks/Week
Ardrishaig		
Campbeltown		
Portavadie		
Sandbank		

7. During what hours is loading/unloading of timber carried out at the ports? (tick all that apply)

	Ardrishaig	Campbeltown	Portavadie	Sandbank
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0800				
0900				
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2100				
2200				
2300				

Section 3: Timber transport by sea

8. How much fuel does the ship use per nautical mile? Does this vary when loaded and unloaded?

	Loaded	Unloaded
Fuel Used per nautical mile		

9. For each of the TimberLINK ports, what is the distance travelled by the Red Baroness, when sailing to Troon and back?

10. How much fuel is used on average when making each of these journeys?

PORT	Fuel Used (outward - loaded)	Fuel Used (return - unloaded)	Distance (nautical miles)
Ardrishaig			
Campbeltown			
Portavadie			
Sandbank			

11. How often is timber collected from each port by boat as part of the TimberLINK service?

12. What is the average volume of timber transported per trip?

13. What is the total annual volume transported from each port?

Port	Sailings/Month	Average Load/Sailing	Total volume Tonnes/yr
Ardrishaig			
Campbeltown			
Portavadie			
Sandbank			

14. Do you have any further data about the fuel efficiency, or emissions from the Red Baroness?

Section 4: Road Transport from Troon pier to processor

15. What is the total volume of timber transported into Troon per week as part of the TimberLINK operation?

16. How many timber trucks travel into and out of Troon per week as part of the TimberLINK operation?

PORT	Volume of timber (tonnes)	Trucks/Week
Troon		

17. What is the total volume of timber transported to each processor (tonnes per year or percentage)

Processor	Timber/year

18. For each of the processors to which timber is taken from the Troon pier, what is the average distance of timber transport from the pier to the processor?

19. Describe the routes taken from Troon pier to each of the processors

Processor	Distance from Pier	Route

20. During what hours is loading/unloading of timber carried out at Troon? (tick all that apply)

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2200	
2300	

Section 5: The Alternative Road Haulage Option

21. If the TimberLINK service did not exist, what would the average distance of timber transport by road from forest to the processors be?

Average Distance

22. Would the average distance be likely to change in the future as the harvest zones change? If so, what would you estimate the average distance to be over the next 5 years

(More/less?; how significant are the differences in distance travelled?)

Likely changes in next 5 years

23. Which roads would be used to transport the timber from the forest to the processors if the TimberLINK service did not exist?

24. How many loaded timber trucks would generally travel along these roads per week?

Route/road	Trucks/week

25. Are there any factors that would influence the number of trucks used to replace the Timberlink service with road transport [above a simple calculation of (total timber/truck capacity)]?

    e.g Do trucks ever carry partial loads? Do trucks travel full from one forest zone to one processor or do they drop off and pick up enroute?

26. What is the typical fuel use of the timber trucks (loaded and unloaded)?

	Fuel use (mpg)

Loaded	
Unloaded	

Section 6: Extension of the TimberLINK service

27. If the TimberLINK service were to be extended to operate additional routes, how much timber would be likely to be transported on each of the following routes?

Route	Timber transported (tonnes/year)
Fort William to Troon	
Mull to Troon	
Creetown to Troon	

Section 7: TimberLINK and the local community

28. How do you feel that the operation of the TimberLINK service impacts on the local communities at Ardrishaig, Campbeltown, Portavadie, Sandbank and Troon?

Local amenity	
Noise	
Visual intrusion	
Air quality	
Tourism	

General comments:

29. Are you aware of any regeneration plans for the local area around the ports? If so, does the TimberLINK operation help these plans? Are there any conflicts between the TimberLINK operation and any regeneration proposals?

General comments:

30. How do you feel that the operation of the TimberLINK service, and the removal of timber trucks from the road, has impacted on the local communities at Lochgilphead, Inverary and Arrochar?

Local amenity	
Noise	

Visual intrusion	
Air quality	
Tourism	
General comments:	

<u>Thank you for your co-operation.</u> Your comments and feedback are greatly appreciated.

A2 APPENDIX 2 – CARBON CALCULATION METHODOLOGY

The total carbon emissions were calculated for the operation of the TimberLINK service and for the alternative road haulage option.

For each of the road legs the emissions per trip were calculated using the following equation:

Emissions per trip = distance travelled (km) x no timber truck trips x CO_2 emission factor (kg/km)

An emission factor of 0.889 kg CO_2/km was used, based on a 50% loaded articulated truck over 33 tonnes. This allows for 100% loading for half the journeys and 0% loading for the other half.

For the shipping legs the emissions per trip were calculated in a similar way using the following equation:

Emissions per trip = distance travelled (km) x no timber boat trips x CO_2 emission factor (g/tonne km)

An emission factor of 20g CO_2/tonne km was used, based on a 'Small tanker' as this is the closest in weight categories to the timber barge, and represents a worst case.

The number of trips was calculated using information about the total volumes of timber transported to and from each location, as presented in Table 4.2: and Table 4.3:

A3 APPENDIX 3 - ROAD DAMAGE CALCULATION METHODOLOGY

The American Association of State Highway and Transportation Officials (AASHO) road tests in the late 1950s stated that to a good approximation, for reasonably firm roads, damage caused by vehicles increases as the fourth power of axle weight - that is, an axle carrying 2 tons will do (2x2x2x2) = 16 times as much damage as an axle weighing 1 ton. This has since become a commonly stated and used approximation, known as the 'fourth power law'. This law indicates that, because of their greater weight, heavy vehicles cause the vast majority of the vehicle damage to roads. For softer roads the increase of damage with axle weight tends even higher, to the 5th or 6th [17], so the 4th power approximation can be taken as a conservative estimate.

An important factor to consider in making road damage calculations is the proportion of damage caused by climate. Paterson (1986)[18] estimates that as much as 60% of road damage in the UK is caused by the weather, rather than by vehicles and in carrying out the road damage calculations it has therefore been assumed that 60% of infrastructure maintenance costs are caused by the weather, and the remaining 40% are attributable to traffic. Attributing 40% of infrastructure maintenance costs to vehicles according to axle weight gives an indication of the increase expected should the TimberLINK loads be transported by the alternative road haulage route instead.

The relative damage a vehicle does to the road is roughly approximated by

$$D = A \times \left(\frac{Gw}{A}\right)^4$$

Where

D = Damage
A = Number of Axles
Gw = Gross vehicle weight

The formula above has been used together with AADT (Average Annual Daily Traffic) flow data for the region[19] to estimate what the additional impact on road maintenance would be of additional timber trucks. The formula was used to calculate the impact of the existing heavy goods traffic, the existing 'other vehicle' traffic, and the potential traffic that would replace the TimberLINK service. For the 'other vehicle' calculations, a weight of 1.5 tonnes has been used, equivalent to a heavy car. These other vehicles range from pedal cycles to light goods vehicles, so it was felt that this was a reasonable approximation.

[17] A.M. Martin, P.M.O. Owende, M.J. O'Mahony, S.M. Ward - Estimation of the Servicability of Forest Access Roads Journal of Forest Engineering, July, 1999, vol.10 no.2

[18] W. D. O. Paterson, 'Distress Mechanisms, Maintenance and Cost', The World Bank, Transportation Department, 1986.

[19] http://www.dft.gov.uk/matrix/MapXtreme/NewMap.htm

By taking into account the cost associated with each section of road, and also considering the length of each section, it is possible to find a weighted average which describes the total impact on road maintenance costs were the TimberLINK trucks to instead travel on the alternative road haulage routes. A shorter section will contribute less to the overall impact than a long section, so the costs must be weighted by the length of road to which they apply.