A83 Rest and Be Thankful

DMRB STAGE 3 SCHEME ASSESSMENT REPORT - VOLUME 1 - TRAFFIC & ECONOMICS

Transport Scotland

09/12/24

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This document has 64 pages including the cover.

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5. Introduction

5.1. Note to Reader

5.1.1. Section 5 of this report provides context for reading through Section 6 - Traffic and Economic Assessment and Section 7 – Wider Economic Impacts. These sections have been copied from the LTS DMRB Stage 3 Scheme Assessment Report.

5.2. Introduction

5.2.1. The A83 Trunk Road is one of two east-west strategic trunk roads that connects Argyll and Bute to the central belt of Scotland, making it a vital link in the region's transportation infrastructure. The A83 is a 98 mile (158km) predominantly single carriageway road originating in Tarbet, where the A82 and A83 meets at the junction on the western side of Loch Lomond. It then terminates in Campbeltown, near the southern tip of the Kintyre Peninsula.

5.2.2. The section of the A83 through Glen Croe, between Ardgartan and the Rest and Be Thankful viewpoint at the A83/B828 junction includes the highest point along the A83 at approximately 265m above ordnance datum and the adjacent hillsides have a history of instability leading to frequent road closures and resultant diversion. The A83 as it passes through Glen Croe is shown in Figure 5-1, below.

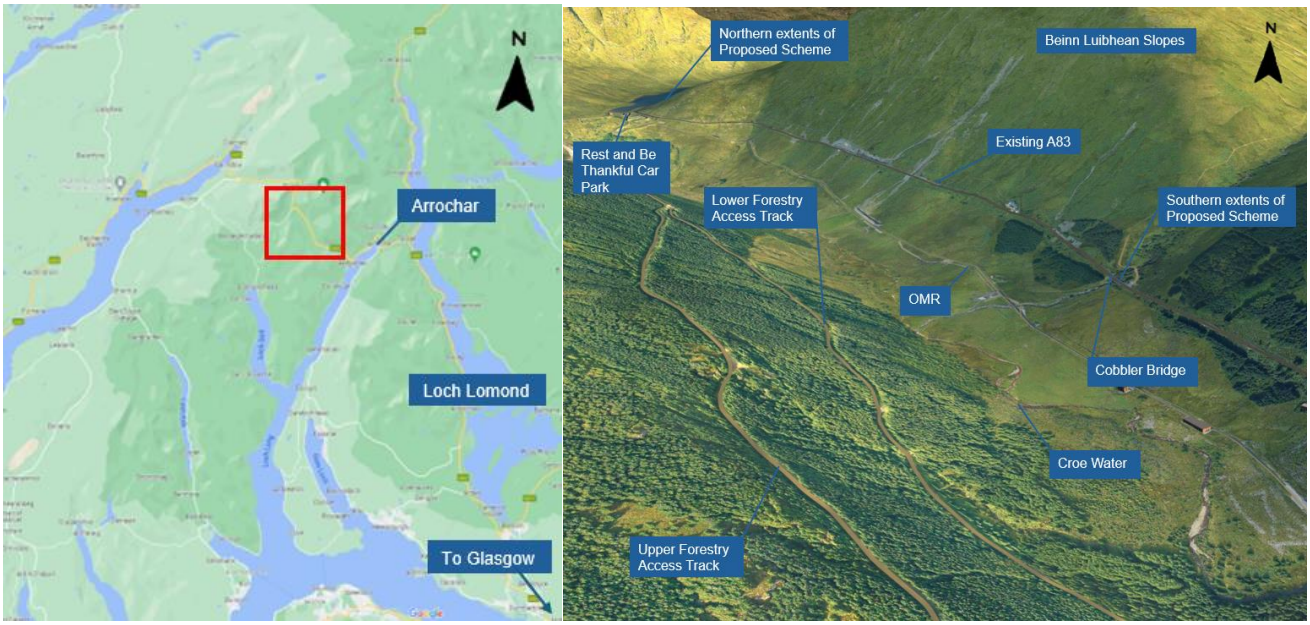

Figure 5-1 - Access to Argyll and Bute (A83) - Scheme Extents

5.2.3. In line with the recommendations of Strategic Transport Projects Review 2 (STPR2) and following major landslide events at the Rest and Be Thankful in August and September 2020, the largest recorded in the area, the then Cabinet Secretary for Transport, Infrastructure and Connectivity instructed Transport Scotland to investigate a long-term, resilient, and sustainable solution to the problem of landslides in Glen Croe. The Access to Argyll and Bute (A83) project team was commissioned with developing a resilient and sustainable road to Argyll and Bute to address the landslide issues at the Rest and Be Thankful.

5.2.4. The preferred corridor spans roughly six kilometres of the wider Glen Croe valley, starting from a point approximately 460m south-east of the intersection of the A83 and the Old Military Road (OMR), and generally following the A83 northward as it climbs through Glen Croe and past Loch Restil. The corridor ends at the eastern extent of Glen Kinglas near Butterbridge.

5.3. Scheme Overview

Current Situation

5.3.1. Since the 2020 landslides, the A83 has, at times, operated under signal control, and by convoy. Notwithstanding the engineering works undertaken to date to improve resilience along the A83, pre-emptive closures and diversion on to the OMR have remained necessary where the potential risk of landslide increases, often during or following heavy rainfall and increased saturation of the hillside. Use of the longer diversion via Dalmally is infrequently used. As rainfall increases year on year due to climate change both with respect to duration and intensity, landslides at RaBT may become more common, posing a greater threat to the connectivity that the A83 provides.

Landslide Events

5.3.2. Up until 2020, closures of the RaBT section of the A83 were occasional; around once per year and would last for on average 5 days.

5.3.3. 2020 was subject to the two worst landslides experienced in the area in terms of their impact on the operation of the A83. The first landslide occurred in August 2020 and split into two channels, one which was caught by the catch fences implemented by BEAR Scotland while the other moved onto the A83. This also washed down onto the OMR which caused the local OMR diversion to be predominantly closed.

5.3.4. The second landslide occurred in September 2020 and caused further closures of the A83 and OMR. In total in 2020, the A83 was closed for 130 days and 193 nights, and the OMR was closed for 16.5 days and 44.5 nights. This also led into 2021 with the A83 closed for 23 days and nights, and 2 days and nights where the OMR was also closed. When both the A83 and OMR were closed the full diversion via the A82/A85/A819 was required, adding costs and delays to the regular user. It is likely that some users didn't make their usual journeys during this time with the uncertainty of the A83 closures or with the additional costs associated with the longer diversion. This may also have had an impact on tourism to the local area as the summer holiday season came to an end, although this was likely minimal as holidaymakers would usually continue with their plans despite delays. However, it is hard to measure the effect of the closures caused by the landslide during this

period due to the potential effects of COVID-19 which would also contribute to drastic change on local travel patterns.

Existing OMR

5.3.5. At the time of writing BEAR Scotland is the Operating Company for the Northwest unit, appointed by Transport Scotland. BEAR Scotland also operates any traffic management and / or convoy along the A83 and the OMR (which is used as a temporary diversion to the affected A83 when there is a risk of landslide or a landslide on the slopes of Beinn Luibhean).

5.3.6. The first stage of pre-emptive safety measures is the introduction of single lane operation under temporary traffic lights. The convoy operation along the A83 is used as the second stage of pre-emptive safety measures when the soil saturation reaches a certain threshold and to allow engineering works of the road or minor clean-up operations following a landslide or debris flow event. This convoy typically operates over a 0.95km stretch and the typical wait time for users in the convoy is approximately 3 minutes depending on the volume of traffic.

5.3.7. If there is a risk of landslide, or if a landslide occurs, the third stage of measures is introduced which includes diversion of the trunk road traffic to the OMR local diversion which operates under traffic management convoy for the majority of its length.

5.3.8. The OMR is a single lane, low-capacity paved private road, which when built was not intended to be used by large traffic volumes nor large vehicles such as HGVs. Because of this, when the convoy was first in operation in 2013 along the OMR, HGVs on occasion became stuck at some of the tight turns and steep gradients on parts of the route. Recovery vehicles from BEAR Scotland would then rescue the affected HGVs, but ultimately, this led to delays for vehicles stuck behind the affected HGV and for vehicles waiting to use the diversion route. In response to this, measures were implemented to resolve many of the issues associated with HGVs using the OMR, such as road widening at tight turns, and installation of high friction surfacing.

5.3.9. Overall, this has helped to reduce the additional journey time associated with travelling along the OMR when operating as a diversion, with most of the additional time associated with waiting at the convoy markers whilst the current convoy was moving. This can amount to average standing times of around 11

minutes; however, if the driver arrives just as the convoy leaves, the waiting time could increase to around 25 minutes. Travel time along the OMR is approximately 12 minutes, amounting to an average additional journey time of 23 minutes.

5.3.10. In the event whereby traffic cannot be diverted onto the OMR, for example due to risk of a significant landslide, a longer diversion route via the A82, A85 and A819 is utilised, shown in Figure 5-2.

5.3.11. An alternative diversion, again depending on the user's origin and destination, is to use the ferry from Dunoon to Gourock. This offers an alternate route from the South of Argyll and Bute into Central Scotland to cities such as Glasgow, but costs £22.75 per journey per car.

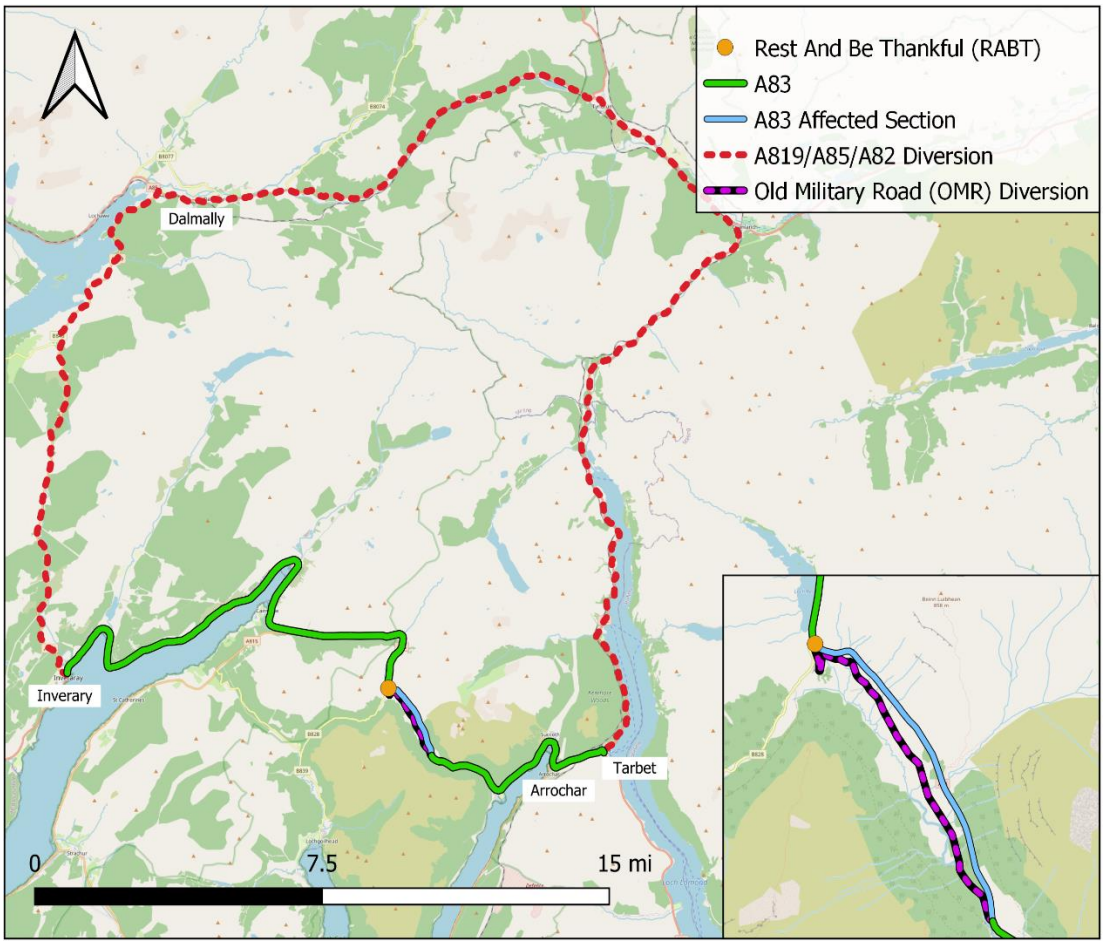

Figure 5-2 – Routes from Inverary to Tarbet

Population and Employment

5.3.12. The Wider Economic Impact Report (WEIR) conducted during DMRB Stage 1 highlighted the rapid decline in population in the study area. This may be partly due to the connectivity issues from the West of Scotland to major central cities, such as Glasgow, arising from the road closures at RABT. The decline in the number of young people and families exacerbates the decline in population due to the lack of babies born in the area.

5.3.13. Some of this decline has been subsidised by an increase in the number of people over 65 years old. However, generally people of this age will be retired and will not be commuting to work or for education via the A83, therefore road closures are expected to have less of an impact on this age group.

5.3.14. The WEIR also showed that the average wage of the population of Argyll and Bute was approximately 7% lower than the Scottish average in 2019. This refers to those who live in Argyll and Bute, regardless of their place of work. However, the wage of those that both live and work within Argyll and Bute was around 17% lower than the Scottish average. Due to the population decline in the area, businesses may be forced to shut due to the lack of workers, putting a greater strain on those continuing to live there to find another job which may feasibly only be accessible via the A83.

Medium-Term Solution

5.3.15. Several schemes for the RaBT LTS were considered by Transport Scotland during DMRB Stage 1, in April 2021, to improve the connectivity between Argyll and Bute and Central Scotland. However, it was decided during the options sifting at the end of Stage 1 that the Proposed Scheme would consist of interventions along the existing A83 corridor.

5.3.16. Understanding the urgency of the situation, in March 2021 Transport Scotland committed to delivering a Medium-Term Solution (MTS), the purpose of which is to deliver a safe, proportionate and more resilient diversion route to the A83 until such time as the LTS is completed. In December 2022 it was announced that the MTS would consist of a series of interventions to the existing OMR and is reported in the Medium-Term Strategy Options Assessment Report. Due to the gradient of the OMR, this upgrade will not provide a full-length two-way road, but instead reduce the existing length of one-way section from 2.7km to 1.3km. This will

significantly improve the journey time of vehicles using the OMR diversion through reducing the wait times.

5.3.17. These works are anticipated to be completed before the start of construction of the permanent, LTS. The MTS interventions will be included during the construction phase in the 'Do Something' scenario for the Economic Appraisal of the LTS.

Long-Term Solution

5.3.18. Eleven route corridors, plus four additional corridors suggested by members of the public, were considered during DMRB Stage 1 by Transport Scotland to improve the connectivity between Argyll and Bute and Central Scotland. Following the corridor assessment at the end of Stage 1 the preferred route corridor was announced as the existing A83 Glen Croe corridor in March 2021.

5.3.19. Since then, the DMRB Stage 2 Options Assessment of five possible route options within Glen Croe was undertaken. In June 2023, the then Minister for Transport announced that the preferred option for the LTS would be a debris flow shelter, generally on the line of the existing A83 where it passes below the Beinn Luibhean slopes. The debris flow shelter includes a roof over the road, supported by a robust protection wall on the hillward side and a series of columns on the valley side to maintain an open aspect to the glen. Behind the protection wall there will be a catch pit, designed to channel land slip material and rock fall, allowing it to be removed safely and efficiently without adversely impacting the road user or the slopes below the A83. The construction period is estimated to be approximately 4 years.

5.3.20. The preferred route, shown in Figure 5-3 - Plan of the permanent long-term preferred option, is predominantly online and is therefore on or very close to the line and level of the existing A83. Its overall length is 2.25km, starting at the Croe Water (Cobbler Bridge) and extending to a point north of the junction between the A83 and B828 Glen Mhor local road.

5.3.21. Landslide, debris flow and boulder fall protection are achieved through the inclusion of a DFS combined with a catchpit over a length of 1.4km, with an additional 180m of catchpit and Debris Flow Protection Wall (DFW) to the north. A conceptual visualisation of the DFS is included in Figure 5-4. The scheme also includes improvements to the B828 Glen Mhor local road junction and Rest and Be Thankful Viewpoint car park.

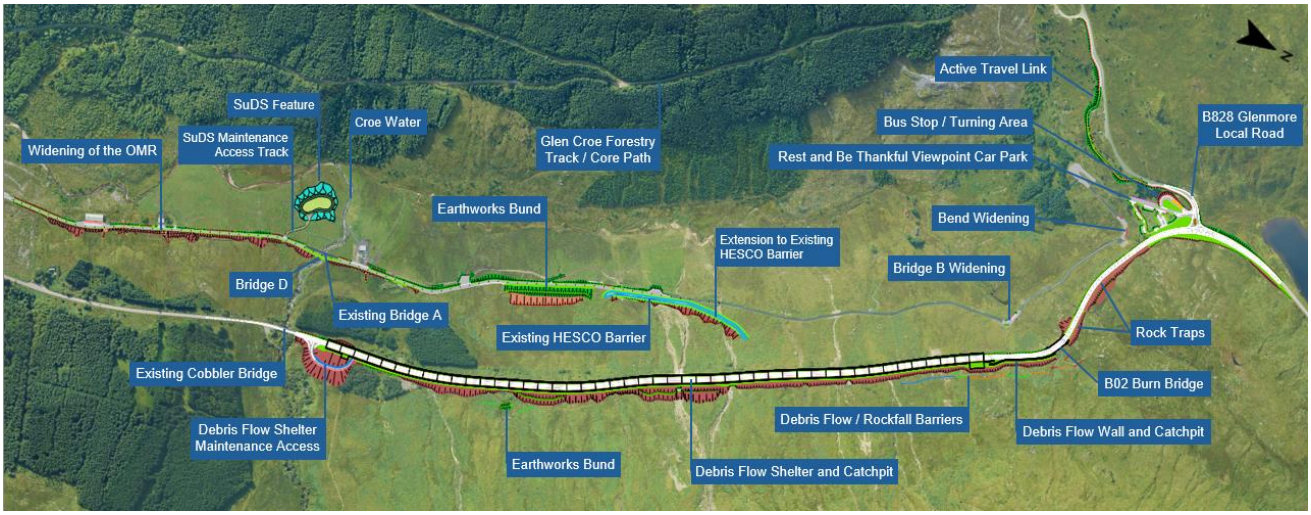

Figure 5-3 - Plan of the permanent long-term preferred option

Figure 5-4 - Debris Flow Shelter – Design Visualisation

6. Traffic and Economic Assessment

6.1. Overview

6.1.1. This section of the DMRB Report for A83 Rest and Be Thankful describes the traffic modelling undertaken to assess the impact of the Proposed Scheme for the DMRB Stage 3 Scheme Assessment. This includes how the data was used to support the economic assessment of the RaBT LTS.

6.1.2. It should be noted that the economic analysis described in this section has been undertaken to assess the performance of the RaBT LTS from a traffic and economic perspective. This report is not intended to underpin the financial justification for the scheme. Further details regarding the wider economic benefits of the scheme which are considered applicable to the Proposed Scheme are presented in Section 3.

6.2. Data Collation

Traffic Surveys

6.2.1. AWJV commissioned 3 sets of traffic count surveys, at different locations around the Rest and Be Thankful Site. The surveys were commissioned over the following dates:

- 30th October 2023 to 12th November 2023;
- 27th February 2024 to 11th March 2024; and
- 1st April 2024 to 8th April 2024.

6.2.2. The Automatic Traffic Count (ATC) locations for the October/November 2023 and February/March 2024 traffic surveys around the Rest and Be Thankful Site are provided below in Figure 6-1.

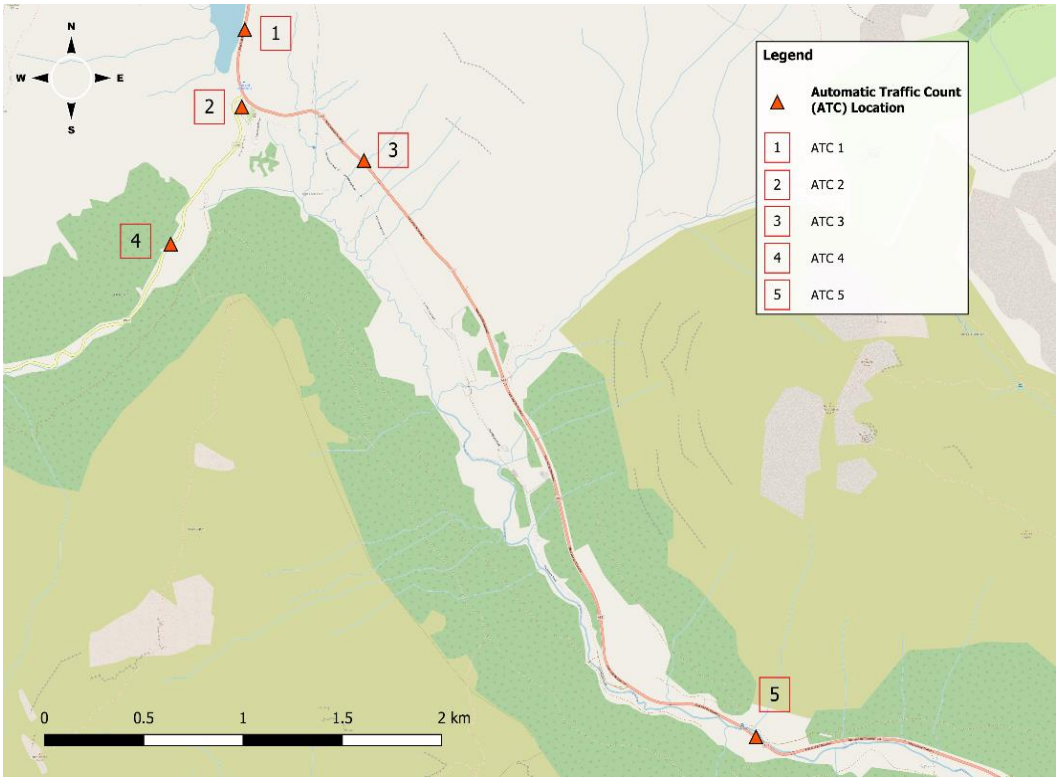

Figure 6-1 : Traffic Count Survey Locations

6.2.3. The data collected in April 2024 has not been used as the A83 was closed for a large portion of the survey period. The October / November 2023 and the March 2024 surveys have been used to calculate an Annual Average Daily Traffic (AADT) value from the surveyed periods. A seasonality factor, derived from a National Traffic Data System (NTDS) count site, was then applied to these values to establish a yearly AADT value, with an average value calculated.

6.2.4. The calculated value was used as the 2024 AADT; it provided the base value from which the future year AADTs were derived from and from which With Policy and Without Policy values were calculated from. The future year and policy flows were derived from Transport Model for Scotland forecasts.

Transport Model for Scotland

6.2.5. The Transport Model for Scotland (TMfS) has been used to forecast the future flows along the A83 for two traffic forecast scenarios, the 'With Policy' and 'Without Policy' forecast traffic scenarios. These scenarios follow assumptions that would represent both low and high 'Motorised Traffic and Emissions' future scenarios. The assumptions used to produce these forecast traffic scenarios are described in Section 5.3. Forecast percentage change in AADT figures along the A83 Trunk Road at the Rest and Be Thankful were extracted from the TMfS for both forecast traffic scenarios. Annual AADT change factors derived from this data were then used to forecast AADT traffic flows along the A83 from the 2024 base year traffic flow. The processing and use of this data is described in greater detail in Section 5.3.

National Traffic Data System Traffic Counts

6.2.6. Access to the NTDS database has been provided to AWJV to aid in the traffic appraisal. There is one active traffic counter located on the A83 Trunk Road in the immediate study area, which is to the south-east of the Proposed Scheme. The location of this counter is shown below in Figure 6-2.

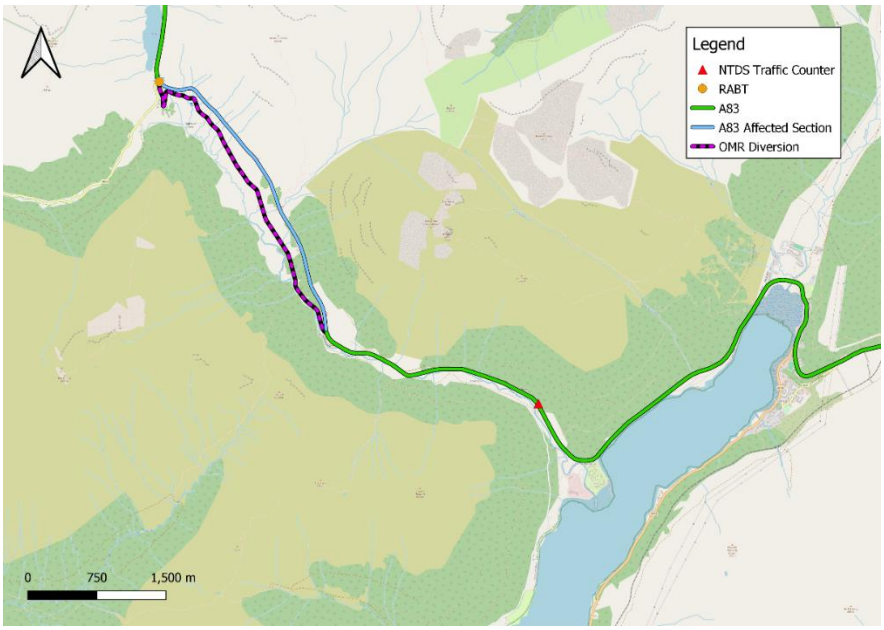

Figure 6-2 – NTDS count location

6.2.7. This counter is considered representative of traffic along the A83 corridor near the Rest and be Thankful site as there is few exit points between the scheme study area and the counter itself. The count data for this site from 2023 has been used to calculate seasonality factors corresponding to the survey periods. The seasonality factors were then applied to the corresponding survey period AADT to produce a yearly average AADT value for each survey.

6.2.8. During the 2020 period, the COVID-19 lockdowns had a pronounced effect on travel patterns, reducing the observed vehicle counts on the A83 by almost 66% from March to April. The number of vehicles increased as government travel restrictions were lifted but then dropped considerably after the two landslides at the RABT site in August and September. This affected travel until the A83 re-opened in April 2021. The remainder of 2021 and 2022 approximately follow the trend of the available data from 2019, showing that the expected longer-term effects of COVID-19 in terms of hybrid working and online shopping, have had little impact on this trunk road specifically. This further emphasises the importance of this road, as many local users of the A83 are required to use this corridor to access workplaces, education, and services.

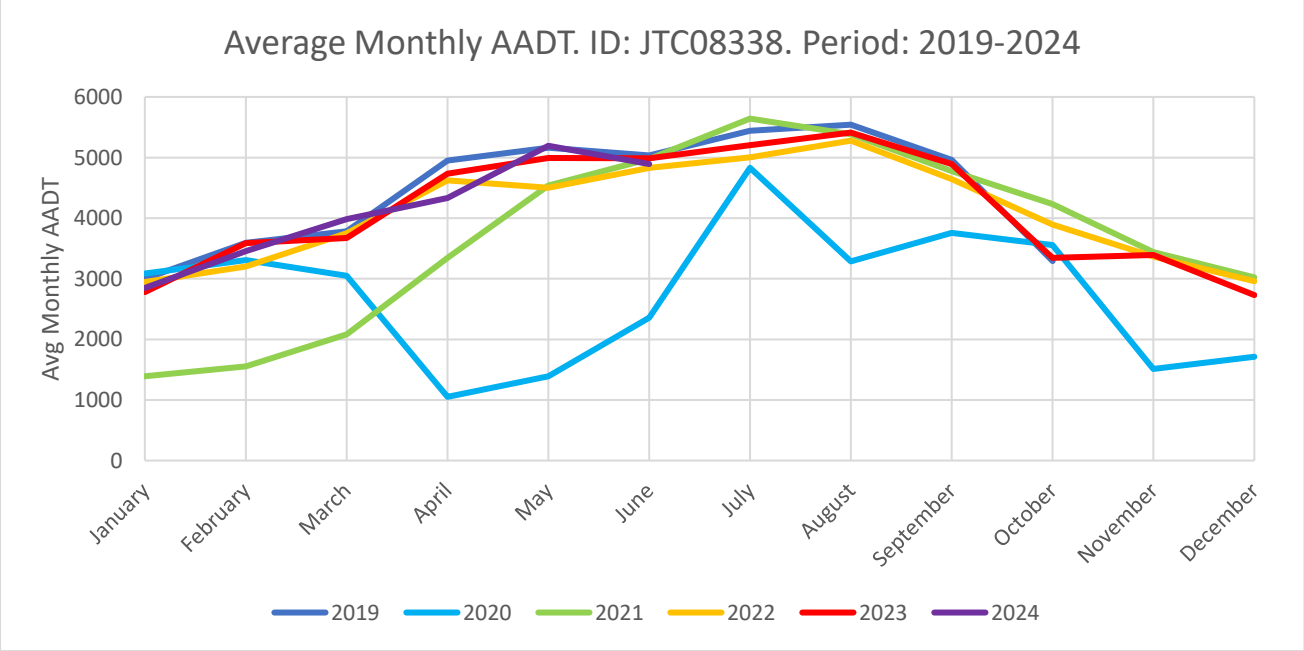

Figure 6-3 - NDTS average vehicle counts 2019-2024

Convoy Data

6.2.9. A register of operations from BEAR Scotland in the period August 2020 to January 2024 has been provided to AWJV for analysis and to inform the appraisal. This register contains dates and times in which the A83 traffic lights, A83 convoy, OMR convoy and full A819/A82/A85 diversion were deployed. This has been particularly useful to highlight disruption caused by each of the traffic management measures and to use in calculating total operating costs per day of the traffic measures in the appraisal.

6.3. Traffic Model

Model Overview

6.3.1. A spreadsheet model to perform an economic appraisal of the transport costs has been developed. This has been built in accordance with Scottish Transport Appraisal Guidance (STAG) reported in Section 9 and the Economic Parameter TAG Databook May 2024 v1.23. Journey time costs and vehicle operating costs have been calculated to obtain a detailed picture of the economic impact that the road closures have on transport within the region.

6.3.2. The current year of 2024 was deemed to provide the most appropriate baseline from which to forecast traffic growth from. This approach utilises the traffic count surveys at the Rest and Be Thankful commissioned by AWJV in early 2024, which provides the most up to date traffic flow data along the A83 that is currently available. Therefore, 2024 has been chosen as the model base year.

6.3.3. The development of the model has been undertaken within a spreadsheet as this was deemed proportionate considering the location of the scheme and the levels of traffic that use the A83. The model applies the changes in travel time to the number of trips predicted to use the A83 using the traffic flow data detailed in the previous section 3. The model represents an average day across the whole year. The changes in journey times for each assumed route are then applied to the number of trips per year to derive journey time benefits and vehicle operating costs for the economic appraisal. The changes in journey times across the OMR convoy were generated using a python simulation as described below.

Convoy Simulation

6.3.4. A simple simulation of the OMR convoy procedure has been developed in python, a general-purpose programming language. This has been used due to the limited journey time data at RABT on OMR diversion days but has also been used to inform the wait time at the A83 convoy. The simulation was used to derive an equation for the average wait time of a vehicle for a given number of vehicles per hour. This equation has then been used in the appraisal. The equation was derived by simulating a series of different vehicles per hour and interpolating the wait times from these outputs.

6.3.5. The wait time of the average user is approximately 11 minutes on the current OMR layout, but this is reduced to around 5 minutes for the upgraded OMR. This has been modelled over a 2-hour period over 30 iterations with a random number of vehicles arriving from the east and west with a range of vehicles per hour tested.

6.3.6. Several assumptions and parameters were used in the creation of the python script, which are given below:

Current OMR:

- One-way section length: 2700m
- One-way section vehicle speed: 10mph
- Vehicles per hour: Range from 25 to 1400
- Maximum convoy length: 35 vehicles (which includes the convoy vehicle)
- Vehicles have instantaneous speed
- No route choice has been incorporated into this simple model

Upgraded OMR:

- One-way section length: 1300m

- One-way section vehicle speed: 10mph
- Vehicles per hour: Range from 25 to 1400
- Maximum convoy length: 35 vehicles (which includes the convoy vehicle)
- Vehicles have instantaneous speed
- No route choice has been incorporated into this simple model

6.3.7. For both the current and upgraded OMR respectively, each iteration of the simulation was averaged and used to produce a relationship between the vehicles per hour (vph) and the average time taken to travel the OMR one-way section. This is presented below in Figure 6-4.

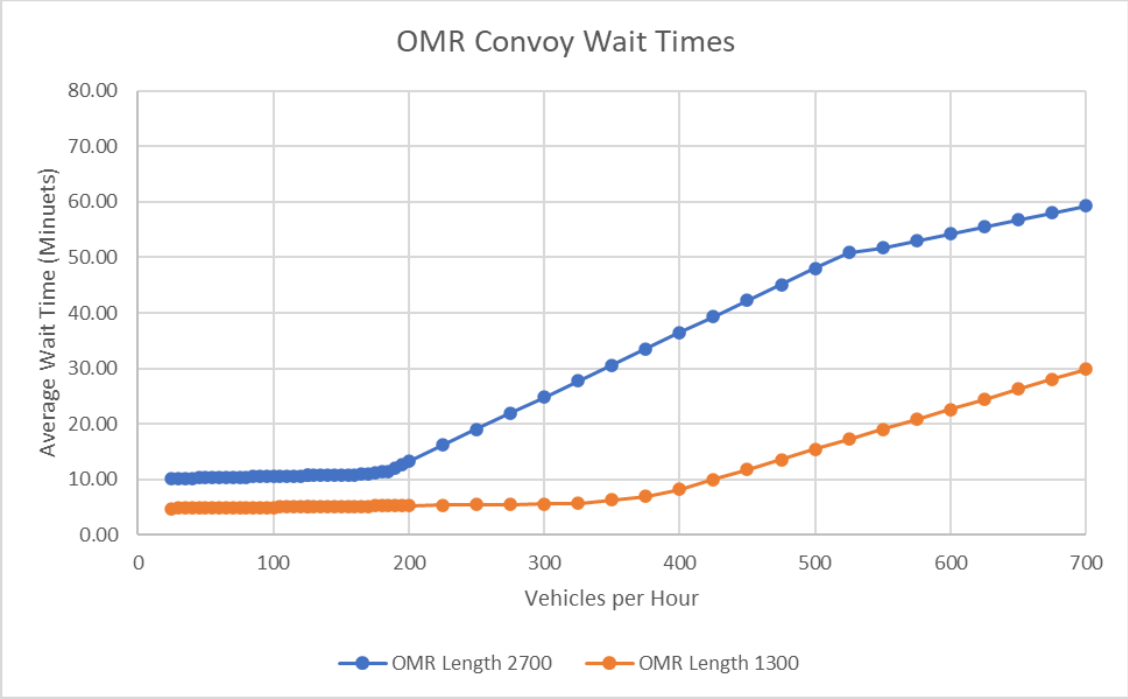

Figure 6-4 - Simulated Convoy wait times

6.3.8. This LTS economic appraisal utilises a 24-hour average vph approach (AADT divided by 24) to calculate journey times along the OMR for forecasted traffic

flows. The results produced were consistent with the average travel time along the current OMR diversion of 24 minutes including the wait time.

6.3.9. Journey times across the existing OMR and upgraded OMR were also calculated from the convoy simulation data using an hourly daily profile extracted from local NTDS traffic counts. This was conducted to explore the potential effect of the MTS intervention on the average journey time at peak hours during A83 Trunk Road closure periods. The results of this are presented below in Figure 6-5.

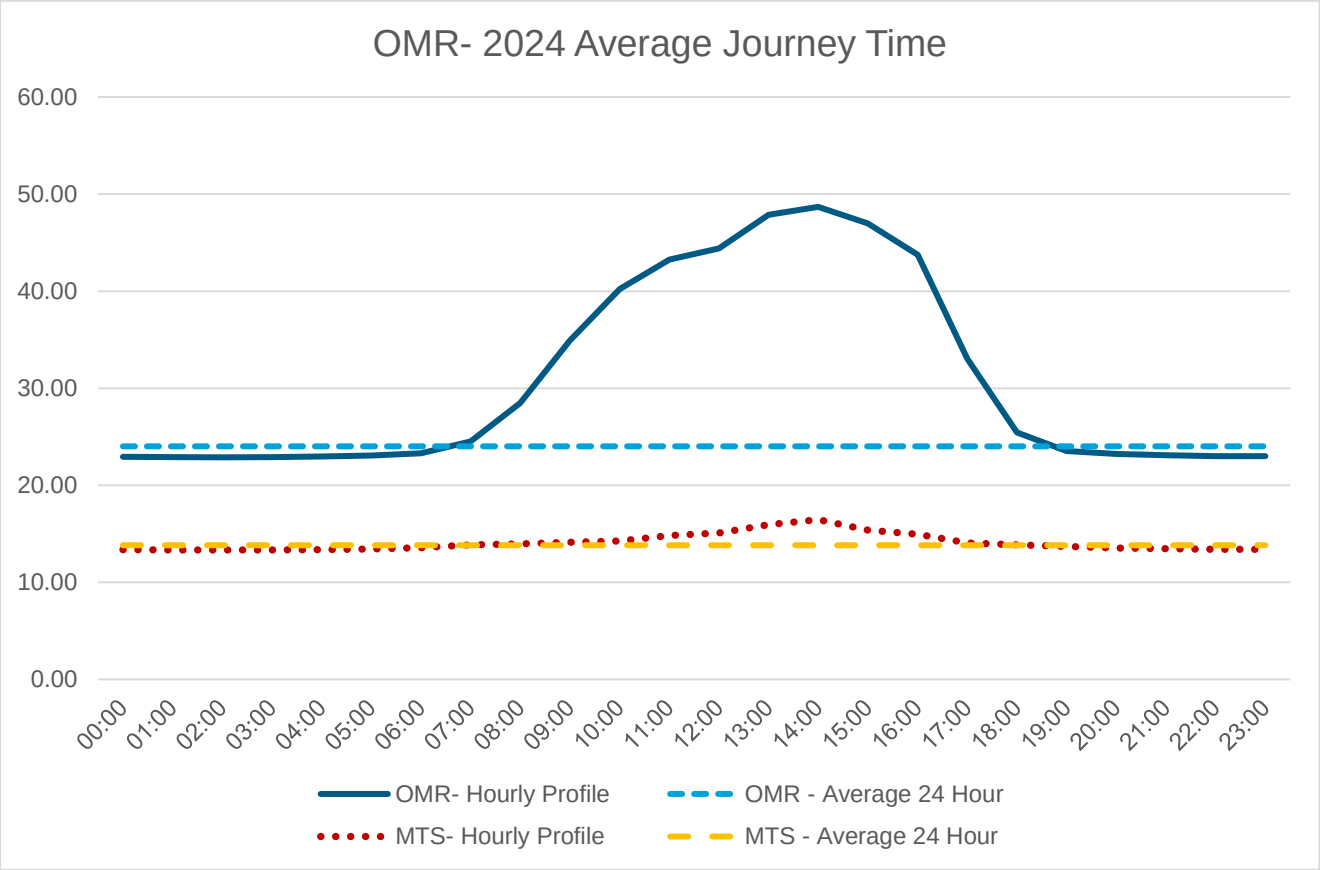

Figure 6-5 – Daily profile OMR journey times

Traffic Flow Forecasts

6.3.10. Traffic flow forecast growth factors have been derived for this stage of the appraisal from the Transport Model for Scotland (TMfS). The traffic flow growth

factors are based on a 2023 baseline from the model version TMfS18a. Included are two flow scenarios:

- Without Policy – High Traffic Scenario
- With Policy – Low Traffic Scenario

6.3.11. The 'Without Policy Ambition' traffic flow forecast, called 'High Motorised Traffic/Emissions Scenario' in DMRB LTS Stage 1, makes the following assumptions:

- Existing electric vehicle growth with no further interventions promoting uptake.
- Car ownership will only be constrained in city centres where there are existing parking constraints.
- Decline in trip rates: -15% commute, -33% business, all others – stable.
- A 40% update of connected and autonomous vehicles (CAV's) by 2050 with the first CAV's appearing in the mid 2020's.
- No change in fuel cost.

6.3.12. The 'With Policy Ambition' traffic flow forecast, called 'Low Motorised Traffic/Emissions Scenario' in DMRB Stage 1, makes the following assumptions:

- Phase out the need for the sale of new petrol and diesel cars and vans by 2030.
- Car ownership constrained in all cities to number in 2020.
- Decline in trip rates: -25% commute, -66% business, all others – extrapolate decline.
- No connected and autonomous vehicles (CAV's) by 2050.

- Car generalised cost increase to achieve 20% reduction in car vehicle kms by 2030.

6.3.13. It was noted that 'Both scenarios incorporate enhancements to explicitly represent the longer-term effects of the COVID-19 pandemic, such as increased home working and increased levels of digital substitution.'

6.3.14. These scenarios have been produced for the following forecast years:

- 2025
- 2030
- 2035
- 2040
- 2045

6.3.15. By having multiple forecast years, a future year profile can be derived up to 2045. The traffic flow forecasts use the 2024 AADT counts presented in Section 6.2 as a baseline and are then calculated up to 2045, after which it has assumed that there is no change in the traffic flow for each scenario as shown in Figure 6-6.

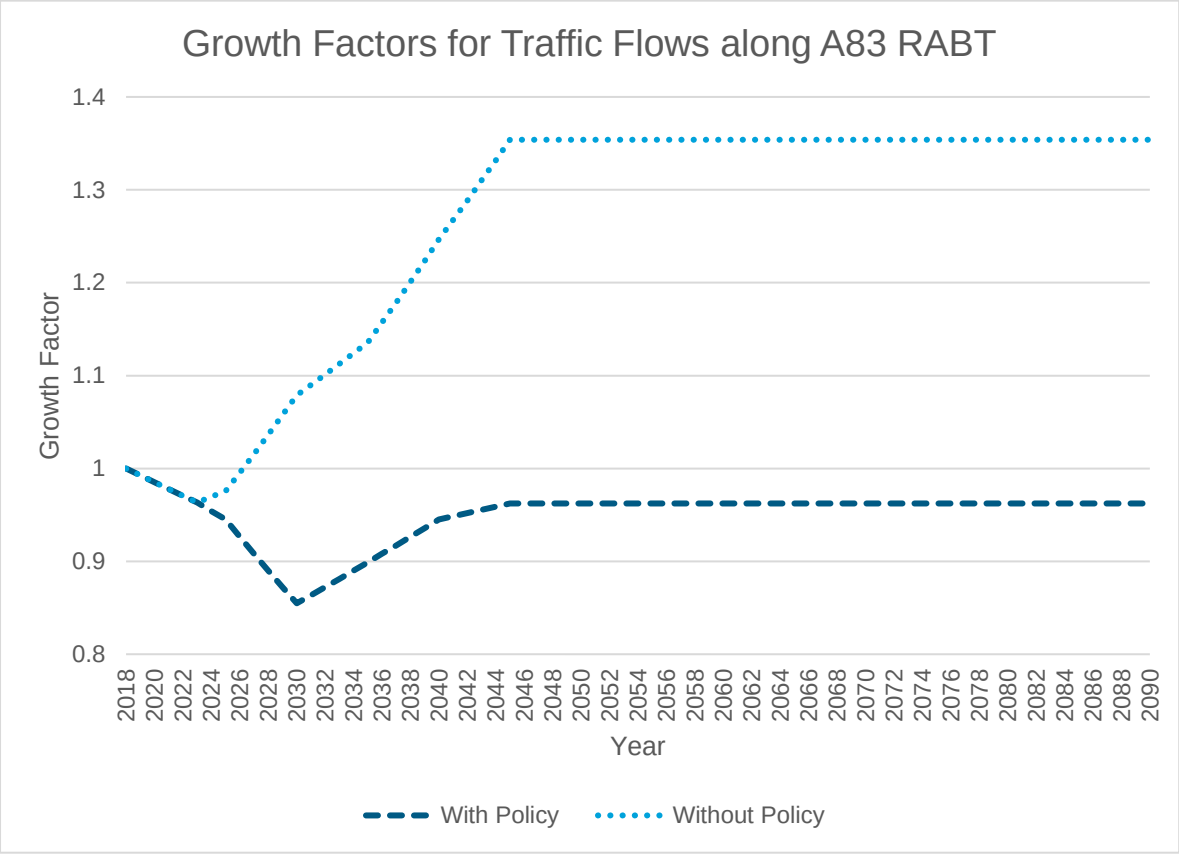

Figure 6-6 – AADT Forecast

6.3.16. Journey purposes using the A83 were extracted from the DMRB LTS Stage 1 Wider Economic Impact Report (WEIR) and are shown in Table 5-1. The 'Non home based' journeys have been split into two types using the assumption from the WEIR that there are around 200 HGV's using the A83 trunk road per day in each direction.

6.3.17. The proportions of each journey type have been used in combination with the projected traffic flow forecasts from Section 5.2. Weekdays, weekends and bank holiday flows have not been treated separately and the total number of vehicles per day in Table 6-1 represents an average of 365 days in 2019. The 2019 journey purpose splits along the A83 Trunk Road have been retained and applied to the 2024 baseline and all forecast years.

6.3.18. It should be noted that business users and LGVs are not separate below and therefore these have been treated as a single class for the modelling methodology.

6.3.19. It has been assumed that Non-home-based equates to Working (purpose) VoTs, which is reasonable for study area.

Table 6-1– Journey purposes

Journey Purpose	Total occupants	Total vehicles	Proportion of travellers
Home based: Work	1244	1058	20%
Home based: Education	258	150	4%
Home based: Other	3244	1874	53%
Non home based: Business cars and LGV's	964	739	16%
Non home based: HGV's	400	400	7%
Total	6110	4221	100%

Model Scenarios

Do Minimum – Existing Traffic Situation

6.3.20. The existing traffic situation at the A83 RABT will form the basis of the Do Minimum Scenario in this economic appraisal. This includes the A83 mainline, and the existing one-way and two-way sections of the OMR convoy.

Do Something Construction Phase– OMR interventions

6.3.21. The planned improvements to the OMR have been included as part of the separate Do Something construction phase. This intervention, which has been committed to by Scottish Ministers, provides an upgrade to the OMR which aims to reduce travel times along the corridor when the A83 RABT is closed during

construction of the LTS. The upgraded sections of the OMR are to allow for two-way traffic and therefore shortens the length of road where the convoy operates. When compared to the current travel time along the OMR, this should reduce the journey time by around 10 minutes. Table 6-2 details the changes to be made to the OMR as part of the interventions. Due to the gradient at the northern section of the OMR, it is not practicable to completely upgrade the OMR to entirely two-way without a major reconstruction of the road and hillside equivalent to that of the long term, permanent solution.

Table 6-2- Breakdown of the OMR route

OMR	Section type	Section length (km)	Section speed (mph)
Current road (Do Minimum)	One-way	2.7	10
	Two-way	1.1	15
OMR upgrade (Do Something construction phase)	One-way	1.3	10
	Two-way	2.5	25

Do Something – Long-Term Solution

6.3.22. Transport Scotland have identified a preferred option of the construction of a Debris Flow Shelter and Catch Pit as a Long-Term Solution (LTS) at the A83 RABT. A conceptual visualisation of the DFS is included in Figure 5 4. This chosen LTS will form the basis of the Do Something scenario.

6.3.23. The scheme design of the LTS shows the distance across the Glen Croe Valley is planned to be slightly shorter than the existing A83 mainline. Recent traffic speed data from recently conducted surveys highlighted that current average vehicle speeds on the A83 are lower than the current 60 mph national speed limit (approximately 45mph). This appraisal assumes all cars and light goods vehicles (LGVs) travel at this average speed on the existing A83 mainline. For the

purposes of the economic appraisal, the LTS is assumed to have the same speed as the existing A83. This appraisal assumes that HGVs will travel at a speed 15% slower than the average speeds along both the existing A83 and LTS route.

Additional Model assumptions

6.3.24. To define the future scenario several assumptions have been made to produce a projection of the number of closures of the A83 defined as the appraisal baseline. The closures have had different severities applied to them to define how road users will travel through the A83. Table 6-3 provides a summary of these assumptions. It is predicted that a similar event to the landslide in 2020 was a 1 in 50-year event. Therefore, it is assumed that a similar magnitude landslide would occur by 2070 and would cause a similar level of disruption to the A83 RABT section.

Table 6-3 - Projected closures on A83

Travel scenario	Estimated Number of days per typical year	Estimated Number of days during a major event (2070)
Old Military Road	40	220
A819/A82/A85 Diversion Route	0	30

6.3.25. In addition to these base scenario assumptions, several sensitivity test scenarios were conducted to assess the economic impact of the frequency and impact of road closures along the A83 RABT. Each sensitivity test put forward ‘worse case’ and ‘better case’ scenarios regarding projected traffic interventions required on the A83 RABT when compared to the base scenario assumptions. The details and results of these sensitivity test scenarios are presented in Section 5.7.

6.3.26. Table 6-4 below summarises the journey time changes for a typical journey from Inverary to Tarbet relative to the existing A83 with no traffic management

measures for 2024 baseline traffic flows. Forecasted changes in traffic flows across the RABT corridor means the OMR and Upgraded OMR will be subject to changes in journey times due to changes in wait times during convoy operation described in Section 5.2. The journey times for the existing A83 and A82/A85/A819 full diversion are assumed to be constant across all traffic forecast scenarios.

Table 6-4 - A83 relative journey time – Core Scenario Assumptions

Route	Variation to typical 2024 journey time (Inverary to Tarbet)
Existing A83 with no traffic management measures	**+ 0 mins**
LTS	**+ 0 mins**
Existing OMR with convoy	**+ 21 mins**
Upgraded OMR with convoy	**+ 11 mins**
Full diversion via A819/A82/A85 diversion	**+ 38 mins**

6.4. Traffic and Economic Appraisal

Overview

6.4.1. This section details the Transport Economic Efficiency (TEE) analysis and Cost Benefit Analysis (CBA) of the Long-Term Solution (LTS). This will capture the main impacts of the Scheme Option in terms of economic welfare, predominantly represented by the main costs and benefits of users and operators of the transport system.

Appraisal scenarios

6.4.2. The Do Minimum and Do Something are structured to accurately capture the objectives of the appraisal as follows:

- The **Do Minimum** consists of a 60-year appraisal of the existing road conditions on the A83 RABT from 2030 to 2090.
- The **Do Something** is also a 60-year appraisal across the same period but using the open LTS for all Scheme Options.

6.4.3. A separate appraisal is calculated for the construction period of the LTS, which includes the improvements along the OMR.

Exclusions

6.4.4. This appraisal has not included any impact on public transport and active modes. There is evidence of low usage of public transport and active modes in the study area and so will have a negligible impact within the economic appraisal.

6.4.5. Indirect tax revenues have not been included in the appraisal due to the expected negligible impact on the overall user benefits.

6.4.6. No accident benefit analysis has been undertaken at this stage. The scheme does not change the standard of road from a traffic speed point of view and is unlikely to show a significant change in the number of accidents occurring on this section of the A83.

6.4.7. For the purposes of the DMRB Stage 3 assessment, the scheme has been subject to an Environmental Impact assessment. The methodology for each impact is summarised within each relevant section of this report.

User Benefits and Vehicle Operating Costs

6.4.8. To calculate the journey time benefits, the average journey time for each user was taken from the spreadsheet model across the 60-year appraisal period. The number of vehicles projected for each year was then expanded into users by applying the occupancy. The value of time has been applied to the

decreases/increases in travel time for each option to provide a total benefit/disbenefit. The model represents a single day and therefore to annualise to represent a whole year this was expanded by 365 days.

6.4.9. For each scenario, the traffic flows were split into journey purpose. This allowed the application to place a cost on the time for each diversion relative to the journey time of a fully open A83. In accordance with STAG, this has been appropriately calculated with parameter values from the TAG economic data book (May 2024 v1.23) and discounted.

6.4.10. It is important to note here that the appraisal makes use of the assumption that HGV's travel 15% slower than light vehicles on the A83 mainline and A82/A85/A819 Diversion routes. This assumption is not used for the OMR routes, where it is assumed, all traffic follows the same fixed, slower speed.

6.4.11. Vehicle operating costs were calculated in a similar way as journey time costs whilst making use of the relevant TAG data book information and AADT flows used throughout this report. Vehicle occupancies are not used in this calculation.

6.4.12. A separate assessment has been undertaken for the construction period. The chosen LTS scheme, the brown option from the previous DRMB Stage 2 Scheme assessment, requires the A83 to be closed for extended periods during construction. For the purposes of this assessment, it is estimated that the A83 will be closed, and traffic diverted to the upgraded OMR local diversion on average for entire construction period. This is presented in Table 6-5.

Table 6-5 - Construction periods and diversions for LTS options

Option	Construction length (years)	Number of OMR diversion days
LTS (Flow Shelter)	4	365

Present Value Benefits

6.4.13. The final discounted totals per year are then collected and summed over the 60-year appraisal after the opening of the LTS, from 2030 to 2089. The number of

closure days and the number of days requiring each diversion are then incorporated to develop a detailed model of the economic impact of disruption to transport should no changes be made to the A83 RABT site. The present value benefits (PVB) for the LTS DMRB Stage 3 appraisal are shown below in Table 6-6 for both 'With Policy Ambition' and 'Without Policy Ambition' forecast traffic flow scenarios.

Table 6-6 - Present Value Benefits (2010 prices)

Option	With Policy Ambition PVB	Without Policy Ambition PVB
LTS (Flow Shelter)	£ 11,351	£ 23,475k

Present Value Costs

6.4.14. The whole life base costs for each scheme are summarised in Table 6-7. These costs include risk and optimism bias, and the maintenance costs are shown in 2024 prices.

Table 6-7 - LTS Scheme base costs

Scheme	Description	Location to existing A83	Construction period	Cost excluding maintenance (£k 2024 Prices)	Maintenance costs (whole life) (£k 2024 price)
LTS	Flow shelter	Online	2026-2030	£ 458,659k	£ 40,131k

6.4.15. The LTS scheme has been profiled equally over the construction period. The treatment of costs has been applied in accordance with TAG Unit A1.2. It has been assumed to be equally spread over the construction period and then had inflation applied. The inflation rate applied is the GDP deflator plus 2.1%. These costs have then been discounted from 2010 with discount rate of 3.5% per year and then rebased to 2010 prices using the GDP deflator to calculate the Present

Value Costs (PVC) in 2010 prices. The maintenance costs have been treated in the same manner over the whole appraisal period and are shown in 2010 prices.

6.4.16. The cost of the projected A83 closures within the Do Minimum scenario have been offset against the LTS investment and maintenance costs within the final PVC. The cost per day for use of the OMR and traffic management have also been included in the as a part of the scheme costs. Costs will reduce once the OMR is purchased by Transport Scotland under the scheme orders, and as such will vary between the Do-Minimum Scenario and Do-Something scenario.

6.4.17. By applying the assumptions on the number of forecast closures, a total cost was derived for the whole appraisal period and then included within the PVC calculation. The PVC for the LTS scheme is shown in Table 6-8.

Table 6-8 - Present Value Costs (2010 prices)

Option	Description	Present Value Costs (£ 2010 Prices)
LTS	Flow shelter	-£ 199,507

Benefit to Cost Ratios

6.4.18. The ratio between the PVB and PVC for the appraisal scheme is presented as the Benefit to Cost Ratio (BCR). The BCR's for the LTS With Policy Ambition and Without Policy Ambition scenarios are given in Table 6-9.

Table 6-9 – Stage 3 LTS option BCR

Option	With Policy Ambition BCR	Without Policy Ambition BCR
LTS	0.06	0.12

6.4.19. Table 6-9 shows that the With Policy Ambition BCR is lower than the Without Policy Ambition BCR. This is as expected because in the With Policy Scenario

there is a reduction in car travel. With less people using the road there is less benefit to be derived from the scheme, resulting in a lower BCR.

Sensitivity Tests

6.4.20. There is a high degree of uncertainty when attempting to predict the number of A83 closures. Therefore, additional scenarios have been included to cover a range of scenarios and the subsequent impact on the BCR values of the LTS scheme appraisal.

A819/A85/A82 Diversion in Place

6.4.21. This sensitivity test tests each scenario using the core assumptions but with a change to the assumptions around the full A819/A85/A82 diversion usage. In this test it is assumed that the A819/A85/A82 diversion would be used for the following:

- 30 days in a landslide year
- 5% of trips would use the diversion when the OMR is in use

6.4.22. Table 6-10 below shows the BCR for each traffic forecast scenario under these assumptions.

Table 6-10 - Diversion Sensitivity Test BCR Results

	With Policy Ambition BCR	Without Policy Ambition BCR
LTS	0.8	0.14

6.4.23. The LTS reduces the need for the A83 to be closed after a landslide or at times of high risk of a landslide. In these events in the DM some traffic uses the diversion and incurs a higher cost, but in the DS this traffic stays on the A83 and has a lower cost as it does not need to take the diversion or the OMR. There is a higher benefit associated with traffic using the diversion since this has a higher cost.

Landslide Occurrence

6.4.24. This sensitivity test appraised the impact of increased landslide frequency by adding in an additional landslide event in 2045, as well as the 2070 landslide included in the core scenario assumptions. The length of closures after each landslide were not changed.

6.4.25. Table 6-11 shows the BCR of this test for the With and Without Policy Ambition traffic forecast scenarios.

Table 6-11 - Landslide events BCR Results

OMR convoy days per year	With Policy Ambition BCR	Without Policy Ambition BCR
2 Landslide Events	0.07	0.13

6.4.26. The results shown in Table 6-11 show an increased BCR from the core results shown in Table 6-9. The increase is caused by the additional closures associated with the 2045 landslide which forces users in the Do Minimum scenario to use either the A819/A85/A82 diversion or the OMR. In the Do Something these passengers can continue to use the A83 deriving a benefit from their shorter journey times.

Conclusions

6.4.27. Local traffic counts and surveys show traffic flows along the A83 RABT corridor are generally low across the year with fluctuations in the Winter and Summer periods. The generally low AADT means that any scheme through this corridor will inherently derive a reduced transport economic benefit. The economic benefit of this scheme is driven by the reduction in A83 closure periods, reducing the annual average journey time across the A83 RABT where the OMR and full A819/A85/A82 Diversion are no longer required.

6.4.28. Following the Department for Transports (DfTs) Value for Money (VfM) framework, the more 60-year appraisal of the LTS appraisal produces a poor VFM BCR for both the ‘With Policy’ and ‘Without Policy’ forecast traffic flow scenarios.

6.4.29. The nature of the LTS scheme is suggests that any occurrence of landslide incidents or roads closures to the A83 mainline beyond the assumptions made in the appraisal would lead to an increased TEE benefits produced from the scheme and increase the BCR. This is reaffirmed by the results of the landslide sensitivity tests presented in Table 6-11.

6.4.30. The full TEE and AST tables for the core scenario are include within the Annex of this document.

7. Wider Economic Impacts

7.1. Overview

7.1.1. This section summarises the findings from a Wider Economic Impact (WEI) Assessment undertaken for the proposed A83 Access to Argyll and Bute scheme. It follows the principles and framework that were already established within the previous analysis carried out in the *A83 Access to Argyll and Bute – DMRB Stage 2 Scheme Assessment Report (Volume 1 – Part 4 Traffic and Economic Assessment)*. The same framework was also captured in the Appraisal Specification Report prepared for DMRB Stage 3 assessment.

7.1.2. The established approach for WEI assessment is focused on three steps, as follows:

- Define the socioeconomic function of the A83 through assessing the relationship and impact of the A83 on a multitude of economic agents.
- Examine the scope of potential wider impacts associated with the forecast transport output
- Confirm the scope of the WEI analysis and undertake assessment

7.1.3. The first two steps above sought to define the roles of the A83 in transport and non-transport markets, assessing how such roles may be affected by forecast changes that may be brought by the proposed scheme in terms of travel time and reliability.

7.1.4. Findings from the first two steps then helped to relate the anticipated transport outcomes from the scheme to potential economic impacts in the current appraisal framework (Scot-TAG and DfT's TAG), which subsequently shaped the scope of the WEI assessment that was carried out in the last step.

7.2. Understanding the socio-economic function of the A83

7.2.1. The A83 which passes through the Rest and Be Thankful (RABT), is a key arterial road in Scotland that plays a crucial socioeconomic role within the local region.

The A83 is one of only two east-west strategic routes from Argyll & Bute to the Central Belt of Scotland, which covers approximately 70% of Scottish population. The A83 connects rural communities with larger urban centres, fostering regional economic development and social cohesion. The road facilitates the movement of goods, services and people, supporting access to markets, healthcare, education and employment opportunities.

7.2.2. The socio-economic function of the A83 was explored following a structured approach, by examining its relationship with four groups of economic agents as shown in **Figure 7-1** and understanding the extent of the impact of landslides and related road closures on each aspect.

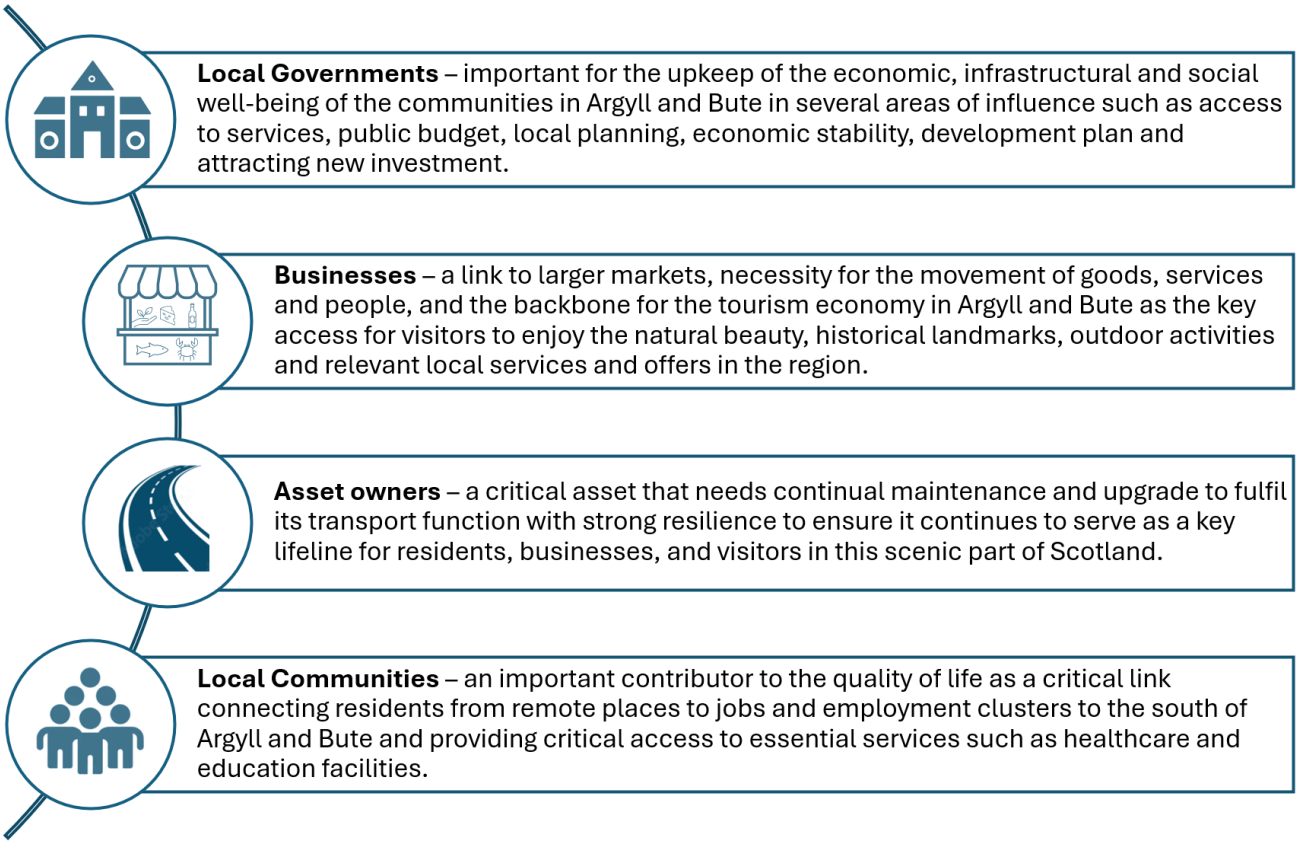

Figure 7-1 – A Summary of the Socio-Economic Function of the A83

Local Government

What is the relationship?

7.2.3. The relationship between the local government and the A83 is tied to economic, infrastructural and the social well-being of the surrounding communities, particularly in Argyll and Bute. Argyll & Bute Council has had to frequently address disruptions relating to the A83 landslide issues.

What is the extent of the impact?

7.2.4. The landslides on the A83, particularly around the RABT, significantly impact Argyll & Bute Council.

7.2.5. The A83 is considered vital for both daily commutes and regional economic activities, therefore frequent disruption and road closures has meant that Argyll & Bute Council (working in partnership with other organisations) has faced increased pressure to mitigate the effects of the A83 landslides. The costs for emergency responses and temporary solutions may have put a strain on public budgets and diverted finances away from other key areas such as housing, education, and other public services.

7.2.6. Despite mitigation measures, the unpredictable nature of the landslides continues to challenge local planning and economic stability. The Argyll and Bute Local Development Plan 2 proposes a range of future development in key areas such as housing, industry, business, public facilities and infrastructure. The disruptions caused by the road closures would not only hamper development plans but also limit the region's ability to attract new investment further impacting local governments in terms of potential loss of income through business rates. [1] [2] [3]

7.2.7. The disruptions from the A83 also mean that Argyll & Bute Council faces challenges in maintaining access to essential services such as health services,

[1] Transport Scotland's A83 Improvements Project
[2] Strategic Transport Projects Review 2
[3] Local Development Plan 2 | Argyll and Bute Council (argyll-bute.gov.uk)

emergency services, and other public services which often experience delays or difficulties reaching remote areas due to the road closures and lengthy detours.

7.2.8. Overall, the A83 landslides have created a complex set of issues for local governments, affecting a multitude of areas such as infrastructure, public services and the regional economy.

Businesses including tourism and other sectors

What is the relationship?

7.2.9. The A83 plays a crucial role in the business sector of the Argyll and Bute region. Its main purpose being that it links the local economy to larger markets and facilitates the movement of goods, services and people. Because of the rural nature of the area, the pattern of employment in the region of Argyll and Bute is different to the Scottish average. As of 2022, Argyll and Bute has 6.1% of people working in seasonal industries such as the agriculture, forestry and fishing, far higher than that of the Scottish average which stands at 1.8%.[4] Businesses in those sectors heavily rely on the A83 for transportation and trade.[5] Smooth and timely transport access plays an important role for these seasonal industries as businesses and workers may be presented with a relatively small time window to make their income for the entire year, and during the off season, workers may opt to commute to other areas to seek employment for higher earnings.

7.2.10. The A83 also plays a significant role in supporting tourism in Argyll and Bute, providing key access for visitors to appreciate the natural beauty, historical landmarks, and outdoor activities offered in the region. The A83 plays an important role in supporting tourism-related activities and sectors. It not only provides a scenic route that draws visitors to attractions such as the RABT and Loch Lomond, but also provides access to destinations such as Kintyre Peninsula and Scottish Isles via ferries. The tourism economic performance of the UK has been increasing since the decision of BREXIT in 2016 due to the fallen value of

[4] Business Register and Employment Survey (2022), Nomis
[5] Economy | Argyll and Bute Council (argyll-bute.gov.uk)

the pound sterling making the UK more attractive to prospective international visitors, which has also resulted in more 'staycations' for UK residents. This impact has filtered through to Scotland and Argyll & Bute. The STEAM (Scottish Tourism Economic Activity Monitor) data published by Argyll and Bute Council in its 2018 Update on Tourism Activities[6] suggests that Argyll and Bute received more than 1.3million visitors in the first half of 2017, an increase of 13.1% on 2016, which also had knock-on impacts on sectors such as food and drink (2.9%), shopping (11.6%) and transport (11.9%).

7.2.11. The Covid-19 pandemic impacted the local tourism sectors in a similar way to elsewhere in the world, and no statistics on the number of visitors in recent years were found. However, a glimpse of the recovery since Covid-19 can be seen by comparing the annual number of ferry passengers carried, as the Argyll and Buteferry network tends to be heavily influenced by tourism. **Table 7-1** below shows changes in passenger numbers on all Calmac routes[7] between 2016 and 2023.

Table 7-1 – Annual passenger carried between 2016 and 2023 across all ferry routes

Year	2023	2022	2021	2020	2019	2018	2017	2016
Passengers in million	5.1	4.9	3.9	2.4	5.7	5.5	5.2	5.1

7.2.12. The impact of Covid-19 can be clearly observed from the table above, but the passenger numbers already recovered in 2023 to the 2016 level, which implied the number of tourism visitors to the region may have also returned to a similar level in 2016.

7.2.13. Referring back to the information published by Argyll and Bute Council in its tourism update, as of 2016, tourism employs nearly 25% of private sector jobs and 9% of local GVA, compared to a 3% average for Scotland. It is therefore inferred

[6] Update on Tourism Activities.pdf (argyll-bute.gov.uk)
[7] Annual Carrying Statistics | CalMac Ferries

that these statistics may still be broadly applicable given the analysis above. The A83 will support this extremely important sector for Argyll and Bute in the following ways:

- Not only a scenic drive itself but also a main access route to Argyll and Bute – one of the primary routes connecting Glasgow and the central belt of Scotland to Argyll and Bute.
- Access to ionic tourist attractions such as Inveraray, Loch Lomond, the Trossachs national park and RABT.
- Key route for accessing outdoor and adventure tourism such as hiking, cycling, sailing and wildlife watching.
- Vital links to remote tourist destinations such as Kintyre Peninsula and west coast islands via ferries.
- Support for small businesses and food and drink tourism such as hotels, B&B, restaurants, shops, local seafood, whisky distilleries and artisanal producers.

What is the extent of the impact?

7.2.14. The disruption due to the landslides experienced on the A83 RABT considerably impacts the local business sector. Overall businesses in the region depend on visitors, transportation, deliveries and access to workforce to maintain business function. Disruption from frequent unplanned road closures significantly impacts local business through supply chain challenges, reduction in visitors and increased operational costs due to increased time and fuel costs because of lengthier detours.[8] Overall business performance is impacted by worsened reliability for accessing markets, services or simply workers not able to reach their workplace in time which in turn impacts their productivity.

7.2.15. For example, businesses in the prominent sectors such as agriculture, forestry and fisheries rely on the A83 for the transportation of goods. When the road is closed, businesses in these seasonal industries face delays and increased transportation costs, as alternative routes are longer and less reliable. This will

[8] Breakdown of road closure on A83 Rest and Be Thankful: EIR release - gov.scot (www.gov.scot)

directly affect the supply chain, reducing business efficiency and overall productivity.

7.2.16. Frequent but unplanned closures of the A83 can also affect tourism by limiting access to key areas and disrupting travel plans. Ultimately, the inconvenience of navigating alternative routes and the uncertainty of road conditions may make the area less attractive to potential visitors. Reliable operation of the A83, therefore, is vital for ensuring that tourists can reach their destinations safely and efficiently.

7.2.17. The adverse impact from unplanned road closure also goes beyond sectors that are heavily reliant on logistics, and extends to other local businesses such as hotels, restaurants, retailers, service providers and other businesses in the visitor economy for the region. When landslides occur, local businesses may see a reduction in foot traffic and delays in delivery of goods affecting stock and customer service.

7.2.18. On a broader level, both business and investor confidence in the region can also suffer due to the uncertainty surrounding the road closures, overall hampering the long-term economic growth and economic sustainability of the region.

Asset owners

What is the relationship?

7.2.19. The A83 road is operated and managed as a vital public asset by Transport Scotland, Transport Scotland oversees three functions related to the A83, including:

- Strategic and resilience planning to identify priorities for improvements and investment needed to address key operational issues and protect the asset from further disruptions.
- Maintenance of the road, routine repair, emergency response, ensuring the road remains functional year-round.
- Resilience measures to mitigate risks like landslides at sections such as the RABT.

7.2.20. Transport Scotland does so by collaborating with private contractors, local authorities, and other stakeholders to ensure the road remains functional, resilient, and capable of supporting the economic, business and tourism needs of Argyll and Bute. The relationship between the A83 and the asset owner is therefore focused on maintaining and upgrading the road while ensuring it continues to serve as a key lifeline for residents, businesses, and visitors in this scenic part of Scotland.

7.2.21. The Scottish Government's National Transport Strategy aims to improve transport links across Scotland and support inclusive economic growth. The A83 plays a key role within this strategy as it functions as an important road in western Scotland, connecting areas like Campbeltown, Inveraray, Lochgilphead and numerous islands including but not limited to Islay to larger transport networks. The road is essential for ensuring that local assets such as businesses, community facilities and infrastructure are accessible and sustained, overall in the interest of local asset owners.

What is the extent of the impact on them?

7.2.22. The frequency of landslides on the A83 at the RABT section has significant impacts on Transport Scotland, as they are the primary asset owner responsible for all three aforementioned functions, i.e., strategic and resilience planning, maintenance of the road and implementation of resilience measures.

7.2.23. The landslides have required costly repairs and mitigation efforts, and in recent years Transport Scotland has invested over £16 million in landslide mitigation works such as debris flow fences, catchpits and improved drainage systems to reduce the frequency and severity of the road closures[9]. It also identified permanent diversion routes to ensure road closures do not completely disrupt traffic and undertook ongoing studies to explore long-term solutions to the problems.

[9] Access to Argyll and Bute (A83) (transport.gov.scot)

7.2.24. Contrastingly, as the A83 passes through areas of significant natural beauty and heritage, Transport Scotland has to take into account of environmental and community considerations for any proposed changes to the road. Local environmental groups have often raised concerns about the impact of the roadworks and landslide mitigation measures on the natural landscape of the area and wildlife protection. For property owners, especially those involved in tourism, preserving the scenic value of the area is crucial as it is a key selling point for attracting visitors.

7.2.25. Turning to the view of local asset owners such as those that own property and businesses within the surrounding areas, the closures to the A83 have hindered access to and from local areas, overall posing significant risks to local asset owners within these surrounding areas. The concerns relating to this could deter prospective home buyers to the local area, having an overall negative impact on property value.

Local communities

What is the relationship?

7.2.26. The relationship between the A83 and local communities reflects the findings from the previous analysis about businesses and local governments, as local businesses are integral to local communities, which are served by local governments.

7.2.27. Data from the Preliminary Assessment of Route Corridors[10] shown in **Figure 7-2** suggests that the A83 Trunk Road through RABT carries over 4,400 vehicle trips per day, serving a variety of purposes (such as transportation, commerce and tourism) to a variety of destinations including Campbeltown, Lochgilphead, Inverary and Rothesay / Dunoon, making it vital for the local community.

7.2.28. Based on information from **Figure 7-2**, the A83 near RABT covers about 20% commuting trips, 4% for Education and 75% for other home and non-home based

[10] Access to Argyll and Bute Wider Economic Impacts: Preliminary Assessment of Route Corridors, Jacobs/Aecom/Transport Scotland, April 2021

purposes, which shows a split of purposes broadly similar to the Scottish average. A significant part of the commuting trips are from places further afield, such as Rothesay/Dunoon, Lochgilphead, (which is the destination of the largest employment site within the area), and Campbelltown. This suggests one function of the A83 is to connect residents from remote places to employment opportunities and clusters to the south of Argyll and Bute.

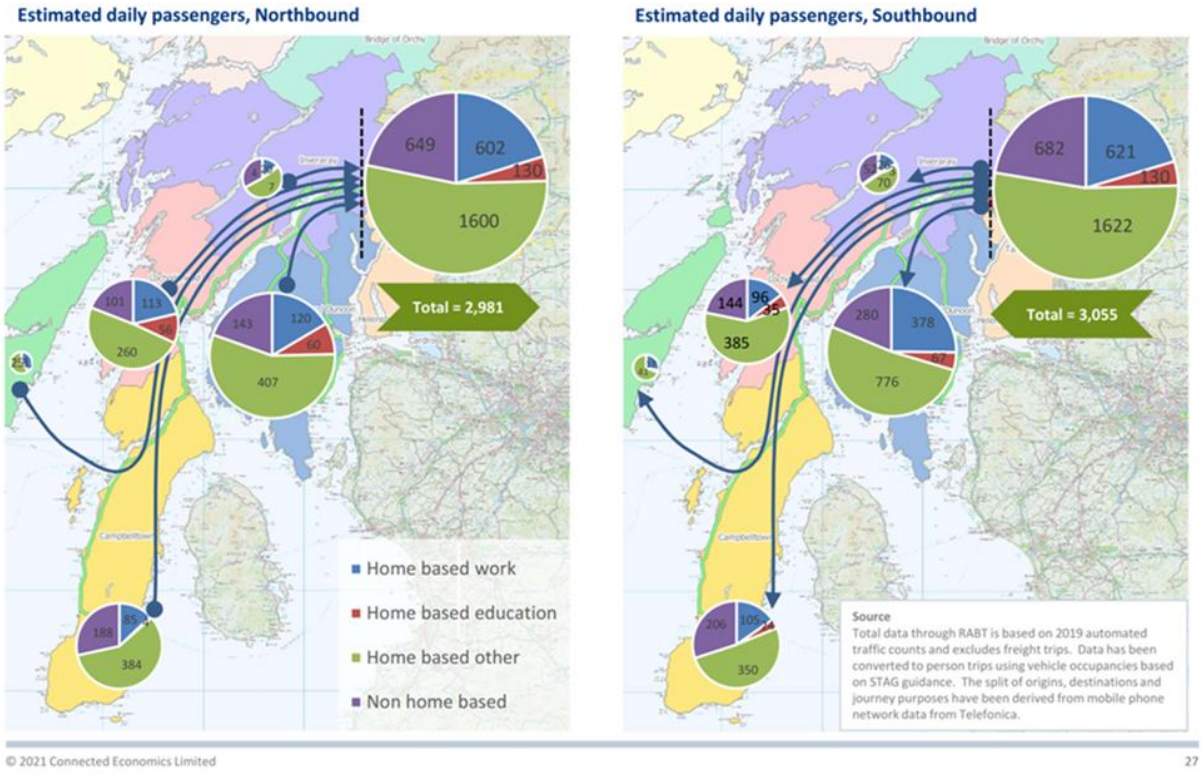

Figure 7-2 – Distribution of approximately 6,000 people travelling through RABT per day in 4,400 vehicles

7.2.29. Information from the NTDS database (presented earlier in the report) suggests the number of vehicles going through A83 varies significantly throughout the year, usually ranging from approximately 3,000 in the Winter to 5,500 vehicles in the Summer. This broadly aligns with the number presented in **Figure 7-2** and does not change the essence of A83's role discussed here.

7.2.30. In addition to connecting the workforce with opportunities, the A83 provides critical access to essential services such as healthcare and education facilities, as well as future growth opportunities, as shown in **Figure 7-3**.

7.2.31. Using access to further and higher education opportunities as an example, the University of Highlands and Islands (UHI) is Argyll's largest provider of further and higher education, with nine campuses throughout Argyll and Bute. With nearly 31,000 students studying per year, it is estimated to contribute £560 million annually to the region, indirectly supporting 6,200 jobs[11]. For rural communities across Argyll and Bute, the A83 strategically supports access to many of these campuses, the educational opportunities they provide and the economic value that they generate.

7.2.32. A similar argument applies to access to healthcare and future growth priorities identified. The Rural Growth Deal[12] priorities shown in **Figure 7-3** comprise a £70 million package of investment that aims to transform the area's natural resources and business innovation into a thriving local economy. The A83 can support these aspirations by:

- connecting high value business sectors with national and international markets
- attracting skills, visitors and businesses, and also enabling training and learning opportunities.
- making more of the natural and built resources in the region

What is the extent of the impact on them?

7.2.33. **Figure 7-3** shows the location of key healthcare and education facilities, alongside the Rural Growth Deal priorities, in relation to the A83 RABT. It is clear that the transport role of the A83 is an integral part of a wider system that supports the local communities.

[11] Source: Our centres - UHI Argyll and UHI Strategic Plan, 2021 – 2025
[12] Source: Rural Growth Deal (argyll-bute.gov.uk)

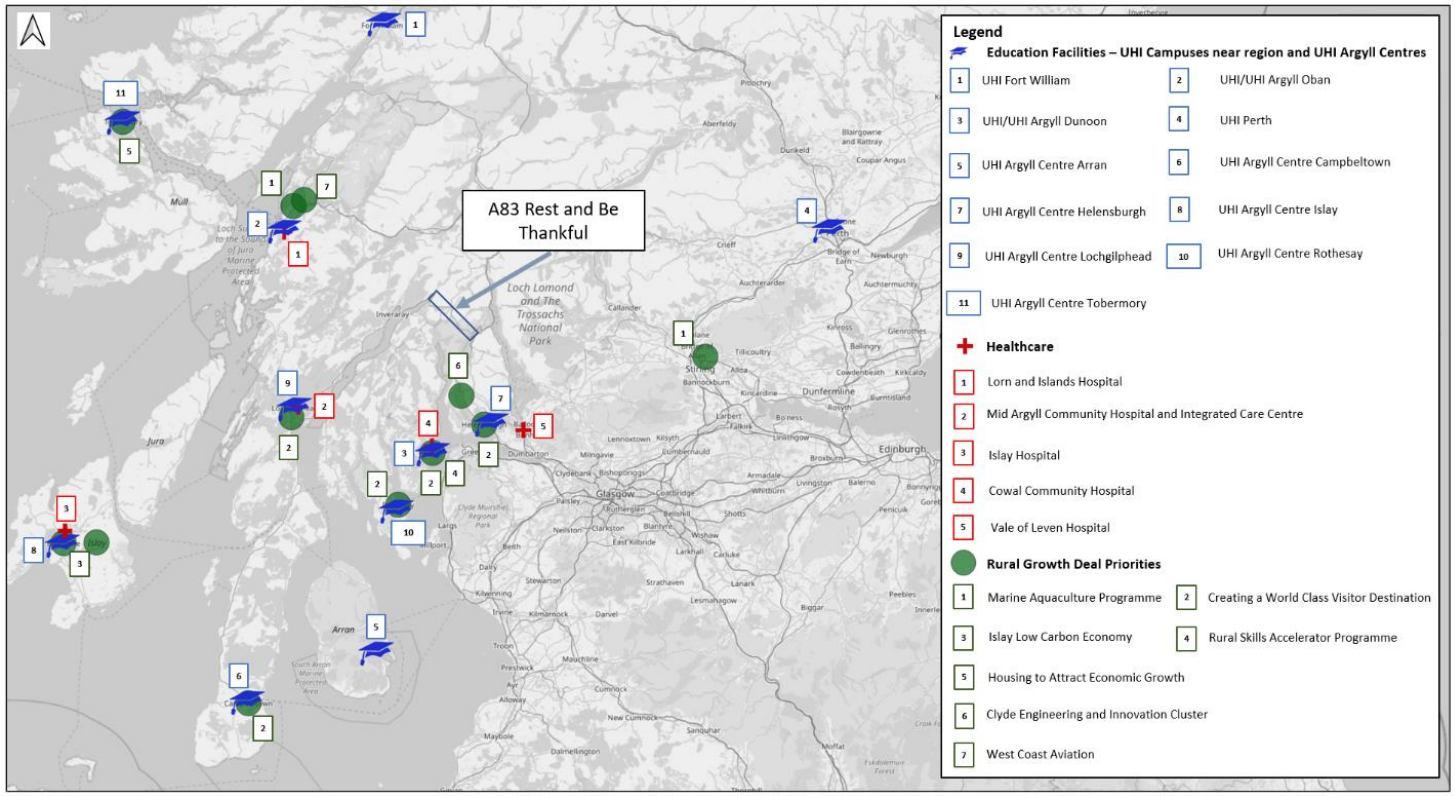

Figure 7-3 – A83 RABT relative to Key Education and Healthcare Facilities, alongside Rural Growth Deal priorities

7.2.34. Frequent and unplanned disruptions and road closures on the A83 can adversely impact its roles in supporting the day-to-day activities of the local communities. These include but are not limited to:

- Connecting rural communities with employment clusters, investment and growth opportunities in sectors including but not limited to tourism and hospitality, aquaculture and fisheries, forestry and wood processing, creative industries, energy and renewables.
- Access to healthcare and social services, such as hospitals for emergency, inpatient care and outpatient clinics, GP, dental and community health services, and care homes.
- Access to schools, outdoor education, further education and higher education, such as the University of Highlands and Islands (with nine campuses throughout Argyll and Bute).

7.2.35. These effects are both immediate and long term. The landslides and associated road closures has meant that use of alternative routes impacts rural communities such as Inveraray, Tarbet and Campbeltown and their access to larger towns or cities in terms of work, education, healthcare and other public services. Delayed access to such public services in particular healthcare and education can have their own long-term impacts on communities. For instance, journey time delays can impact students' attendance and performance at schools as missing lessons could mean gaps in learning and potentially lower academic performance. Similarly, delayed access to healthcare could lead to worsened health outcomes, particularly for chronic conditions that require regular monitoring and treatment.

7.2.36. The negative impact on business activity due to the disruption can also translate into high unemployment levels, as businesses look to reduce costs. High unemployment levels within the community can create a cyclical impact as unemployment leads to reduced household incomes and consumer spending, potentially leading to further job losses.

7.3. Examine the scope of potential wider impacts

7.3.1. Insights on the socio-economic function of the A83 developed in Section 6.2 informed the scope for the assessment of relevant wider economic impacts from the proposed scheme.

7.3.2. Firstly, a national framework[13] for a full spectrum of potential wider economic impacts from transport investment was examined in the context of their relevance to the scheme considering the socio-economic functions of the infrastructure asset and transport changes anticipated from the proposed scheme.

7.3.3. The examination of relevant impacts was supported by a benefit logic map, underpinned by findings from Section 6.2, highlighting the rationale for intervention, inputs, outputs and outcomes expected from the interventions, illustrating the transmission mechanism for the anticipated potential benefits to the wider economy.

7.3.4. The key change brought about by the scheme, is the improvement to journey times and reliability for the users of the A83 through Glen Croe, and its knock-on impacts on key stakeholders (local governments, businesses, asset owners and local communities as examined in Section 6.2). These changes and impacts drove the range of transport and non-transport outputs, outcomes and impacts on the members of the public, businesses, communities and our economy.

7.3.5. From a transport perspective, the proposed interventions are expected to result in a more reliable east-west strategic route connecting Argyll and Bute with Central Belt. The access of Argyll and Bute business sectors to labour/skills, visitors and markets further afield through the year will also be maintained. This will benefit all stakeholders, business sectors and local communities as discussed in Section 6.2 and outlined in the logic map in **Table 7-2**.

[13] Wider economic impact framework in accordance with the guidance in TAG Unit A2.1 (Source: TAG unit A2.1 wider economic impacts appraisal, May 2018 (publishing.service.gov.uk)).

Table 7-2 – Benefit logic map

Problems	Inputs	Outputs	Outcomes	Impacts
What is the case for change?	**What are the activities and inputs?**	**What will be the outputs?**	**What will result from the outputs?**	**What will be the benefits?**
• Frequent road closures of the RABT section of the A83 due to landslides. • Increased journey times and reduced reliability due to the partial diversion onto the OMR and the full diversion route via the A82/A819.	**Medium-Term Solution** • An upgrade to the one-way section of the existing OMR through reducing its existing length from 2.7km to 1.3km. **Long Term Solution** • The A83 Glen Croe corridor will be part of the LTS, with the interventions consisting of debris flow shelter, putting a roof over the road supported by robust protection wall on the hill ward side and a series of columns on the valley side to maintain an open aspect to the glen. • A catch pit behind the protection wall to channel land slip material and rock fall, allowing it to be removed safely and efficiently without adversely impacting the road user or the slopes below the A83. • Relevant funding to deliver the interventions proposed	• A reduction to the one-way section of the OMR from 2.7km to 1.3km, • The construction of a debris flow shelter, robust protection wall and a series of columns on the valley side to maintain the open aspect of the glen.	**Transport users** • Significantly improved reliability for road users **Governments** • Improved accessibility for public services • Improved transportation links for businesses **Business Sector** • Improved access to labour pool, supply chains, customers and visitors. • Improved delivery times for goods and services **Asset Owners** • Better, more reliable and resilient assets. • More successful resilience planning **Local Communities** • Improved transport and accessibility to amenities and public services. • Improved access to the workplace and other opportunities	**Transport users** • Savings in travel costs from better reliability **Governments** • Better public satisfaction • Lower strain on budgets • Accelerated development plans • Tax revenue from new inward investment. **Business Sector** • Higher revenue for businesses in visitor economy from increased number of visitors • Improved productivity levels **Assets Owners** • Cost savings in repairs and mitigations • Improved public satisfaction **Local Communities** • Improved welfare and better quality of life from improved access • Reduced unemployment or better labour participation • Improved scenic value and property value

7.3.6. Findings from the examination of relevant wider economic impacts in accordance with insights captured in the logic map are presented in Table 6-3, which summarises the range of potential benefit streams deemed relevant after the assessment in the context of the proposed interventions.

Table 7-3 - Scope of economic impacts from changes brought by the scheme

Benefit Streams	Impacts from changes brought by the proposed scheme
User impacts	**Real time savings** and **welfare benefits for transport users** from improved journey experience from reduced delay, better journey planning and improved reliability
Productivity impacts	Improved reliability will **reduce the costs for commuting and business journeys** within Argyll and Bute, and to markets and suppliers in the central belt, the rest of Scotland and Great Britain. The reduced travel costs may **enhance the Access to Economy Mass** for Argyll and Bute, which in turn leads to **uplift in productivity** for local firms and workers.
Employment effects	Reduced costs (due to decreased journey time) for commuting may **encourage higher labour participation** from the economic active population and **increase the reach to potential labour pool** for businesses in areas where tangible time savings and / or reliability improvement are expected.
	Faster journeys on the A83 without disruption also present opportunities that may lead to **relocation of workers / jobs**, make the area more attractive to **inward investment** and facilitate **development growth**, due to variations in productivity between regions, skill levels/occupational mix, specialisation, stock of knowledge and market access.
Induced investment	This may include but not limited to workers, firms and investors exploiting differences in factor endowments such as environment and natural resources for tourism, mining and renewables, and the thriving creative industry in Argyll and Bute for opportunities in traditional arts (visual, performing, music, literature and crafts) and digital industry.

7.3.7. These benefit streams identified were assessed qualitatively and quantitatively. Findings from the assessment are reported in the section that follows.

7.4. Findings from the Assessment

7.4.1. The scope of the wider economic impact assessment for the A83 RABT scheme has been identified following the narrative on its economic function and forecast changes as described in Section 7.2, in accordance with the wider economic

impact framework in TAG Unit A2.1[14]. Findings from the assessment are presented in this subsection, as follows:

- An overview of the findings from the assessment.
- Elaboration of the assessment of productivity impacts
- Elaboration of the assessment of induced investment
- Quantifying the overall social and economic value

Overview of the findings

7.4.2. A summary of the findings from the wider impact assessment is presented in **Table 7-4**, including a qualitative assessment of the potential impacts and their likely welfare and GDP impacts.

Table 7-4 - Overview of the Findings from the Wider Economic Impact Assessment

Benefit Streams	Assessment	Welfare Impacts	GDP Impacts
User impacts	Quantified in the PVB Present Value Benefit from the transport user impacts appraisal. Impact is **positive** but the scale of benefit may be modest compared with the cost due to the low traffic volume	User time and travel cost benefits from business, commuting and leisure trips	Impacts on business users which is a part of the overall welfare impacts
Productivity impacts	**Positive** impact driven by faster journey time and better reliability enhancing three pillars of agglomeration (sharing, matching and learning) in the local economy.	Uplift in productivity because of enhanced agglomeration (access to economic mass)	
Employment effects	**Likely to be positive**. Reliable and resilient access to job opportunities will encourage better labour participation, particularly reducing involuntary unemployment given the significant journey time and unplanned disruptions at present. The scale of benefits can only be significant when	40% of the GDP impacts (to the right) to represent the tax revenue income from more people working	Increase in GVA when there are more people working

[14] https://assets.publishing.service.gov.uk/media/5fc8b4bdd3bf7f7f52707867/tag-a2-1-wider-economic-impacts-appraisal.pdf

	the intervention is delivered in a complementary package (transport and non-transport interventions), and therefore better to be appraised as **part of a holistic package** that brings step changes.	30% of the GDP impacts (to the right) to represent the tax revenue income	Net increase in GVA when workers / jobs relocate
Induced investment	Likely to be **positive but modest** as imperfect competition is likely to be present in the remote rural economy	Increased economic output in imperfect competitive market (10% of business user benefits)	
	This is likely to be **positive,** but the impact can only be **significant if implemented as part of a holistic package**. Quantification is only appropriate with clarity on specific development opportunities and strong evidence for dependency (without the A83 Rest and Be Thankful scheme, the development cannot be delivered).	Land Value Uplift from developments unlocked by the A83 scheme	Additionality applied

7.4.3. Specific benefit streams in the table above were explored in more depth as part of the assessment. This includes productivity impact and induced investment, which are documented in the following sections. An attempt to give a high-level quantification of the social and economic value of the road is documented in Section 7.4.10, which valued the social and economic activities supported by journeys made on the A83 at approximately £40m (2024) to £140m (2060) per year as a minimum. Comparison of traffic data from 2020 and other recent years suggests that a major landslide is likely to disrupt about 1/3 of these activities, and this level of disruption could happen again in the future without interventions.

Productivity Impacts

7.4.4. Individuals and firms derive productivity benefits from locating in close proximity to other individuals and firms. These benefits arise because of individuals and firms interacting with one another and are an important factor in the formation of clusters; also known as agglomeration. Agglomeration economies arise from improved labour market interactions, knowledge spill-overs and linkages between intermediate and final goods suppliers, which can occur within an industry and/or across industries.

7.4.5. WITA[15] is the standard appraisal tool recommended for quantifying potential productivity impacts, which assesses agglomeration impacts in individual origin areas defined based on one or multiple Local Authority Districts (LAD). As Argyll and Bute is defined as a single LAD, which is the finest level of spatial resolution that can be assessed in WITA. This level of resolution (treating Argyll and Bute as a whole) is too coarse for a meaningful assessment with a reasonable level of robustness given the size of the scheme and its modest traffic impact.

7.4.6. In the absence of quantified forecast, a high-level "what-if?" analysis was undertaken to perceive the potential of productivity uplift from the scheme. **Table 7-5** presents the total GVA by sector in Argyll and Bute along with the sectoral average productivity compared to the national average. It can be seen that consumer services and producer services are the two weakest sectors in Argyll and Bute in terms of the average productivity. However, judging by the size of the relevant economic activities as measured by their combined GVA (over £900m), these two sectors account for approximately 70% of the GVA in Argyll and Bute. A marginal 1% uplift in the average productivity of these two sectors, assumed as the potential outcome from transport investment represented by enhanced agglomeration, represents a potential £9 million increase in the GVA from the region per annum.

Table 7-5 - An Overview of Divergence in Productivity by Sector

Sector	Total GVA by Sector in Argyll and Bute	Total GVA by Sector in Argyll and Bute as %	Productivity in Argyll and Bute	Productivity in Scotland	Difference in Productivity with National Average
Manufacturing	£252,222,161	19%	£98,933	£99,743	-1%
Construction	£166,494,004	12%	£55,086	£59,408	-7%
Consumer services	£657,801,616	49%	£37,968	£49,333	-23%
Producer services	£254,926,422	19%	£41,234	£62,220	-34%

[15] TASM (tagsoftware.co.uk)

Induced Investment

7.4.7. Induced investment refers to changes in the productive capacity of the economy as a result of a transport investment. In appraisal practice it may be two-fold. On one hand, it refers to additional output from the businesses which benefit from the enhanced connectivity with increase in their output higher than the changes in the marginal cost, under imperfect competition. On the other hand, changes in transport connectivity and productive capacity of the economy may affect the level and location of economic activity, and as a result output, employment and productivity. However, the scale of such changes can only be significant when any transport intervention is delivered as a part of a holistic package that alters the use of land.

7.4.8. For increased output under imperfectly competitive market, improved accessibility and/or reductions in generalised travel costs as a result of the scheme will lower the costs of production for businesses. The corresponding increase in output from these firms is greater than the time savings captured in the conventional appraisal of business user benefits under imperfect competition. This additional benefit can be captured as a wider economic impact, as advised in TAG Unit A2.4, by applying a 10% uplift factor to the business users' transport impacts (part of the total PVB presented in Section 6.4 of this report). It can be seen from the total Present Value Benefits presented in this report that 10% of the forecast user benefits (as a proxy for output increase under imperfect competition) is a modest value.

7.4.9. For induced investment relating to more significant changes to the level and location of economic activity, whilst a positive impact is expected, these impacts were not quantified in the absence of specific development opportunities (or their dependence on the proposed scheme) to inform robust Land Use and Transport Interaction modelling and / or Land Value Uplift assessment.

Quantifying the social and economic value

7.4.10. Although the wider economic impacts assessment undertaken is largely based on narrative, qualitative assessment and "what-if?" analysis, it is important to recognise that the value of the social and economic activities supported by the journeys made on the A83 can be very significant. Analysis presented in this

subsection is an attempt for a conservative estimate of such value to corroborate the narrative developed.

7.4.11. The logic behind this analysis is based on a simple assumption that the value of all social and economic activities enabled by the journeys on the A83 must be at least higher than the cost for making these journeys. Therefore, by quantifying and monetising the time spent on making these trips, it is possible to establish an approximate, conservative estimate of the floor value of activities supported. This estimate can be used as an approximate representation of the minimal social and economic value of the infrastructure.

7.4.12. The estimate of the floor value was based on assumptions on the average journey time and the volume of traffic per year on the A83.

7.4.13. It was acknowledged in Argyll and Bute Transport Connectivity and Economy Research Study[16] that most road journeys are 50 miles or more and that this is evident in the relatively long distances travelled by some commuters and students. The study also suggested that the vast majority of car journeys between the five main settlements in Argyll and Bute and to/from Glasgow take over 1.5 hours and most are over 2 hours. This reflects the nature of Argyll and Bute with very low population density of 13 persons per hectare[17]. An average journey length of 90mins was therefore assumed for the purpose of this assessment.

7.4.14. The average annual traffic volume was established based on the data in NTDS database from 2019 to 2024. Assumptions for the annual traffic volume on the A83 are approximately 1.5m vehicles in a regular year with minor landslide events, which will reduce to just under 1m vehicles a year with a major event (such as 2020).

7.4.15. Combining the assumptions on average travel time and traffic volumes, the total time that transport users spent on the A83 was estimated, which was then monetised to the market price of individual future years based on the assumed

[16] Committee Report Council HIE Transport Connectivity Study 9.09.16 v0 4.pdf (argyll-bute.gov.uk)
[17] Population: Where We Live | Argyll and Bute Council (argyll-bute.gov.uk)

Value of Time. The value of time spent on the A83 was therefore quantified as shown in **Table 7-6**. This table suggests that the A83 is supporting social and economic activities that are worth at least £39m per annum in 2024. This figure goes up in the future and will reach £142m per annum in 2060. When there was major disruption from landslide (without the proposed intervention), the value of activities that were disrupted (i.e. trips diverted to longer routes or supressed) is about approximately 35% of the total values estimated. These estimates are conservative as no future growth in traffic was considered and the monetised value of travel time is also much smaller than the activities supported by the journeys made. However, even these conservative annual estimates are significant in value and will amount to billions when summed over a longer period. This finding corroborates the narrative developed in the wider economic impacts assessment about the significant role of the A83 to the local and regional economy and communities. The proposed scheme will ensure that the A83 can continue to support the significant value of social and economic activities reliant on the infrastructure and avoid disruption to transport connectivity and the associated activities in the future.

Table 7-6 – Minimal value of social and economic activities supported by trips made on the A83 per year (all journeys and journeys disrupted)

Year	Minimal Value of Social and Economic Activities supported per annum	Minimal Value of Social and Economic Activities disrupted in a year with major landslide
2024	£39m	£14m
2030	£47m	£17m
2040	£69m	£24m
2050	£99m	£35m
2060	£142m	£50m
** all monetary values in this table are presented nominal terms for specific years. Estimation of monetary impacts was driven by traffic volume observed between 2019 and 2024 with no future growth assumed.*		

Annex – TEE and AST

Annex A – Transport Economic Efficiency (TEE) Table- With Policy Ambition Scenario - LTS Flow Shelter Core

Non-business: Commuting	**ALL MODES**		**ROAD**
User benefits	**TOTAL**		**Private Cars and LGVs**
Travel time	£ 4,183,111.16		£ 4,183,111.16
Vehicle operating costs	£ 90,731.84		£ 90,731.84
User charges	£ -		£ -
During Construction & Maintenance	-£ 1,605,332.34		-£ 1,605,332.34
NET NON-BUSINESS BENEFITS: COMMUTING	£ 2,668,510.66	*(1a)*	£ 2,668,510.66

Non-business: Other	**ALL MODES**		**ROAD**
User benefits	**TOTAL**		**Private Cars and LGVs**
Travel time	£ 6,073,428.90		£ 6,073,428.90
Vehicle operating costs	£ 173,397.16		£ 173,397.16
User charges	£ -		£ -
During Construction & Maintenance	-£ 2,361,116.57		-£ 2,361,116.57
NET NON-BUSINESS BENEFITS: OTHER	£ 3,885,709.50	*(1b)*	£ 3,885,709.50

Business			**Goods Vehicles**	**Business Cars & LGVs**
User benefits				
Travel time	£ 7,208,804.97		£ 2,668,136.99	£ 4,540,667.98
Vehicle operating costs	£ 447,669.06		£ 308,896.97	£ 138,772.09
User charges	£ -		£ -	£ -
During Construction & Maintenance	-£ 2,859,421.66		-£ 1,101,826.44	-£ 1,757,595.22
Subtotal	£ 4,797,052.38	*(2)*	£ 1,875,207.52	£ 2,921,844.86

Private sector provider impacts		
Revenue	£ -	
Operating costs	£ -	
Investment costs	£ -	
Grant/subsidy	£ -	
Subtotal	£ -	*(3)*

Other business impacts

Developer contributions	£ -	*(4)*	£ -
NET BUSINESS IMPACT	£ 4,797,052.38	*(5) = (2) + (3) + (4)*	

TOTAL Present Value of Transport Economic Efficiency Benefits (TEE)	£ 11,351,272.54	*(6) = (1a) + (1b) + (5)*

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.

All entries are discounted present values, in 2010 prices and values

Annex B – Transport Economic Efficiency (TEE) Table- Without Policy Ambition Scenario – LTS Flow Shelter Core

Non-business: Commuting	**ALL MODES**		**ROAD**
User benefits	**TOTAL**		**Private Cars and LGVs**
Travel time	£ 7,220,359.19		£ 7,220,359.19
Vehicle operating costs	£ 121,067.56		£ 121,067.56
User charges	£ -		£ -
During Construction & Maintenance	-£ 1,795,677.54		-£ 1,795,677.54
NET NON-BUSINESS BENEFITS: COMMUTING	£ 5,545,749.21	*(1a)*	£ 5,545,749.21

Non-business: Other	**ALL MODES**		**ROAD**
User benefits	**TOTAL**		**Private Cars and LGVs**
Travel time	£ 10,483,187.40		£ 10,483,187.40
Vehicle operating costs	£ 231,371.59		£ 231,371.59
User charges	£ -		£ -
During Construction & Maintenance	-£ 2,641,077.76		-£ 2,641,077.76
NET NON-BUSINESS BENEFITS: OTHER	£ 8,073,481.23	*(1b)*	£ 8,073,481.23

Business				
User benefits			**Goods Vehicles**	**Business Cars & LGVs**
Travel time	£ 12,455,102.51		£ 4,617,573.80	£ 7,837,528.71
Vehicle operating costs	£ 599,623.90		£ 413,902.49	£ 185,721.41
User charges	£ -		£ -	£ -
During Construction & Maintenance	-£ 3,198,827.29		-£ 1,232,690.76	-£ 1,966,136.54
Subtotal	£ 9,855,899.11	*(2)*	£ 3,798,785.53	£ 6,057,113.58
Private sector provider impacts				
Revenue	£ -			
Operating costs	£ -			
Investment costs	£ -			
Grant/subsidy	£ -			
Subtotal	£ -	*(3)*		
Other business impacts				
Developer contributions	£ -	*(4)*	£ -	
NET BUSINESS IMPACT	£ 9,855,899.11	*(5) = (2) + (3) + (4)*		

TOTAL		
Present Value of Transport Economic Efficiency Benefits (TEE)	£ 23,475,129.55	*(6) = (1a) + (1b) + (5)*

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.

All entries are discounted present values, in 2010 prices and values

Annex C – Appraisal Summary Table

Sub-Criterion	Item	With policy ambition	Without policy ambition
Transport economic efficiency	Travel time	£ 17,465,345.03	£ 30,158,649.10
	User charges	£ -	£ -
	Vehicle operating costs	£ 711,798.06	£ 952,063.05
	Investment costs	£ -	£ -
	During Operating and maintenance	-£ 6,825,870.56	-£ 7,635,582.60
	Revenues	£ -	£ -
	Grant/Subsidy payments	£ -	£ -
	Monetised summary	£ 11,351,272.54	£ 23,475,129.55
	Monetary impact ratio	0.06	0.12
Cost to public sector	Public sector investment costs	£ 197,771,864.68	£ 197,771,864.68
	Public sector operating and maintenance costs	£ 1,735,441.57	£ 1,735,441.57
	Grant/Subsidy payments	£ -	£ -
	Revenues	£ -	£ -
	Taxation impacts	£ -	£ -
	Cost to funding agency	£ -	£ -
Monetised summary	Present value of transport benefits	£ 11,351,272.54	£ 23,475,129.55
	Present value of cost to government	£ 199,507,306.25	£ 199,507,306.25
	Net present value	-£ 188,156,033.72	£ 222,982,435.80
	BCR to government	0.06	0.12

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.

All entries are discounted present values, in 2010 prices and values