STRATEGIC TRANSPORT PROJECTS REVIEW

PROTECTING OUR CLIMATE AND IMPROVING LIVES

Initial Appraisal: Case for Change

Forth Valley Region

February 2021

Jacobs AECOM

STRATEGIC TRANSPORT PROJECTS REVIEW 2

Project No:	B2356701
Document Title:	STPR2: Initial Appraisal: Case for Change – Forth Valley Region
Revision:	Final
Date:	03/02/21

Jacobs UK Ltd

95 Bothwell Street
Glasgow, Scotland G2 7HX
United Kingdom

T +44.(0)141 243 8000
F +44 (0)141 226 3109

www.jacobs.com

Contents

Appendices

Appendix A: Figures
Appendix B: List of Policy Documents
Appendix C: Stakeholder Engagement

Figures

Tables

List of Acronyms

ACRONYM	
AADF	Annual Average Daily Flow
AQMA	Air Quality Management Area
BRES	Business Register and Employment Survey
CO_2	Carbon Dioxide
CRWIA	Children's Rights and Wellbeing Impact Assessment
dB	Decibels
DRT	Demand Responsive Transport
DPMTAG	Development Planning and Management Transport Appraisal Guidance
EqIA	Equality Impact Assessment
FSDA	Fairer Scotland Duty Assessment
GDP	Gross Domestic Product
GVA	Gross Value Added
HGV	Heavy Goods Vehicle
ICIA	Island Communities Impact Assessment
km	Kilometre
Lden	Day-evening-night noise level
LGV	Large Goods Vehicle
LNR	Local Nature Reserve
MaaS	Mobility as a Service
MPA	Marine Protected Area
NCN	National Cycle Network
NHS	National Health Service
No.	Number
NPF	National Planning Framework
NSA	National Scenic Area
NTS2	National Transport Strategy 2
ORR	Office of Road and Rail

RSPB	Royal Society for the Protection of Birds Reserve
RTP	Regional Transport Partnership
RTS	Regional Transport Strategy
RTWG	Regional Transport Working Group
SABI	Scottish Access to Bus Indicator
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SEPA	Scottish Environmental Protection Agency
SEStran	South East of Scotland Transport Partnership
SFBB	Superfast Broadband
SIMD	Scottish Index of Multiple Deprivation
SPA	Special Protection Area
SRMCS	Scottish Road Maintenance Condition Survey
SSSI	Site of Special Scientific Interest
STAG	Scottish Transport Appraisal Guidance
STPR2	Strategic Transport Projects Review
Tactran	Tayside and Central Scotland Transport Partnership
TMfS	Transport Model for Scotland
TPO	Transport Planning Objective
UFBB	Ultrafast Fibre broadband
USO	Universal Service Obligation

1. Introduction

1.1. Background and Report Purpose

Transport Scotland is currently undertaking the second Strategic Transport Projects Review (STPR2) to inform the Scottish Government's transport investment programme in Scotland over the next 20 years (2022 to 2042). STPR2 takes a national overview of the transport network with a focus on regions and will help deliver the vision, priorities and outcomes that are set out in the National Transport Strategy (NTS2)[1]. It is recognised that the vision set out in NTS2 will only come to fruition through working in partnership with others, including Local Authorities and Regional Transport Partnerships. This is particularly in areas of transport for which local authorities are responsible and which are not within the scope of this national strategic transport review.

STPR2 is being carried out in accordance with the Scottish Transport Appraisal Guidance (STAG)[2] which is an objective-led, evidence-based transport appraisal process. The 4 key phases of STAG are illustrated in Figure 1.

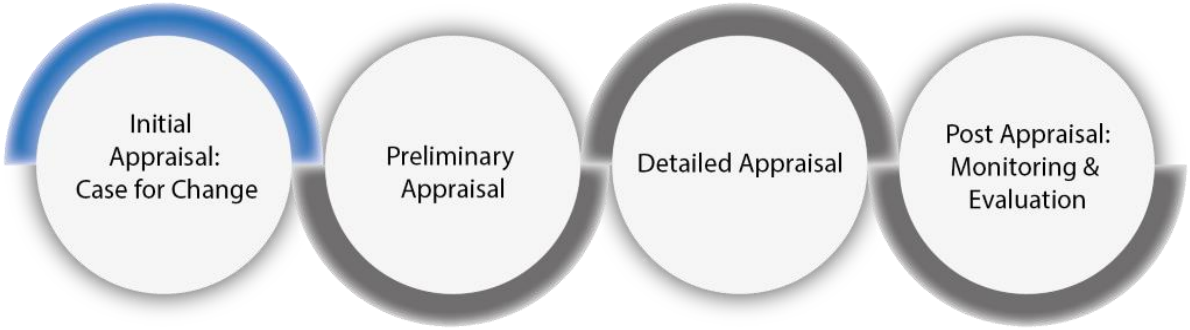


Figure 1: The 4 Key Phases to the Scottish Transport Appraisal Guidance (STAG)

This report sets out the *Initial Appraisal: Case for Change* for the Forth Valley region as shown in Figure 2 and forms 1 of 11 STPR2 regions. The Case for Change constitutes the first phase of STAG and sets out the evidence base for problems and opportunities linked to the strategic transport network across the Forth Valley region drawing on relevant data analysis, policy review and stakeholder engagement. This report is supported by a national level Case for Change report which sets out the overarching vision for transport investment in Scotland and the challenges that must be addressed to support delivery of the priorities set out in NTS2.

STPR2 specifically focusses on Scotland's key strategic transport assets, which are wide ranging and varied. In the context of STPR2, the strategic transport network is defined as being:

[1] Transport Scotland, National Transport Strategy (NTS2), February 2020, www.transport.gov.scot/media/47052/national-transport-strategy.pdf
[2] Transport Scotland, Scottish Transport Appraisal Guidance (STAG), 2008, www.transport.gov.scot/media/41507/j9760.pdf

- All transport networks and services owned, operated and funded directly by Transport Scotland;
- Transport access to major ports[3] and airports; and
- The inter-urban bus and active travel network and principal routes within the city region areas.

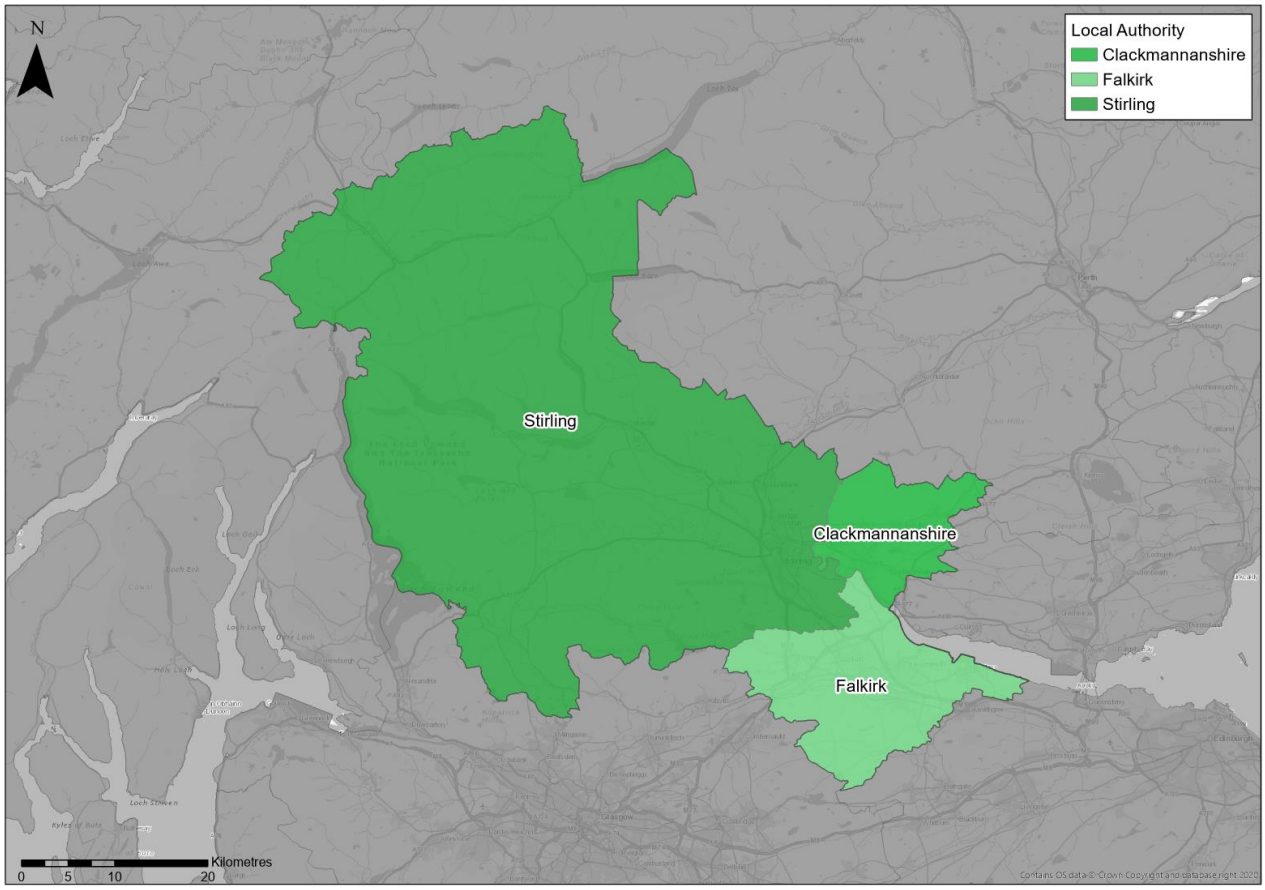


Figure 2: Forth Valley Study Area[4]

(click image to enlarge figure)

The Forth Valley region comprises the 3 local authorities of Clackmannanshire, Falkirk and Stirling. It has an extensive transport network, including active travel, rail and road.

To reflect the regional approach of STPR2, a Regional Transport Working Group (RTWG) has been established with representatives from the 3 local authorities (Clackmannanshire, Falkirk and Stirling), the 2 regional transport partnerships (RTPs); SEStran and Tactran, the Loch Lomond and Trossachs National Park, Transport Scotland and the STPR2 consultant team.

This Case for Change report also presents a final set of Transport Planning Objectives

[3] List of major ports is still under review

[4] *'Large scale figures can be found in Appendix A of this document or by following the link below the figure title where provided.'*

(TPOs), aligned with the national STPR2 objectives. The TPOs express the outcomes sought for the region. Additionally, the TPOs provide the basis for the appraisal of alternative options and, during post appraisal, will be central to monitoring and evaluation.

A long list of multi-modal options to address the identified problems and opportunities in the study area was developed and sifted in line with the proposed approach detailed later in this report.

Subsequent phases of the STAG process, the Preliminary and Detailed appraisal phases, involve more detailed appraisal work, considering the feasibility and performance of options to tackle the identified transport-related problems and opportunities and will be developed as the STPR2 process moves forward.

The following chapter sets out the socio-economic, environmental and transport context for the Forth Valley region.

1.2. COVID-19 Impacts

The draft version of this report was published in February 2020 and draws on data and stakeholder engagement collected before the COVID-19 pandemic. It is recognised that the pandemic and the restrictions implemented have changed the way society works and travels and that the longer term impacts of the pandemic will have to be taken into consideration as STPR2 progresses. A more detailed review of the short term impacts of COVID-19 on STPR2 is provided in the National Case for Change document.

2. Context

2.1. Policy Context

At the national, regional and local levels, relevant transport, planning and economic strategies and policies have been reviewed to provide background context against which this Case for Change has been developed. A comprehensive list of policy documents reviewed is included in Appendix B. Figure 3 provides an overview of the strategies and policies reviewed, with a summary of key documents presented below.

- **Programme for Government**[5]; sets out the Scottish Government's ambitions and aims to make Scotland a more successful country with opportunities and increased wellbeing for all.
- **National Transport Strategy (NTS2)**[6]; The NTS2 provides the emerging national transport policy framework, setting out a clear vision of a sustainable, inclusive, safe and accessible transport system which helps deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors. It sets out key priorities to support that vision: reduces inequalities; takes climate action; helps deliver inclusive economic growth; and improves our health and wellbeing. The NTS2 Delivery Plan was published on 17 December 2020 detailing the actions being taken by the Scottish Government between 2020 and 2022 to achieve the vision of the NTS2.
- **Climate Emergency**[7]; declared by the Scottish and UK Governments and multiple local authorities since 2019. As part of this, the Climate Change Bill commits the Scottish Government to a target of net zero emissions of all greenhouse gases by 2045. The Climate Change Plan update was published on 16 December 2020, and details Scottish Government's plans to meet new ambitious targets to end our contribution to climate change by 2045.

[5] Scottish Government, Protecting Scotland, Renewing Scotland: The Government's Programme for Scotland 2020-2021, 2020, https://www.gov.scot/publications/protecting-scotland-renewing-scotland-governments-programme-scotland-2020-2021/
[6] Transport Scotland, National Transport Strategy (NTS2), February 2020, www.transport.gov.scot/media/47052/national-transport-strategy.pdf
[7] Scottish Government, The Global Climate Emergency - Scotland's Response: Climate Change Secretary Roseanna Cunningham's statement, May 2019, https://www.gov.scot/publications/global-climate-emergency-scotlands-response-climate-change-secretary-roseanna-cunninghams-statement/

At the regional and local levels, transport objectives are set out in the relevant RTPs' regional transport strategies for SEStran[8] and Tactran[9], and the 3 authorities' local transport strategies[10][11][12]. As part of the £214 million Stirling and Clackmannanshire City Region Deal, the Heads of Terms Agreement published in May 2018 includes a commitment to invest in new and improved active travel routes. In July 2020 a package of £90 million was announced towards delivery of the Falkirk Growth Deal, with the Heads of Terms to be agreed[13].

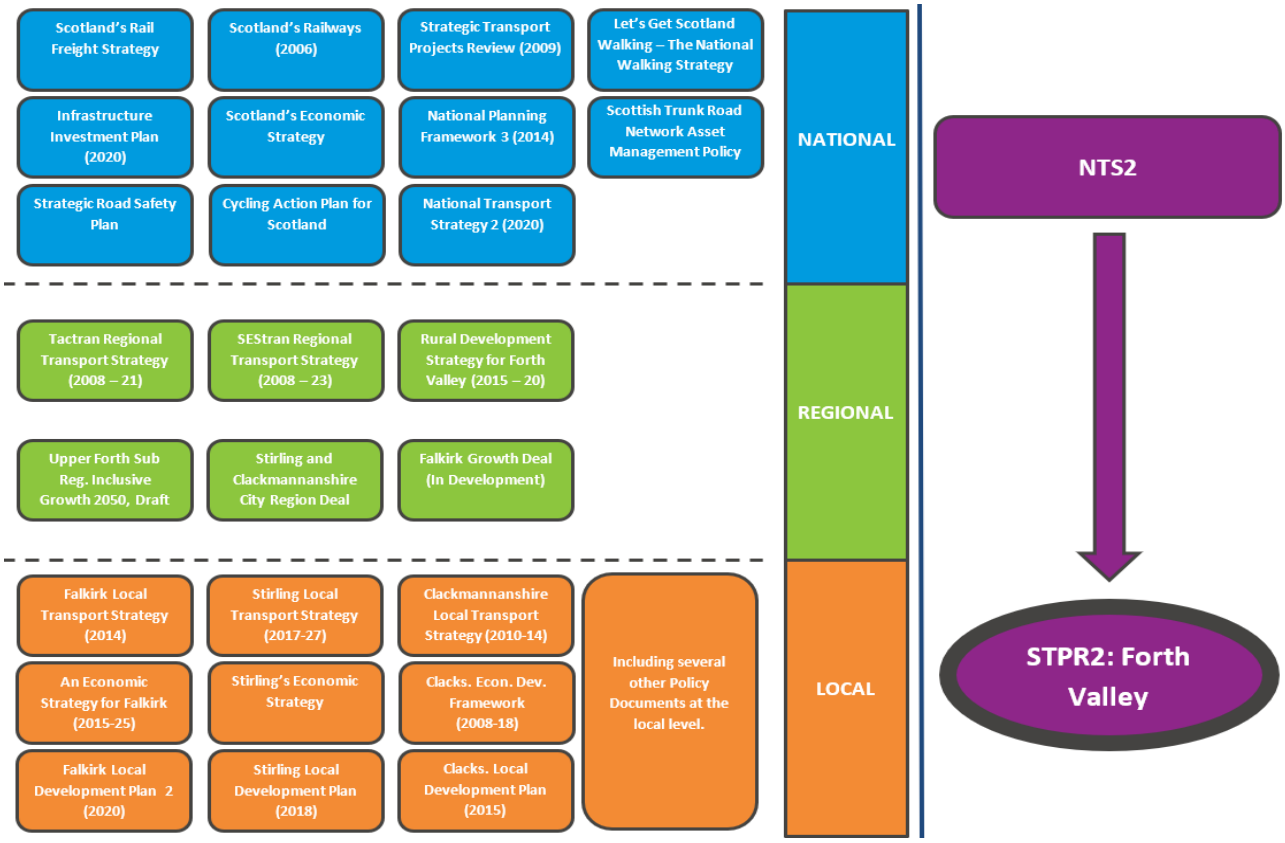


Figure 3: Policy Review

(click image to enlarge figure)

[8] SEStran, Regional Transport Strategy 2015-2025 Refresh, 2015, https://sestran.gov.uk/publications/regional-transport-strategy-2015-2025-refresh/

[9] Tactran, Regional Transport Strategy 2008 – 2023, 2008, https://www.tactran.gov.uk/documents/TACTRANRTS-FinalNov2008.pdf

[10] Clackmannanshire Council, Local Transport Strategy 2010-2014, 2010, https://www.clacks.gov.uk/transport/localtransportstrategy/

[11] Falkirk Council, Local Transport Strategy, 2014, https://www.falkirk.gov.uk/services/roads-parking-transport/policies-strategies/transport-policy.aspx

[12] Stirling Council, Stirling Local Transport Strategy 2017 to 2027, 2016, https://www.stirling.gov.uk/media/3623/stirling-council-local-transport-strategy-2017-2027.pdf

[13] Scottish Government, £50 million for Falkirk, 2020, https://www.gov.scot/news/gbp-50-million-for-falkirk/

In addition to the 4 key priorities presented above, the NTS2 supports the adoption of a Sustainable Travel Hierarchy, which promotes walking, wheeling, cycling, public transport and shared transport options in preference to single occupancy private car use, as well as a Sustainable Investment Hierarchy, which prioritises investment aimed at reducing the need to travel unsustainably and maintaining and safely operating existing assets ahead of new infrastructure investment.

To support and inform the development of STPR2, Strategic Environmental Assessment (SEA) and Equality Impact Assessment (EqIA) processes are being developed. Alongside these, assessments under the Fairer Scotland Duty Act (FSDA), the Child Rights and Wellbeing Impact Assessment (CRWIA) and the Island Communities Impact Assessment (ICIA) are being undertaken. Early work on these assessments has informed this Case for Change document.

Furthermore, there are shared aspirations across the Forth Valley councils on the future growth challenges and opportunities, specifically being able to significantly increase job growth with investment in key sectors.

This is detailed further in the Stirling and Clackmannanshire City deal, with a financial commitment to support the following investment areas and associated programmes/projects:

- Innovation
- Digital
- Culture, Heritage & Tourism
- Capital Fund for Clackmannanshire
- Transport, Connectivity & Low Carbon
- Infrastructure
- Skills & Inclusion

In addition to the above, information from the Falkirk Growth Deal indicates that, over the next 10 year period, money will “fund targeted economic development activity across a range of themes, including infrastructure, transport, innovation, energy transition and skills”[14].

[14] Scottish Government, £50 Million for Falkirk, 2020, https://www.gov.scot/news/gbp-50-million-for-falkirk/

2.2. Geographical Context

The Forth Valley region is a mix of urban and rural settlements and areas, comprising 3 local authorities; Clackmannanshire, Falkirk and Stirling. The Scottish Government Urban Rural 6-fold Classification[15], which distinguishes between urban, rural, and remote areas through 6 categories, is shown for the region in Figure 4:

- Large Urban Areas
- Other Urban Areas
- Accessible Small Towns
- Remote Small Towns
- Accessible Rural
- Remote Rural

Of the above, 4 classifications are represented within the Forth Valley region. 70% of the region's population is located in Other Urban Areas (e.g. Stirling, Falkirk, Alloa and Denny), 13% in Accessible Small Towns (e.g. Clackmannan, Dunblane and Callander) and the remaining areas classed as either Accessible Rural (15% of the population) or Remote Rural (2% of the population) (predominantly located to the north west of the region)[16].

[15] Scottish Government, Urban Rural Classification, 2016, https://www.gov.scot/publications/scottish-government-urban-rural-classification-2016/pages/2/

[16] Based on NRS, Mid-Year Population Estimates, 2019, https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/mid-year-population-estimates

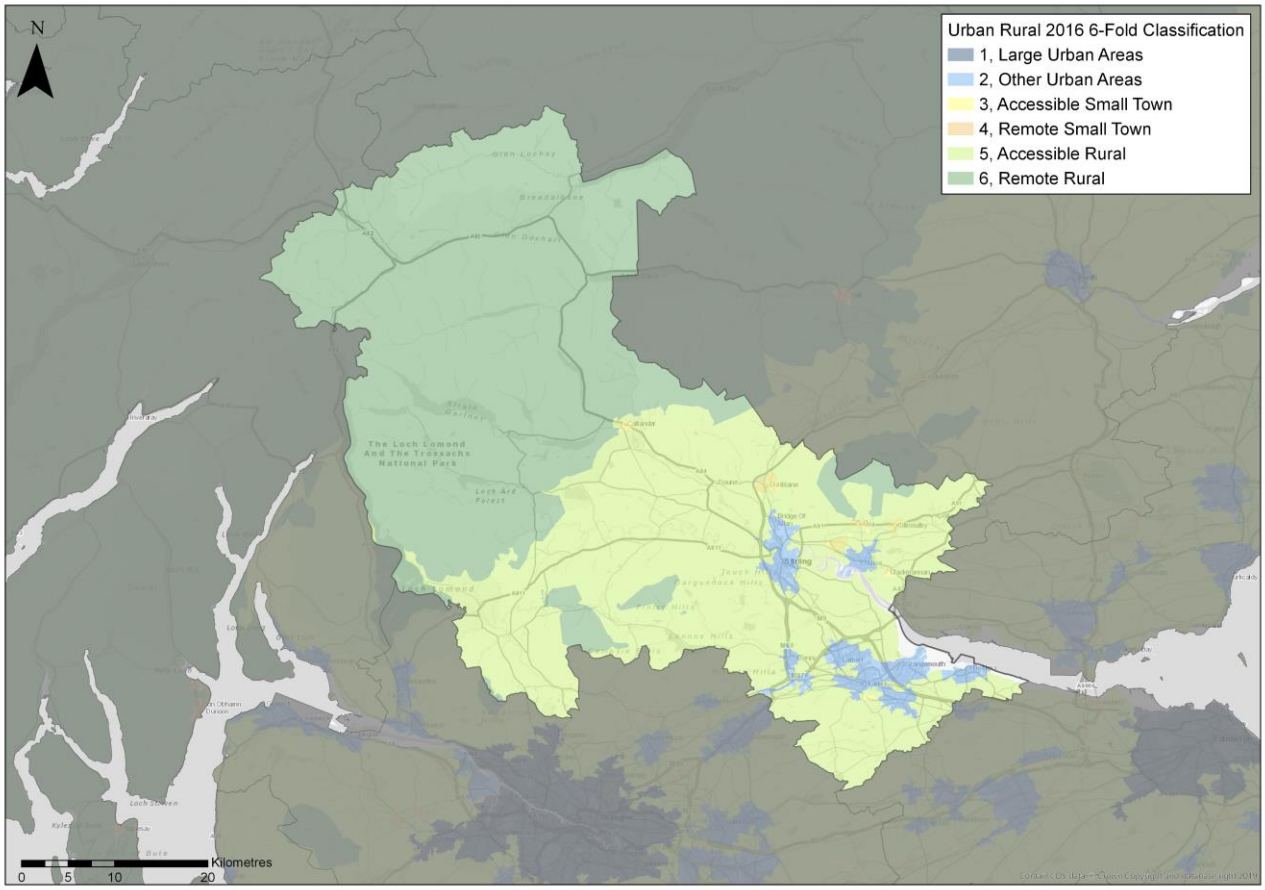


Figure 4: Urban Rural 2016 6-fold Classification

(click image to enlarge figure)

2.3. Socio-Economic Context

Note that wherever possible the latest available datasets have been analysed to produce the statistics and results presented in this report. In some cases, however, the data used may not be fully up-to-date. This is typically because the latest data is not yet available, or because the data and/or the method of collection may have changed over time and can no longer be used in the same way. It is also recognised that the pandemic and the restrictions implemented have changed the way society works and travels. However, given the uncertainty over what the potential lasting impacts of the pandemic may be, pre-COVID-19 datasets have been used to reflect the baseline situation.

2.3.1. Population

In 2019, the Forth Valley region had a population of 306,640, which was an increase of 6,240 (2.1%) from 2014[17]. This represented 5.6% of Scotland's total population. In 2019, approximately 63.6% of people were of working age, 17.1% were aged 15 and under and 19.3% were aged over 65 (a similar profile to Scotland). Figure 5 shows the population in

[17] NRS, Mid-Year Population Estimates, 2019, https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/mid-year-population-estimates

2016 of the 10 largest Forth Valley settlements.

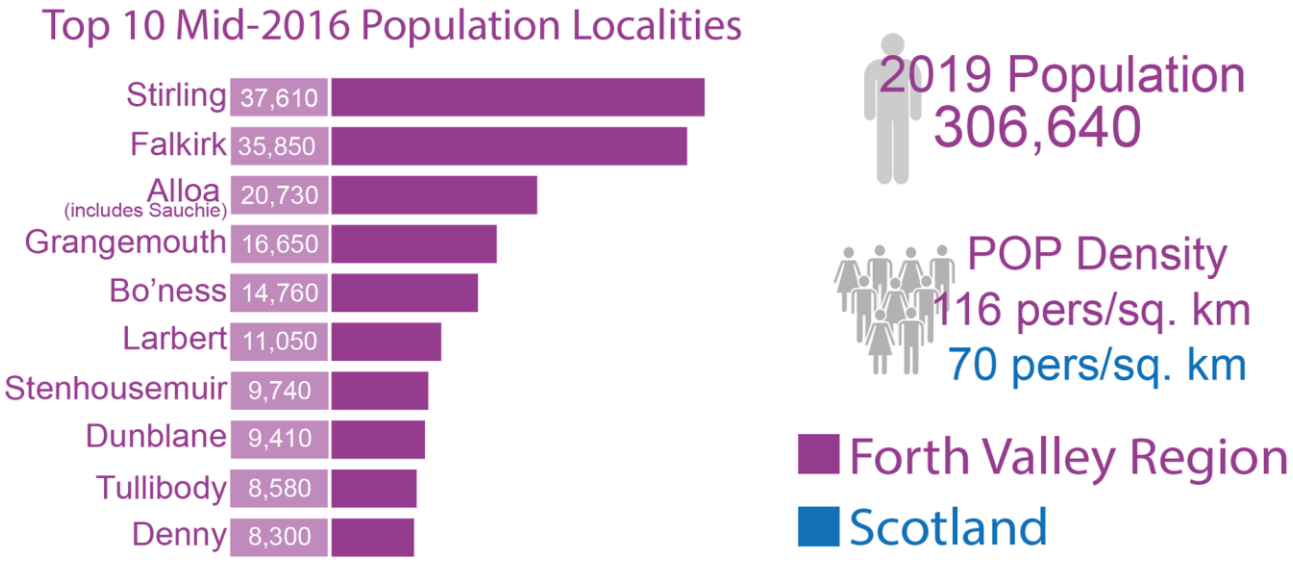


Figure 5: Forth Valley population statistics (2016, 2019)

The net migration figures show that between 2011 and 2016, just under 12,000 people moved into Forth Valley, with just under 8,750 moving out - a total net increase of almost 3,250[18]. All 3 council areas recorded an increase in population due to net migration.

The 2019 population age structure is shown in Figure 6 with the change in population age structure between 2011 and 2019 illustrated in Figure 7.

[18] NRS, Migration Flows, Births and Deaths, https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/migration

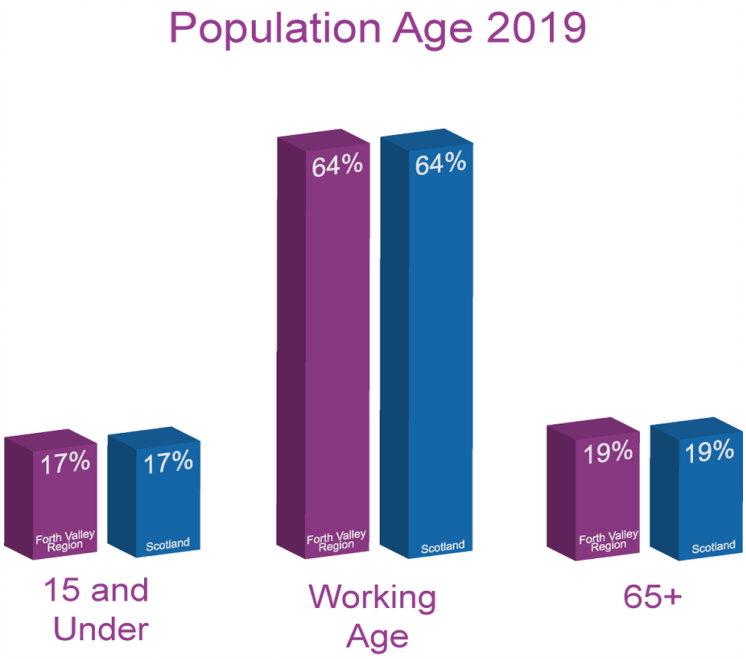


Figure 6: Forth Valley population age structure 2019[19]

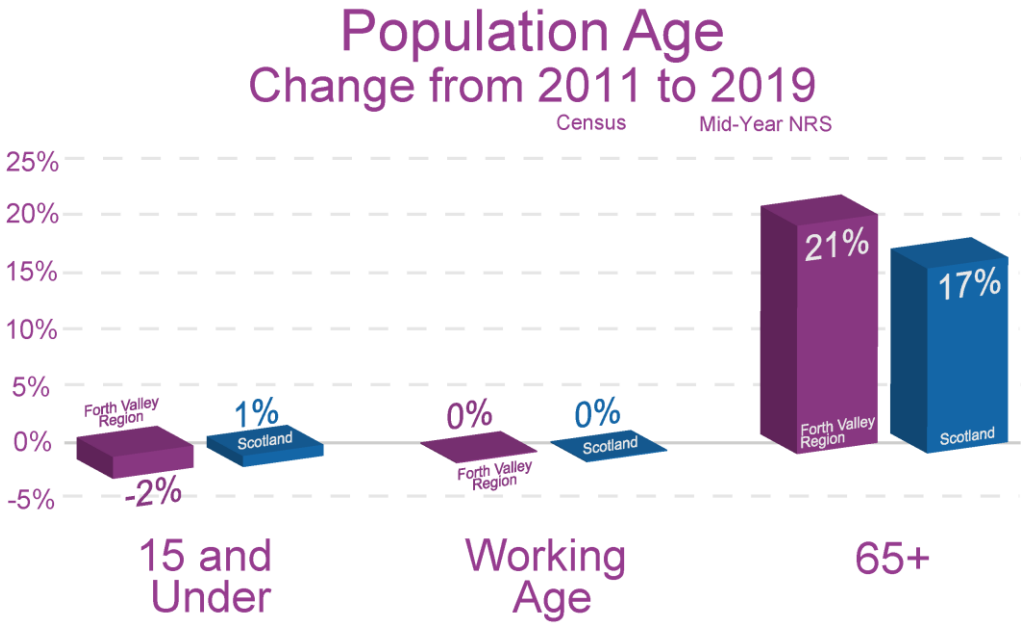


Figure 7: Forth Valley population age change 2011 to 2019[20]

Figure 7 indicates an increase in the 65+ population and a decrease in the 15 and under population from 2011 to 2019, with the 2019 population age structure for the Forth Valley

[19] NRS, Mid-Year Population Estimates, 2019, https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/mid-year-population-estimates

[20] NRS, Mid-Year Population Estimates, 2019, https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/mid-year-population-estimates

region identical to the Scottish structure.

NRS data[21] displayed in Figure 8 shows that 4 of the 10 largest localities within the region recorded a decline in population between 2012 and 2016 and 6 localities recorded increases.

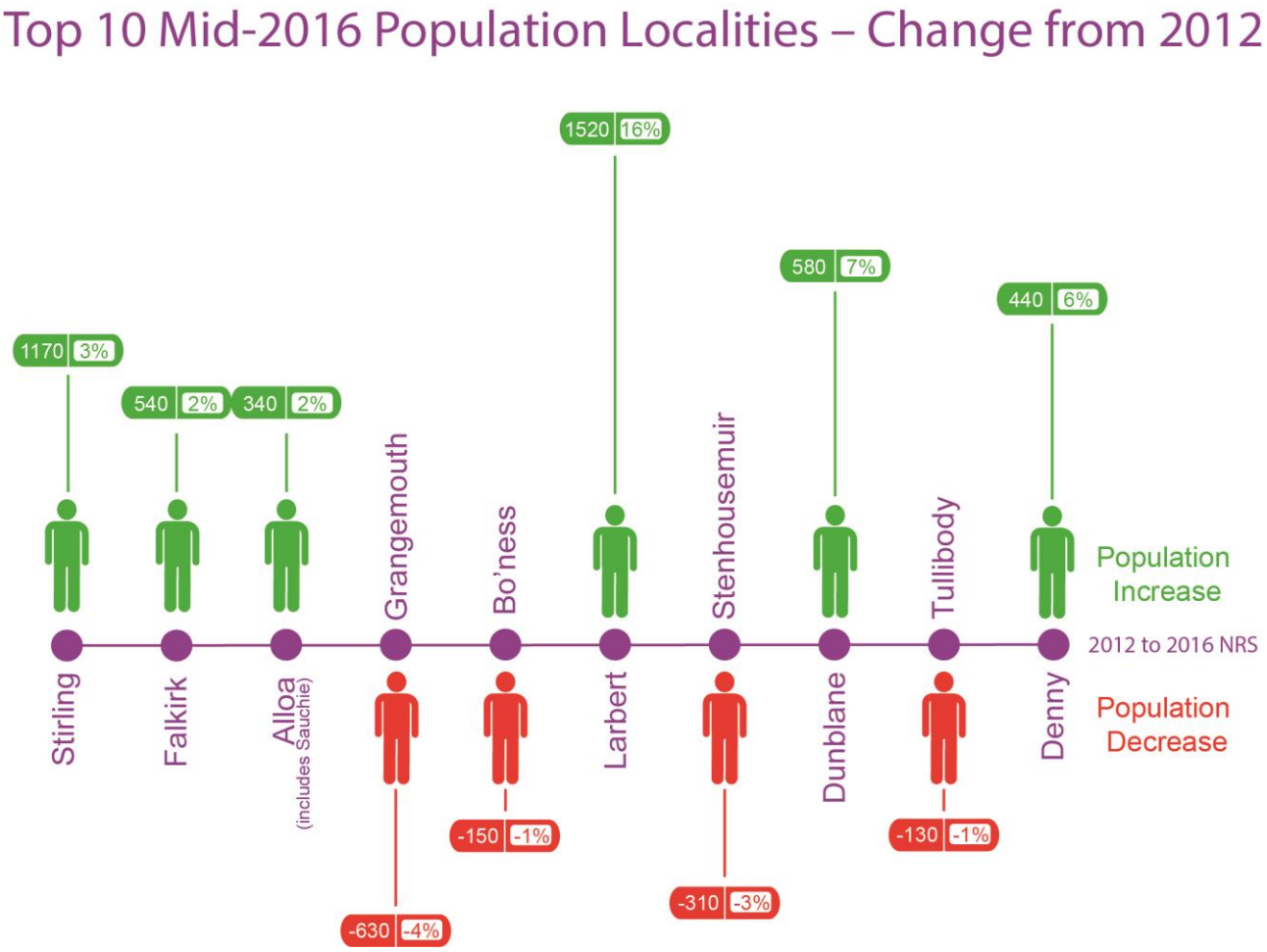


Figure 8: Top 10 Mid-2016 Forth Valley Localities, change from 2012

[21] NRS, Population Estimates for Settlements and Localities in Scotland, July 2014, March 2018, https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/special-area-population-estimates/settlements-and-localities/background-information

2.3.2. Travel to Work - Mode Share

At a regional level, travel to work mode share (Figure 9) is largely consistent with the national average with respect to the proportion of residents who work from home (10%), cycle to work (1%) or travel to work by train (4%). A higher proportion of residents in the region use car or van as their main mode of commuting (70%) compared to the Scottish equivalent (62%). A lower proportion of residents in the region walk (7%) or travel to work by bus (5%) compared to the Scottish equivalent (10% for each)[22].

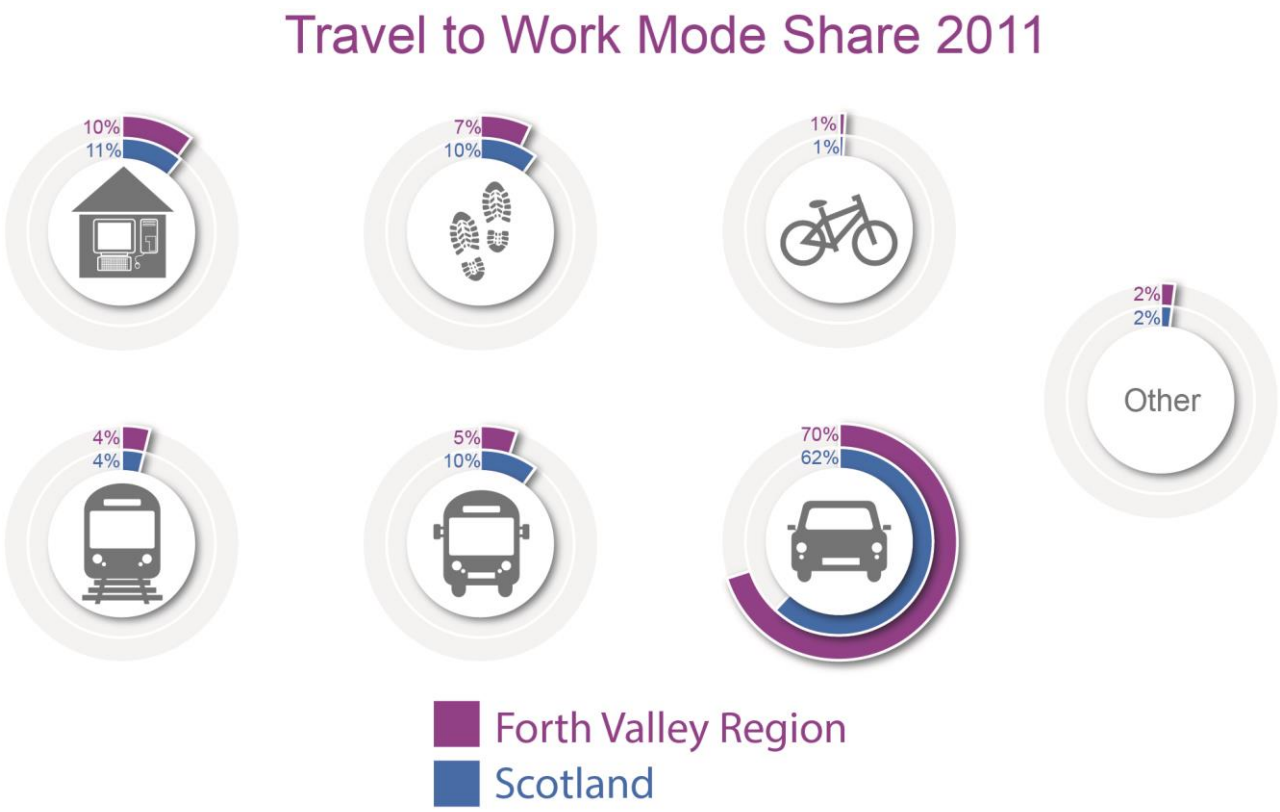


Figure 9: Travel to Work Mode Share 2011

Table 1 however illustrates that there is some variation in travel to work mode share amongst the local authorities in the region. The relationship between travel mode and distance travelled is explored in Section 2.3.3.

Table 1: Travel to Work Mode Share 2011 by Local Authority

Local Authority	Car / Van	Bus	Rail	Work at or from home	Walking	Cycling
Clackmannanshire	73%	5%	2%	9%	7%	1%
Falkirk	72%	6%	5%	8%	6%	1%
Stirling	66%	5%	4%	14%	9%	1%

[22] NRS, Census 2011 (Scotland), 2011, https://scotlandscensus.gov.uk/

Access to 1 car or van in Forth Valley (Figure 10)[23] is similar to the national average, although the percentage of households without access to a car or van is 6 percentage points lower than the national average (24% vs 31%), and the percentage of those with 2 cars is 4 percentage points higher than the national average (26% vs 22%). Households with access to 1 or more cars or vans varies across the local authorities (75.1% in Clackmannanshire, 74.8% in Falkirk, 77.7% in Stirling) but is higher in all 3 areas than the Scotland average of 69.5%.

As a component of Transport Poverty[24] (explained further in Section 3.2.1), the levels of car availability in the Forth Valley region are reflected in the 'high risk' classification of 42% of data zones in the region. This compares to 36% of data zones nationally. Whilst the proportion of 'medium risk' data zones (49%) is also higher than the national proportion (43%). The proportion of 'low risk' data zones in the Forth Valley region (9%) is lower than the national proportion (21%).

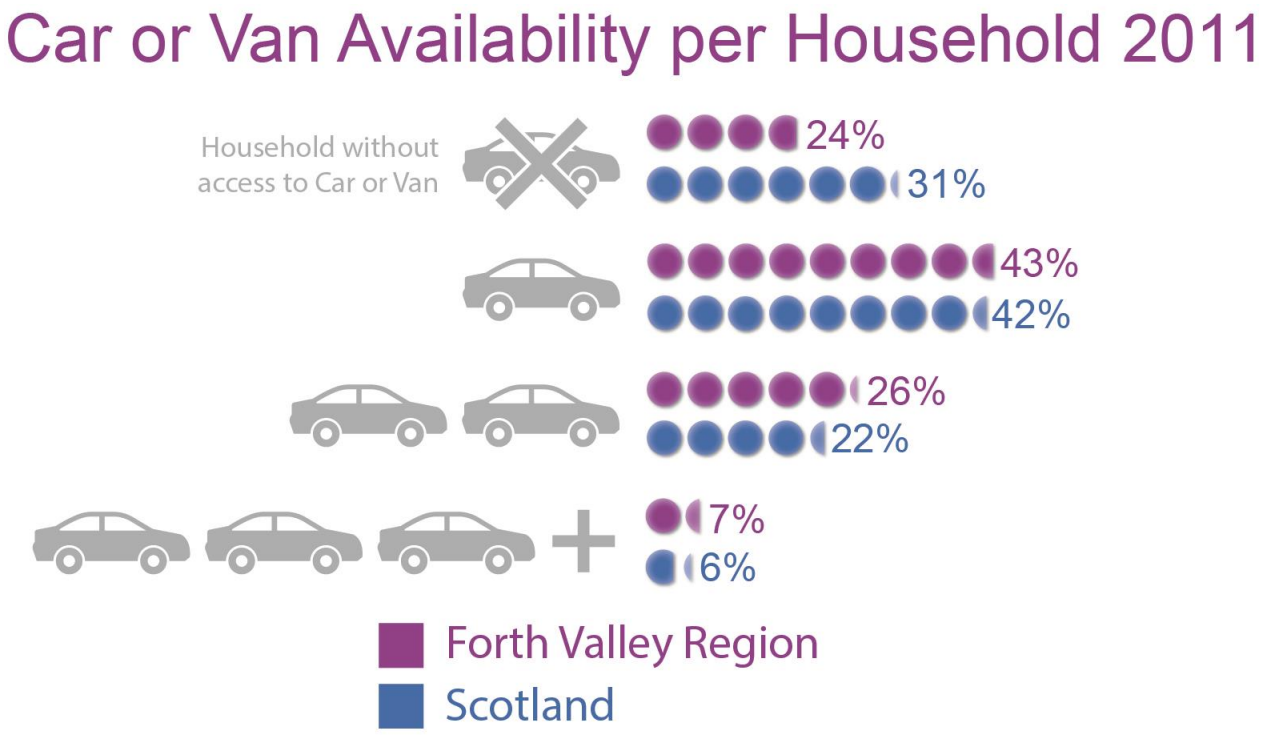


Figure 10: Access to Car or Van 2011

[23] NRS, Census 2011 (Scotland), 2011, https://scotlandscensus.gov.uk/

[24] Transport Poverty analysis is based on research which uses data on household income, car availability and access to the public transport network. Based on Sustrans, Transport Poverty in Scotland, 2016, https://www.sustrans.org.uk/media/2880/transport_poverty_in_scotland_2016.pdf

2.3.3. Travel to Work – Distance Travelled

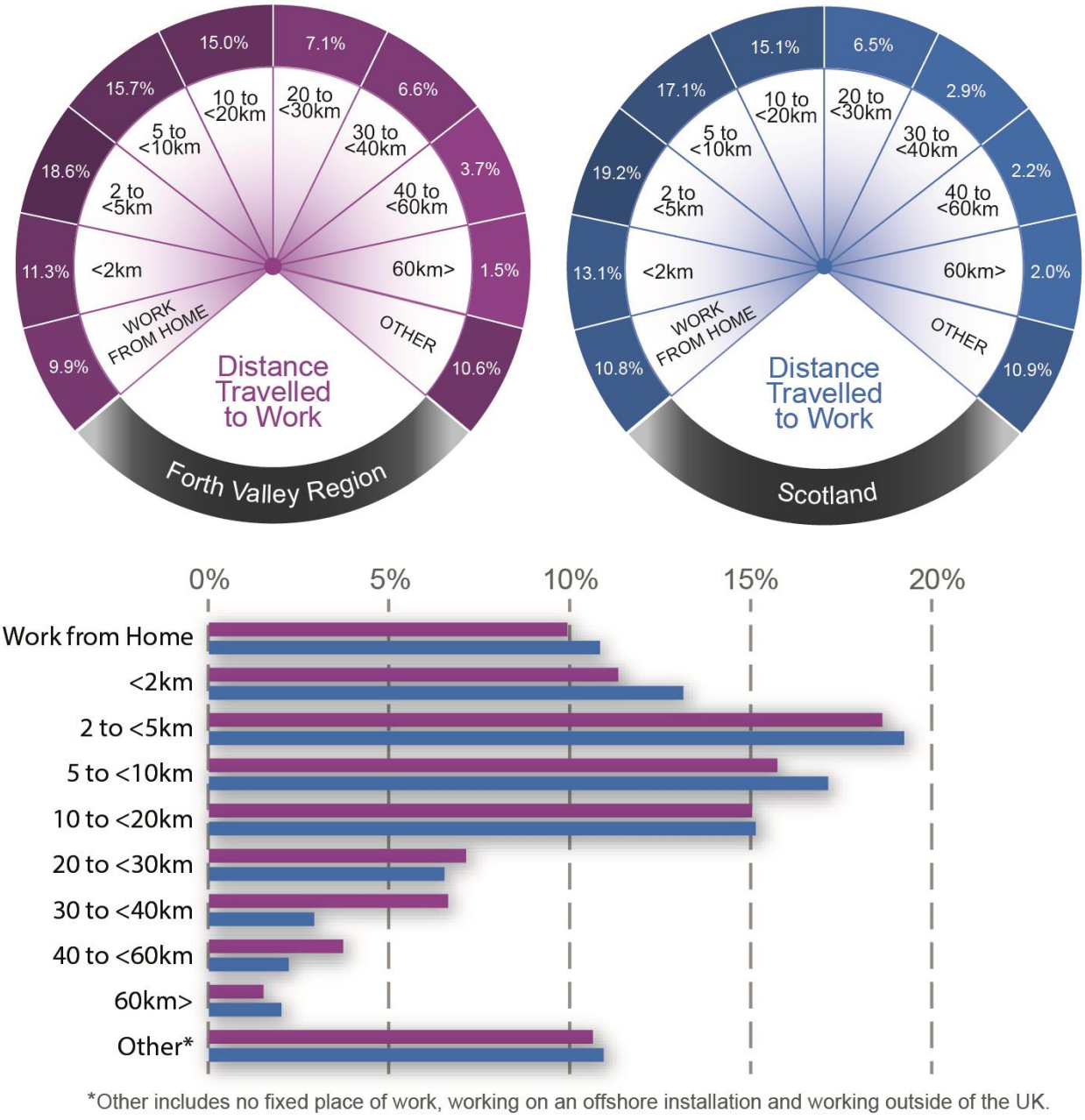
Analysis of the travel to work data[25] highlights that the majority of travel to work trips (70%) in Forth Valley are intra-regional. Of the intra-regional trips within the Forth Valley region, the largest proportion of people worked within the same local authority in which they lived for all 3 local authorities. This proportion was higher in Falkirk and Stirling (84% for both), than in Clackmannanshire (54%). These proportions are markedly higher than those working in neighbouring regions of Edinburgh and Glasgow.

As shown in Figure 11[26], a lower proportion of Forth Valley residents travel less than 10km to work compared to across Scotland (46% compared to 49%). Conversely, a higher proportion of Forth Valley residents travel between 10km and 60km compared to across Scotland (32% v 27%).

Notable intra-region, cross-authority working patterns i.e. live in Forth Valley region but travel to another Forth Valley local authority for work - included 35% of those who live in Clackmannanshire and work in the Forth Valley region working in Stirling; 14% of people living in Falkirk working in Stirling; 11% of people living in Stirling working in Falkirk; and 11% of people living in Clackmannanshire working in Falkirk. Only 5% of people living in Stirling and 2% of people living in Falkirk worked in Clackmannanshire.

[25] NRS, Census 2011 (Scotland), 2011, https://scotlandscensus.gov.uk/
[26] NRS, Census 2011 (Scotland), 2011, https://scotlandscensus.gov.uk/

Distance Travelled to Work 2011



*Other includes no fixed place of work, working on an offshore installation and working outside of the UK.

Figure 11: Distance Travelled to Work 2011 (All modes)

Looking at key travel to work destinations outwith the region, in Forth Valley, 7.3% of people worked in Edinburgh; 5.8% worked in Glasgow; 3.7% worked in West Lothian, 3.4% worked in North Lanarkshire; 2.1% worked in Fife, and 1.2% worked in Perth & Kinross[27]. The proportions for each local authority varies as shown below:

- 4.8% of people in Clackmannanshire worked in Fife; 3.6% worked in Edinburgh; 2.8% worked in Glasgow; 1.9% worked in North Lanarkshire; 1.6% worked in Perth & Kinross; and 1.5% worked in West Lothian.
- 10.0% of people in Falkirk worked in Edinburgh; 5.7% worked in West Lothian; 5.1% worked in Glasgow; 4.4% worked in North Lanarkshire; and 1.8% worked in Fife.
- 8.9% of people in Stirling worked in Glasgow; 4.5% worked in Edinburgh; 2.4% worked in North Lanarkshire; 2.2% worked in Perth & Kinross; 1.2% worked in East Dunbartonshire; 1.1% worked in Fife; and 1.1% worked in West Lothian.

This highlights some of the outbound commuting trends and the importance of commuter destinations such as Glasgow, Edinburgh, Fife and West Lothian. Car driving was the most common mode for travel to work within and outside the region. Driving was less prevalent for the shortest travel to work distances of 5km or less, ranging from 51% in Stirling to 61% in Clackmannanshire[28]. Rates generally increased with distance, and this was the case for travel to work within local authorities, cross local authority travel to work within the region, and travel to work outside the region. The exception to this was for the longest trips of 20km or more outside the region, where travel to work by driving represented 71% of travel, compared to 91% for external travel between 10km and 20km.

Bus generally made up 5-12% of travel to work within local authorities. For travel to work between local authorities, bus was more common for short to medium journeys (8-10%) compared to travel to work over 20km (4%). For travel to work outside the region, bus share decreased from 11% of the shortest travel to work, to only 2% of the longest travel to work.

Between the regional local authorities, train made up between 1% and 4% of travel to work, increasing with distance. For travel to work outside the region, train made up only 0-1% of travel to work less than 20km. However, for travel to work of 20km of more, train made up 16%.

In general, walking was common for travel to work less than 5km; 22% in Clackmannanshire, 19% in Falkirk, and 26% in Stirling. However, with the exception of travel to work over 20km in Falkirk and Stirling (for which it is considered that reported walking may be part of a multi-modal journey), for all other distances, all travel to work across local authorities within the region, and all travel to work outside the region, walking represents a very small proportion of travel to work, between 0% and 2%.

The above illustrates the significance of good transport connections to locations both within and outwith the region and the locations between which opportunities to provide access to employment currently exist.

[27] NRS, Census 2011 (Scotland), 2011, https://scotlandscensus.gov.uk/
[28] NRS, Census 2011 (Scotland), 2011, https://scotlandscensus.gov.uk/

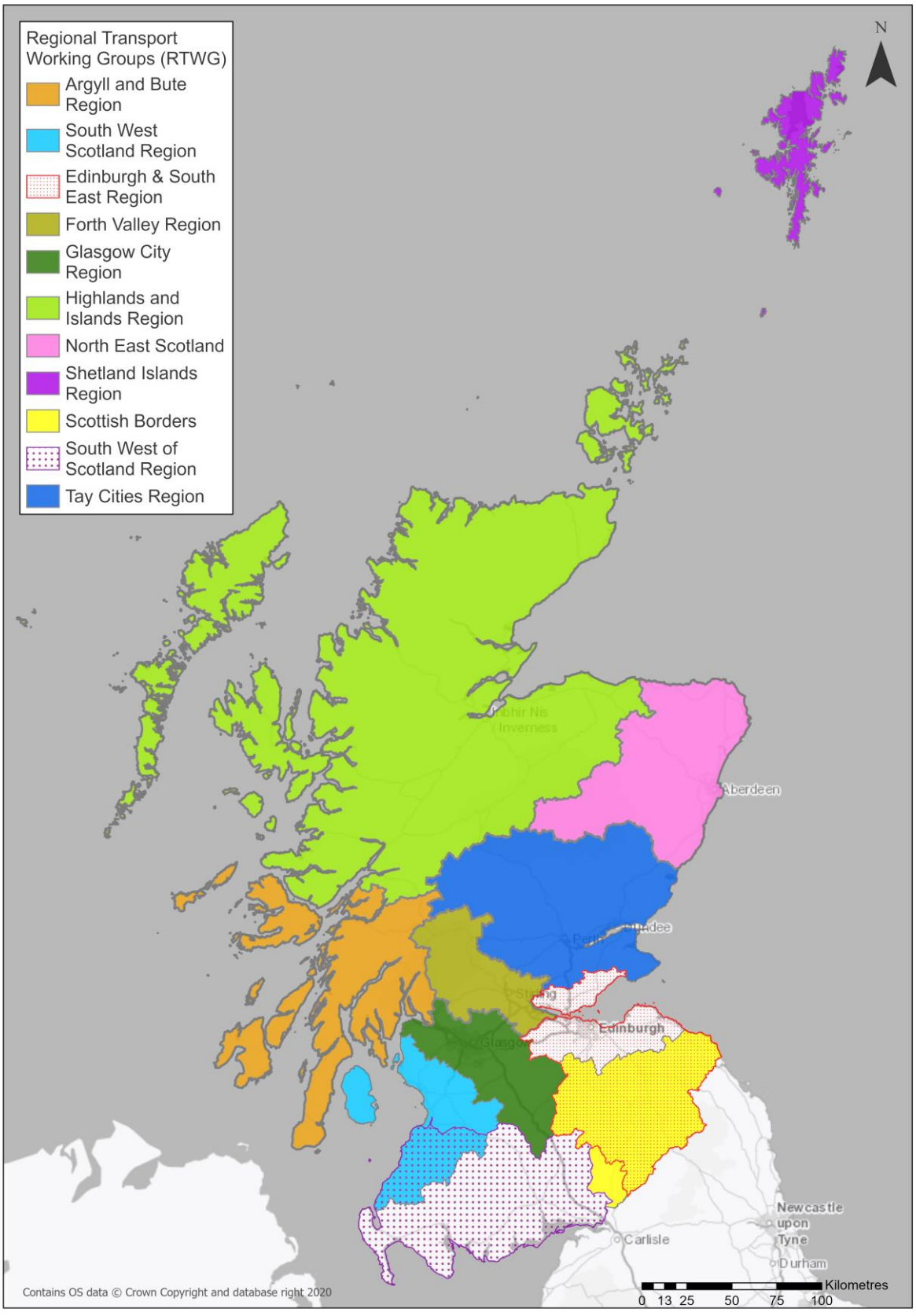


Figure 12: STPR2 Regions

(click image to enlarge figure)

Given Forth Valley's central location in Scotland, as shown in Figure 12, it is important to recognise the inter-regional commuting journeys which may potentially utilise the strategic transport network in the region. These are displayed below[29]:

- 3% of people in North Lanarkshire worked in West Lothian; 2% worked in Edinburgh; 2% worked in Falkirk; and 1% worked in Stirling.
- Census data shows that 1,201 people from the Tay Cities region commuted to a workplace in the Glasgow City Region.
- Data also shows that 1,359 people in South Fife commuted to a workplace in the Glasgow City Region. Similarly, car travel accounted for the highest proportion of this (1,118) total.

This highlights a range of inter-regional trips from multiple neighbouring regions which may potentially route through the strategic transport network in the Forth Valley region. As a result of these trends, there is the potential for increased pressure on the strategic routes such as the M80 and M9, especially as just under 2,000 of those who travelled from Tay Cities and South Fife to Glasgow City Region travelled by car.

2.3.4. Economic Activity

In this section we outline a range of measures that may be used to assess economic performance in the region including unemployment rate, mean and median annual earnings, GVA, GVA per head, employment and the sectoral range of key industries.

In 2018, unemployment rates in the region stood at 2.7% which is lower than the national benchmark (at 4.4%)[30].

In 2019 the average (mean) gross weekly earnings for residents of Stirling was £681.20, followed by Clackmannanshire with £537.70 and Falkirk with £513.90; Stirling's average constitutes the second highest of all local authorities which is also higher than the average for Scotland of £548.40[31]. Comparison of the median earnings shows less variation between the region and Scotland, the median earning was highest in Stirling at £533.50, followed by Falkirk with £473.90 and Clackmannanshire with £445.90 whilst the Scotland value was £472.80[32]. The difference between the median and mean salaries for each local authority is indicative of some outliers with very high salaries (Stirling) or very low salaries (Clackmannanshire / Falkirk) skewing the mean.

As a component of Transport Poverty[33] (explained further in Section 3.2.1), the level of income deprivation in the Forth Valley region indicates that 51% of data zones are classed as 'high risk' for Transport Poverty. This compares to 50% of data zones nationally which

[29] NRS, Census 2011 (Scotland), 2011, https://scotlandscensus.gov.uk/
[30] ONS, NOMIS Official Labour Market Statistics, 2019, https://www.nomisweb.co.uk/
[31] ONS, NOMIS Annual Survey of Hours and Earnings, 2019, https://www.ons.gov.uk/releases/employeeearningsintheuk2019
[32] ONS, NOMIS Annual Survey of Hours and Earnings, 2019, ibid
[33] Transport Poverty analysis is based on research which uses data on household income, car availability and access to the public transport network. Based on Sustrans, Transport Poverty in Scotland, 2016, https://www.sustrans.org.uk/media/2880/transport_poverty_in_scotland_2016.pdf

are classed as 'high risk'. The proportion of 'medium risk' data zones (14%) is below the national proportion (18%), with the proportion of 'low risk' data zones in the Forth Valley region (35%) higher than the national proportion (31%).

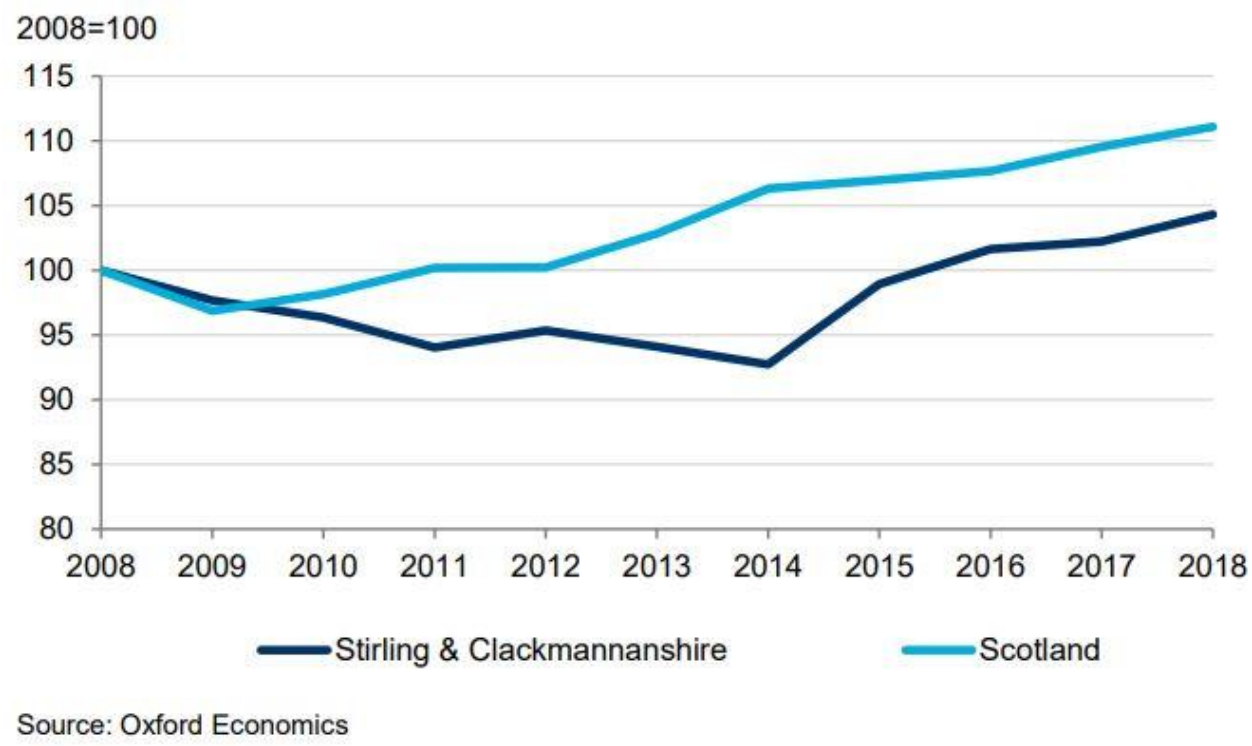
In terms of total GVA in 2018[34], Forth Valley region's stood at £7.8 million which accounts for 5.5% of Scotland's GVA. This was an increase of 14.4% between 2013 and 2018 up from £6.8 million. In the same period the national figure increased by 14.6% from £124 million to £142 million.

In the Forth Valley region, GVA per head in 2018 was £25,517 which was £617 less than the national figure of £26,134. The GVA per head for Forth Valley increased by 12% between 2013 and 2018, an increase of 0.2 percentage points less than the national benchmark increase. These increases in total GVA and GVA per head were the fifth highest of the 8 STPR regions over the same period of time.

It is however noted that while Scotland as a whole recovered quickly from the 2008-09 recession, levels of GVA across Forth Valley were slower to recover to pre-recession levels, as illustrated in Figure 13 for Clackmannanshire & Stirling and Figure 14 for Falkirk[35].

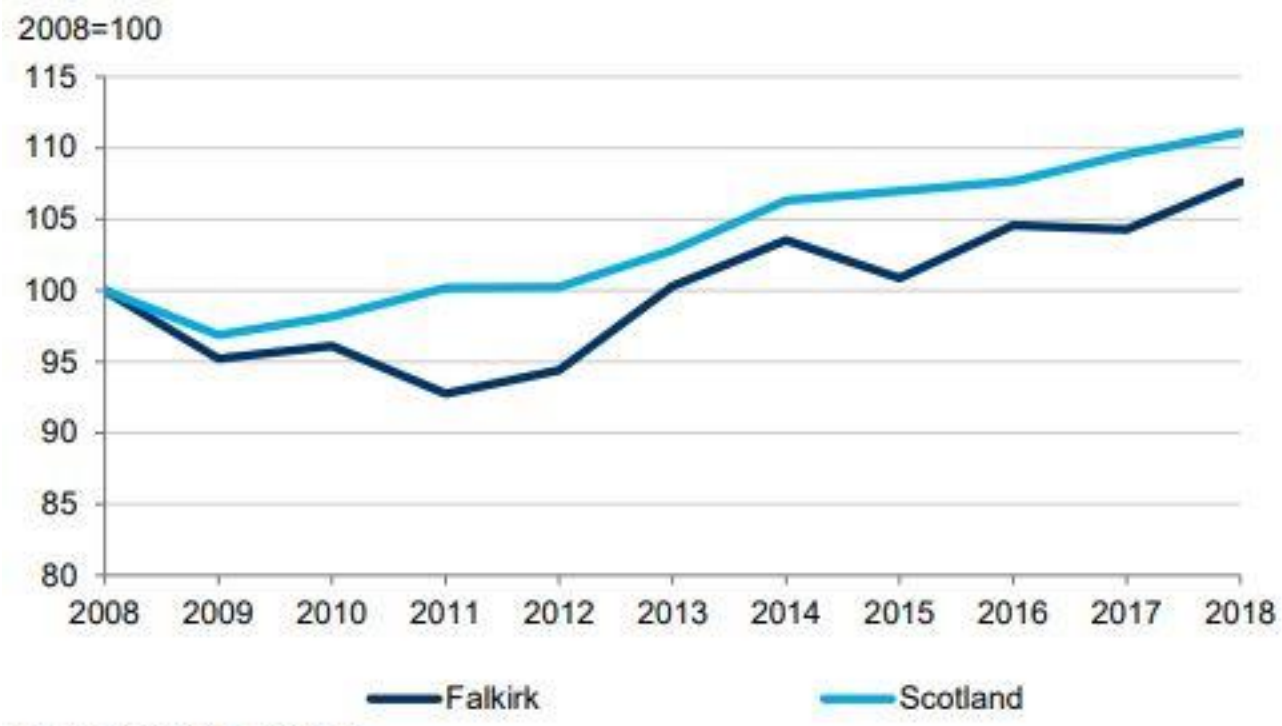
[34] ONS, Regional gross value added (balanced) by industry: local authorities by NUTS1 region: UKM Scotland current prices, 2018, https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/regionalgrossvalueaddedbalancedlocalauthoritiesbynuts1region

[35] Oxford Economics, International Research on Regional Economies - Implications for Delivering Inclusive Growth in Scotland, May 2019, https://www.scottishfuturestrust.org.uk/storage/uploads/internationalresearchonregionaleconomiesmay2019.pdf



Source: Oxford Economics

Figure 13: Index of GVA Stirling & Clackmannanshire and Scotland, 2008-2018



Source: Oxford Economics

Figure 14: Index of GVA Falkirk and Scotland, 2008-2018

The sectoral profile can also be seen to differ across the region with that of Stirling and Clackmannanshire broadly similar to Scotland as a whole (Figure 15), whereas there is a more marked difference between Falkirk's and Scotland's profiles (Figure 16).

Stirling and Clackmannanshire have a comparatively large share of activity in the education sector, linked to the local university. They also hold a similar advantage in sectors such as professional services and finance and insurance, which are key growth sectors across Scotland (Figure 15).

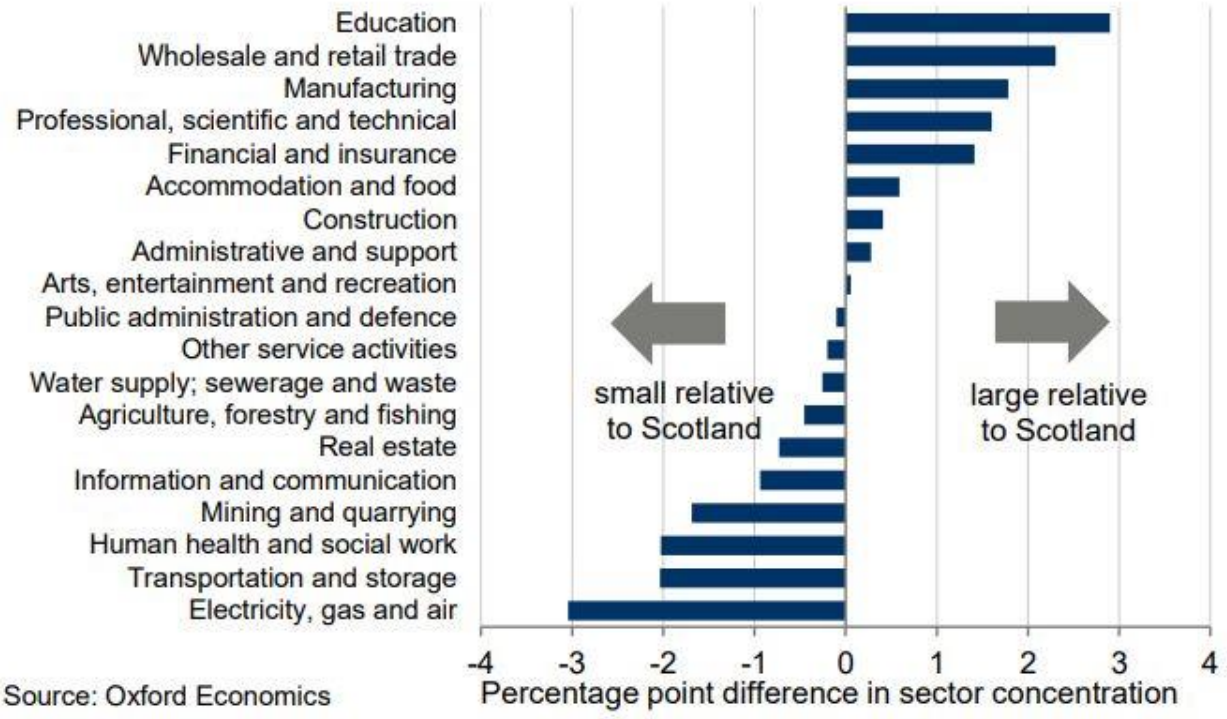


Figure 15: Sector GVA Share Stirling & Clackmannanshire vs Scotland 2018

Falkirk's economy (Figure 16) is dominated by manufacturing activity, mostly linked to the petrochemical industry associated with the Grangemouth refinery. It is noted that transportation holds the second highest share of Falkirk's economy though this includes both pipeline and tanker operations. The share of Falkirk's economic activity concentrated in both manufacturing (19%) and transportation & storage (10%) is around 8 and 6 percentage points higher in sector concentration relative to Scotland.

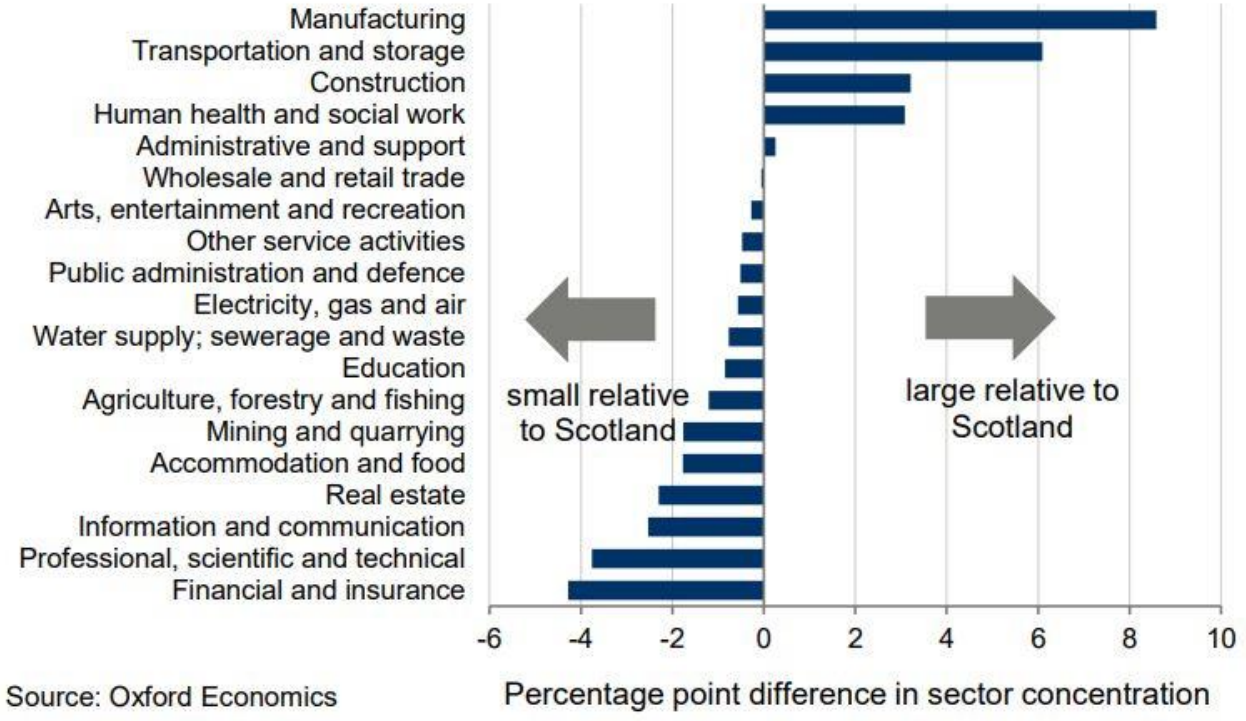


Figure 16: Sector GVA Share Falkirk vs Scotland 2018

2.3.5. Access to Employment

Figure 17 illustrates the accessibility in the region to key employment centres by public transport on a typical weekday morning. Key employment locations[36] are mostly located in the east of the region.

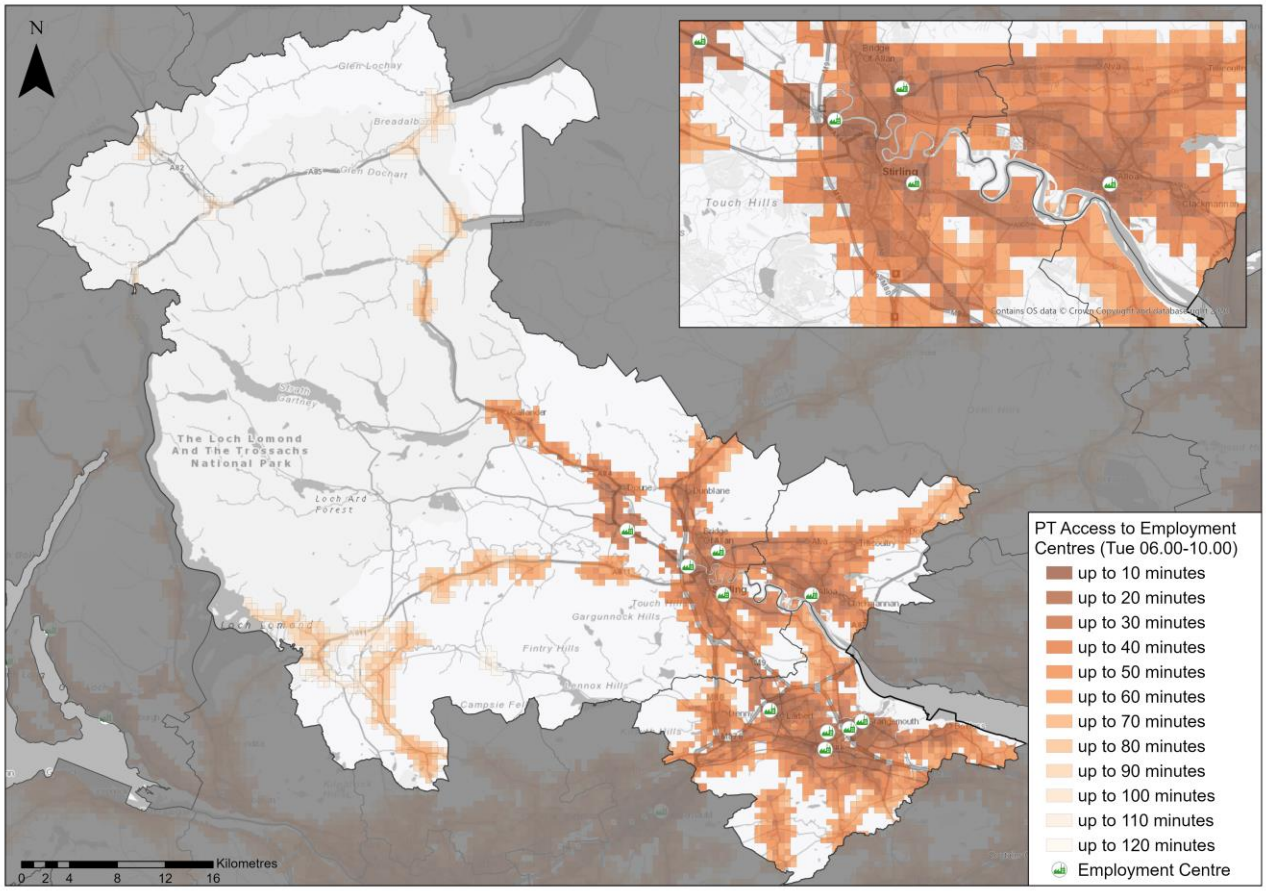


Figure 17: Public Transport Access to Employment

(click image to enlarge figure)

TRACC[37] analysis (explained in further detail in Section 3.2.1) indicates that almost a quarter of the Forth Valley working population[38] and almost a fifth of the unemployed population[39] are unable to access at least 1 key employment centre within 30 minutes by public transport on an average weekday morning (06:00-10:00).

[36] BRES employment data used to identify top 10 employment locations across the region by number of employees.
[37] TRACC - multimodal accessibility and journey time analysis tool.
[38] Individuals classified as either *Economically active: Employee: Full-time* or *Economically active: Employee: Part-time*
[39] Individuals classified as *Economically active: Unemployed*

2.3.6. Deprivation

The Scottish Index of Multiple Deprivation (SIMD)[40] demonstrates the socio-economic issues experienced in the region, with 16.7% of all data zones in the region (equating to 68 data zones) in the 2020 release within the 20% most deprived in Scotland. This is the 5th lowest proportion (out of 8 STPR2 regions) and is slightly lower than the neighbouring Tay Cities region (18.6%). The red areas on the map (Figure 18) show the most deprived areas, and the blue areas on the map the least deprived. Pockets of deprivation are particularly evident in data zones within Alloa, Stirling, Falkirk, and Bonnybridge (data zones are groups of 2011 Census output areas which have populations of around 500 to 1,000 residents. There are 6,976 2011 Data Zones in Scotland[41]).

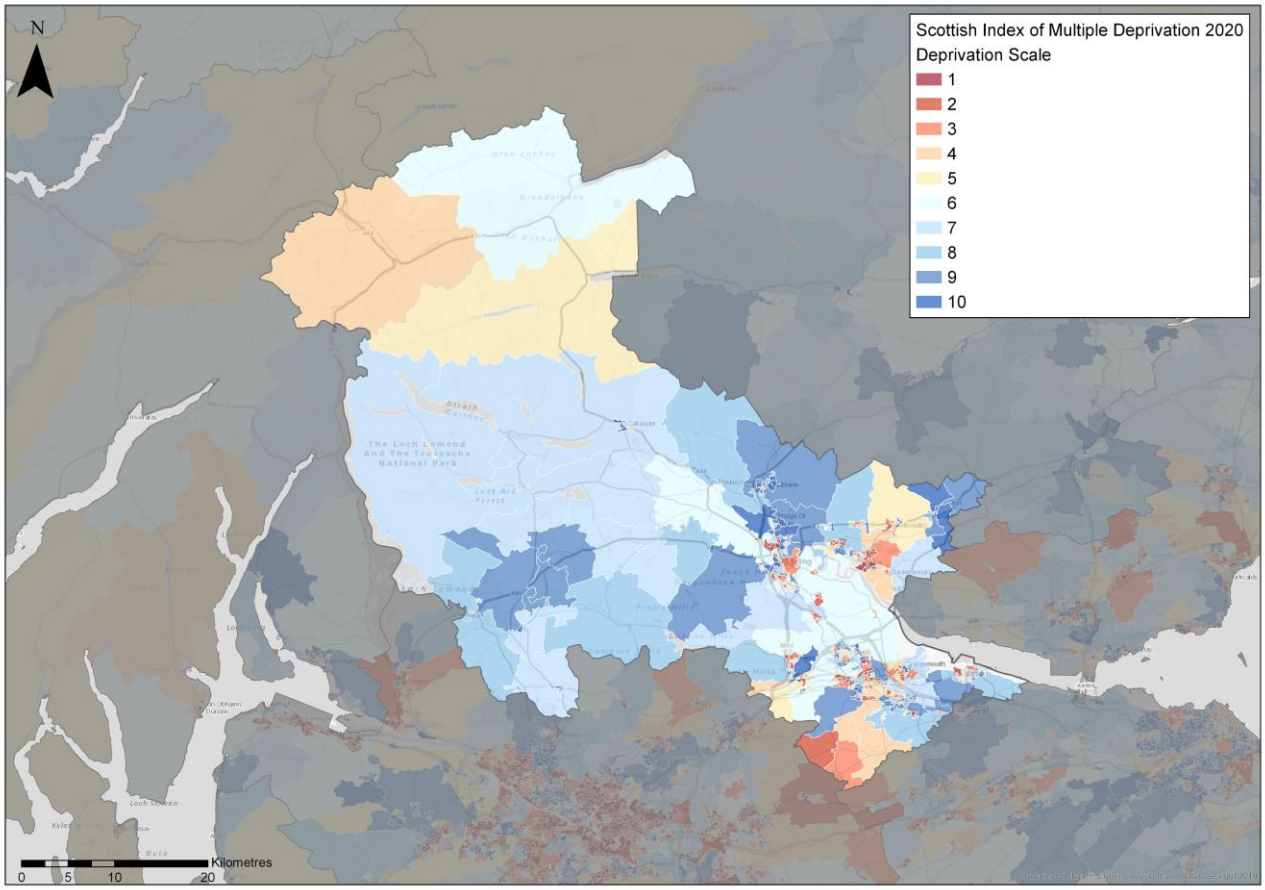


Figure 18: Scottish Index of Multiple Deprivation 2020[42]

(click image to enlarge figure)

[40] Scottish Government, Scottish Index of Multiple Deprivation (SIMD), 2020, https://simd.scot/

[41] NRS, Census 2011 (Scotland), 2011, https://scotlandscensus.gov.uk/

[42] The SIMD Deprivation Scale is measured from 1 (Most Deprived) to 10 (Least Deprived)

2.3.7. Health

According to the 2011 Census data 19.3% of the region's population are limited in their day-to-day activities by a disability or long term health problem, which is roughly the same as the National proportion of 19.6% and the Tay Cities benchmark of 19.8%[43]. Applying this proportion to the 2019 population statistics, implies 59,182 people with a limiting disability in the Forth Valley region.

2.3.8. Summary of Socio-economic Context

To summarise, the Socio-Economic situation in Forth Valley is as follows:

- Population of 306,640. In 2019, approximately 64% of people were of working age, 17% are aged 15 and under and 19% were aged over 65 (a similar profile as Scotland).
- The net migration figures show a total net increase of 3,249 people.
- Access to at least 1 car or van in Forth Valley (76%) is higher than the national average (70%).
- Travel to work mode share is similar to the national average, with 70% of residents using car or van as their main mode of commuting.
- In 2018, unemployment rates in the region at 2.7% were lower than the national benchmark (at 4.4%).
- GVA per head in 2018 was £25,517 which was £617 less than the national figure of £26,134.
- The sectoral profile differs across the region. Stirling and Clackmannanshire are broadly similar to Scotland as a whole, whereas there is a more marked difference between Falkirk's and Scotland's profiles, primarily due to Grangemouth.
- Stirling and Clackmannanshire have a comparatively large share of activity in the education sector, linked to the local university. It also holds a similar advantage in sectors such as professional services and finance and insurance.
- Falkirk's economy is dominated by manufacturing activity, mostly linked to the petrochemical industry associated with the Grangemouth refinery.
- The Index of Multiple Deprivation 2020 demonstrates the socio-economic issues experienced, with 16.7% of all data zones in the region within the 20% most deprived in Scotland.
- Pockets of deprivation are particularly evident in data zones within Alloa, Stirling, Falkirk, and Bonnybridge.
- 19.8% of the population's day-to-day activities are limited by their disability.

[43] NRS, Census 2011 (Scotland), 2011, https://scotlandscensus.gov.uk/

2.4. Environmental Context

Within the Forth Valley region, there are many areas classified as environmentally sensitive, with varying levels of statutory protection. Environmental designations within the region include the following biodiversity, landscape and heritage designations which fall either wholly or partly within the region:

- 92 Sites of Special Scientific Interest (SSSI)
- 4 Special Protection Areas (SPA)
- 12 Special Areas of Conservation (SAC)
- 2 Ramsar sites
- 4 National Nature Reserves (NNR)
- 5 Local Nature Reserves (LNR)
- 4 Royal Society for the Protection of Birds (RSPB) Reserves
- 3 National Scenic Areas (NSA)
- 1 National Park (Loch Lomond and Trossachs National Park)
- 21 Gardens and designed landscapes
- 52 Conservation Areas
- 1 World Heritage Site
- 7 Battlefield Sites
- 277 Scheduled Monuments.

An environmental constraints mapping exercise has been undertaken, as presented in Figure 19[44]. As can be seen, designated sites within the region tend to be concentrated in the north and west, towards The Loch Lomond and Trossachs National Park. There are no Nature Conservation Marine Protected Areas (MPA) or Regional Parks within the region.

In addition, the region contains a significant number of historic assets, including the Antonine Wall designated World Heritage Site (stretching across the central belt of Scotland from the Clyde to the Forth; and the largest relic of the Roman occupation of Scotland), 2,690 Category A-C Listed buildings. There are large designated Battlefield Areas to the north-east for the Battle of Stirling Bridge and to the south of Stirling for the Battle of Bannockburn and Battle of Sauchieburn. There are no Heritage MPAs within the region.

[44] Contains SNH information licensed under the Open Government Licence v3.0

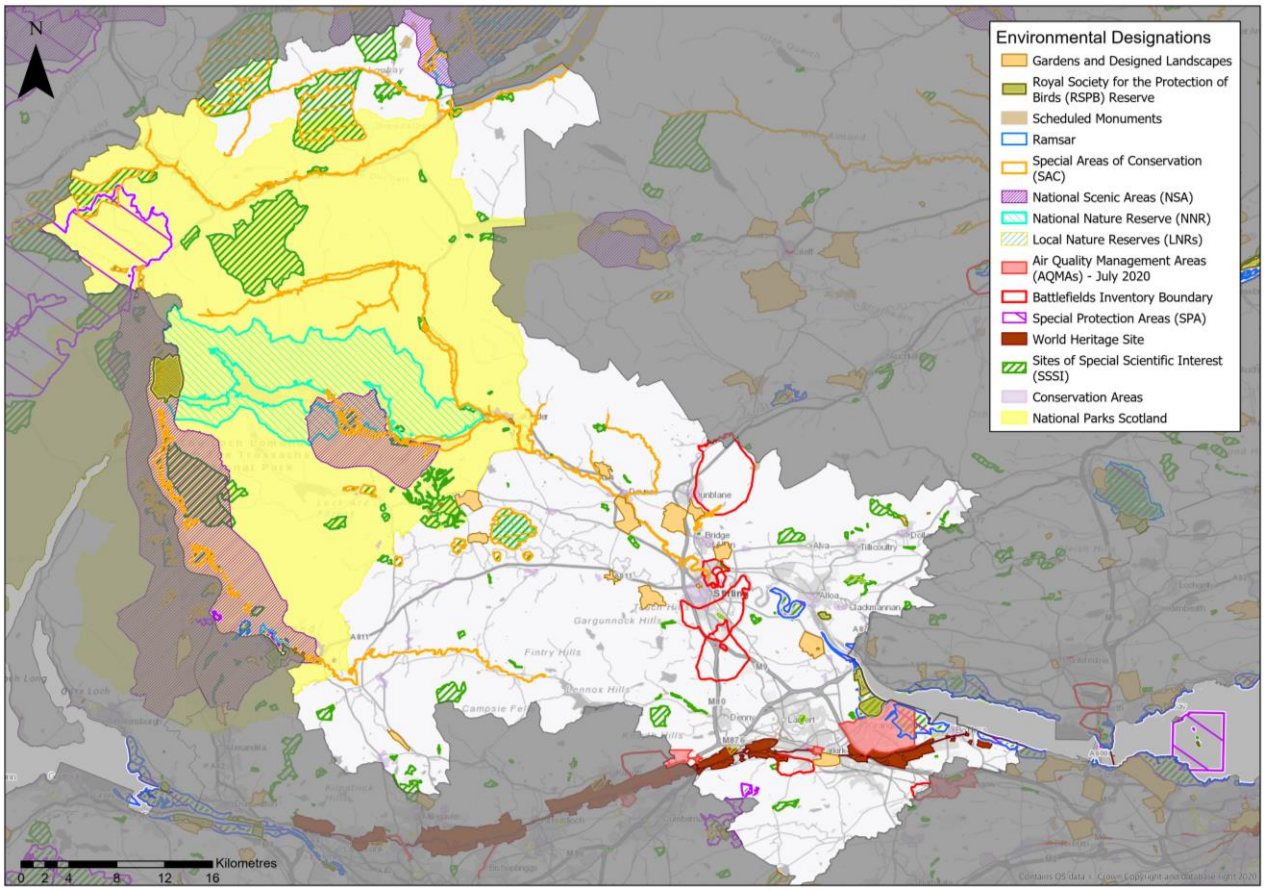


Figure 19: Environmental Designations for Forth Valley region

(click image to enlarge figure)

Scotland's noise map illustrates noise exposure from rail, road, air traffic and industry sources in response to the European Parliament and Council Directive for Assessment and Management of Environmental Noise 2002/49/EC. Scotland's strategic noise mapping represents step one in the process for managing environmental noise; with step two requiring competent authorities to prepare noise action plans in response. The latest mapping (Round 3 data[45]) mapped the following noise sources throughout Scotland: *"roads with more than 3,000,000 (three million) vehicle passages per year; major railways with more than 30,000 (thirty thousand) train passages a year; major airports with more than 50,000 (fifty thousand) movements; and transport sources and industry in qualifying agglomerations (urban areas with populations in excess of 100,000 (one hundred thousand): Aberdeen, Dundee, Edinburgh and Glasgow)"*[46].

Figure 20 illustrates the noise levels above 55 decibels (dB)[47] at specific points from

[45] The noise mapping data is reviewed on a 5 year rolling programme. Round 3 is the latest 5 year update.
[46] Scottish Government, Scotland's Noise, 2017, https://noise.environment.gov.scot/index.html
[47] Only modelled noise levels above 55 dB have been included on the figure, in order to depict those noise levels with the greatest potential to cause annoyance to the population.

modelled noise sources for the region, based on consolidated noise sources for the average day, evening and night metric (Lden). 55 dB Lden is the EU indicator threshold for noise exposure defined in the Environmental Noise Directive (Directive 2002/49/EC)[48]. Figure 20 shows the greatest modelled noise levels to be located in the south of the region, primarily associated with the strategic road corridors around Stirling, Larbet and Grangemouth (i.e. M9, M80, M876, A9, 71 A76, A77, A78, A79) and the rail routes through this area.

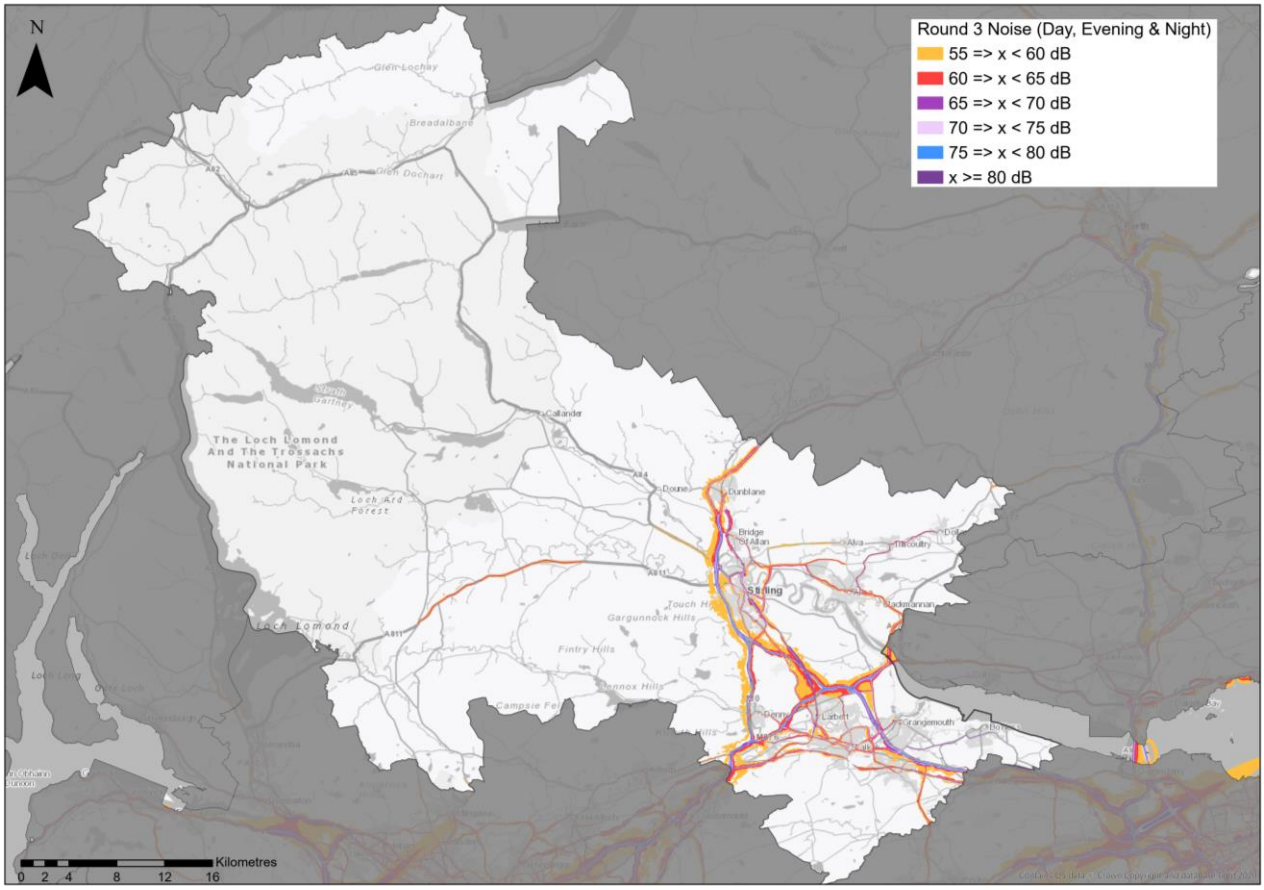


Figure 20: Noise Mapping for Forth Valley region[49]

(click image to enlarge figure)

SEPA flood mapping[50] (Figure 21) identifies flood risk from surface water, river and coastal flooding at medium (1 in 200 year) and high (1 in 10 year) likelihood of flooding within the region. Settlements at greatest risk of coastal flooding are located along the Firth of Forth and River Forth, including Stirling, Grangemouth and Culross. Areas at medium and high risk of river flooding are predominantly located in the vicinity of the River Forth, River Devon and River Teith. These include Stirling, Aberfoyle, Callander and Alloa. Areas at high and medium risk of surface water flooding are typically associated with

[48] The European Noise Directive (END), Directive 2002/49/EC of the European Parliament and of the Council, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002L0049&from=EN

[49] Scottish Government, Scotland's Noise, 2017, https://noise.environment.gov.scot/index.html

[50] SEPA (2021) https://map.sepa.org.uk/floodmap/map.htm, accessed 20/01/21

Lochs within The Loch Lomond and the Trossachs National Park where population density is typically low.

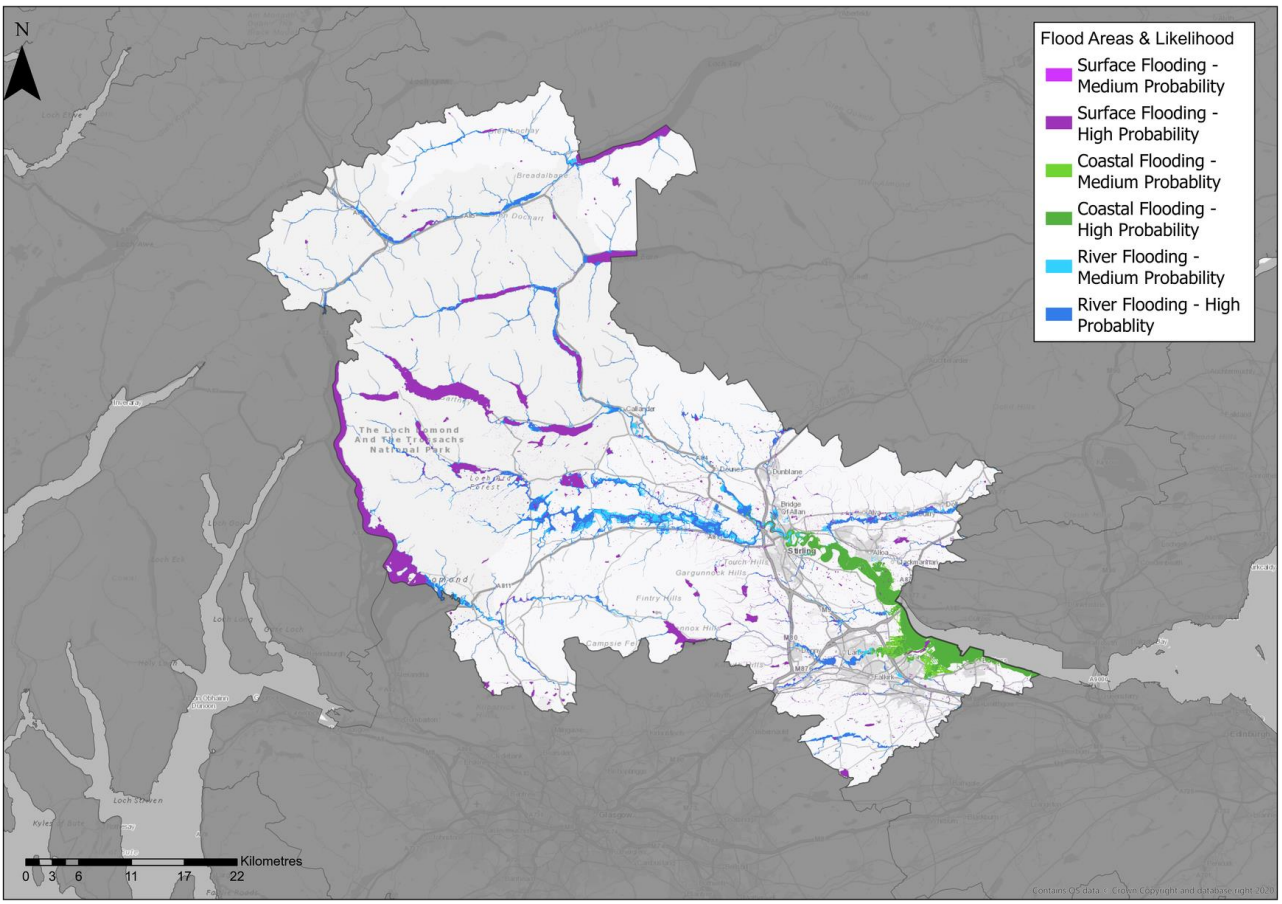


Figure 21: SEPA Flood Map for Forth Valley Region

(click image to go back to main report)

Buried peats are an important carbon sink. More than 20% of Scotland is covered by peat soil; with soils representing over half of Scotland's terrestrial store of carbon[51]. A variety of soil types are present within the region, with mineral gleys, brown and calcareous soils being prevalent. Figure 22 illustrates the distribution of carbon and peatland classes for soils across the region. Classes 1 and 2 represent nationally important carbon-rich soils, deep peat and priority peatland habitat; Class 3 represents occasional peatland habitats with carbon-rich soils and some areas of deep peat; Class 4 represents predominantly mineral soils, unlikely to include carbon-rich soils; and Class 5 represents areas where no peatland habitat is recorded however soils are carbon rich and deep peat[52].

[51] NatureScot, Managing nature for carbon capture, 2020, https://www.nature.scot/professional-advice/land-and-sea-management/carbon-management/managing-nature-carbon-capture

[52] Scottish Government, Scotland's Soils, 2016, https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/

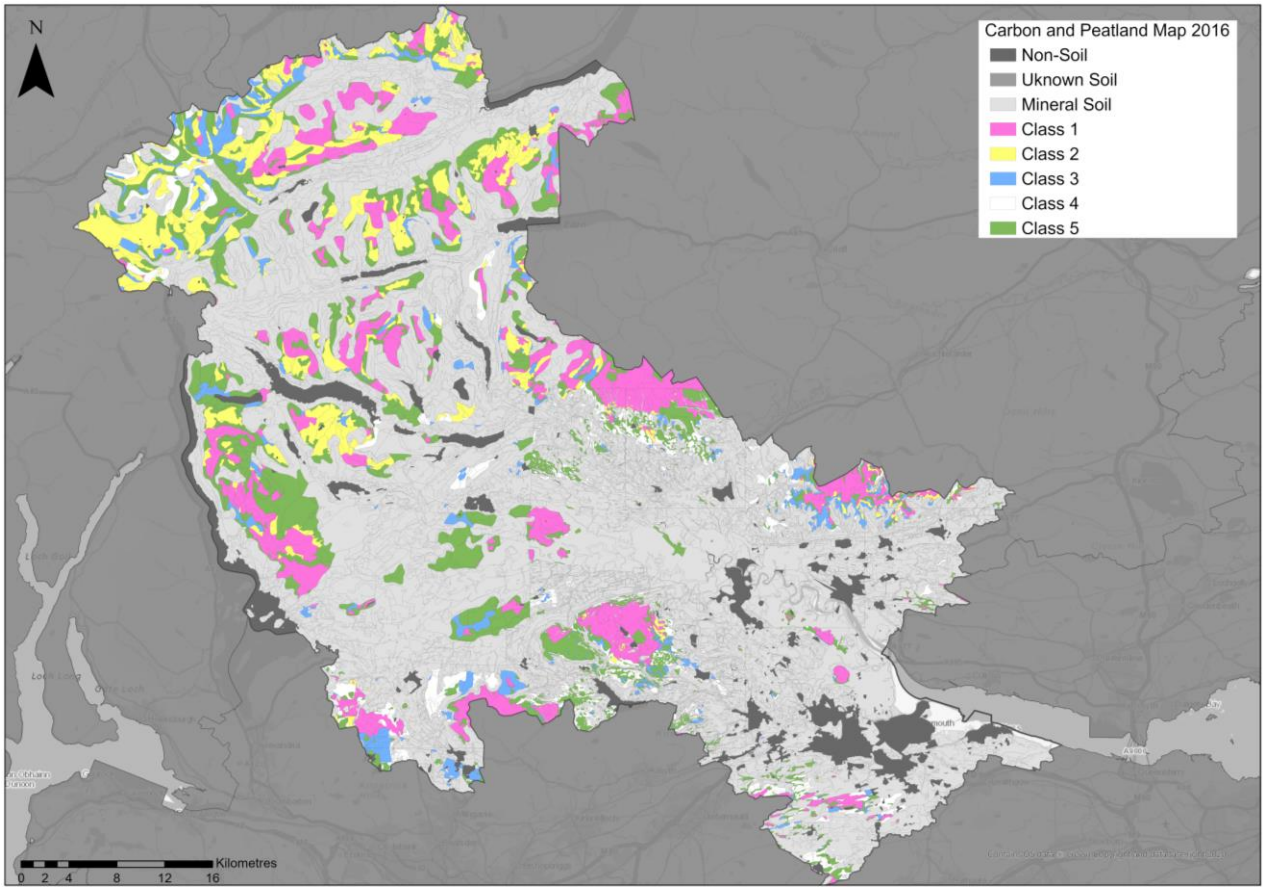


Figure 22: Carbon and Peatland Map for Forth Valley region[53]

(click image to enlarge figure)

There are 4 Air Quality Management Areas (AQMAs) within the region, concentrated in the industrial region around the Grangemouth oil refinery and the cement and plastics factories as below[54]:

- Grangemouth AQMA, encompassing Grangemouth petrochemical complex and adjacent areas
- Banknock & Haggs AQMA, encompassing parts of Banknock and Haggs around the junction of the A803 and M80.
- Falkirk Town Centre AQMA, encompassing part of Falkirk town centre
- Falkirk Council AQMA No.5, covering part of Banknock.

Air quality is poorest in highly trafficked routes traversing the region and in the more urbanised areas such as the M80 at Haggs and M80 / M876 at Bankhead, Grahamston in Falkirk, the M876 / M9, M9 Junction 5 and the vicinity of Earl's Road Grangemouth.

[53] Scottish Government, Scotland's Soils, 2016, ibid
[54] DEFRA, All AQMAs boundaries in Scotland, 2019, https://uk-air.defra.gov.uk/aqma/maps/

In 2018[55], Stirling recorded higher CO_2 emissions from transport per capita relative to the other authority areas within the region; whilst Clackmannanshire recorded the lowest per capita in the region, as shown in Table 2. Stirling's and Falkirk's per capita emissions were the 3rd and 6th highest respectively of all local authorities, with Clackmannanshire's 23rd highest overall.

Within the region, the highest proportion of Scotland's total CO_2 emissions from transport were from the Falkirk authority area in 2018. The Clackmannanshire authority area recorded the lowest proportion of emissions from transport in the region.

Table 2 shows that the total CO_2 emissions from transport within the Forth Valley region equated to 6.9% of the Scotland's total transport emissions overall.

Table 2: CO_2 Emissions Per Capita from Transport and Percentage of Scotland Total Transport-Related Emissions[56]

Area	Per Capita Transport Emissions, 2018 (t) CO_2	% of Scotland Total Transport Emissions
Clackmannanshire	1.6	0.7%
Falkirk	2.5	3.6%
Stirling	3.0	2.6%
Forth Valley region	2.5	6.9%
Scotland average	2.0	-

2.4.1. Summary of Environmental Context

To summarise the Environmental situation in Forth Valley is as follows:

- Forth Valley has a number of key features / constraints including; The Antonine Wall, large Designated Battlefield Areas, Loch Lomond and the Trossachs National Park, 3 National Scenic Areas, 4 Air Quality Management Areas, 129 Surface Water features, 12 Special Areas of Conservation, 7 Special Protection Areas and approximately 30 Sites of Special Scientific Interest and NCN Routes 76, 764, 765 and 768.
- The region contributes 6.9% of Scotland's total transport emissions. Per capita transport emissions in Stirling are almost double that of Clackmannanshire.
- Air quality is poorest in highly trafficked routes traversing the region and in the more urbanised areas such as the M80 at Haggs and M80 / M876 at Bankhead, Grahamston in Falkirk, the M876 / M9, M9 Junction 5 and the vicinity of Earl's Road

[55] UK Government, UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2018, 2020, https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2018

[56] UK Government, UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2018, 2020, https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2018

Grangemouth.

2.5. Transport Context

2.5.1. Introduction

This section outlines the supply and demand side for transport in the Forth Valley region. Figure 23 shows the transport network in the region (the cycle network and core paths are additionally shown on separate maps for clarity).

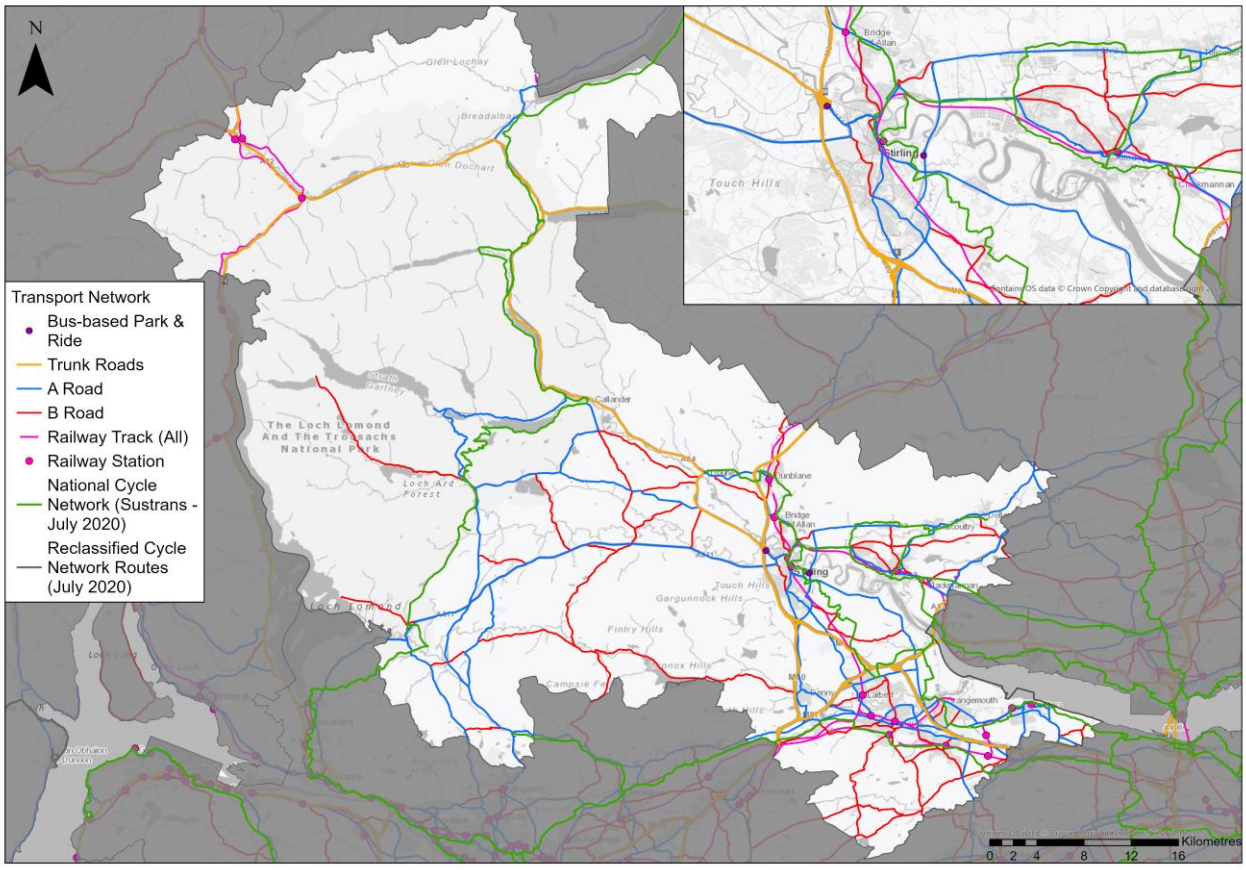


Figure 23: Transport Network

(click image to enlarge figure)

2.5.2. Active Travel

The National Cycle Network (NCN) is shown in Figure 24. Several off-road and on-road cycle routes make up the NCN in the region, which includes:

- NCN Route 7 (Sunderland to Inverness: passing through Loch Lomond and the Trossachs National Park);
- NCN Route 754 (Edinburgh to Glasgow: running along the Union Canal and passing the Falkirk Wheel);
- NCN Route 755 (Kirkintilloch to Strathblane: running along the Strathkelvin Railway Pass);
- NCN Route 76 (Berwick-upon-Tweed to Kirkcaldy: running through Stirling along the Forth Estuary);
- NCN Route 764 (Clackmannan to Dunfermline: known as the West Fife Way and following the course of the former Dunfermline to Alloa railway);
- NCN Route 767 (Alloa to Dollar: known as the Devon Way and following the course of the former Devon Way railway); and
- NCN Route 768 (Tullibody to Alva: continuation of the railway path (part of Route 76) that runs from Cambus).

It should be noted that local connections are possible within the above National Cycle Network routes, such as between Deanfield and Grangemouth and northwards on NCN 76 and more widely within the southeast of Forth Valley[57]. However, as the map shows, most of the NCN is distributed in the more central and south-eastern areas; meaning local active travel connections are limited in the north-west between areas like Aberfoyle and Kinlochard, with a lack of supporting infrastructure compared to the more urban parts.

In addition, the region has an extensive core paths network.

[57] Sustrans, National Cycle Network, 2020, https://osmaps.ordnancesurvey.co.uk/ncn

Figure 24: National Cycle Network

(click image to enlarge figure)

2.5.3. Bus Network

A map illustrating scheduled bus routes is shown in Figure 25.

Alloa has a number of services serving the smaller towns and connecting with Stirling, however there are no direct bus services to cities other than Stirling. The only direct connection outwith the region is to Dunfermline.

Falkirk has a number of services serving the population within the region. There are also services connecting to Edinburgh, Glasgow, Bathgate, Broxburn, Cumbernauld and Dunfermline.

Stirling has services operating all over the council area connecting the smaller towns to Stirling. Stirling has connections to Edinburgh, Glasgow, Perth, Dundee, London and Aberdeen. Crianlarich has services to Stirling, Fort William, Edinburgh, Glasgow, Uig and Oban. Stirling has 2 Park and Ride sites which operate services into Stirling only.

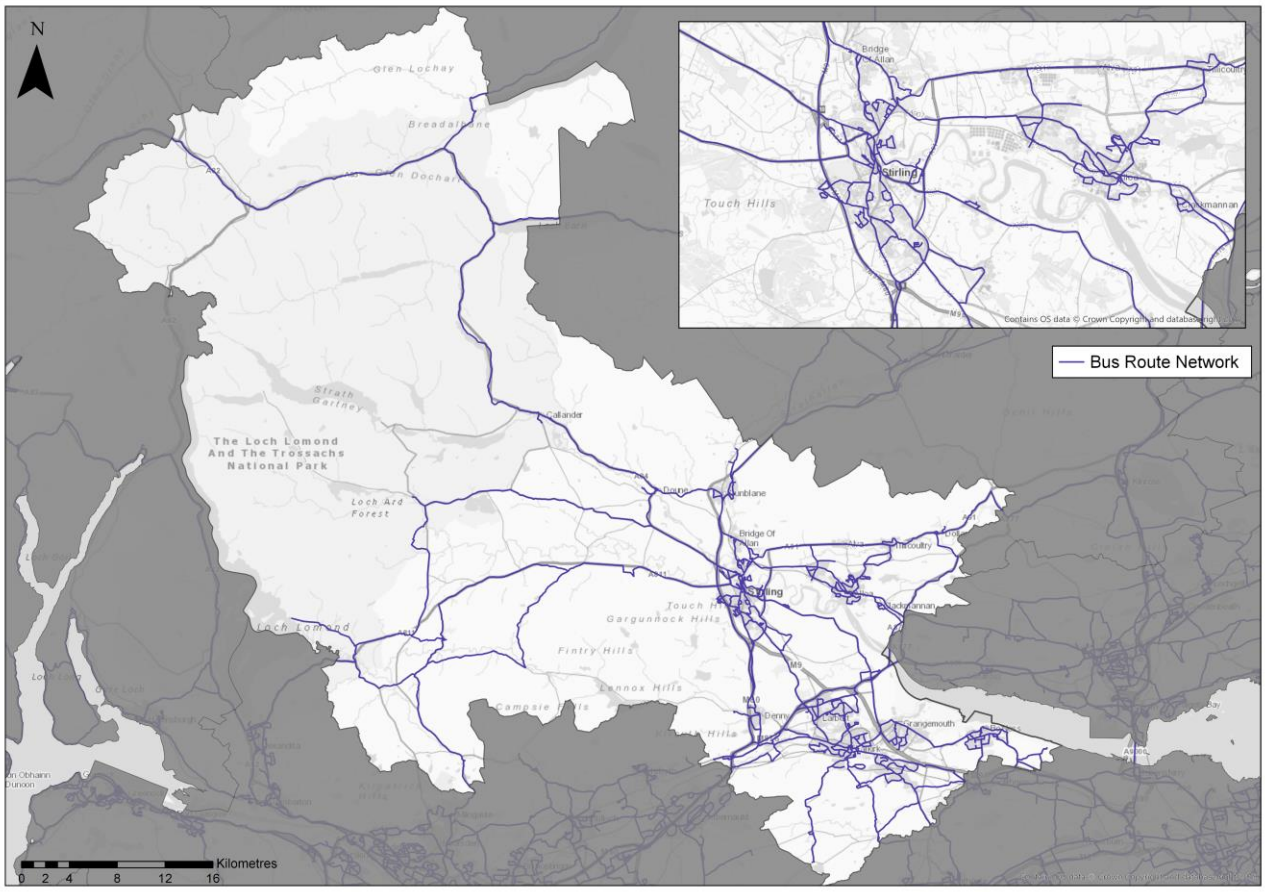


Figure 25: Forth Valley Bus Routes

(click image to enlarge figure)

The areas served by scheduled bus routes reduces in the evening as shown in Figure 26, with only a third of the AM peak (0700-0859) service level operating in the off-peak period.

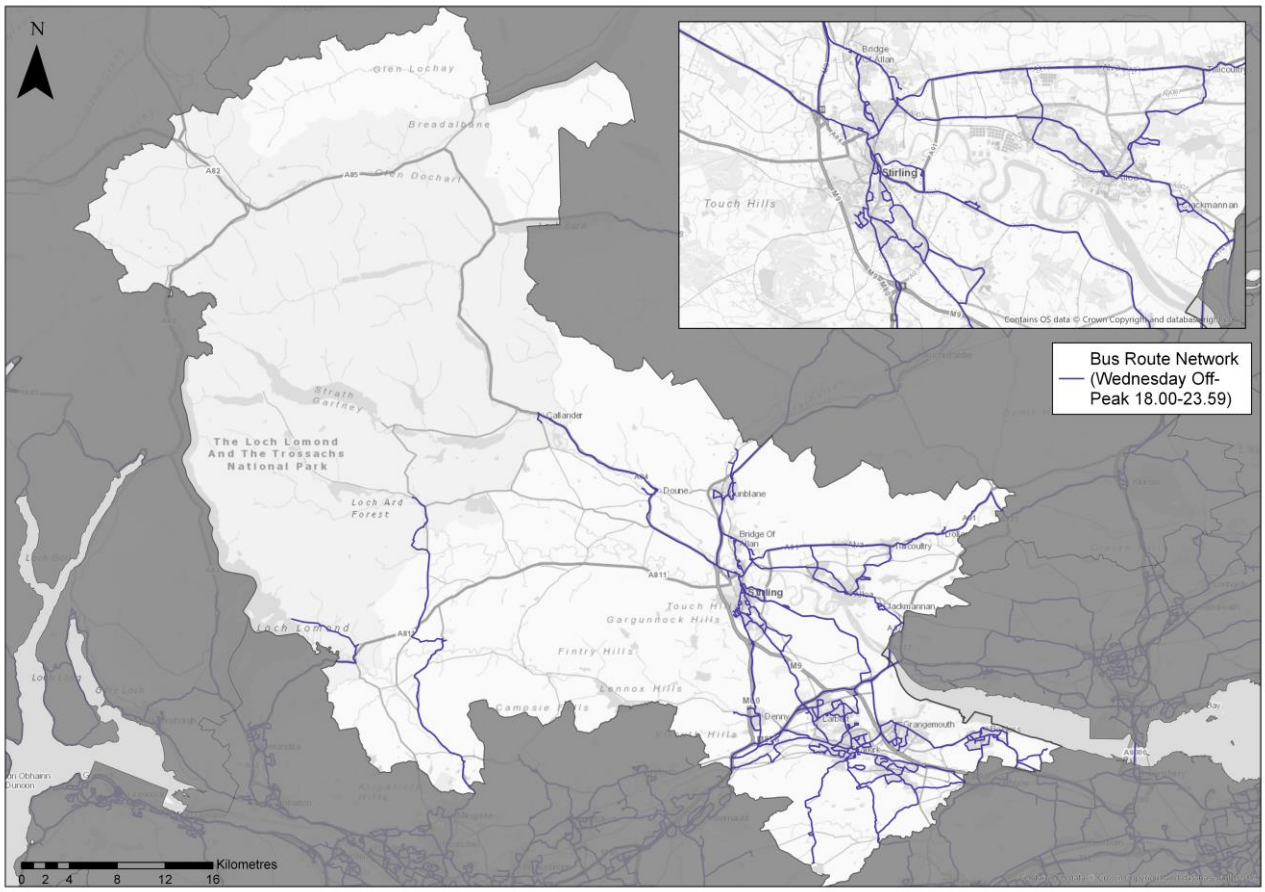


Figure 26: Wednesday Offpeak (18:00 – 23:59) Bus Routes

(click image to enlarge figure)

Demand Responsive Transport (DRT) accounts for several bus journeys in Forth Valley, although due to its nature accurate data is not available. DRT schemes typically operate in local areas where there are few or no conventional bus services. The exact route and stopping points are usually flexible, but in all cases journeys must be booked in advance. Some DRT services are only for specific groups of people in the community, such as the elderly or disabled. The service usually operates like a taxi and costs around the same as a bus fare. Dial-a-journey provides transport services for people who have mobility difficulties in Falkirk, Stirling and Clackmannanshire. There are additional operators/services throughout the Forth Valley region.

There has been a general trend of decline in bus use nationally and this is reflected in Falkirk, Clackmannanshire and Stirling[58] as shown in Figure 27. In relative terms i.e. the decline in travel by region, the Forth Valley region was ranked in the worst quintile alongside Ayrshire & Arran.

[58] Transport Scotland, Transport and Travel in Scotland, 2019, https://www.transport.gov.scot/our-approach/statistics/#42764

Based on research into the causes of bus patronage decline, the worst performing factors that have contributed to patronage decline in the Forth Valley region have been identified as congestion, bus mileage (total scheduled vehicle km) and bus connectivity, with Falkirk Council 1 of the local authorities in the worst 2 quintiles for congestion[59].

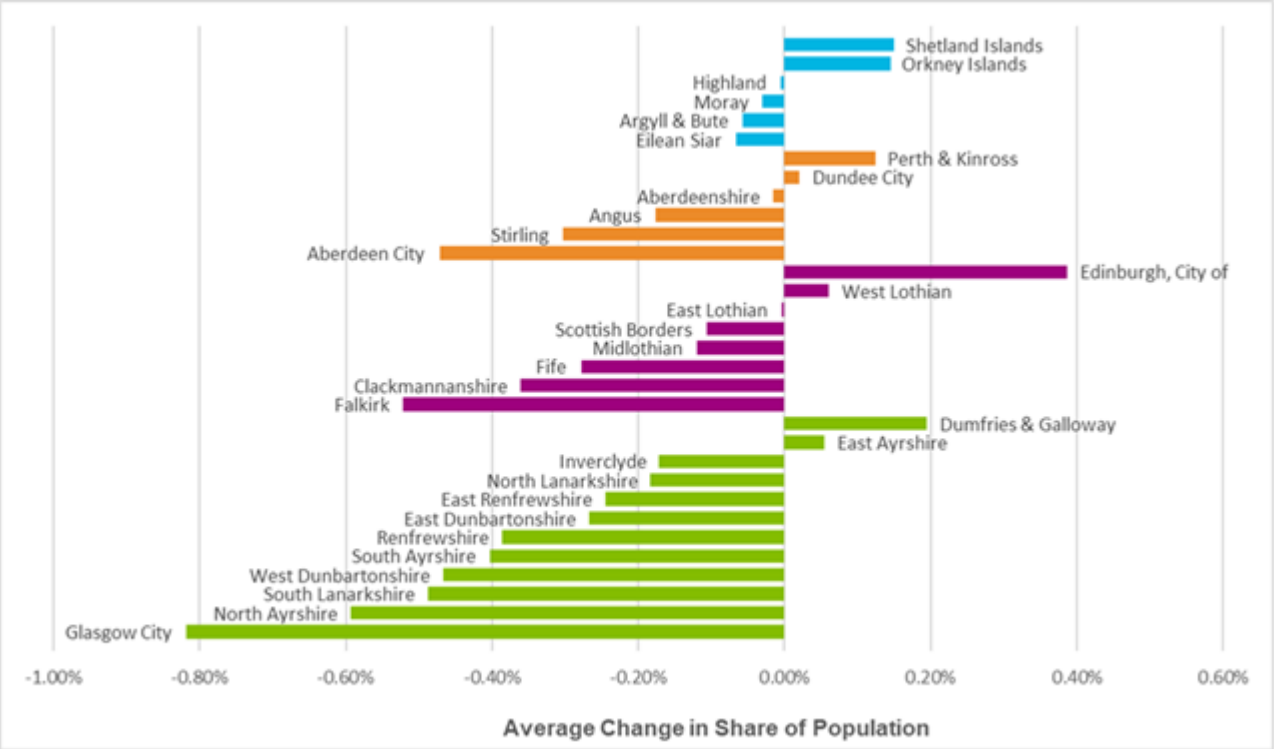


Figure 27: Average Yearly Change in Share of Population Using the Bus 4 or More Days a Week, 2003/04 – 2017[60]

[59] Transport Scotland, Transport and Travel in Scotland, 2019, https://www.transport.gov.scot/our-approach/statistics/#42764

[60] Adults (16+) - use of local bus services, and train services, in the previous month, Transport and Travel in Scotland. Calculated on the basis of the average percentage change per annum across 2003/04, 2005/06, 2007/08, 2009/10, 2012/13, 2014, 2015, 2016 and 2017.

2.5.4. Rail Network

The Forth Valley region has a total of 12 rail stations - 9 in the east; and Crianlarich, Lower Tyndrum and Upper Tyndrum in the northwest of the region. Estimated annual entry and exit numbers for each of these stations from the period 2016-17 to 2018-19 are detailed in Table 3[61] – it is clear that rail patronage is generally increasing across the network.

Table 3: Office of Rail and Road (ORR) Estimates of Station Usage for Forth Valley

Station	2016-17	2017-18 (% annual change)	2018-19 (% annual change)
Stirling	2,337,656	2,503,092 (7%)	2,480,154 (-1%)
Falkirk High	846,642	872,426 (3%)	909,868 (4%)
Larbert	803,812	850,346 (6%)	858,388 (1%)
Polmont	756,212	789,052 (4%)	793,658 (1%)
Falkirk Grahamston	669,976	690,380 (3%)	720,008 (4%)
Dunblane	519,370	553,028 (6%)	547,270 (-1%)
Alloa	360,596	388,194 (8%)	370,452 (-5%)
Bridge of Allan	271,416	289,060 (7%)	290,858 (1%)
Camelon	132,166	127,576 (-3%)	142,044 (11%)
Crianlarich	16,672	17,586 (5%)	16,960 (-4%)
Tyndrum Lower	5,510	5,366 (-3%)	5,996 (12%)
Upper Tyndrum	4,512	5,290 (17%)	5,702 (8%)
Region total (% annual change)	**6,724,540**	**7,091,396 (5%)**	**7,135,656 (1%)**

The top 4 destinations for journeys originating in each of the local authority areas are as follows[62]:

Table 4: Top Rail Destinations by Origin Local Authority

Clackmannanshire	Falkirk	Stirling
Glasgow	Edinburgh	Glasgow
Stirling	Glasgow	Edinburgh
Edinburgh	Stirling	Stirling
Falkirk	Falkirk	Falkirk

[61] ORR, 2018/19 Rail Stations Entries / Exits, https://dataportal.orr.gov.uk/
[62] Transport Scotland, Scottish Transport Statistics No. 38, 2019, https://www.transport.gov.scot/publication/scottish-transport-statistics-no-38-2019-edition/

Station Travel Plans have been prepared for 3 of the 12 Forth Valley stations and details of services are included below:

Stirling station, which is located on the former Caledonian Railway main line between Glasgow and Perth, is a key commuter station for journeys to Glasgow, Edinburgh and Perth, served by 4 trains per hour to Glasgow Queen Street, 3 trains per hour to Edinburgh Waverley and 3 trains per hour to Perth during peak times. The station is also served by long distance services to Dundee (hourly), Aberdeen (hourly) and Inverness (8 trains per day) and is the junction for the branch line to Alloa, with 3 trains per hour to Dunblane. The majority of services are operated by ScotRail, with some limited services offered to London Kings Cross by London North Eastern Railway and Serco Caledonia Sleeper services[63].

It is noted that Stirling Station redevelopment has been approved by Transport Scotland. ScotRail, as part of a franchise obligation, will now tender for the works with construction planned to start on site in 2021. There is no delivery timeline as yet until the construction contract has been awarded.

Falkirk High is on the main line between Edinburgh and Glasgow and is managed by ScotRail. Services stopping here are operated by ScotRail. Trains to Edinburgh are routed via Polmont and Linlithgow, whilst trains to Glasgow are via Croy. There are services to Edinburgh and Glasgow 4 times per hour during peak hours Monday to Saturday, with a twice hourly service operating in the evenings and on Sunday[64].

Falkirk Grahamston rail station is on the Edinburgh to Dunblane Line and is managed by ScotRail. The vast majority of services stopping at the station are operated by ScotRail. There are regular services to Edinburgh, Glasgow and Dunblane from Monday to Saturday, and a reduced service operating on Sunday. There is also a daily service to Inverness from Monday to Friday. From December 2018 service levels were improved; to exploit electrification and new trains, a new half hourly electric service between Glasgow and Edinburgh via Cumbernauld was introduced, calling at Falkirk Grahamston. This doubled the service level to Edinburgh, helping to make it a more attractive alternative to Falkirk High.

In addition to the 3 above, Polmont station is an important station in the region serving the east Falkirk area. As of 2018-19, it was the fourth most used station in Forth Valley with 11.1% of the total annual entry and exit numbers and provides a frequent connection to Edinburgh and Glasgow. Due to a drive to increase capacity and decrease journey times between the cities, Polmont is now a stopping station on the 'Express' service via Falkirk High and the newly introduced Edinburgh to Glasgow via Cumbernauld route with services to each city calling approximately 4 times per hour (twice per route). However, it should be noted from Network Rail timetables that there is now no longer a direct connection to

[63] Scotrail, Stirling Station Travel Plan, July 2017, https://www.scotrail.co.uk/sites/default/files/assets/download_ct/stirling_station_travel_plan.pdf

[64] Scotrail, Falkirk Station Travel Plan, March 2019, https://www.scotrail.co.uk/sites/default/files/assets/download_ct/falkirk_station_travel_plan.pdf

Stirling (Table 5). ScotRail[65] indicated at the time of releasing the December 2018 timetable that passengers from Polmont and Linlithgow would be required to interchange at Falkirk Grahamston for onward travel to Larbert, Stirling and Dunblane. Consequently, accessibility to the wider Forth Valley region by rail from Polmont was reduced from December 2018 with the focus of the network being on improved Edinburgh to Glasgow connectivity.

The issue of connectivity also applies to Alloa station, the only rail station in Clackmannanshire. As Table 6 shows, the only direct connection from here is to Glasgow Queen Street via Stirling. This means that all rail passengers aiming to travel east to Edinburgh and other Forth Valley areas such as Falkirk and Camelon must interchange at Stirling or Larbert. As such, this indicates that accessibility to and from Clackmannanshire by rail is restricted and may be a contributory factor in the 17.5% drop in patronage between 2017-18 and 2018-19.

Table 5: Network Rail Polmont destinations and frequency 2020

POLMONT			
Destination	**Mon-Fri**	**Saturday**	**Sunday**
Edinburgh	Every 15-30 minutes (06:12-00:08)	Every 15-30 minutes (06:12-00:08)	Every 30 minutes (08:20-00:08)
Glasgow QS	Every 15-30 minutes (05:26-0007)	Every 15-30 minutes (05:26-0007)	Every 30 minutes (08:21-00:07)

Table 6: Network Rail Alloa destinations and frequency 2020[66]

ALLOA			
Destination	**Mon-Fri**	**Saturday**	**Sunday**
Glasgow QS	Every 60 minutes (06:17-23:48)	Every 60 minutes (06:17-23:48)	Every 60 minutes (09:16-21:16)

[65] Scotrail, Time for new timetables, December 2018, https://www.scotrail.co.uk/time-new-timetables

[66] Network Rail, Electronic National Rail timetable, December 2019, https://www.networkrail.co.uk/running-the-railway/the-timetable/electronic-national-rail-timetable/

2.5.5. Maritime

There are no passenger ferry routes which operate within the Forth Valley region. The commercial port, Forth Ports Grangemouth, is Scotland's largest container port, handling 9 million tonnes of cargo each year through specialist container, liquid and general cargo terminals. This cargo flow represents as much as 30% of Scotland's gross domestic product (GDP), highlighting the port's essential role as an economic facilitator for Scotland[67]. A range of liquid bulks, containers and general cargo commodities transit the port using road, rail and sea.

2.5.6. Road Network

The trunk road network consists of the following routes:

- A82 (Glasgow to Fort William / Inverness)
- A84 (Stirling to Loch Earn)
- A85 (Oban to Dundee)
- A876 (Clackmannanshire Bridge)
- A9 (Edinburgh to Inverness)
- A985 (Kincardine Bridge to Rosyth)
- M80 (Glasgow to Bannockburn)
- M876 (Bonnybridge to Kincardine Bridge)
- M9 (Edinburgh to Dunblane).

In addition to these roads, it was identified through consultation that the A91, A905, A907, A977, A801 and A811 (non-trunk roads) serve a number of important regional movements.

Table 7 lists the maximum Annual Average Daily Flow (AADF) on these roads (within Forth Valley) together with traffic mix[68] in 2018. The percentage of freight has been estimated as proportion of LGV and HGV in the total motor vehicles.

Following a route to neighbouring Tay Cities Region, the A827(non-trunk road) Lix Toll to A9 Ballinluig (via Loch Tay) has been identified by stakeholders as performing an important regional function. However, it should be noted that this route traverses between regions with its eastern extent being in Tay Cities.

[67] Forth Ports, Our Ports: Grangemouth, accessed January 2020, https://www.forthports.co.uk/our-ports/grangemouth/

[68] Department for Transport, Traffic Counts, 2018, https://data.gov.uk/dataset/208c0e7b-353f-4e2d-8b7a-1a7118467acc/gb-road-traffic-counts

Table 7: AADF on regional roads (2018)

Road	Cars and taxis	LGVs	HGVs	Total motor vehicles	Percentage freight (LGV+HGV) /Total
A801 (non-trunk road)	8,395	2,144	963	11,556	26.9
A811 (non-trunk road)	12,708	1,459	259	14,540	11.8
A82	4,596	861	449	6,433	20.4
A84	14,439	1,802	334	16,697	12.8
A85	2,166	818	348	3,413	34.2
A876	25,078	5,164	3,194	33,746	24.8
A9	23,901	3,737	3,528	31,508	23.1
A905 (non-trunk road)	18,751	5,836	756	25,578	25.8
A907 (non-trunk road)	20,672	3,152	726	24,948	15.5
A977 (non-trunk road)	3,667	1,385	712	5,844	35.9
A91 (non-trunk road)	19,865	3,549	807	24,371	17.9
M80	54,239	11,300	7,571	73,615	25.6
M876	33,869	7,769	4,416	46,320	26.3
M9	50,873	10,194	5,985	67,336	24.0

Traffic count data from sites in the vicinity of tourist destinations indicates that traffic volumes in some parts of the region are subject to seasonal variation. In 2012 the August average daily flow on the A84 between Callander and Doune was 26% more than the seven-day AADF[69]. By comparison, the 2017 data for the M876 at Bonnybridge demonstrated low levels of seasonal variation with the August average daily flow only 6% more than the seven-day AADF.

[69] Traffic Scotland, National Traffic Data System, 2019, https://ntds.trafficscotland.org/

2.5.7. Aviation

There are no major airports in the Forth Valley region, but the region is in close proximity to Glasgow and Edinburgh Airports as detailed in Table 8.

Table 8: Proximity to Airports

Origin	Airport	Distance	Mode	Journey Time[70*]	Journey stages
Alloa	Edinburgh Airport	29 miles	Road	35 minutes	-
			Public Transport	1 hour 39 minutes	3 (train to Stirling/Larbert; train to Edinburgh Park; tram to airport)
	Glasgow Airport	42 miles	Road	48 minutes	-
			Public Transport	47 – 56 minutes	2 (train to Glasgow Queen Street; bus to airport)
Falkirk	Edinburgh Airport	19 miles	Road	25 minutes	-
			Public Transport	45 – 56 minutes	2 (train to Edinburgh Park/Haymarket; tram to airport)
	Glasgow Airport	32 miles	Road	41 minutes	-
			Public Transport	47 minutes – 1 hour 13 minutes	2 (train to Glasgow Queen Street; bus to airport)
Stirling	Edinburgh Airport	30 miles	Road	35 minutes	-
			Public Transport	59 minutes – 1 hour 8 minutes	2 (train to Edinburgh Park; tram to airport)
	Glasgow Airport	35 miles	Road	41 minutes	-
			Public Transport	1 hour – 1 hour 4 minutes	2 (train to Glasgow Queen Street; bus to airport)

[70] Google journey planner (weekday journey) – correct as of 20 Feb 2020
*Journey times set at 14:00 on a Tuesday

2.5.9. Summary of Transport Context

To summarise the Transport situation in Forth Valley is as follows:

- **Active Travel**: several off-road and on-road cycle routes make up the NCN in the region, including NCN 7, 754, 755, 76, 764, 767, 768 and an extensive core path network.
- **Bus**:
  - Alloa has services serving the smaller towns and connecting with Stirling. There are no services to cities other than Stirling. The only connection outwith the region is to Dunfermline.
  - Falkirk has services serving the population within the region and also to Edinburgh, Glasgow, Bathgate, Broxburn, Cumbernauld and Dunfermline.
  - Stirling has services operating over the council area connecting the smaller towns to Stirling, plus services to Edinburgh, Glasgow, Perth, Dundee, London and Aberdeen.
  - In addition to scheduled services that operate in urban locations, there are also services that operate from some of the region's more rural locations e.g. Crianlarich has services to Stirling, Fort William, Edinburgh, Glasgow, Uig and Oban.
  - Stirling has 2 Park and Ride sites which operate services into Stirling only. DRT also accounts for several journeys in the region.
  - Bus patronage is continuing to decline across the region.
- **Rail:** the region has a total of 12 stations (9 in the east and 3 in the northwest) the busiest of which are Stirling, Falkirk High, Larbert, Polmont and Falkirk Grahamston. Top destinations of most rail travel from all local authority areas include; Edinburgh, Falkirk, Glasgow and Stirling. Rail patronage is generally increasing
- **Maritime:** there are no passenger ferry routes which operate within the Forth Valley region. The commercial port, Forth Ports Grangemouth, is Scotland's largest port.
- **Road:** the trunk road network consists of A82 (Glasgow to Fort William / Inverness), A84 (Stirling to Loch Earn), A85 (Oban to Dundee), A876 (Clackmannanshire Bridge), A9 (Edinburgh to Inverness), A985 (Kincardine Bridge to Rosyth), M80 (Glasgow to Bannockburn), M876 (Bonnybridge to Kincardine Bridge) and M9 (Edinburgh to Dunblane). In addition to these roads, it was identified through consultation that the A91, A905, A907, A977, A801, A811 and A827 (non-trunk roads) serve a number of important regional movements. Maximum AADF data from 2018 ranges from c. 3400 to 73,500, with percentage freight (estimated as LGV+HGV as proportion of total) ranging from 12% to 34%.
- **Aviation:** there are no major airports in the region, but the region is in close proximity to Glasgow and Edinburgh Airports with Alloa, Falkirk and Stirling all being within 30 miles of an airport.

2.6. Context Summary

Key points to note from the context review are:

- Key documents and policies considered within the context of STPR2 generally have a strong focus on tackling climate change and strengthening connectivity as a driver for economic growth.
- In economic terms, the sectoral profiles of Stirling and Clackmannanshire are broadly similar to Scotland as a whole, whereas there is a more marked difference between the profiles of Falkirk and Scotland, primarily due to Grangemouth.
- 15.7% of all data zones in the region are within the 20% most deprived in Scotland.
- There has been a slight increase in the region's population in recent years.
- Household car / van availability is higher than the Scottish average, which is reflected in this mode's dominance for travel to work. Conversely, travel to work by bike and foot is below the Scottish average.
- A lower proportion of Forth Valley residents travel less than 10km to work compared to across Scotland. Conversely, a higher proportion of Forth Valley residents travel between 10km and 60km compared to across Scotland.

3. Problems & Opportunities

3.1. Approach to Problem & Opportunity Identification

Deriving evidenced transport related problems and opportunities is a critical element of the Initial Appraisal: Case for Change. They are identified from a range of sources including a review of existing policy and strategy documents, data analysis and extensive stakeholder engagement. This chapter sets out the problems and opportunities with the transport network in the Forth Valley region and details the approach to their identification. Local problems and opportunities have been considered in analysis to gain a full understanding of the regional issues, but options to address these may not be within the scope of this strategic study.

3.1.1. Data Analysis

A wide range of data sources has been used to identify transport related problems and opportunities in the region. Analysis of the data has also enabled problems and opportunities identified through stakeholder engagement to be evidenced to understand the real and perceived nature of feedback and comments raised. Sources of analysis have included primary data such Scottish Household Survey[71], Transport and Travel in Scotland[72], journey time data[73], accident data, public transport provision, as well as data gathered from recent reports and studies in the region. Key findings from the data analysis are presented below, to evidence the problem and opportunity themes set out.

[71] Scottish Government, Scottish Household Survey, 2018, https://www.gov.scot/publications/scottish-household-survey-key-findings-2018/
[72] Transport Scotland, Transport and Travel in Scotland, 2019, https://www.transport.gov.scot/our-approach/statistics/#42764
[73] Data supplied by INRIX via Transport Scotland

3.1.2. Stakeholder Engagement

Stakeholder engagement is an important element in the identification of problems and opportunities. For the Forth Valley region this has consisted of:

- Problems and opportunities workshops held in Falkirk and Stirling with regional stakeholders in May and June 2019 respectively;
- An option generation workshop was subsequently held in Stirling in November 2019 to generate potential options which may address the identified problems and opportunities. The same stakeholders invited to the May and June workshops were invited to the option generation workshop, as well as a number of additional stakeholders;
- Structured interviews with senior officers across the local authorities and other organisations in the region;
- An elected members briefing workshop was held in January 2020. A number of elected members were invited and it was an opportunity for them to hear first-hand about the project and its programme, the problems and opportunities gathered, the interventions generated, as well as putting forward their own views;
- An online survey carried out between 2nd December 2019 and 10th January 2020 for the public and organisations to provide their views on transport issues and challenges in their day to day journeys;
- Regional Transport Working Group meetings, comprising representatives from the 3 constituent councils, SEStran, Tactran, Loch Lomond and Trossachs National Park and Transport Scotland; and
- Schools engagement has been undertaken across the country, with a primary and a secondary school in the Forth Valley region involved to date in undertaking an exercise to consider the transport problems and opportunities in their area and to develop this into a transport plan setting out what is required.

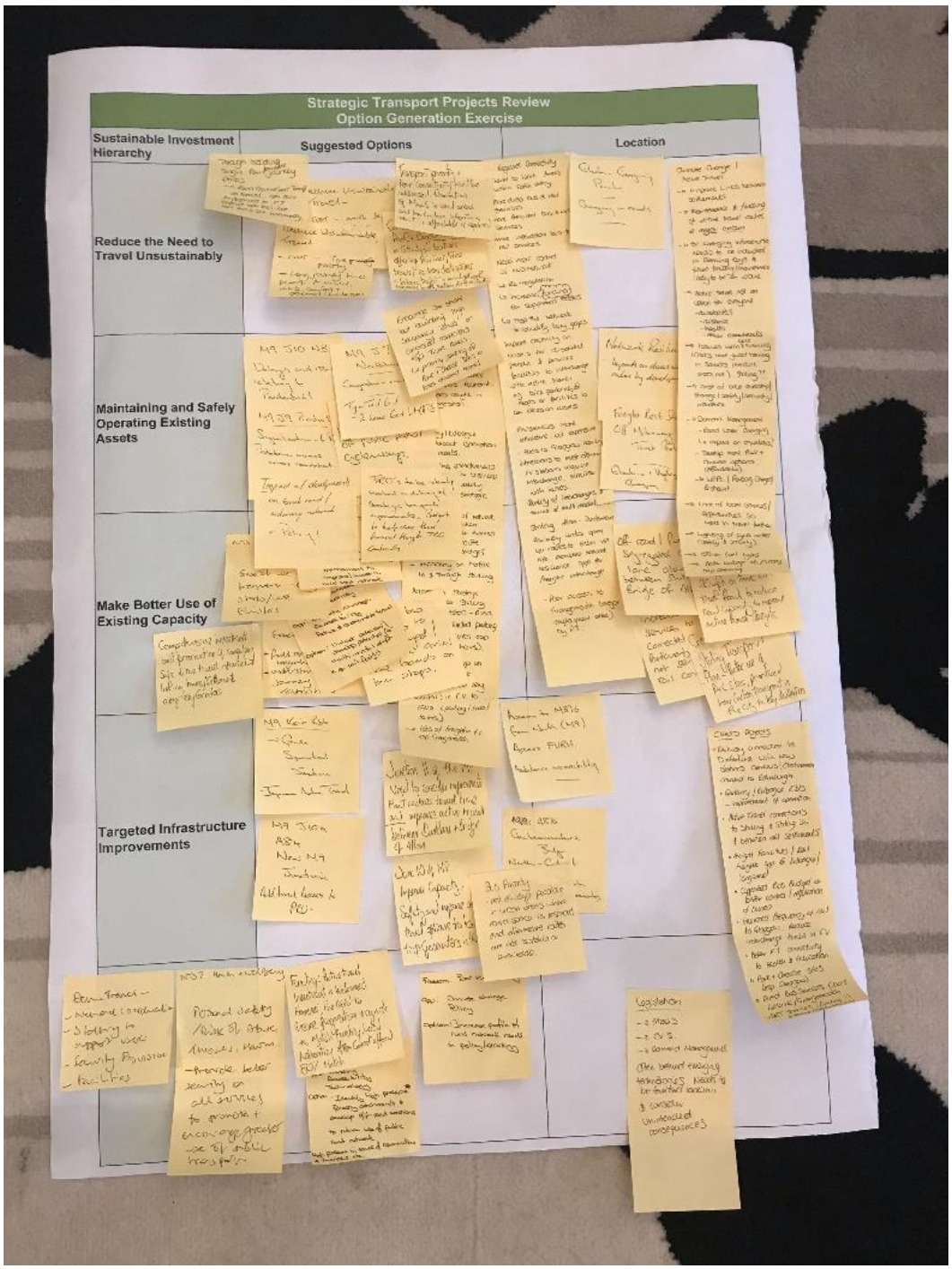


Figure 28: Stakeholder Engagement

Further details of stakeholder engagement activities are available in Appendix C.

3.2. Problems and Opportunities

Based on the activities described above, the following key transport related problems and opportunities have been identified for the Forth Valley region. Evidence to support the key themes listed below is provided in this section:

Problems

- Poor accessibility and connectivity
- Poor road user experience
  - Maintenance and resilience issues
  - Pinch points: long journey times and delays/pollution
- Affordability of public transport
- Barriers to active travel
- Limited digital connectivity.

Opportunities

- Public Transport Interchange, Accessibility and Connectivity
- Active and Sustainable Travel
- Climate Change Emergency
- Technology

Evidence to support the themes is provided in this section.

3.2.1. Problems

It is recognised that inter-dependencies between the identified problems exist and as such, these should not be read in isolation but instead considered holistically across the various topics.

POOR ACCESSIBILITY AND CONNECTIVITY

Geographic Access

Figure 29 shows Geographic Access by datazone in the Forth Valley region and helps to demonstrate the extent of the transport network. This data, which constitutes 1 of the 7 SIMD domains, considers drive time to key services such as GP surgeries, fuel stations, post offices, retail centres and schools. As well as public transport journey times to GP surgeries, post offices and retail centres. The output shows that access is considerably greater in urban areas compared to rural parts. In terms of overall geographic access, much of the region, except for the immediate vicinity of urban settlements, is ranked in the bottom 50% of all Scottish data zones. 29% of Stirling's data zones are in the bottom 20% for Geographic Access, compared to 18% of Falkirk's and 14% of Cackmannanshire's. This highlights the inequality of access between the region's rural and urban locations.

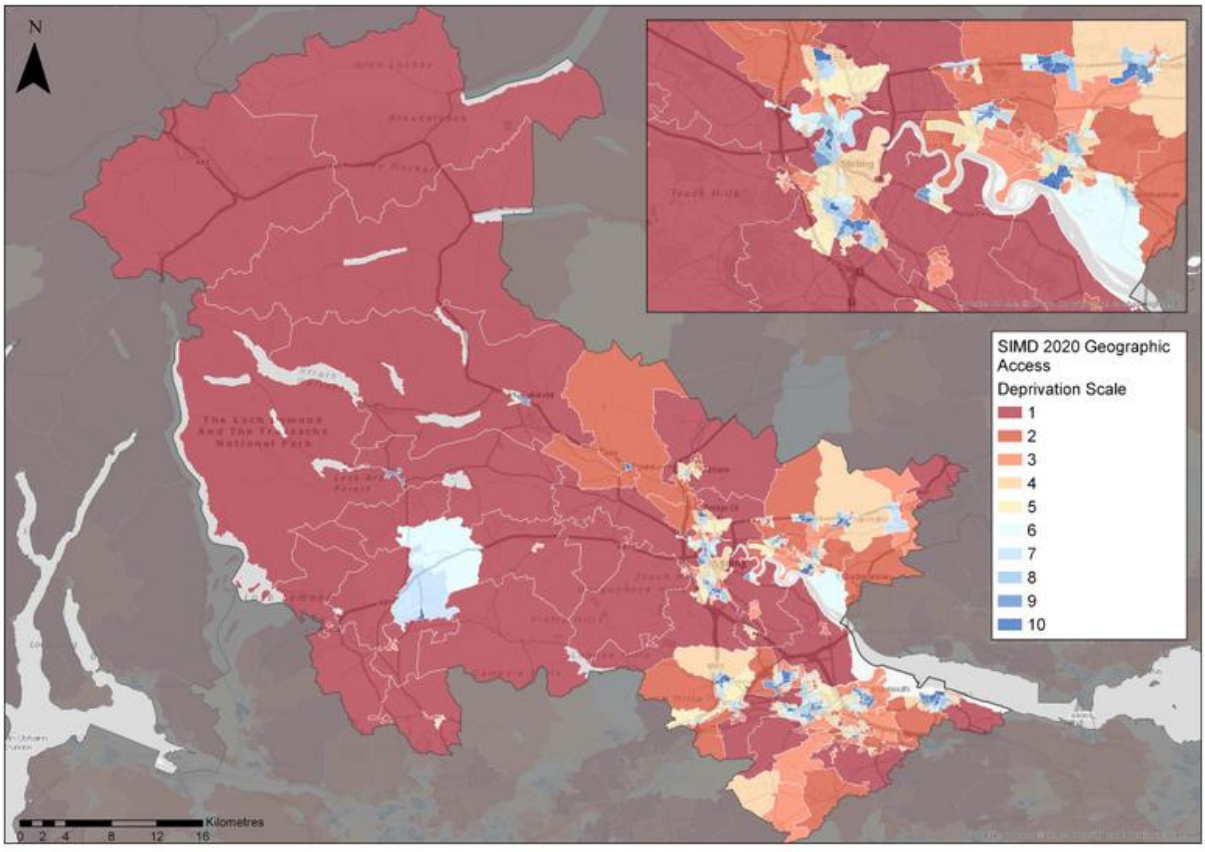


Figure 29: SIMD 2020 Geographic Access

(click image to enlarge figure)

In addition to roads-based accessibility / connectivity issues as illustrated in Figure 29, a

POOR ACCESSIBILITY AND CONNECTIVITY

lack of railway stations in the west of the region, with very few outwith the built up areas in the east, further contributes to overall accessibility and connectivity issues.

There are 12 rail stations in the region, although 9 out of 12, with the exception of Crianlarich, Upper Tyndrum and Lower Tyndrum, are located in the east of the region. Those located in the northwest are not directly connected to other parts of Forth Valley by rail (journeys must be made via Glasgow). Figure 30 and Figure 31[74] illustrate the rail stations / routes in the central region.

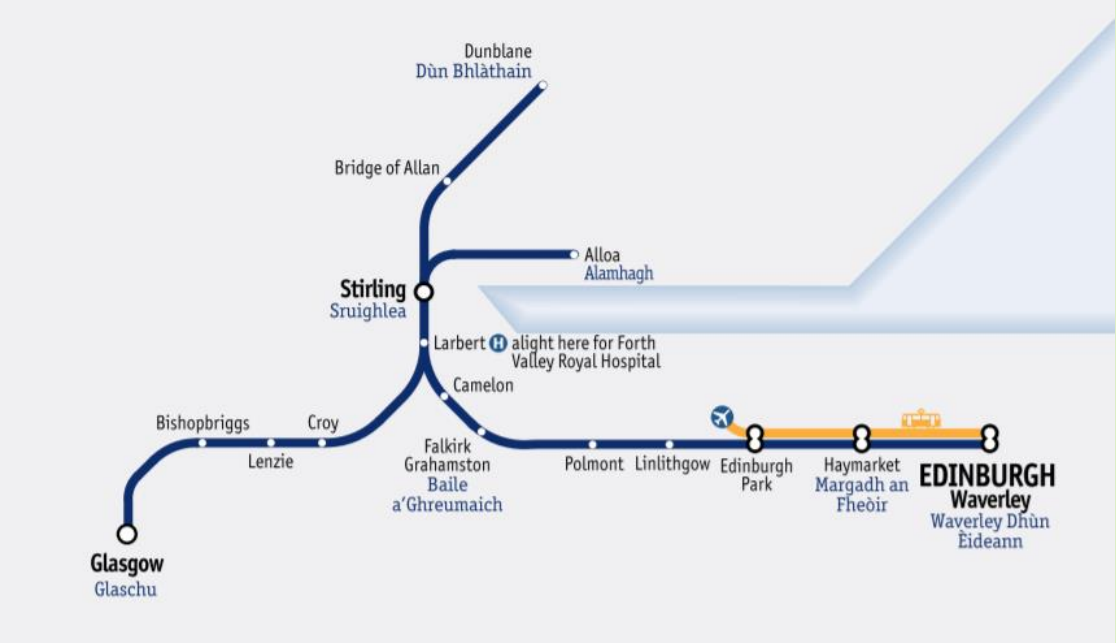


Figure 30: Central Scotland stations (i)

[74] Extracted from 2 ScotRail timetables https://www.scotrail.co.uk/sites/default/files/assets/download_ct/20246_central_scotland_lp.pdf and https://www.scotrail.co.uk/sites/default/files/assets/download_ct/20230_glasgow-edinburgh_via_falkirk_high_lp.pdf

POOR ACCESSIBILITY AND CONNECTIVITY

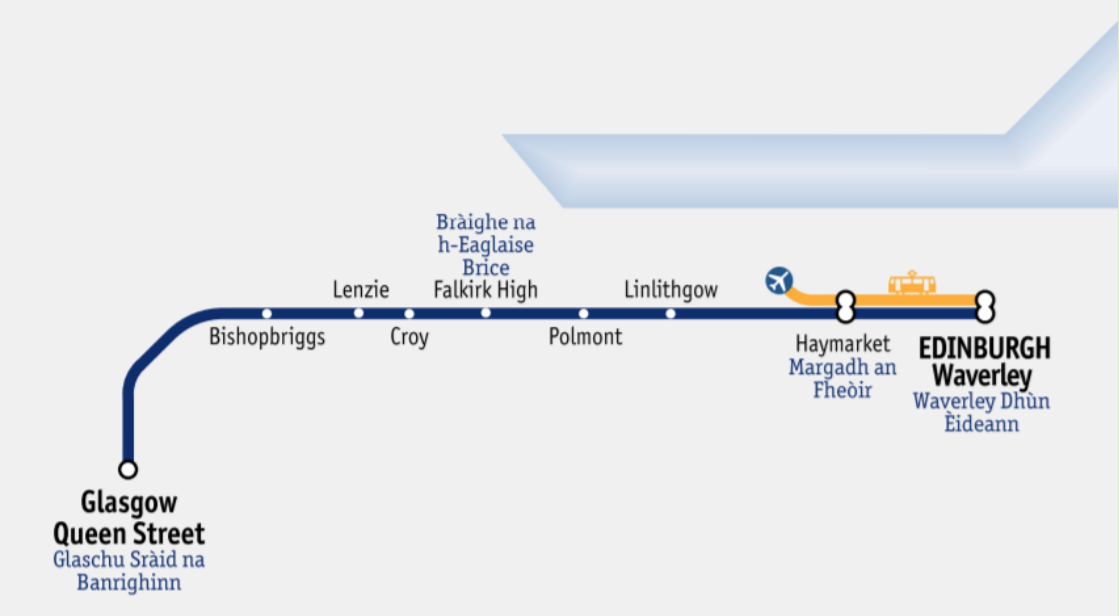


Figure 31: Central Scotland stations (ii)

A survey conducted as part of Falkirk High / Grahamston Station Travel Plan demonstrates that the most frequently cited improvement needed at Falkirk High is public transport access to and from the station[75]. This suggests that there may be potential for modal shift and greater interchange opportunities at Falkirk High Station. Further to this, the third most frequently cited improvement needed is pedestrian / cycle access to and from the station, again suggesting the potential for modal shift.

The area for improvement highlighted above can be related to a wider issue of multi-modal interchange between the strategic rail and road network. TRACC outputs show the M9/M80 strategic roads passing through the region and rail routes connecting all Scotland's cities; Forth Valley's position in the centre of cross-country strategic links therefore provides further opportunity for modal shift into the main settlements.

In addition, general perceptions from survey respondents included "*The walking paths from the station are dark and possibly unsafe late at night I normally get the last train back so have to walk them alone. Lack of buses that go direct from the station and there's no late services. Not many taxi's waiting at the station.*"

Results from a survey undertaken as part of the Stirling Station Travel Plan identified the top 3 reasons for respondents travelling by car as being; journey time (19%), lack of suitable alternatives (17%) and journey reliability (15%)[76].

The results of engagement activities and data analysis indicate that the region needs to be better connected internally (particularly to / from rural areas), including to health, key

[75] Scotrail, Falkirk Station Travel Plan, March 2019, ibid
[76] Scotrail, Stirling Station Travel Plan, July 2017, ibid

POOR ACCESSIBILITY AND CONNECTIVITY

employment, education and leisure sites within Forth Valley.

The apparent lack of connectivity and public transport share in the region suggest there are barriers, from a lack of integration to journey reliability, preventing an increase in travel by more sustainable modes like bus and rail. Stakeholder engagement activities have pointed to disparities in the destinations served by the rail network along with a lack of competitiveness in journey time versus the private car.

Accessibility Analysis

Accessibility analysis was undertaken using TRACC - a multi-modal travel time analysis tool. Utilising public transport network data, public transport timetable data and active travel network data, the tool was used to calculate public transport and active travel journey times to / from key origins and destinations. These journey time thresholds (isochrones) were then used to calculate the population within this area. Population data used was 2011 Census Output Area populations. Destinations used in the TRACC analysis are illustrated in Figure 32.

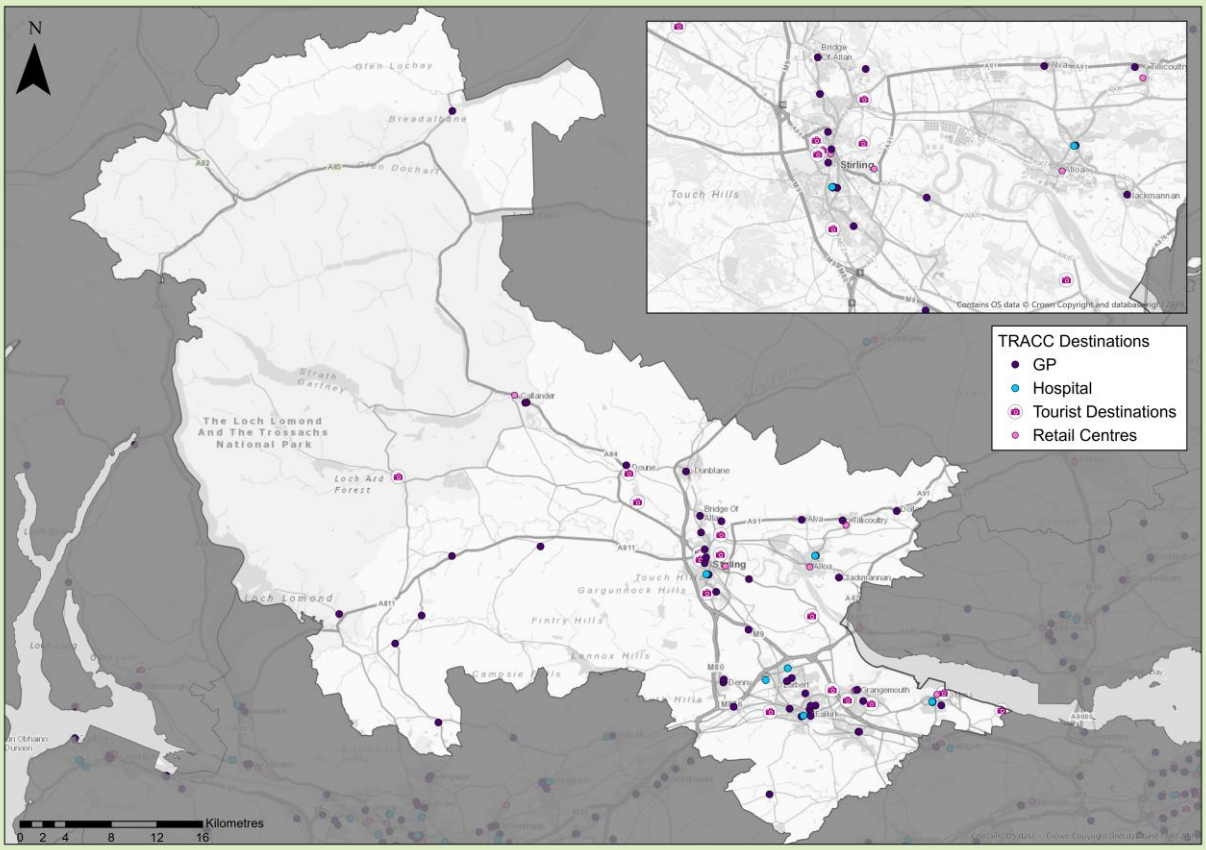


Figure 32: Destinations used in TRACC analysis

(click image to enlarge figure)

The following figures further demonstrate poor accessibility and connectivity in certain areas by public transport to key destinations such as healthcare, higher and further

POOR ACCESSIBILITY AND CONNECTIVITY

education, and by walking to schools.

It is however noted that the provision of bus services requires revenue funding which is out of scope for STPR2

Access to Healthcare by Public Transport

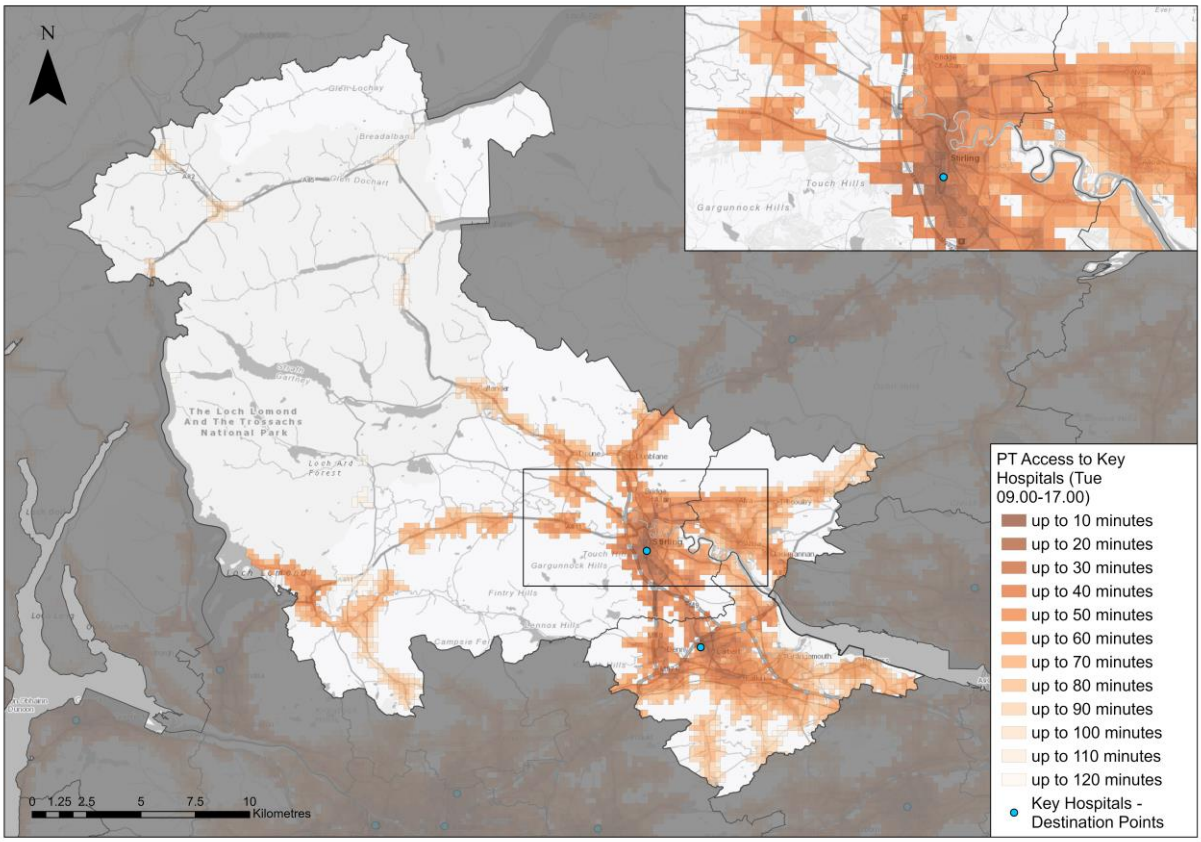


Figure 33: Public Transport Access to Healthcare

(click image to enlarge figure)

Figure 33 shows the access by public transport to Key Hospitals[77], up to 120 minutes. The TRACC analysis shows that on an average weekday (09:00-17:00) almost three quarters of Forth Valley inhabitants are unable to access Key Hospitals within 30 minutes by public transport from their home. The analysis also shows that for 16% of inhabitants it takes in excess of 1 hour to access healthcare by public transport.

[77] Includes Forth Valley Royal Hospital and Stirling Health & Care Village in Forth Valley region and Vale of Leven District General Hospital in Glasgow City Region

POOR ACCESSIBILITY AND CONNECTIVITY

Access to Further / Higher Education by Public Transport

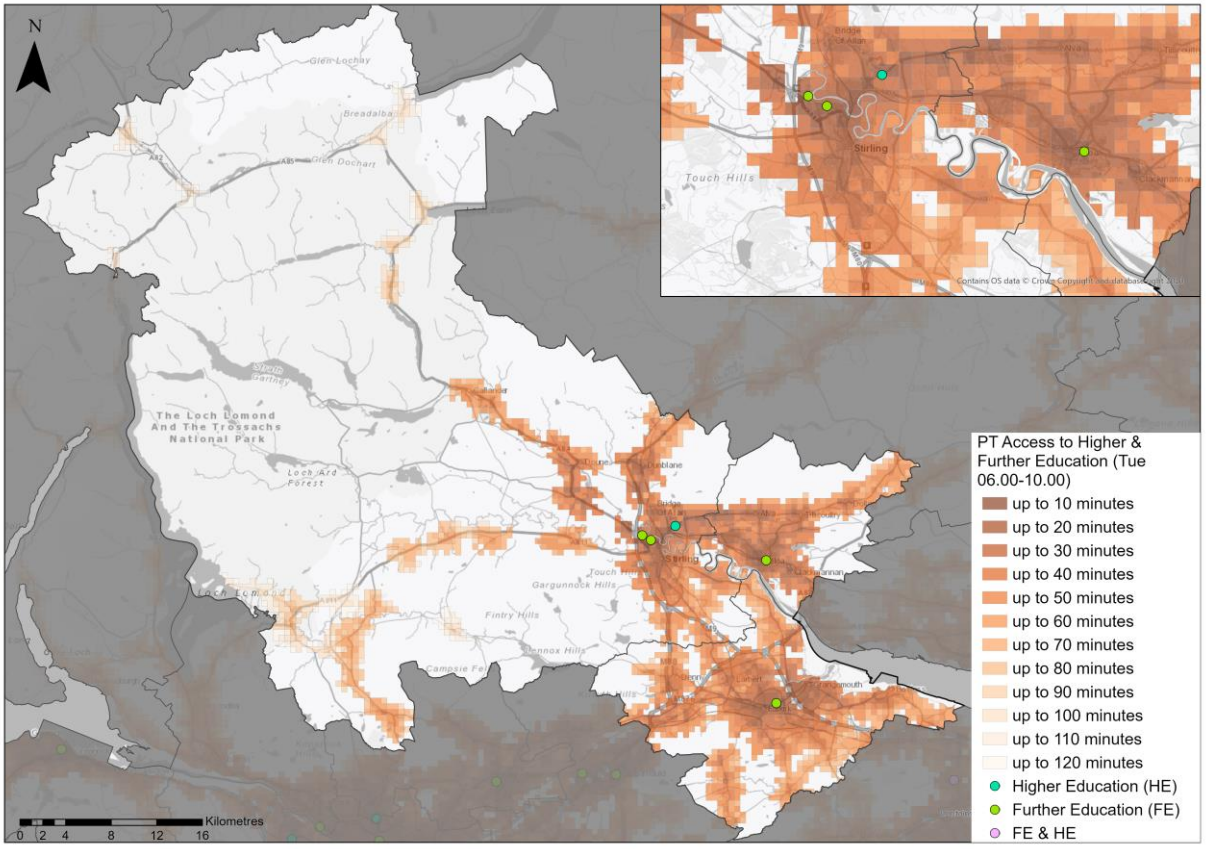


Figure 34: Public Transport Access to Further/Higher Education

(click image to enlarge figure)

Figure 34 shows the access by public transport to further / higher education facilties, up to 120 minutes. TRACC analysis shows that 30% of students[78] who reside within the region are unable to access further / higher education facilities within 30 minutes by public transport from their home on an average weekday (06:00-10:00).

[78] Individuals classified as either *Economically active: Full-time student* or *Economically inactive: Student*

POOR ACCESSIBILITY AND CONNECTIVITY

Access to School by Walking

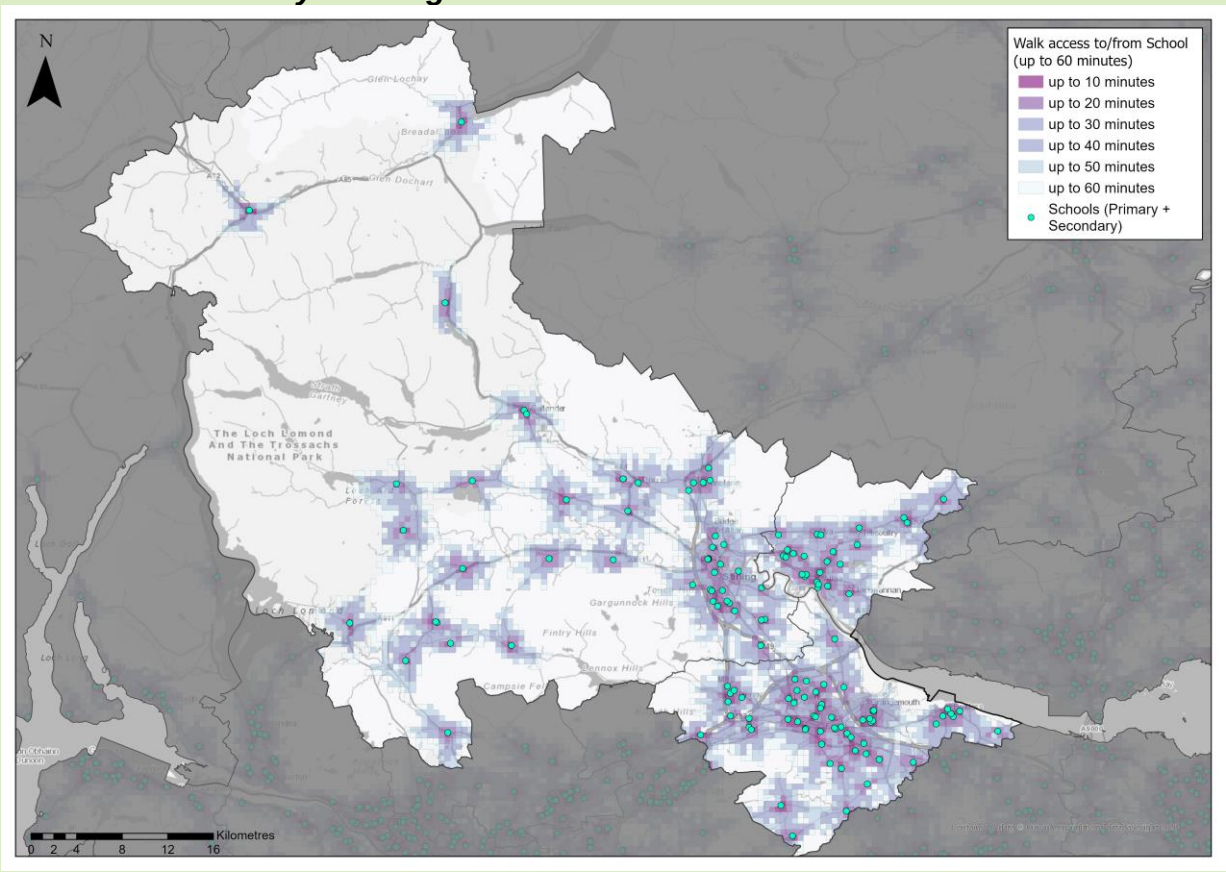


Figure 35: Walk Access to/from School

(click image to enlarge figure)

Figure 35 shows the access by walking to / from school, up to 60 minutes. TRACC analysis indicates that 94% of all 5 to 17 year olds are within a 30 minute walk catchment between a school and their home (28% within 10 minutes and 50% within 10-20 minutes).

POOR ACCESSIBILITY AND CONNECTIVITY

Access to tourist destinations

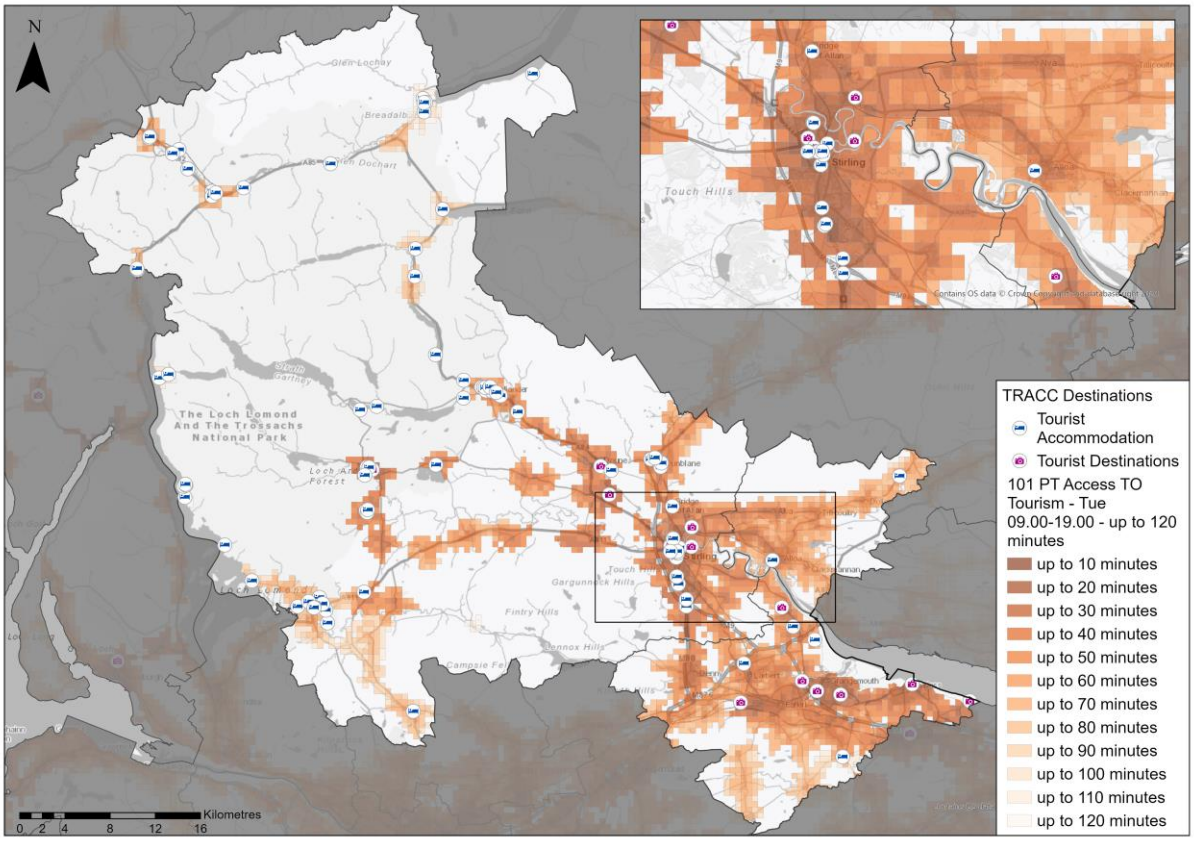


Figure 36: Public Transport Access to Tourist Destinations

Figure 36 shows that around a third of Forth Valley accommodation services[79] are more than 60 minutes by public transport from 1 of the region's tourist sites such as the Helix and Queen Elizabeth Forest Park.

Public Transport connectivity to neighbouring towns/areas

The public transport context indicated a lack of connectivity in parts between towns within Forth Valley and also beyond to neighbouring areas such as Edinburgh and parts of Lanarkshire. It was noted by stakeholders that Clackmannashire with its single railway station (Alloa) suffers from a lack of bus and rail connections. As Table 6 shows the only rail destination from Alloa is Glasgow Queen Street, whilst by bus the only direct city connection is to Stirling.

Whilst areas in the south of the region around Falkirk may benefit from bus services serving a variety of Forth Valley and Central Scotland locations, the rail context highlights that people in the Polmont area are now only able to make a direct connection to Edinburgh and Glasgow; albeit at a 4 times per hour frequency during the week. This

[79] Openstreetmap, Tourist Accommodation, 2020, https://www.openstreetmap.org

POOR ACCESSIBILITY AND CONNECTIVITY

is as a result of a Scotrail December 2018 timetable change meaning it is no longer possible to travel to Stirling and Dunblane by train, with an interchange at Falkirk Grahamston now required.

TRACC analysis illustrates disparities between the level of connectivity in the northwest and southeast of the region. Table 9 shows that from Crianlarich limited direct connections to Glasgow, Oban and Fort William/Mallaig are available and Table 10 shows that Lower Tyndrum is served only by a limited Oban/Glasgow service. The lack of rail connections and limited bus services from these areas to the more urban central and southern part of the region illustrates reduced accessibility in comparison to Falkirk and Stirling.

Table 9: Network Rail Crianlarich destinations and frequency[80]

CRIANLARICH*			
Destination	**Mon-Fri**	**Saturday**	**Sunday**
Fort William**	07:46	07:46	07:46
Oban	07:18,10:15,12:33, 14:18, 18:29 & 20:14	07:18,10:15,12:33,14:18, 18:29 & 20:15	11:45, 14:18 & 20:14
Mallaig	10:21,14:24 & 20:20	10:21,14:24 & 20:21	14:24 & 20:20
Glasgow QS	06:31,09:31,10:08, 13:27, 15:54,19:32 & 21:48	06:31,09:31,10:08,13:27, 15:54,19:32 & 21:49	13:19, 19:14 & 21:05
London Euston**	22:08	21:18	21:18

**All services aside from Oban route also call at Tyndrum Upper*

***Operated by Serco Caledonian Sleeper*

[80] Network Rail, Electronic National Rail timetable, December 2019, https://www.networkrail.co.uk/running-the-railway/the-timetable/electronic-national-rail-timetable/

POOR ACCESSIBILITY AND CONNECTIVITY

Table 10: Network Rail Tyndrum Lower destinations and frequency

TYNDRUM LOWER			
Destination	**Mon-Fri**	**Saturday**	**Sunday**
Oban	07:27,10:24,12:41,14:26, 18:37 & 20:22	07:27,10:24,12:41,14:26, 18:37 & 20:23	11:56, 14:26 & 20:22
Glasgow QS	06:22,09:59,13:20, 15;45, 19:15 & 21:39	06:22,09:59,13:20, 15:45, 19:15 & 21:40	13:17, 17:17 & 19:15

POOR ROAD USER EXPERIENCE

Maintenance and resilience: Road Condition

The Scottish Roads Maintenance Condition Survey (SRMCS) is an annual survey which assesses the condition of the Scottish adopted road network[81]. It is used to calculate a Road Condition Indicator (RCI) that is used by Audit Scotland as a Statutory Performance Indicator (SPI) for reporting road condition. The survey is undertaken by an independent contractor, accredited by the Transport Research Laboratory (TRL).

The survey results are banded into 3 categories dependant on the severity of the defects present at the time of the survey. This is represented by Red, Amber and Green convention as follows:

- Red - the road has deteriorated to the point at which it is likely repairs to prolong its future life should be undertaken
- Amber - further investigation should be undertaken to establish if treatment is required
- Green - minor defects may be present, but the road is considered to be in an acceptable condition

41% of Stirling's local authority roads are categorised as red (10%) or amber (31%), which is above the Scotland wide averages (7% red, 29% amber) respectively. Falkirk and Clackmannanshire are broadly in line with Scotland wide averages[82] (Table 11).

The data for Stirling suggests that road quality could be improved by undertaking repairs

[81] The adopted road network is all public roads managed and maintained by the Local Authority in their role as Roads Authority (under Section 1 of The Roads (Scotland) Act 1984) and includes carriageway, footways and verges and cycle / footpaths

[82] Transport Scotland, Scottish Transport Statistics No. 38, 2019, https://www.transport.gov.scot/publication/scottish-transport-statistics-no-38-2019-edition/

POOR ROAD USER EXPERIENCE

to prolong its future life. Relative to Scotland, the problem of poor quality roads raised during the stakeholder engagement is validated in Stirling. The problem is less acute for Falkirk and Clackmannanshire.

It is however noted that Local roads are out of scope, unless:

- they provide access to major ports or airports, (Major airports are currently defined as Edinburgh, Glasgow, Aberdeen and Inverness; Prestwick is currently included from a freight perspective only). The list of major ports is currently being discussed and agreed with the Aviation, Maritime, Freight and Canals Directorate at Transport Scotland; or
- they provide access to nationally significant National Planning Framework (NPF4) sites; or
- they relate to strategic bus priority or strategic active travel links.

Table 11: Road Condition Indicator

Council Area	All Roads – Red (%)	All Roads – Amber (%)
Clackmannnanshire	5	29
Falkirk	6	30
Stirling	10	31
Scotland	7	30

99% of 506 respondents from the Stirling Council LTS consultation (2016) agreed that 'road safety, road maintenance, quality of roads and street environment for residents and visitors need to be considered when delivering the second LTS'[83].

Pinch Points: Long Journey Times

Journey time analysis was undertaken using the INRIX[84] tool which provides a comprehensive collection of historic speed and travel time data. The tool was used to analyse data for key corridors in the region. Analysis shows that average weekday journey speed between Lochearnhead and Stirling (M9 Junction 10) is around 42mph, it further shows that the average weekday journey speed between Aberfoyle and Stirling (M9 Junction 10) is around 37mph highlighting slow journey speeds relative to signposted speed limits, between rural areas and a main employment and leisure centre. Whilst it is noted that signposted speed limits are not a target speed and drivers

[83] Stirling Council, LTS Consultation Report, 2016, https://my.stirling.gov.uk/services/transport-and-streets/transport-policy/local-transport-strategy-consultation

[84] INRIX - INRIX is a private sector organisation whose data services consist of roadway analytics (including journey time metrics).

POOR ROAD USER EXPERIENCE

should drive to the conditions of the road, these average journey speeds can be seen to contribute to the perception of long journey times.

Pinch-Points: Delays and Pollution

Modelled data from the Transport Model for Scotland (TMfS14[85]) has been analysed to establish the volume capacity ratio[86] of the trunk road network. This has been used to identify 'pinch-points' on the network i.e. roads in the 0.75-1 band or higher have been considered as approaching or exceeding capacity.

Figure 37 illustrates that areas with the highest volume capacity ratios were generally in the more urban areas such as Stirling, Falkirk, Dunblane and Bridge of Allan, as well as at the key entry and exit points to the M80.

Furthermore, air quality data highlights that the highest PM_{10} concentrations – areas with the poorest air quality – are located in the most urban parts of Forth Valley, covering locations where the M80, M9 and M876 all traverse[87]. This suggests a link between 'pinch points' on the network and air quality; as a result, contributing to poor road user experience on the network itself and surrounding areas such as Falkirk and Grangemouth as congestion levels have adverse impacts on pollution.

In relation to congestion on the strategic road network, the Stirling Local Development Plan Development Planning and Management Transport Appraisal Guidance (DPMTAG) Study[88] highlights the following locations as being amongst problems in the "Stirling Core Area":

- M9 Junction 9 Pirnhall
- M9 Junction 10 Craigforth
- M9 Junction 11 Keir Roundabout

As well as the above, the Study highlights that LDP allocations in the south and east of the city will exacerbate congestion problems on the A91 whilst there will be connectivity and pressure on bus and rail networks.

---

85 *'The current version is TMfS14 which was calibrated and validated using available data for 2014. Note that modelling does not consider any impacts of the COVID-19 pandemic.'*

86 Volume to capacity ratio is a measure of how congested or saturated with vehicles a particular road is. When the volume to capacity ratio of a link approaches or exceeds one, congestion can be expected.

87 National Atmospheric Emissions Inventory, PM10 (Particulate Matter < 10µm) in 2018, 2020, https://naei.beis.gov.uk/data/map-uk-das?pollutant_id=24&emiss_maps_submit=naei-20201223144930

88 SiAS (now SYSTRA), Stirling Local Development Plan DPMTAG Study, 2016, https://my.stirling.gov.uk/media/3647/transport-dpmtag-appraisal-report.pdf

POOR ROAD USER EXPERIENCE

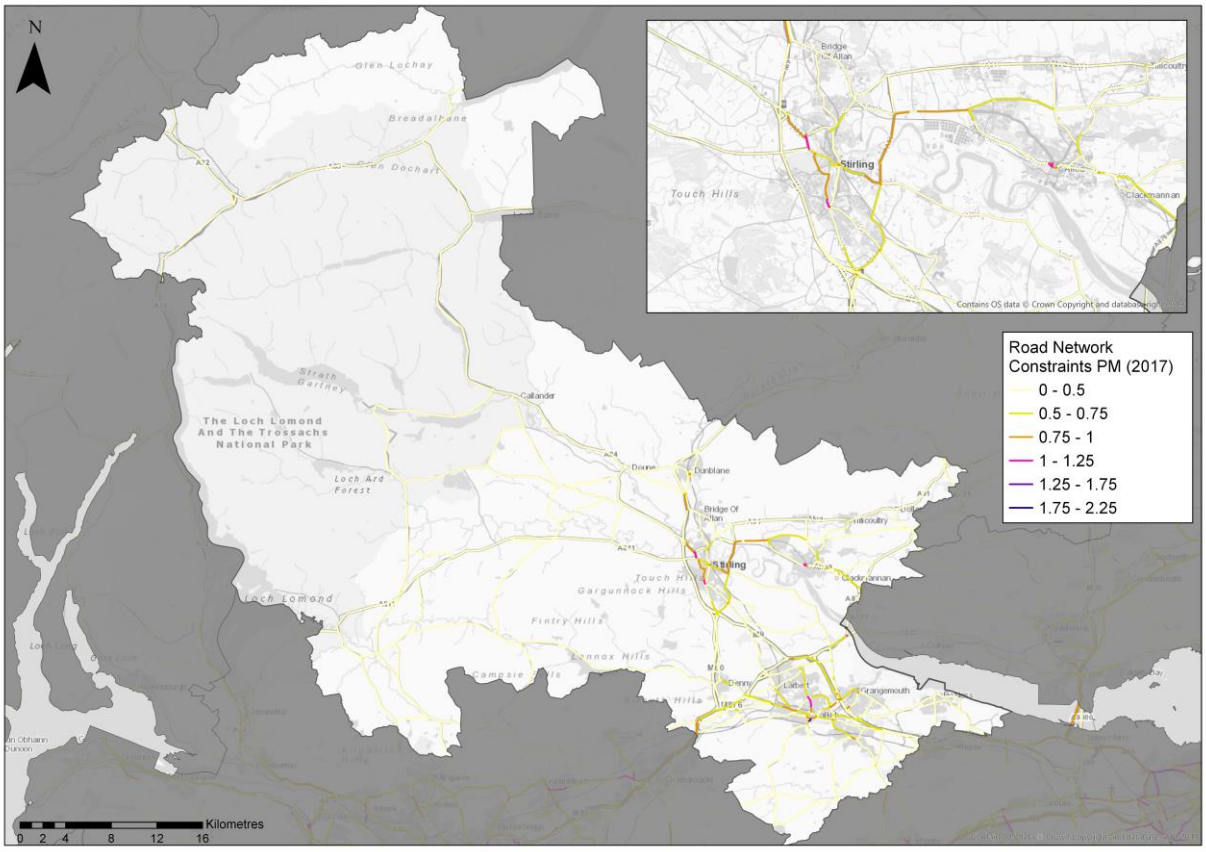


Figure 37: Road Network Constraints 2017 PM (TMfS)

(click image to enlarge figure)

AFFORDABILITY OF PUBLIC TRANSPORT

Fares

In addition to the actual cost of public transport fares, the relative measures of transport expenditure and transport poverty provide insight as to the true 'cost' of transport for residents of the Forth Valley region.

Bus and rail fares in the region are relatively high when compared to the rest of the country. The average full rail fare in the Forth Valley region is £0.24 per mile, this is the third most expensive in the country after the North East and Tay Cities[89]. The cost of day tickets in each of Alloa, Falkirk and Stirling (£4.80 - £5) are also higher compared to the equivalent ticket type in Dundee (£3.50 / £3.80) and Perth (£4). The same is true for monthly tickets (£74.10 - £78) for Alloa, Falkirk and Stirling compared to £46 / £50 for Dundee and £42.50 for Perth[90].

There is also a considerable variation in the relative cost of fares for journeys of different types i.e. intra-regional and inter-regional. For example, Bridge of Allan to Stirling by train takes 4 minutes and a single ticket costs £2.60 (distance of approx. 3 miles) and Stirling to Edinburgh has a journey time of around 45 minutes (distance of approx. 37 miles) and costs only £9.40; proportionately, the shorter Bridge of Allan to Stirling trip is significantly more expensive. The rail fare between Stirling and Bridge of Allan costs 60p per minute, or 87p per mile, whereas the fare between Stirling and Edinburgh is 21p per minute, or 26p per mile.

By rail, Stirling to Edinburgh/Glasgow/Dundee is approximately the same travel time, however it costs approximately £12 more to travel to Dundee. Peak Return prices from Stirling are £16.10 to Edinburgh; £14.20 to Glasgow; £28.10 to Dundee[91]. This limits the realistic work place destinations for people in Alloa and Stirling as well as limiting the potential hinterland for Dundee at the expense of Edinburgh and Glasgow.

There are approximately 3,400 designated parking spaces in Stirling[92], with many more undesignated or on/off-street parking. Parking is readily available and relatively low cost compared to alternative modes of transport. e.g. parking for a family of 4 at the Forthside Car Park is £2 compared to £3.60 from the Park and Ride (2 adults + 2 children)[93]. It is increasingly challenging to encourage a switch to Park And Ride and sustainable travel options with traffic contributing to congestion entering and leaving the area.

[89] MOIRA 2.2 rail planning tool which utilises data sourced from the rail industry's ticketing and revenue system, LENNON.
[90] Operators' websites (correct as of 20 Feb 2020)
[91] National Rail Enquiries, 2019, https://www.nationalrail.co.uk/
[92] SYSTRA, Stirling Strategic Park and Ride Study: Case for Change, Feb 2020
[93] Stirling Council, Stirling Car Park Information, February 2020, https://www.stirling.gov.uk/roads-transport-streets/parking-zones-permits/parking-car-parks/

AFFORDABILITY OF PUBLIC TRANSPORT

In 2016, it was reported that there was a weekday average of 325[94] cars using Stirling's Park and Ride Sites. The LTS further highlights a 2022 target of 650 cars using both Castleview and Springkerse Park and Ride and a new "Southern Park and Ride".

Similarly to Stirling, low cost all day town centre parking is available in Falkirk from £1.90[95] and free of charge in Alloa town centre[96], with all 800 Council managed public parking spaces in Clackmannanshire free of charge.

Views from young people[97] show many depend on public transport to access work and education but affordability of bus and train fares is an issue.

The lower priced tariffs in town centre car parks coupled with the lack of interchange sites in the region – along the length of the strategic motorway network – and the fact that, as of 2019, the existing 2 sites only have services to Stirling may act as barriers to Park and Ride use in favour of less sustainable modes.

Transport Expenditure

The Office for National Statistics collects information on average weekly expenditure on goods and services in the UK, which is shown by region, age, income group, for example. The 12 categories of spending are included in the information involving Food and Drink, Clothing, Household Goods and Education. Transport is included as 1 of the 12 categories. Within the category of Transport, expenditure is broken down into the sub-categories of Purchase of Vehicles, Operation of Personal Transport (fuel and repairs), and Transport Services (public transport costs). For the purposes of this analysis, detailed household expenditure by gross income decile group (Financial Year Ending (FYE) 2018) has been used[98].

Based on the information provided covering the financial year ending 2018, the average household in the UK in total spends £575.70 in a week, with £81.20 of this on Transport. This represents a 14.1% proportion of total expenditure. Of the 12 specified categories, Transport is the category with the most spent on it. This is compared to Food and Non-

[94] Stirling Council, Stirling Local Transport Strategy 2017 to 2027, 2016, https://www.stirling.gov.uk/media/3623/stirling-council-local-transport-strategy-2017-2027.pdf

[95] Falkirk Council, Falkirk Car Park Information, Feb 2020, https://www.falkirk.gov.uk/services/roads-parking-transport/streets-parking/car-parks.aspx

[96] Clackmannanshire Council, Clackmannanshire Car Park Information, Feb 2020, https://www.clacks.gov.uk/transport/parking/

[97] Scottish Youth Parliament, All Aboard, January 2019, https://syp.org.uk/campaign/all-aboard/

[98] Transport Expenditure is a calculation based on the average weekly household expenditure dedicated to transport as a percentage of the total average weekly household expenditure. ONS, Expenditure, FYE 2018, https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/expenditure

AFFORDABILITY OF PUBLIC TRANSPORT

Alcoholic Drinks at £61.00, Clothing and Footwear at £24.70, and Housing, Fuel and Power at £76.20. The Transport category is then broken down by Purchase of Vehicles at £27.90, Operation of Personal Transport at £33.60, and Transport Services at £19.70[99].

Figure 38 shows the household expenditure on transport for the Forth Valley region which illustrates that household expenditure for a large proportion of the region exceeds the national average, equating to 19-20% of all expenditure in a number of locations, many of which are concentrated in the north west of the region[100].

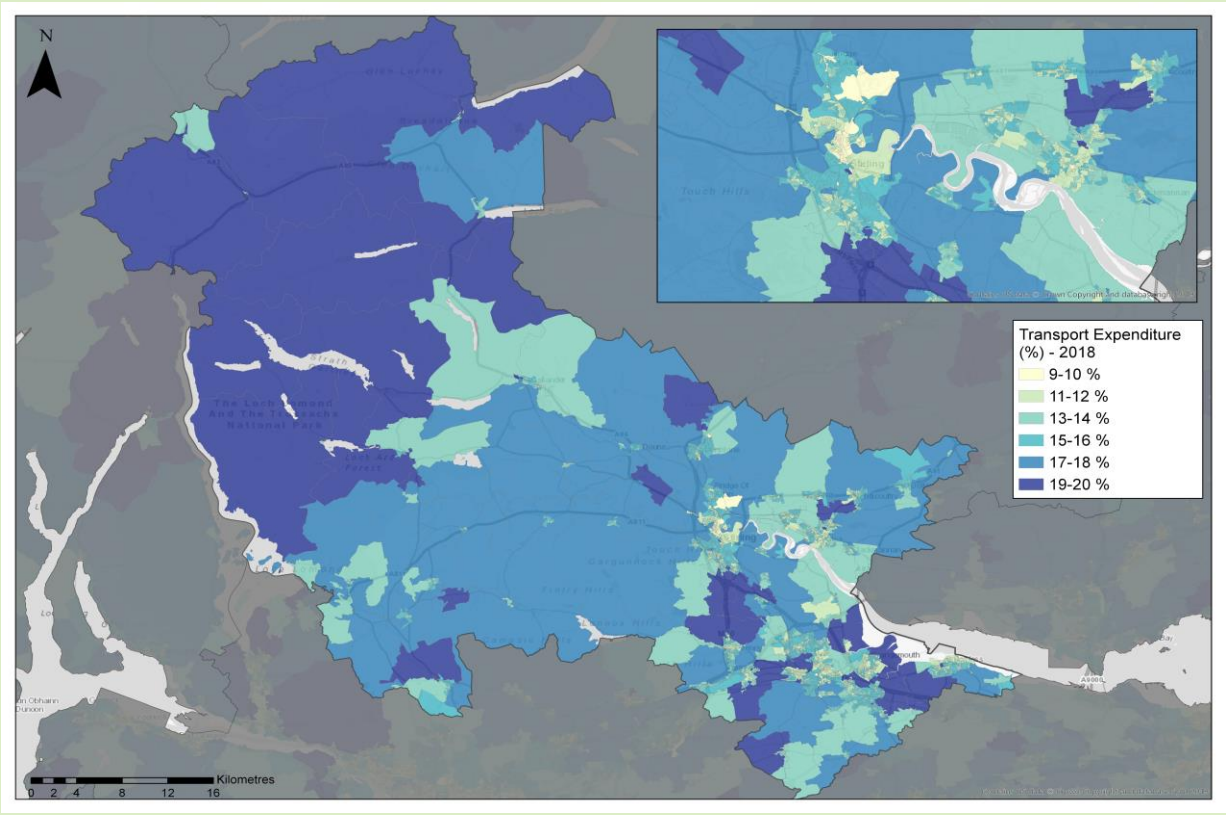


Figure 38: Transport Expenditure as Percentage of Household Expenditure[101]

(click image to enlarge figure)

[99] ONS, Expenditure, FYE 2018, https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/expenditure

[100] Transport Expenditure is a calculation based on the average weekly household expenditure dedicated to transport as a percentage of the total average weekly household expenditure. ONS, Expenditure, FYE 2018, https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/expenditure

[101] ONS, Based on UK Average weekly household expenditure by Output Area Classification (OAC) group, Living costs and food survey - FYE 2018, 2020,

AFFORDABILITY OF PUBLIC TRANSPORT

Transport Poverty

A risk rating was allocated to each Scottish data zone by bringing together data on income, car availability and access to the public transport network, based on methodology developed by Sustrans[102]. This highlights areas where motoring costs may place pressures on income, and where there may be risk to communities from exclusion when alternatives to accessing key services are not available.

Risk of transport poverty was considered to be greatest in areas with (relatively) low income, high car availability and low access to essential services by public transport. Each datazone is categorised as high, medium or low risk of Transport Poverty (Figure 39) and is mapped across Forth Valley in Figure 40.

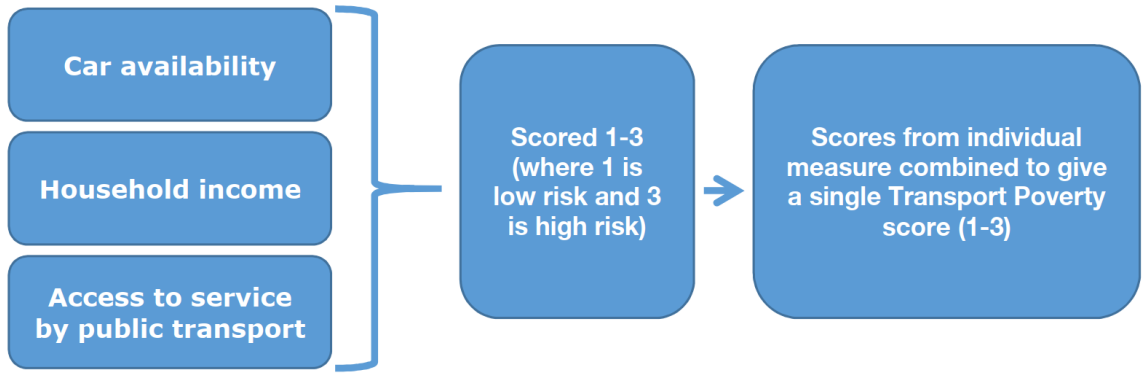


Figure 39: Derivation of transport poverty score

In the Forth Valley region, 42% of data zones were classified as high risk for transport poverty compared to 36% in Scotland; 49% were classified as medium risk compared to 43% in Scotland; and 9% were classified as low risk compared to 21% in Scotland. This suggests that the region is at relatively high risk of transport poverty (Figure 40). With 57% of Clackmannanshire's data zones categorised as high risk in terms of transport poverty, it represents the seventh highest proportion amongst all Scottish local authorities. Table 12 presents the proportion of data zones in each risk level for the Forth Valley local authority areas.

https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/expenditure

[102] Transport Poverty analysis is based on research which uses data on household income, car availability and access to the public transport network. Based on Sustrans, Transport Poverty in Scotland, 2016, https://www.sustrans.org.uk/media/2880/transport_poverty_in_scotland_2016.pdf

AFFORDABILITY OF PUBLIC TRANSPORT

Table 12: Transport Poverty 2016 by local authority

Council Area	High Risk Data zones (%)	Medium Risk Data zones (%)	Low Risk Data zones (%)
Clackmannnanshire	57	42	1
Falkirk	41	49	10
Stirling	35	55	10
Scotland	36	43	21

In comparison to other regions, the level of Transport Poverty in the Forth Valley region has the sixth highest proportion (of 11 STPR2 regions) of high risk data zones.

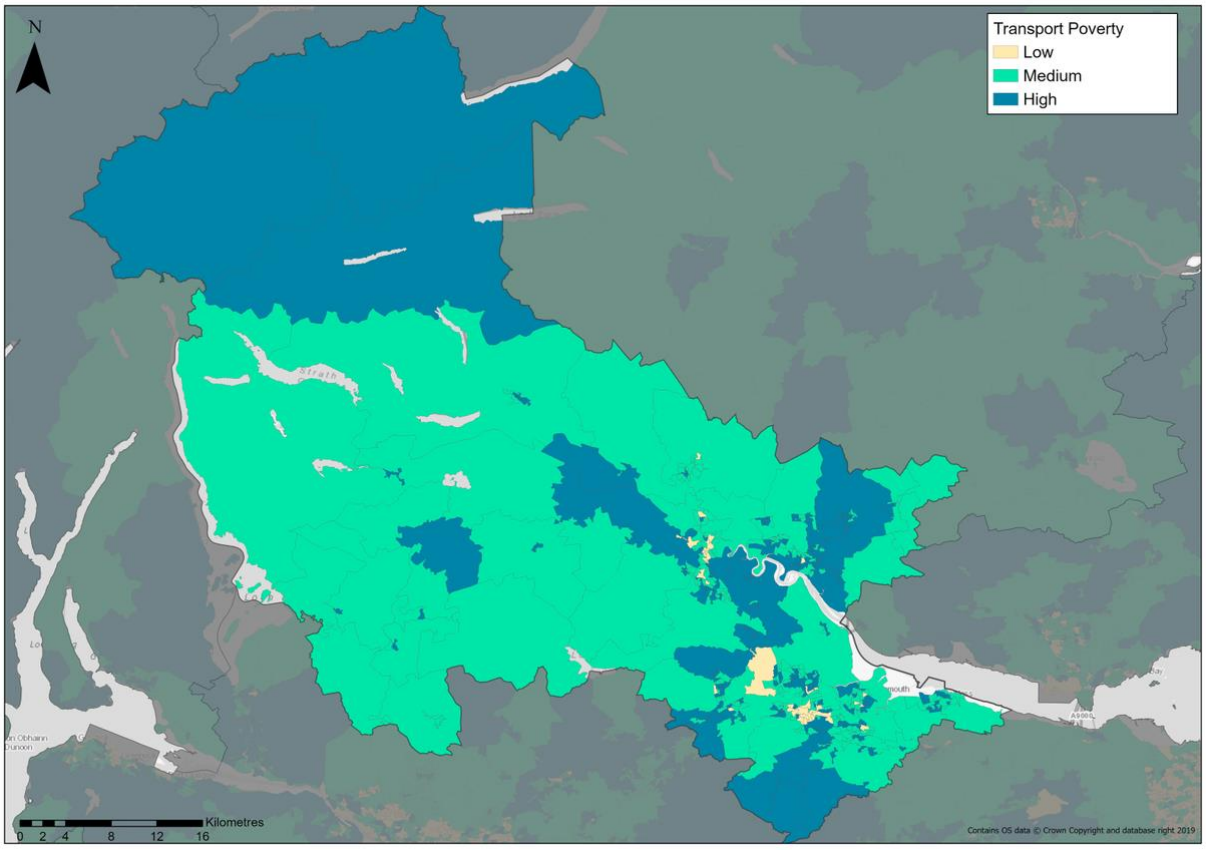


Figure 40: Transport Poverty 2020 by Datazone

(click image to enlarge figure)

BARRIERS TO ACTIVE TRAVEL

The Stirling Local Development Plan DPMTAG report identified 'a number of problems and issues that primarily act as a barrier to movement and act as a disincentive to travel by sustainable and active travel modes'[103]. These are listed below:

- Stirling city transport network is dominated by a dual carriageway with 2 busy roundabout junctions restricting movement in and out of the city centre. Some of the active travel routes are severed by busy arterial routes, railway lines, and the River Forth;
- Incomplete cycle network;
- Severance issues act as barriers to walking;
- Safety concerns from cyclists;
- Other than travel to and from the University of Stirling and Kildean, which reflects a higher proportion of walking and cycling trips than elsewhere across the city, the scope to promote active travel modes is not as great as in the city centre;
- Limited existing walking and cycling opportunities between the communities and to and from Stirling;
- Physical constraints such as A91 act as barriers to walking and cycling from eastern villages; and
- Limited safe walking and cycling routes in the countryside to local facilities and services.

Stakeholder engagement activities including schools workshops further identified concerns regarding active travel provision in rural locations with a lack of cycle routes and pedestrian facilities between villages highlighted. Fragmented cycle routes was raised as a concern in workshops and other stakeholder engagement activities.

Where cycle routes are available, they are frequently classified as on-road routes[104]; this has been raised by stakeholders as a direct contributory factor of safety concerns and as such deterring many from cycling. For example, the NCN network between Falkirk and Stirling and Stirling to Dunblane is on road (Figure 24).

At a local level, the Cycling Scotland Monitoring Report provides further information, although the date for some of the source data is not recorded. There is a wide variation in the levels of Level 2 Bikeability Scotland training in primary schools across Forth Valley: 33.3% of schools in Clackmannanshire, 6% in Falkirk, and 71.8% in Stirling[105]. The same report notes the percentage of employees cycling to work usually / regularly

[103] SiAS (now SYSTRA), Stirling Local Development Plan DPMTAG Study, 2016, https://my.stirling.gov.uk/media/3647/transport-dpmtag-appraisal-report.pdf
[104] National Cycle Network mapped https://osmaps.ordnancesurvey.co.uk/ncn
[105] Cycling Scotland, Annual Cycling Monitoring Report, 2019, https://www.cycling.scot/mediaLibrary/other/english/6353.pdf

BARRIERS TO ACTIVE TRAVEL

across the region: 5.3% in Clackmannanshire, 5.4% in Falkirk, and 3.6% in Stirling. The percentage of households with access to 1 or more bikes for private use ranges from 31.9% in Clackmannanshire, 33% in Falkirk, to 42% in Stirling.

Scottish Road Safety Reduction 2020 targets were established by the Road Safety Framework and came in to effect in 2010, taking the place of the previously applied UK-wide targets. The targets are based on a 2004-2008 baseline[106]. Table 13 presents the number of recorded casualties by mode of transport from the baseline period of 2004-2008 to 2014-2018. A casualty is defined as a person killed or injured in an accident. Casualties are sub-divided into killed, seriously injured and slightly injured[107]:

Table 13: Average Yearly Casualties 2014-2018 by Mode[108]

Local Authority	Bike	Bus	Car	HGV	LGV	Motor cycle	Pedestrian	Other[109]
Clackmannnanshire	6	1	44	0	2	5	12	1
Falkirk	20	2	198	2	9	18	35	3
Stirling	16	4	146	3	10	20	23	3
Forth Valley	**41**	**7**	**388**	**4**	**21**	**43**	**69**	**7**

Data indicates a reduction in the average yearly casualties across all modes between 2004-08 and 2014-18. The reduction in cyclist casualties (8%) is lower than that for car (32%) and pedestrian (45%). This lesser comparative reduction may be a contributory factor to perceived safety concerns stated with regards to cycling. Table 14 shows the severity of cyclist casulties by year in Forth Valley between 2014 and 2018[110]. Figure 41 maps the location of the cyclist casualties in Forth Valley between 2014 and 2018.

106 Scottish Government, Scotland's Road Safety Framework to 2020, 2009, https://www2.gov.scot/resource/doc/274654/0082190.pdf
107 Department for Transport, STATS19 Road Safety Data, 2019, https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data
108 Department for Transport, STATS19 Accident Data, 2019, https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data
109 *Includes agricultural vehicles, goods vehicles, horse, minibus, mobility scooter, tram and other.
110 Department for Transport, STATS19 Accident Data, 2019, https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data

Table 14: Cyclist casualties by severity[111]

Year	Slight	Serious	Fatal	Total
2014	38	15	1	54
2015	37	10	0	47
2016	38	7	1	46
2017	32	9	0	41
2018	10	8	0	18
Total	**155**	**49**	**2**	**206**

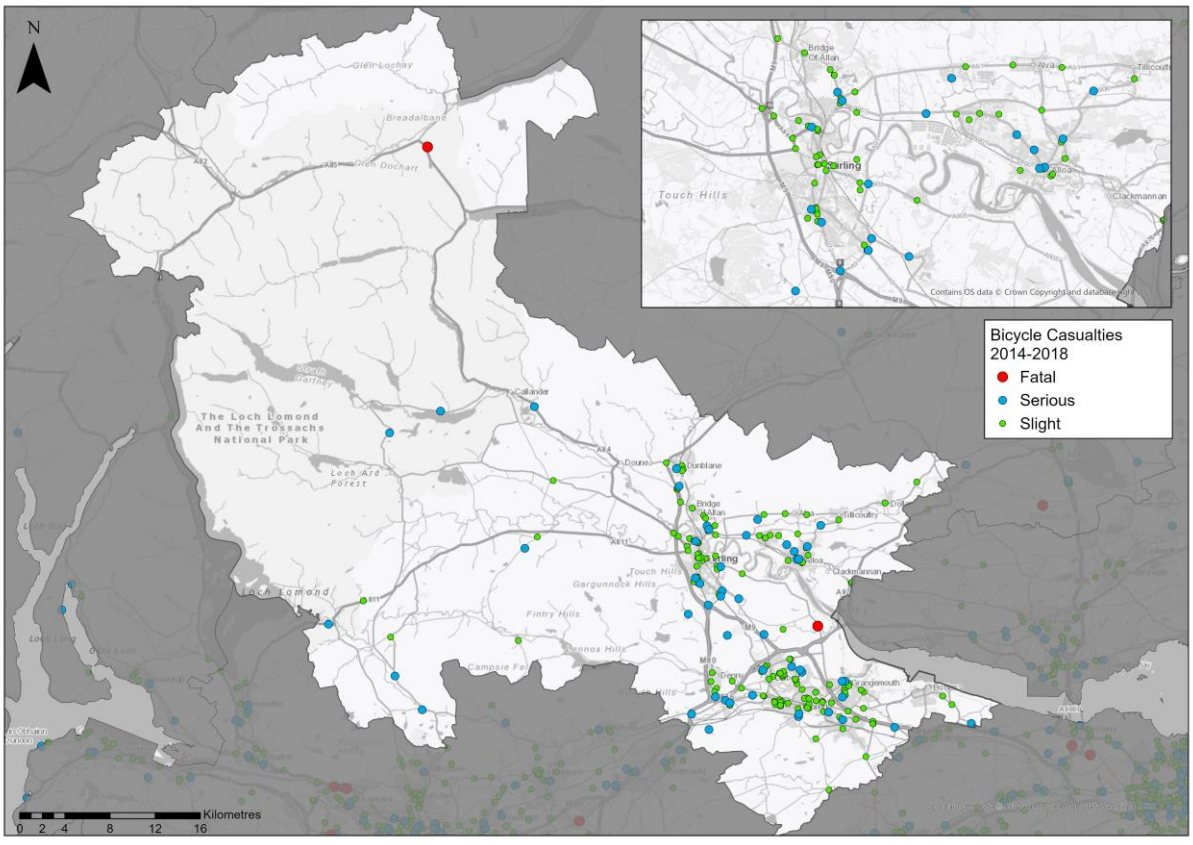


Figure 41: Cyclist Casualties in Forth Valley 2014-2018, by severity[112]

(click image to enlarge figure)

The Cycling Scotland Monitoring Report 2019[113] notes that for Scotland the KSI rate per million cycle vehicle kilometres increased from 0.54 in 2016 to 0.61 in 2017 but that the overall casualty rate per million cycle vehicle kms decreased from 2.74 in 2016 to 2.51 in 2017 (it is not possible to compare figures to earlier years as the cycle vehicle kilometres calculations were revised in 2016).

Table 15 shows the severity of pedestrian casualties by year in Forth Valley between 2014 and 2018. Figure 42 maps the pedestrian casualties in Forth Valley between 2014

BARRIERS TO ACTIVE TRAVEL

and 2018. The pedestrian casualties are concentrated in the more built-up areas.

Table 15: Pedestrian casualties by severity[114]

Year	Slight	Serious	Fatal	Total
2014	46	16	0	62
2015	57	25	3	85
2016	57	15	0	72
2017	41	26	1	68
2018	42	16	2	60
Total	**243**	**98**	**6**	**347**

[111] Department for Transport, STATS19 Accident Data, 2019, https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data
[112] Department for Transport, STATS19 Accident Data, 2019, https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data
[113] Cycling Scotland, Annual Cycling Monitoring Report, 2019, https://www.cycling.scot/mediaLibrary/other/english/6353.pdf
[114] Department for Transport, STATS19 Road Safety Data, 2019, https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data

BARRIERS TO ACTIVE TRAVEL

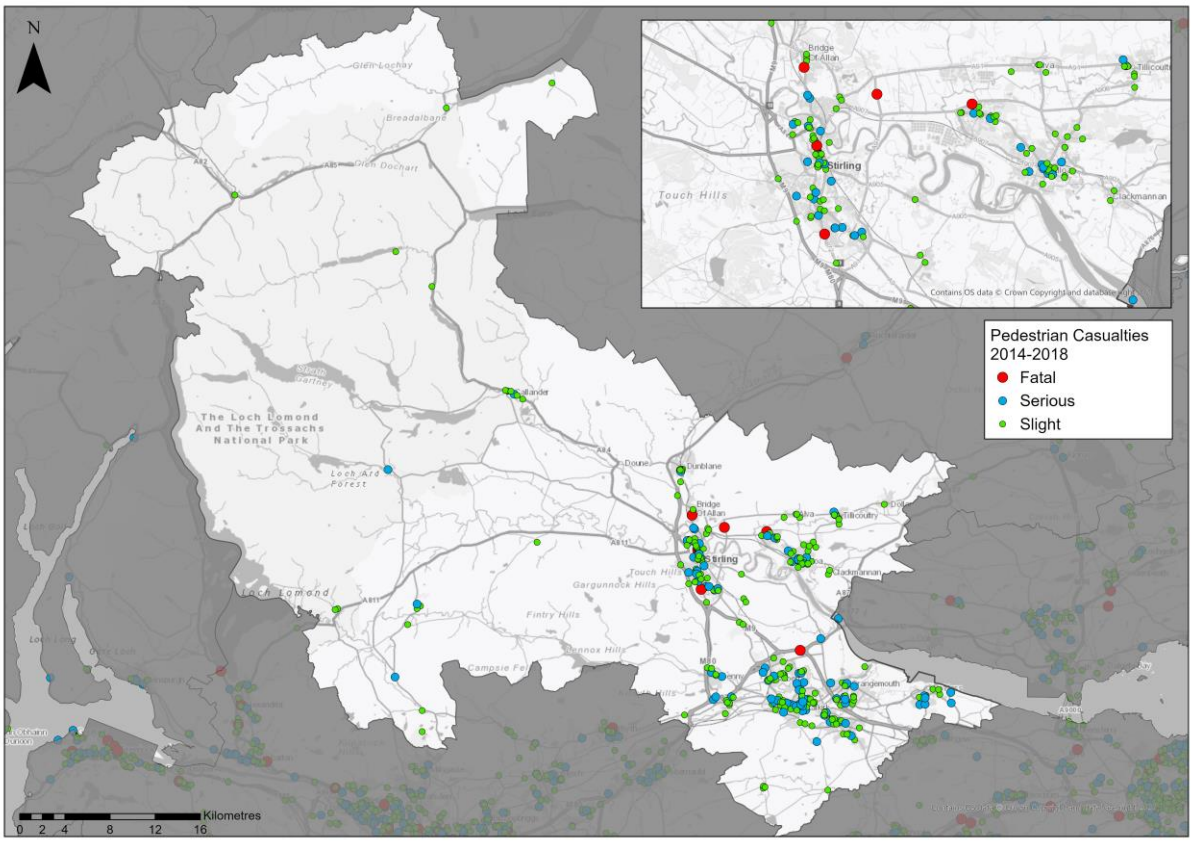


Figure 42: Pedestrian Casualties in Forth Valley 2014-2018, by severity[115]

(click image to enlarge figure)

[115] Department for Transport, STATS19 Accident Data, 2019, https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data

LIMITED DIGITAL CONNECTIVITY

In a transport context, digital connectivity is of importance due to its role as an enabler of e.g.:

- Managing traffic systems;
- Providing real-time passenger information services; and
- Working from home and remote meeting services.

However, it could be argued that increasing the levels of working from home may reduce the demand for public transport.

Whilst digital connectivity has an enabling role in the transport context, it should be noted that it is not within scope for STPR2.

LIMITED DIGITAL CONNECTIVITY

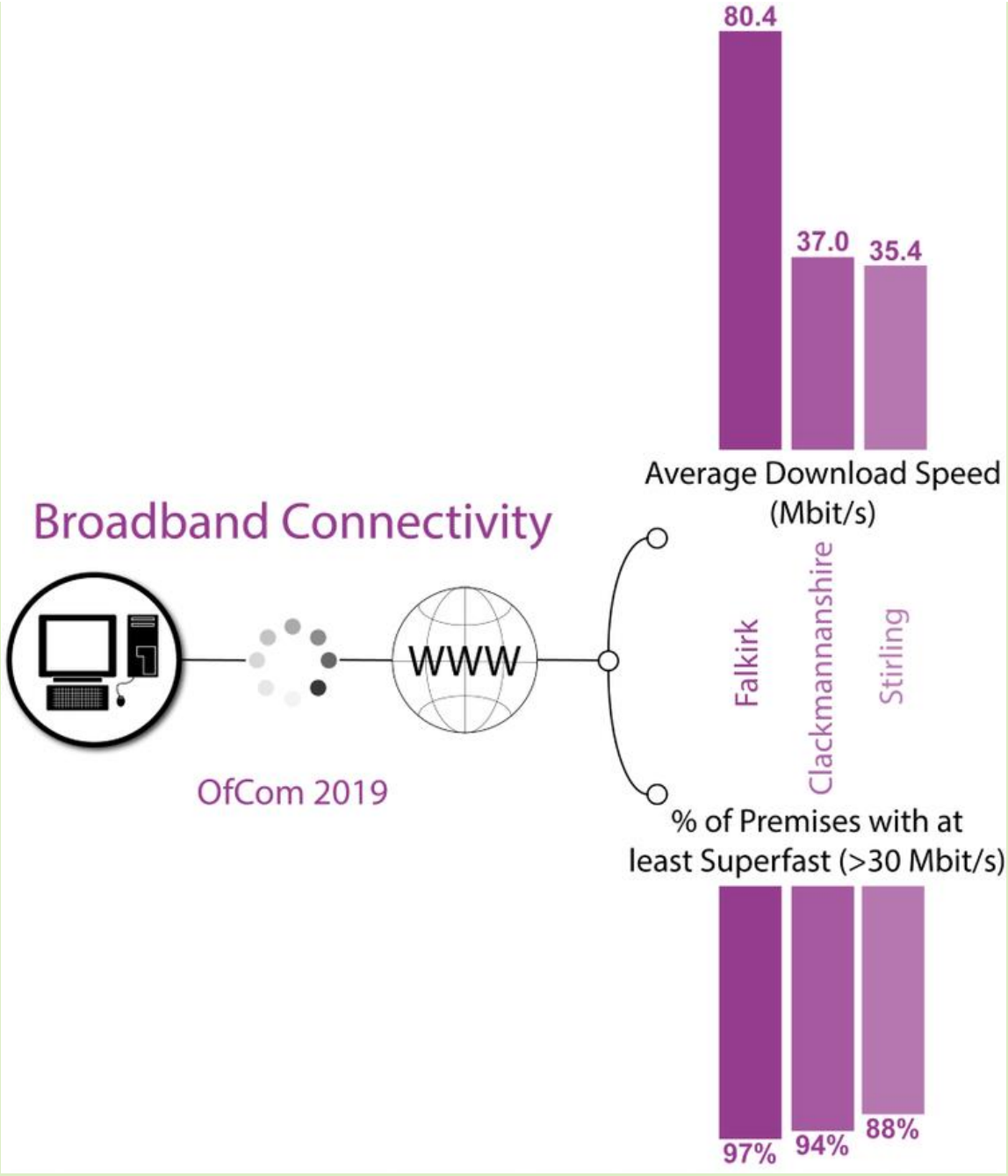


Figure 43: Broadband availability

According to the Connected Nations Update from summer 2019 (Figure 43), there is a degree of variability across the Forth Valley region regarding broadband speed and availability[116].

[116] Ofcom, Connected Nations, 2019, https://www.ofcom.org.uk/research-and-data/multi-sector-research/infrastructure-research/connected-nations-2019/data-downloads

LIMITED DIGITAL CONNECTIVITY

SFBB = Access to a download speed of 30Mbit/s or higher (superfast)

UFBB = Access to a download speed of 300Mbit/s or higher (ultrafast)

Full fibre = Full-fibre broadband uses fibre optic cables to connect the exchange directly to each premises. Full-fibre connections are capable of download and upload speeds over 1 Gbps. It is currently the fastest and most reliable broadband technology.

The Connected Nations update report further illustrates that:

- 94% of premises in Clackmannanshire had access to superfast broadband (SFBB) and 88% in Stirling and 97% for the Falkirk area. This compares to 94% of all Scottish premises.
- 78% of premises in Falkirk have access to ultrafast broadband (UFBB), making it the highest of Forth Valley local authorities, compared to just 22% in Stirling and less than 5% in Clackmannanshire. This compares to 52% of all Scottish premises.
- 17% of Stirling households have access to Full Fibre whilst Falkirk and Clackmannanshire were 1%. This compares to 10% of all Scottish households.
- Whilst the proportion of premises with access to SFBB and Full Fibre suggests connectivity in Forth Valley is improving, the figures illustrate that for many in the region, digital connectivity remains an issue.
- Stirling has the highest proportion (2.3%) of premises in Forth Valley that are unable to access a download speed of 10Mbit/s and an upload speed of 1Mbit/s which is the UK Universal Service Obligation (USO). This compares to 0.2% of households in Clackmannanshire and Falkirk and 0.1% of Scottish premises.

Digital connectivity is limited in Forth Valley and remains an issue, as slow broadband speed limits the opportunities for home working. However, this is not an area that STPR2 can directly address.

3.2.2. Online Survey: Reported Problems in the Forth Valley Region

As part of the wide-ranging engagement exercise undertaken for STPR2, an online survey was promoted to collect the views from the public and organisations across Scotland on the transport issues and challenges that impact their day to day journeys. As part of the survey, respondents were asked to rank their top 3 priority problems.

Top ranking problems for the Forth Valley region included:

- **Bus - Frequency and reliability of bus services**, which **30** respondents ranked as their top priority and **53** ranked within their top 3;
- **Cycling - Availability of safe cycling infrastructure**, which **26** respondents ranked as their top priority and **32** ranked within their top 3;
- **Roads - Quality of roads infrastructure**, which **16** respondents ranked as their top priority and **38** ranked within their top 3;

Other commonly raised areas of concern related to access to the nearest rail station, cost of rail travel, connectivity to other parts of Scotland, and cost of bus travel.

The findings from the survey have been used to inform and further validate the identification of the transport related problems described in this section.

3.2.3. Opportunities

This section provides a summary of key opportunity themes identified for the Forth Valley region.

Public Transport Interchange, Accessibility and Connectivity

The opportunities offered for improved transport (especially public transport) accessibility and connectivity are evidenced earlier in this report under the problems section. As is often the case a problem can be the starting point for an opportunity under the right circumstances. In addition to the evidence outlined earlier, stakeholder engagement highlighted the strong policy and strategy (NTS2) framework for improvements to public transport services in Scotland. A number of stakeholders mentioned the opportunity to better integrate transport services within the Forth Valley region.

Furthermore, the proximity of the region to strategic road (M9/M80) and rail routes (Aberdeen/Inverness-Glasgow; Dunblane/Alloa-Edinburgh; Edinburgh-Glasgow) offers an opportunity to provide strategic interchange opportunities into and out of the region's main settlements. The location of existing and planned trip attractors and generators on the outskirts of Stirling could also provide an opportunity to capture car trips travelling on the strategic road network on bus and coach and rail network.

There is also an opportunity to improve strategic connections to towns and villages in the region, as highlighted in the Stirling Park and Ride Case for Change[117] which indicates that there are a number of communities with "below average access to services" and are near strategic routes, such as Plean, Cowie and Fallin, would benefit from improved

[117] SYSTRA, Stirling Strategic Park and Ride Study, 2020

transport accessibility and connectivity.

Active and Sustainable Travel

The strong political and policy environment for active travel was noted repeatedly during stakeholder engagement. This is evidenced in the more than doubling of the Scottish Government budget for active travel measures in recent years and the emphasis placed on walking, wheeling and cycling within the sustainable travel hierarchy within NTS2.

It was noted that development of the active travel network for everyday as well as leisure and recreational trips, "*helps people make healthy living choices and assists in delivering places that are happier, more inclusive and equal, and more prosperous*"[118]. In so doing this supports the people and places agenda within Scottish Government.

Transport Scotland's Review of Active Travel Policy Implementation (2016)[119] identifies the factors that enable more people to walk and cycle more often:

- The right infrastructure (good quality routes, connecting the right places, associated parking and other elements)
- The right information
- The right enablers of change (access to bikes, led walks, etc)
- The right attitudes (active travel seen to be relevant, acceptable).

Recent research undertaken for Cycling Scotland[120] shows that, setting aside journeys that are too far to cycle and poor weather, the main perceived barriers to cycling are feeling unsafe and lack of appropriate infrastructure, both of which can be addressed by appropriate network development.

Moreover, many settlements in the region are within close proximity of each other. This, as a result, provides opportunities for active travel trips between settlements.

[118] Scottish Government, Scottish Government Active Travel Framework, 2019, https://www.transport.gov.scot/media/47158/sct09190900361.pdf
[119] Transport Scotland, Review of Active Travel Policy Implementation, October 2016, https://www.transport.gov.scot/publication/review-of-active-travel-policy-implementation/
[120] Cycling Scotland, Attitudes and Behaviours Towards Cycling in Scotland, 2019, https://www.cycling.scot/mediaLibrary/other/english/7268.pdf

Climate Change Emergency

The Climate Emergency was often cited in the stakeholder consultation as offering an opportunity to make transport investment decisions that encourage people out of private vehicles through better active travel and public transport provision. It was felt that the time was right for a step change in sustainable transport provision when linked to the strong political and policy environment and increasing awareness within the wider public. There are therefore opportunities for transport to shape the pathways to help deliver a net zero Scotland. It is also acknowledged that elements of the climate emergency (in the context of STAG) are more related to issues than opportunities.

Technology

Technology was viewed by stakeholders as a potential aid to address some of the problems raised earlier in this report or leveraging other opportunities. Areas specifically identified include:

- Alternative Low Emission Fuels – there is significant potential for alternative low emission fuels in the region. Transport definitely has a role to play in their development but it is acknowledged that wider issues within the energy market and other industry sectors may have more influence on how the market develops.
- Ticketing – the advent of modern, integrated and in some instances digital ticketing solutions represents an opportunity for the transport industry that to date was not considered as well developed in the Forth Valley region. Comparisons were drawn with Edinburgh.
- MaaS/Online travel information – Tactran has recently been awarded funds from the MaaS Scotland Investment Fund, to roll out MaaS solutions in partnership with NHS Tayside, Dundee & Angus College and Loch Lomond and the Trossachs National Park. SEStran are also developing related initiatives.
- Home/Flexible Working– opportunities exist to reduce the need to travel by working from home or having flexibility on the time and date of travel. This is often linked to improved digital infrastructure and services, which in the context of STPR2, is considered to be an issue not an opportunity.

The above initiatives and others demonstrate a good willingness from the region's transport authorities and other partners to identify and capitalise on the new technological opportunities becoming available within the transport sector.

During stakeholder engagement, issues around alternative transport governance arrangements were identified alongside the constraints of current funding streams. It was noted that the NTS2 does identify that transport governance and collaboration will be improved through the continuation of the work initiated through the NTS roles and responsibilities group. Stakeholders also noted the opportunities available for alternative funding streams such as the emerging Growth deals in the region, 'greening the last mile' and workplace parking levies as contained within the recent Transport (Scotland) Act.

3.3. Summary of Problems & Opportunities

- Poor accessibility and connectivity: this has been identified as a problem across the region, but most significantly in the areas outwith urban centres, predominantly to the north west of the region.
- Poor road user experience: this has been identified primarily in relation to the quality and maintenance of existing infrastructure, slow journey times and network 'pinch-points'.
- High cost of public transport fares: a larger proportion of Forth Valley data zones are classified as being at 'high risk' of transport poverty compared to the national proportion. Household expenditure on transport for a large proportion of the region exceeds the national average, equating to 19-20% of all expenditure in a number of locations, many of which are concentrated in the north west of the region
- Barriers to active travel: where cycle routes are available, they are frequently classified as on-road routes, leading to perceived safety issues. Physical constraints such as the A91 act as barriers to walking and cycling from eastern villages and there are limited safe walking and cycling routes in the countryside to local facilities and services.
- Limited digital connectivity: digital connectivity is limited in Forth Valley and remains an issue, as slow broadband speed limits the opportunities for home working. However, this is not an area that STPR2 can directly address.
- There are opportunities in the region associated with: public transport interchange; accessibility and connectivity; active and sustainable travel; climate change emergency; and technology. It is however noted that the provision of bus services requires revenue funding which is out of scope for STPR2.

3.4. Future Conditions

The problems and opportunities identified above are focused on the transport system pre COVID-19 drawing on the findings from data analysis and engagement. Given the timescales for the delivery of STPR2, there is a need for 'horizon scanning' to better understand how potential future uncertainties could impact the operation and management of the transport network, a knowledge of which will support the identification of interventions that are resilient in the face of potential alternative futures. This process of scenario planning will consider major transport disrupters and uncertainties and is accordingly being carried out at a national level for the STPR2 programme as a whole.

Notwithstanding the above, for the Forth Valley region, a review of the national transport model, the Transport Model for Scotland (TMfS), has been undertaken. Assuming current policies remain in place and no interventions beyond those already committed will be undertaken, the model suggests that between 2014 and 2037 the following may occur[121];

- Road Traffic (billion vehicle miles p.a.): a 34% increase in the region, slightly lower than the national growth of 37%.
- Road Congestion (PM Peak Delay seconds/mile): 9% increase in the region, lower than 37% rise across Scotland.
- Bus Passenger mileage forecasts: 10% decrease, higher than the national decline of 5%.
- Rail Passenger mileage forecasts: 72% increase compared to a 42% rise across Scotland.

Future pressures:

- Projected pressures on the strategic road network from the Durieshill/South Stirling Gateway development at M9 Junction 9 and the Grangemouth Investment Zone.

Based on these projections, it is clear that there are major challenges ahead which STPR2 must respond to if the transport sector is to play its role in supporting the Scottish Government commitment to meet its net zero emission target.

[121] Transport Scotland, Transport Forecasts, 2018, https://www.transport.gov.scot/media/43316/transport-forecasts-2018.pdf

4. Transport Planning Objectives

Transport Planning Objectives (TPOs) are of central importance to the STAG process. In line with STAG, TPOs should express the outcomes sought by the study, be based on a comprehensive understanding of problems and opportunities and lend themselves to clear and transparent appraisal of transport options. They will be a key appraisal tool from initial option identification and sifting through to full scheme appraisal and subsequent monitoring / evaluation.

For STPR2, TPOs have been developed to sit at a national level, supported by regional sub-objectives. At a national level, an overarching set of programme-level TPOs have been established which are closely aligned with the vision, 4 priorities, 12 outcomes and 14 policies contained within NTS2.

A series of regional sub-objectives sits within the overall direction of the national TPOs but with a focus on the specific evidence-based problems and opportunities for the Forth Valley region. The national TPOs and regional sub-objectives are presented in Table 16 detailed below.

Table 16: National and Regional TPOs

STPR2 OBJECTIVE	SUB-OBJECTIVE
A sustainable strategic transport system that contributes significantly to the Scottish Government's net zero emissions target.	▪ Reduce the consumption of fossil fuels through managing travel demand and enable a shift to more sustainable modes of transport. ▪ Increase the share of active travel for everyday journeys, particularly in the main population centres of Alloa, Falkirk and Stirling. ▪ Increase the share of public transport, including travel outwith the main population centres of Alloa, Falkirk and Stirling. ▪ Reduce emissions generated by the transport system.
An inclusive strategic transport system that improves the affordability and accessibility of public transport.	▪ Increase public transport share by connecting sustainable modes of transport, with a focus on key interchanges in the region. ▪ Improve mobility and inclusion, with a particular focus on interventions that improve mobility for all, including outwith the urban centres of Alloa, Falkirk and Stirling. ▪ Reduce transport poverty by increasing travel choice, particularly outwith the urban centres of Alloa, Falkirk and Stirling. ▪ Reduce the reliance on private car by enhancing public transport options to access key centres for healthcare, employment and education, within the region and key destinations, particularly in the central belt.
A cohesive strategic transport system that enhances communities as places, supporting health and wellbeing.	▪ Reduce demand for unsustainable travel by supporting and embedding place-making principles in the strategic transport system. ▪ Increase the share of active travel for shorter everyday journeys, particularly in the main population centres of Alloa, Falkirk and Stirling. ▪ Reduce demand for unsustainable travel arising from nationally significant growth areas, taking cognisance of the emerging NPF4. ▪ Reduce emissions from the strategic transport system that are harmful to people's health by alleviating pressure on and improving air quality at 'pinchpoints' and AQMAs.
An integrated strategic transport system that	▪ Increase sustainable access to labour markets and key centres for employment, education and training both

STPR2 OBJECTIVE	SUB-OBJECTIVE
contributes towards sustainable inclusive growth in Scotland.	within Forth Valley and other key destinations in the Central Belt. ▪ Increase competitive transport access by all modes to key domestic and international markets, by reducing costs and improving journey time reliability for commercial transport, within Forth Valley, to key destinations in the Central Belt and to Forth Ports. ▪ Increase resilience of accesses to key domestic and international markets to encourage people to live, study, visit and invest in Forth Valley. ▪ Increase the mode share of freight by sustainable modes
A reliable and resilient strategic transport system that is safe and secure for users.	▪ Increase resilience from disruption on Forth Valley's strategic road and rail infrastructure. ▪ Reduce transport related casualties in line with reduction targets, with a particular focus on reduction of the number and severity of cycling collisions in Forth Valley. ▪ Improve resilience through climate change adaptation within the management and maintenance of Forth Valley's strategic road and rail infrastructure. ▪ Improve perceived and actual security on Forth Valley's strategic road and rail infrastructure

Table 17 demonstrates the alignment of the sub-objectives developed for the Forth Valley region with the identified problems and opportunity themes in the region.

Table 17: Objectives vs Problems / Opportunities

National Objective/Outcome	Regional Sub-objective	Problems					Opportunities			
		Poor accessibility and connectivity	Poor road user experience	High cost of public transport fares	Barriers to active travel	Limited digital connectivity	Public Transport Interchange, Accessibility and Connectivity	Active and Sustainable Travel	Climate Change Emergency	Technology
A sustainable strategic transport system that contributes significantly to the Scottish Government's net zero emissions target	Reduce the consumption of fossil fuels through managing travel demand and enable a shift to more sustainable modes of transport.		■		■		■	■	■	
	Increase the mode share of active travel for everyday journeys, particularly in the main population centres of Alloa, Falkirk and Stirling.	■	■		■			■	■	
	Increase the mode share of public transport, including travel outwith the main population centres of Alloa, Falkirk and Stirling.	■		■			■	■	■	
	Reduce emissions generated by the transport system.		■		■			■	■	■
An inclusive strategic transport system that improves the affordability and accessibility of public transport	Increase public transport mode share by connecting sustainable modes of transport, with a focus on key interchanges in the region.	■		■			■	■	■	■
	Improve mobility and inclusion, with a particular focus on interventions that improve mobility for all, including outwith the urban centres of Alloa, Falkirk and Stirling.	■		■	■	■	■	■		■
	Reduce transport poverty by increasing travel choice, particularly outwith the urban centres of Alloa, Falkirk and Stirling.	■		■	■		■	■		■
	Reduce the reliance on private car by enhancing public transport options to access key centres for healthcare, employment and education, within the region and key destinations, particularly in the central belt.	■	■	■			■		■	
A cohesive strategic transport system that enhances communities as places, supporting health and wellbeing	Reduce demand for unsustainable travel by supporting and embedding place-making principles in the strategic transport system.	■			■		■	■	■	
	Increase the mode share of active travel for shorter everyday journeys, particularly in the main population centres of Alloa, Falkirk and Stirling.	■			■			■	■	
	Reduce demand for unsustainable travel arising from nationally significant growth areas, taking cognisance of the emerging NPF4.	■			■		■	■	■	
	Reduce emissions from the strategic transport system that are harmful to people's health by alleviating pressure on and improving air quality at 'pinchpoints' and AQMAs.	■	■		■	■	■	■	■	■
An integrated strategic transport system that contributes towards	Increase sustainable access to labour markets and to key centres for employment, education and training both within Forth Valley and other key destinations in the Central Belt.	■		■	■		■	■	■	
	Increase competitive transport access by all modes to key domestic and international markets, by reducing costs and improving journey time reliability for	■	■							

National Objective/Outcome	Regional Sub-objective	Problems					Opportunities			
		Poor accessibility and connectivity	Poor road user experience	High cost of public transport fares	Barriers to active travel	Limited digital connectivity	Public Transport Interchange, Accessibility and Connectivity	Active and Sustainable Travel	Climate Change Emergency	Technology
sustainable inclusive growth in Scotland	commercial transport, within Forth Valley, to key destinations in the Central Belt and to Forth Ports.	■	■							
	Increase resilience of accesses to key domestic and international markets to encourage people to live, work, study, visit and invest in Forth Valley.	■	■				■			■
	Increase the mode share of freight by sustainable modes	■	■					■	■	■
A reliable and resilient strategic transport system that is safe and secure for users	Increase resilience from disruption on Forth Valley's strategic road and rail infrastructure.	■	■				■			■
	Reduce transport related casualties in line with reduction targets, with a particular focus on reduction of the number and severity of cycling collisions in Forth Valley.		■		■			■		
	Improve resilience through climate change adaptation within the management and maintenance of Forth Valley's strategic road and rail infrastructure.		■				■		■	■
	Improve perceived and actual security on Forth Valley's strategic road and rail infrastructure	■	■		■		■	■		■

5. Option Generation and Sifting

5.1. Strategic Options

As set out earlier, STPR2 specifically focusses on Scotland's key strategic transport assets. In the context of STPR2, a strategic transport project is defined as any transport project that materially contributes to Scottish Government and Transport Scotland policies and strategies. Specifically, this will include:

- Any transport project that plays a significant part in supporting the 4 NTS2 priorities and related outcomes;
- Projects or groups of projects related to transport networks owned, operated and funded directly by Transport Scotland;
- Passenger and freight access to ports and airports of national significance; and
- The inter-urban bus and active travel networks and principal corridors within urban areas.

Within the overall definition above, the interventions considered within STPR2 may include:

- Appropriate transport policy and financial instruments (that are within the responsibility of Scottish Government);
- Demand management measures, including use of technology, innovation and behavioural change;
- Asset management and safety measures;
- Measures to increase travel by active travel modes;
- Public transport improvements, including interchanges, road space allocation, technology and ticketing;
- Transport links to/from areas of economic activity of national significance;
- Targeted infrastructure improvements on the transport networks owned, operated and funded directly by Transport Scotland;
- Changes to the operation of ferry terminals and services that are part of the CHFS and NIFS network;
- Infrastructure measures at ports and harbours of national significance; and
- Improved access to major airports.

5.2. Approach

In keeping with the principles of STAG, the Initial Appraisal: Case for Change has been developed to provide a robust method to generate, clean and sift options; ensuring a broad range of options across all modes are considered.

The STPR2 option generation, cleaning and sifting approach is summarised in Figure 44 alongside the number of options generated at the various key stages that are specific to the Forth Valley region.

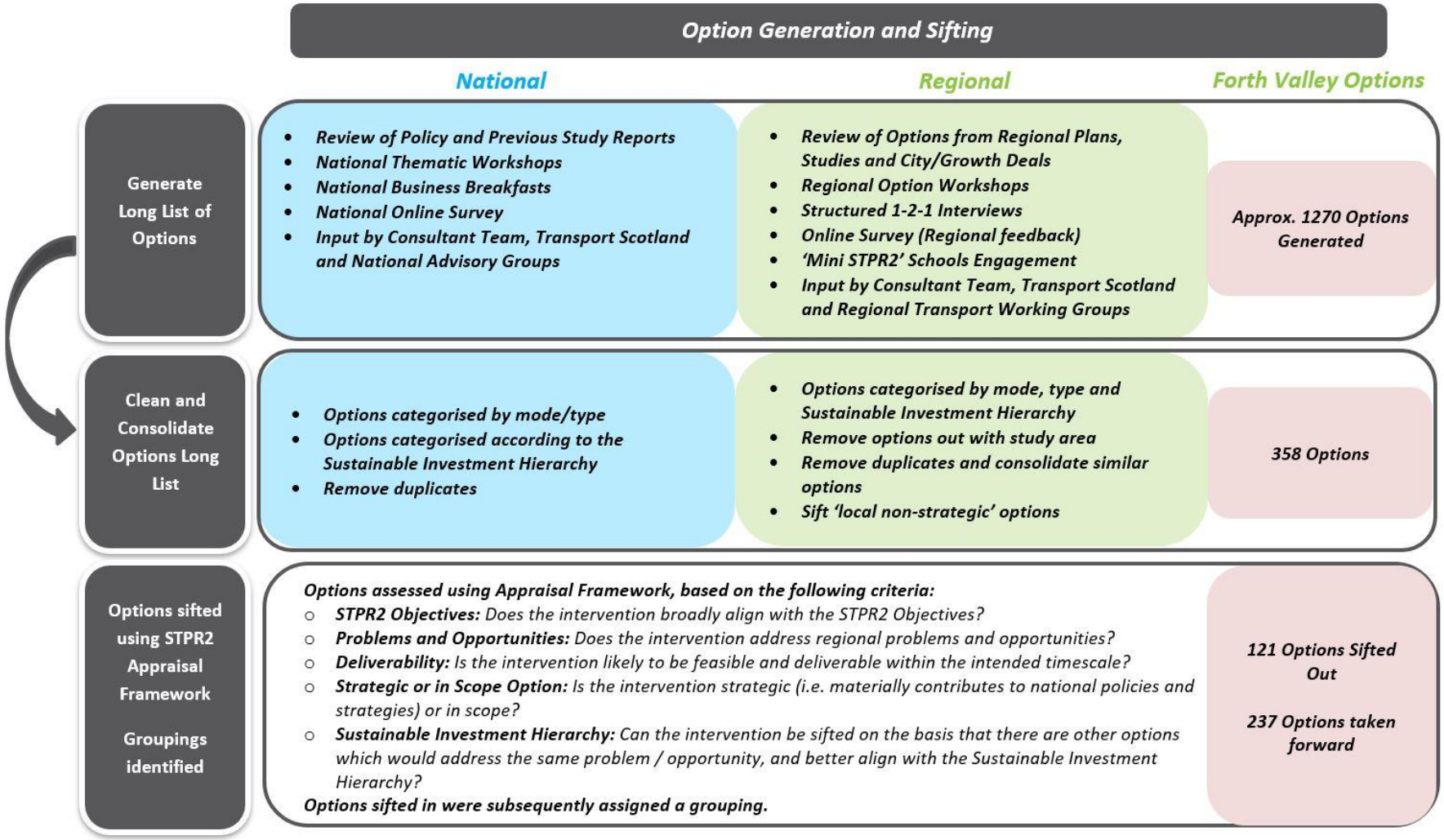


Figure 44: Approach to Option Generation and Sifting

5.2.1. Generate Long List of Initial 'Options'

A long list of initial transport options was generated based on a range of sources, including: a review of options identified from recent local and regional studies and via extensive stakeholder engagement and public consultation activities. This included Stakeholder Workshops, Structured Telephone Interviews, an Elected Members briefing and an Online Survey. Options were also generated through discussions with the Regional Transport Working Group and supplemented by the Consultant team. Options were identified across all modes and encapsulate many of the main routes and key centres across the regions. Some of these options were well developed and had a clearly defined output, others were suggestions and ideas. All of these ideas/suggestions/options were collated and considered at this stage.

Specific to the Forth Valley Region, there were **1270** options generated.

5.2.2. Option Cleaning

Although approximately 1270 individual ideas/suggestions/options were identified, this included a number that required further definition, duplicated options and options which were broadly similar. As such, an exercise was undertaken to clean this 'long list'. Options were reviewed at a regional level or a national level depending on the initial source of the information. Options that required further definition were developed, and similar options were consolidated

Following the option cleaning exercise, 358 options were retained in the long list of interventions to be sifted specific to the Forth Valley Region.

5.2.3. Option Sifting

Each of the options included in the long list, following cleaning, have been assessed using an Option Sifting methodology developed to drive consistency in the sifting of options across STPR2.

Options were assessed against the range of criteria shown in Figure 44, to ensure that any options removed from this stage of the process are done so on a robust and transparent basis. Importantly, this included consideration of the Sustainable Investment Hierarchy. Figure 45 provides more detail of the sifting process.

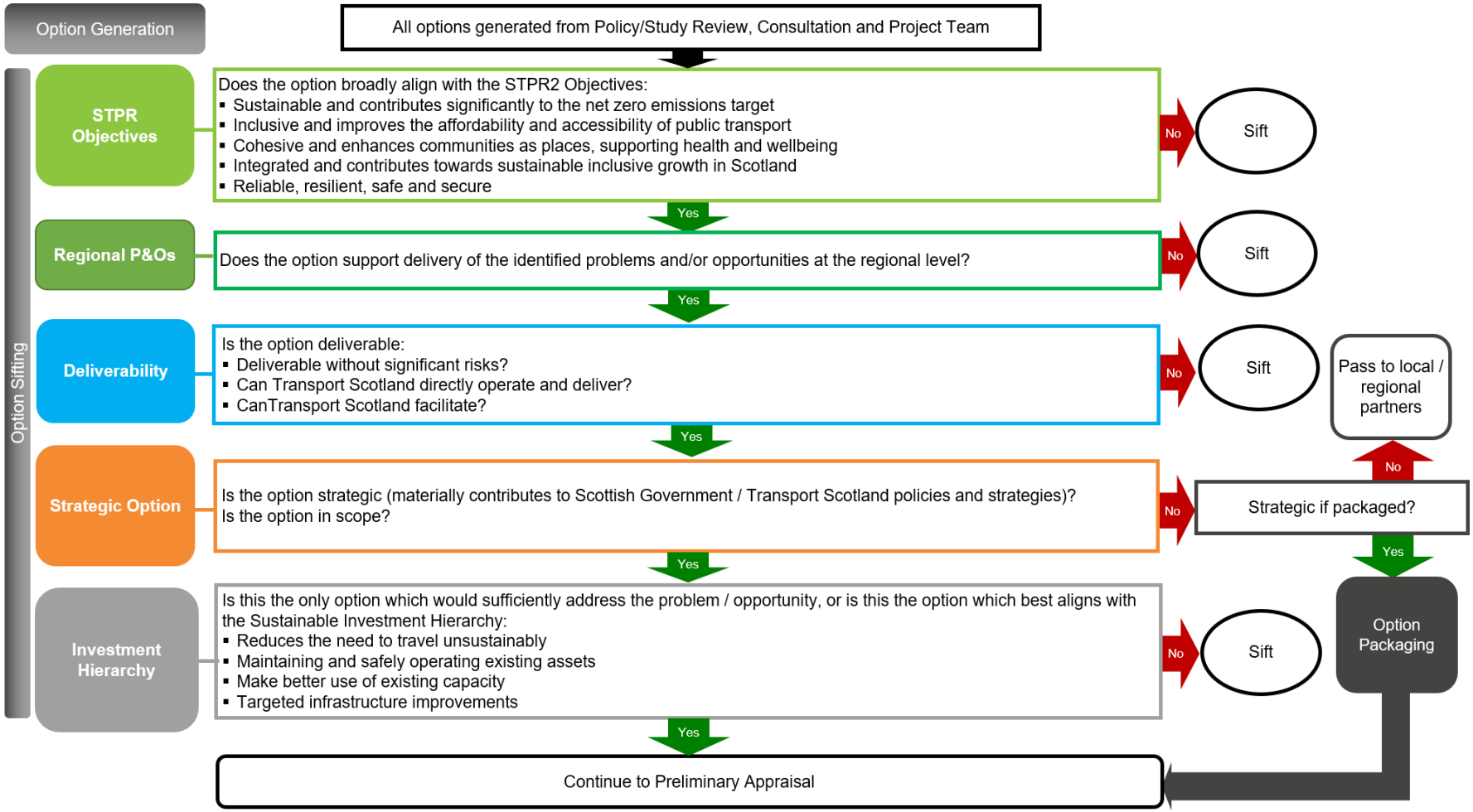


Figure 45: Option sifting process

Based on the methodology above, options were either:

- Sifted in for further consideration; or
- Sifted out from the process. If appropriate, these will be passed to other areas of Transport Scotland / Scottish Government, or the appropriate local/regional transport authorities and partnerships (through the RTWGs) for consideration out with STPR2.

5.2.4. Options sifted out

Options were sifted out at this stage for one of the following reasons:

- Option is out of scope and/or
- Option does not address the problems / opportunities in the region and/or
- Poor performance against transport planning objectives/sifting criteria, and/or
- Deliverability concerns and/or
- The problems/ opportunities are better addressed through another option and/or
- The option is being progressed out with STPR2.

A full list of options that were sifted out across all regions and at a national level is provided as an Appendix to the National Case for Change. In the Forth Valley Region, 121 options were sifted out at this stage.

5.2.5. Options sifted in

Following the sifting exercise, 237 options specific to the Forth Valley Region remain in the process. There are many of these options that share common traits across the regions and many options which in isolation would not deliver the strategic improvements STPR2 is seeking to deliver. Recognising the strategic and national dimension, options that have been sifted in for further appraisal have been allocated to Groupings. Groupings have been established to:

- allow similar options to be collated together to provide a more manageable list for further appraisal;
- collate similar options across regions, thus aiding consistency in definition and appraisal; and, where appropriate
- allow options that may, on their own merit, not be considered strategic, however when grouped address the identified national and regional Problems and Opportunities.

These Groupings will be appraised in the next stages of STPR2. The Groupings represent the range of interventions that STPR2 will consider in the appraisal stages. The list of Groupings along with a short description is provided in Table 18 and a full

list of options sifted in for further consideration alongside their allocated Grouping is provided in an Appendix to the National Case for Change.

Table 18: Groupings proposed to progress to STPR2 appraisal

Category	Grouping Name	Grouping Description
Active Travel	Access to Bikes	Options to improve access to bikes (conventional and e-bikes) and equipment such as charging facilities, lights, locks and helmets through bike libraries and other initiatives
Active Travel	Active Travel Hubs	Options to provide active travel hubs in Scotland's cities and major towns that provide advice, bike storage and maintenance facilities
Active Travel	Connect More Settlements to the National Cycle Network (NCN)	Options to expand the NCN to reach more settlements
Active Travel	Cycle / Public Transport Integration	Options (outside of franchise commitments) which allow the safe and efficient transport of bikes on public transport (bus, rail and ferry) and at transport hubs.
Active Travel	Current National Cycle Network	Options to upgrade the existing NCN, including addressing issues where there are safety concerns at on-road sections since their addition to the network.
Active Travel	Information & Signage for Active Travel	Options to provide good quality information, journey planning and signage of active travel networks and facilities

Category	Grouping Name	Grouping Description
Active Travel	Major Trip Attractor Accessibility by Active Travel	Options to provide safe, high quality active travel routes that enable easy access to major trip attractors (e.g. hospitals, major employment sites) in Scotland's cities and towns
Active Travel	Liveable Neighbourhoods	Options to make urban and suburban neighbourhoods in Scotland's cities and towns more conducive for active travel by improving conditions for walking, wheeling and cycling and reducing traffic dominance
Active Travel	Strategic Road Severance	Options to improve facilities and crossings for pedestrians and cyclists in locations where strategic roads have a significant severance effect in communities
Active Travel	Public Bike Hire Schemes	Options to facilitate the roll out of public bike hire schemes to enable their use by more people in more locations across Scotland
Active Travel	Quiet Roads	Options to implement quiet roads, potentially including measures such as traffic calming measures and speed limit reductions that form parts of strategic active travel networks, where appropriate
Active Travel	School Active Travel	Options to provide opportunities for safe and high quality active travel routes that enables school pupils resident in Scotland's cities and towns to walk, wheel or cycle to school

Category	Grouping Name	Grouping Description
Active Travel	Strategic Expansions of the National Cycle Network	Options to expand the NCN to reach more settlements and complete strategic gaps in the network.
Active Travel	Footway Enhancements on Strategic Routes	Options to upgrade existing footways on trunk roads and principal routes in our towns and cities, such as width, surfacing, drainage and drop kerbs at crossings. In addition, safe crossing facilities on major desire lines and adequate security (such as sightlines, lighting) where feasible.
Active Travel	Strategic Active Travel Corridors within and between Urban Areas (Active Freeways)	Options to provide high quality, segregated active travel routes on major distributor routes in Scotland's towns and cities, with connections to major trip attractors
Active Travel	Thriving Centres	Options to make town and neighbourhood centres more conducive for active travel by improving the urban realm and reducing the dominance of vehicular traffic and car parking
Active Travel	Transport Node Connectivity	Options to provide high quality active travel routes between public transport nodes (rail stations, bus stations, interchange facilities) and their catchments (such as residential and key trip attractors), along with high quality cycle parking at the nodes
Active Travel	Village – Town Active Travel Connections	Options to provide active travel routes from villages to a nearby town or regional centre.

Category	Grouping Name	Grouping Description
Active Travel	Former Rail Route Re-use for active travel	Options to create more active travel routes on former rail lines
Active Travel	Urban Placemaking	Options to facilitate placemaking schemes to improve the quality and ambiance of street spaces in Scotland's cities, towns and villages
Behaviour Change	School Streets	Options to facilitate traffic exclusion zones on streets where it is appropriate to do so near schools at school start/end times
Behaviour Change	National Behaviour Change Programme	Options to implement a national, long-term campaign to promote the benefits of active and sustainable travel and give information on appropriate-opportunities to do so
Behaviour Change	Regional Behaviour Change Programmes	Options to support regional, long-term campaigns to promote the benefits of active and sustainable travel and give information on appropriate local opportunities to do so
Behaviour Change	Expansion of Car Clubs	Options to expand car club availability and use across Scotland
Behaviour Change	Improved Information on Sustainable Travel Modes	Options to improve information (such as printed, real time and on-vehicle announcements) about active and sustainable travel routes and services
Behaviour Change	Sustainable Travel towns/Cities	City/Town-wide initiatives to give a holistic programme of promotion on active and sustainable travel choices

Category	Grouping Name	Grouping Description
Behaviour Change	Road Safety Campaigns	Options that consider a national, long-term campaign (and/or support local/regional campaigns) to promote better driver behaviour and reduce road safety fears including people travelling actively
Behaviour Change	Travel Demand Management	Measures to effectively manage travel demand and encourage more sustainable travel options.
Behaviour Change	Low Emission Zones (LEZ)	Options related to Low Emission Zones (LEZ), i.e. where only certain vehicles are allowed to enter, based on their emissions standards.
Bus	Bus Priority Infrastructure	Options to increase the roll out of bus priority measures, and where already available, improve existing measures
Bus	Decarbonisation of the Bus Network	Options related to decarbonisation of the bus network (incl. fleet).
Bus	Demand Responsive Transport (DRT) / Community Transport	Measures to support Demand Responsive (DRT) and Community Transport, excluding revenue funding
Rail	Central & North East Scotland Rail Improvements	Options to improve capacity, frequency and reliability of train services, such as, train lengthening and linespeed improvements

Category	Grouping Name	Grouping Description
Rail	Glasgow, West Coast and South West Scotland Rail Improvements	Options to improve capacity, frequency and reliability of train services, such as, train lengthening and linespeed improvements
Rail	Edinburgh, East Coast and Borders Rail Improvements	Options to improve capacity, frequency and reliability of train services, such as, train lengthening and linespeed improvements
Rail	Highland and Far North Rail Improvements	Options to improve capacity, frequency and reliability of train services, such as, train lengthening and linespeed improvements
Rail	Decarbonisation of the Rail Network	Options related to decarbonisation of the rail network (incl. rolling stock).
Rail	High Speed Rail	Development of High Speed Rail north of HS2 to Scotland and / or within Scotland
Rail	New Rail Lines, Including Re-Opening of Disused Lines for rail services	Options related to re-opening of disused rail corridors for rail and opening new rail lines including associated new stations
Rail	New Rail Stations	Options related to opening new rail stations on the existing rail network
Rail	New Sleeper Routes	Option related to the introduction of new or extensions to existing rail sleeper routes

Category	Grouping Name	Grouping Description
Rail	Rolling Stock Quality	Improvements to the quality of heavy rail rolling stock not already committed to within the relevant ScotRail and Caledonian Sleeper franchise. This does not include decarbonisation options which are covered under RL5.
Public Transport	Public Transport Network Coverage, Frequency and Service Integration	Options to improve the network coverage, frequency and service integration of bus and rail, excluding revenue funding. Particularly access to key services such as healthcare, education, leisure and retail**.**
Public Transport	Mobility Hubs and Multi-modal Interchanges	Implement new / upgrade existing strategically important mobility hubs, Park & Ride sites and other multi-modal interchanges.
Public Transport	Regional Passenger Facilities/Station Enhancements	Bus and rail passenger facilities and station enhancement improvements, including improved accessibility to facilities for passengers with reduced mobility.
Public Transport	Integrated Public Transport Ticketing	Integration of ticketing across public transport (bus, rail, light rail and ferries).
Ferries / Island Connectivity	Ferry Service Improvements on the CHFS and NIFS network	Options related to CHFS or NIFS network that suggest a change to ferry services, such as capacity, frequency or related port infrastructure.

Category	Grouping Name	Grouping Description
Ferries / Island Connectivity	New Ferry Routes (Internal to Scotland)	Options related to new internal ferry routes (within Scotland) which may reduce operating costs or subsidy on the CHFS or NIFS network.
Ferries / Island Connectivity	New International Ferry Routes	Options relating to new international ferry services that could bring positive economic benefit to Scotland but which are not sufficiently attractive to the market.
Ferries / Island Connectivity	Decarbonisation of Ferry Network	Options related to decarbonisation of the ferry network (incl. vessels).
Ferries / Island Connectivity	Fixed Links	Options related to fixed links which meet at least one of the following criteria: Connect the Scottish mainland to an island; Reduce the operating costs of the CHFS or NIFS network; Address a strategic problem as identified through evidence-based appraisal that cannot be addressed by reasonable alternatives.
Road	North West Scotland Trunk Road Network Improvements	Package of measures to improve the capacity, reliability and resilience of routes, such as overtaking opportunities, partial dualling, junction improvements and route realignment.
Road	North East Scotland Trunk Road Network Improvements	Package of measures to improve the capacity, reliability and resilience of routes, such as overtaking opportunities, partial dualling, junction improvements and route realignment.

Category	Grouping Name	Grouping Description
Road	South West Scotland Trunk Road Network Improvements	Package of measures to improve the capacity, reliability and resilience of routes, such as overtaking opportunities, partial dualling, junction improvements and route realignment.
Road	South East Scotland Trunk Road Network Improvements	Package of measures to improve the capacity, reliability and resilience of routes, such as overtaking opportunities, partial dualling, junction improvements and route realignment.
Road	Low Emission/Ultra Low Emission/Electric Vehicle National Action Plan	A National Action Plan to support the shift to Low Emission/Ultra Low Emission/Electric Vehicles and help deliver Scottish Governments net zero targets.
Road	Road Safety (Vision Zero) Measures	A national package of road safety measures, such as road safety campaigns and technology to target casualty reduction.
Road	Trunk Road Space Reallocation	Package of measures to reallocate road space on the trunk road network, such as reduction of on-street parking, high occupancy vehicle lanes and no parking zones.
Road	Review of speed limits (national)	Review of speed limits across the road network, including the potential to implement 20mph zones
Freight	Decarbonisation of Freight Deliveries	Measures to encourage low carbon fuels (including electric, hydrogen, CNG/LNG) that will decarbonise the freight transport sector in line with the Scottish Government targets and commitments.

Category	Grouping Name	Grouping Description
Freight	Freight Consolidation Measures	Measures related to Freight Consolidation and Multimodal Hubs to help facilitate sustainable freight deliveries.
Freight	Freight Rest Stops	Measures to help facilitate the introduction of freight rest stops for HGV drivers to take breaks and rest periods as required by regulation.
Freight	Freight Reliability and Efficiency Improvements	Measures aimed at improving the reliability and efficiency of freight journeys.
Freight	Last-Mile Logistics	Moving freight deliveries to low/zero carbon forms of transport, by encouraging the use of active travel measures and electric vehicles to service last-mile logistics
Freight	Sustainable Modal Shift of Freight	Transferring the delivery of freight from road vehicles to more sustainable modes, such as rail and water freight.
Freight	Rail Freight Enhancements	Measures to facilitate the growth of rail freight in Scotland, such as Gauge, Route Availability, Trailing Length, Terminals and Pathing
Technology	Connected Autonomous Vehicles (CAV)	Measures related to Connected Autonomous Vehicles (CAV), i.e. the operation of vehicles without direct driver input to control. This grouping relates to all modes of transport.

Category	Grouping Name	Grouping Description
Technology	Co-operative Intelligent Transport Systems (C-ITS)	Measures related to C-ITS, which are a group of technologies and applications that allow effective data exchange through wireless technologies between vehicles and infrastructure which can also be applied to vulnerable road users such as pedestrians, cyclists or motorcyclists.
Technology	Transport Scotland Operational Communications	Options related to both wireless and fibre communications to support the management and operation of Transport Scotland services
Technology	Nationwide Open Data, Passenger Information and Communications	Options related to transport data and the provision of public transport information and passenger communications for journey planning.
Technology	Adaptive Traffic Control on the Trunk Road	Options that allow optimisation of the performance of the Trunk Road Network through adaptive control.
Technology	Incident Management System Upgrade	Measures to improve the system software or architecture of Incident Management Systems.
Technology	Control Centre of the Future	Development of operation functions and procedures within the Traffic Scotland National Control Centre to adapt to changing requirements

Category	Grouping Name	Grouping Description
Technology	Intelligent Transport Systems (ITS) Roadside Infrastructure on Motorways and Trunk Road Network	Options to improve transport outcomes such as transport safety, transport productivity, travel reliability, informed travel choices, social equity, environmental performance and network operation resilience
Multimodal	Improve Routes to Major Ports and Airports	Options related to improving surface access to Major Ports and Airports, by all modes.
Multimodal	Improved Resilience of the trunk road and rail networks	Options to improve the resilience of the trunk road and rail network including the impacts from climate change.
Multimodal	Mobility as a Service (MaaS) Digital Platform	Options which assist in the development and adoption of a MaaS digital platform for Scotland across a wide range of existing public, shared and demand-responsive transport services.
Mass Transit	Glasgow Metro	Development of the public transport network within the Glasgow city region, with consideration of bus rapid transport, rail conversion, light rail and underground elements

Category	Grouping Name	Grouping Description
Mass Transit	Edinburgh Mass Transit Options	Development of the public transport network within the Edinburgh City Region with consideration of bus rapid transit, rail conversion, and tram network extension
Mass Transit	Aberdeen Mass Transit Options	Development of the public transport network within the Aberdeen City Region, with consideration of bus rapid transit, and light rail

5.3. Next Steps

This chapter has described the process undertaken to arrive at a sifted list of options for STPR2. These options, presented within Groupings will be taken forward for more detailed development and appraisal through the next stage of the STPR2 process.

This will include an assessment of the likely impacts of Groupings against the:

- STPR2 Transport Planning Objectives;
- STAG criteria [Environment, Safety, Economy, Integration, and Accessibility and Social Inclusion];
- Established policy directives; and
- Feasibility, affordability and public acceptability of options.

As part of the STPR2 engagement process, feedback on the Transport Options contained within this STPR2 Case for Change report can be submitted using a comments that can be accessed here. The closing date for comments is midnight on 31 March 2021.

APPENDICES

Appendix A: Figures

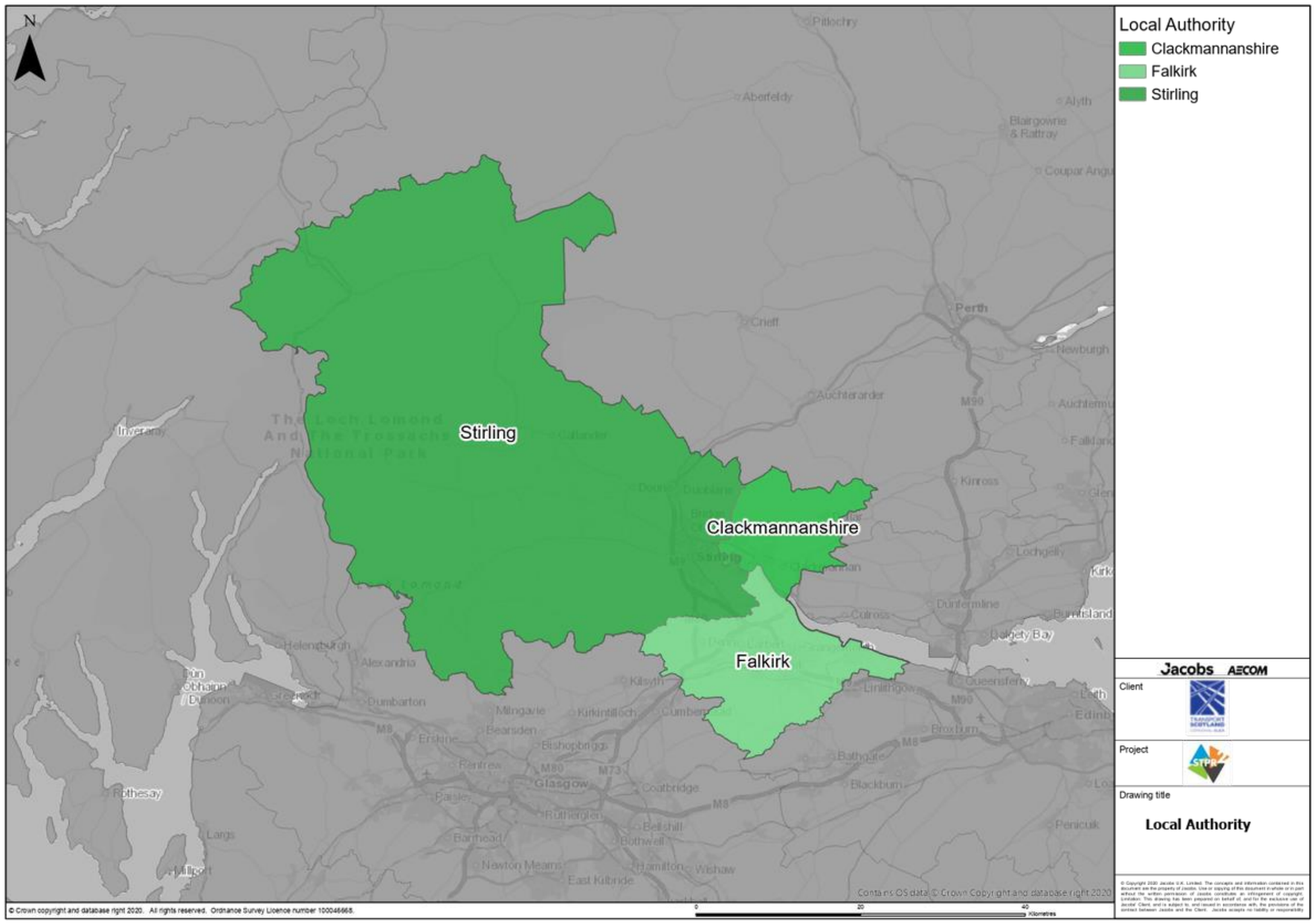


Figure A 1: Forth Valley Study Area (click image to go back to main report)

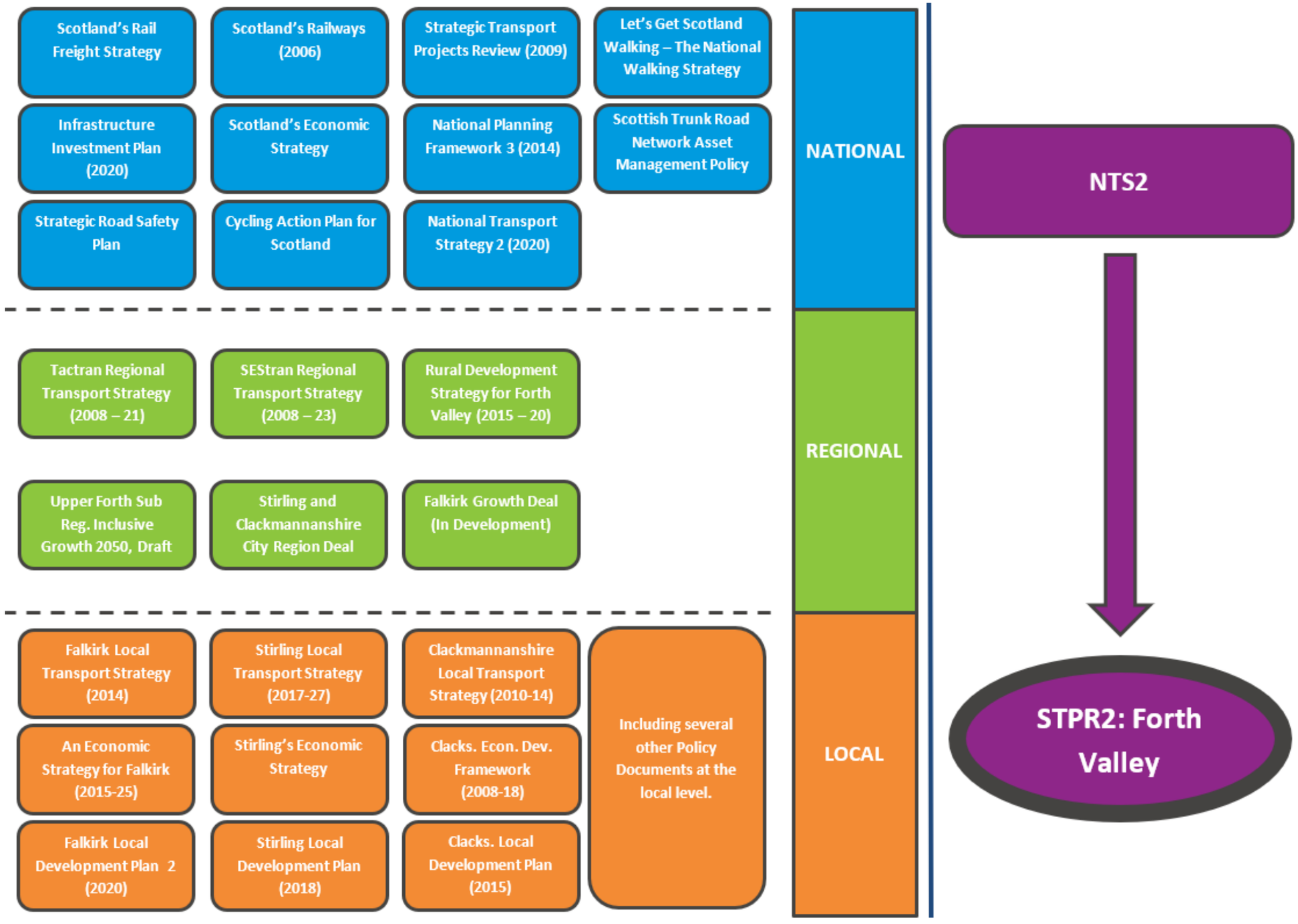


Figure A 2: Policy Review (click image to go back to main report)

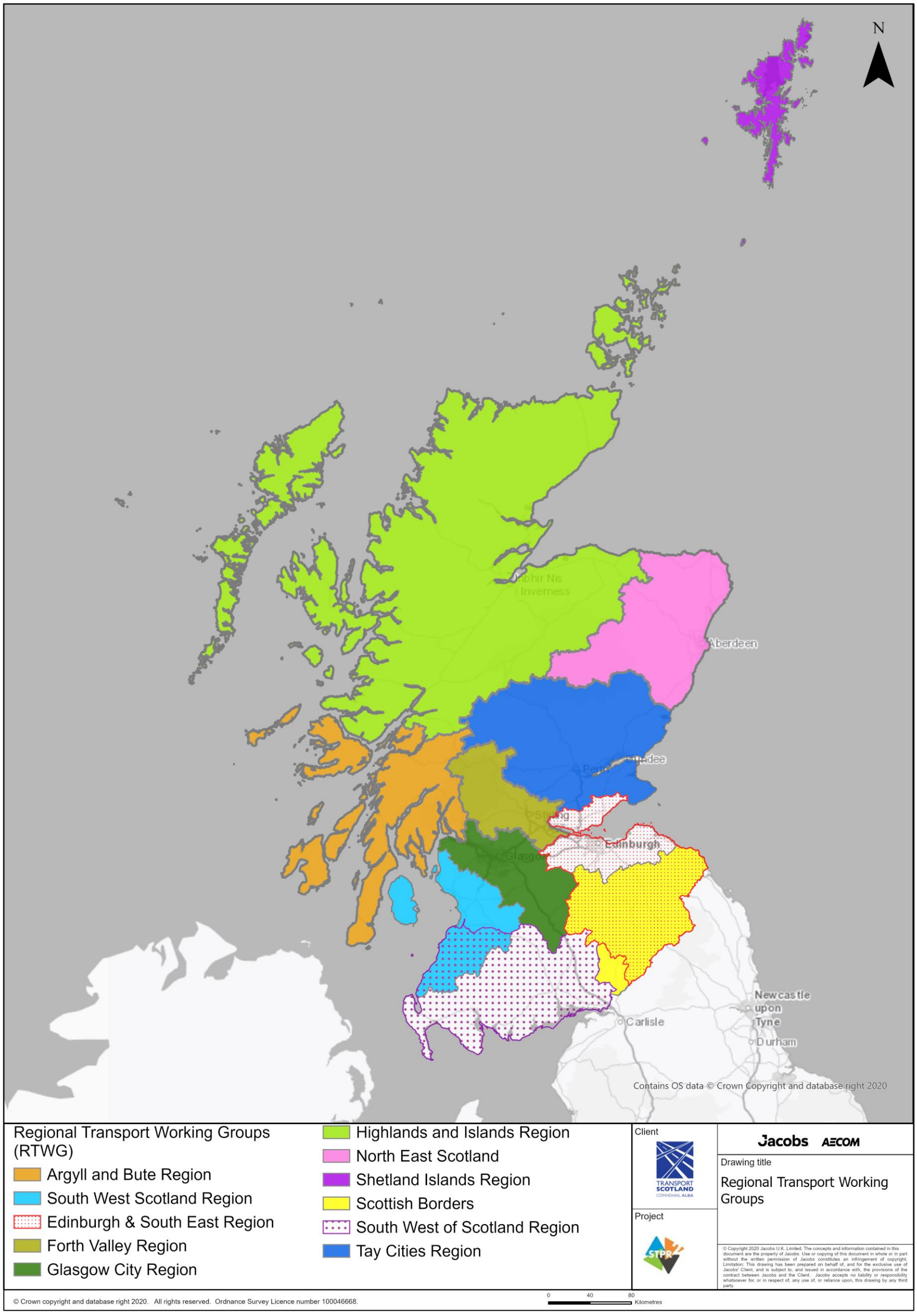


Figure A 3: STPR2 Regions (click image to go back to main report)

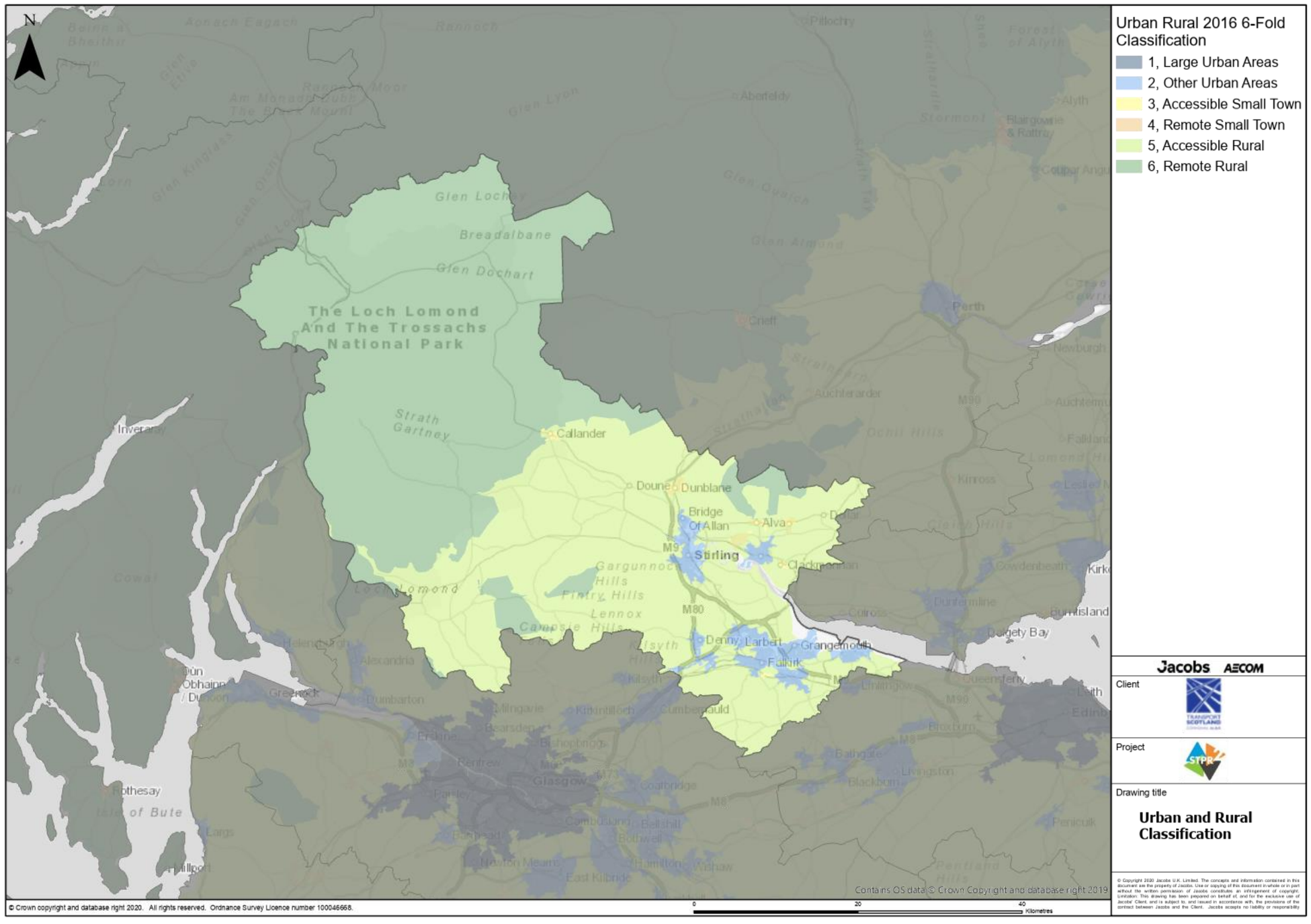


Figure A 4: Urban Rural 6-Fold Classification (click image to go back to main report)

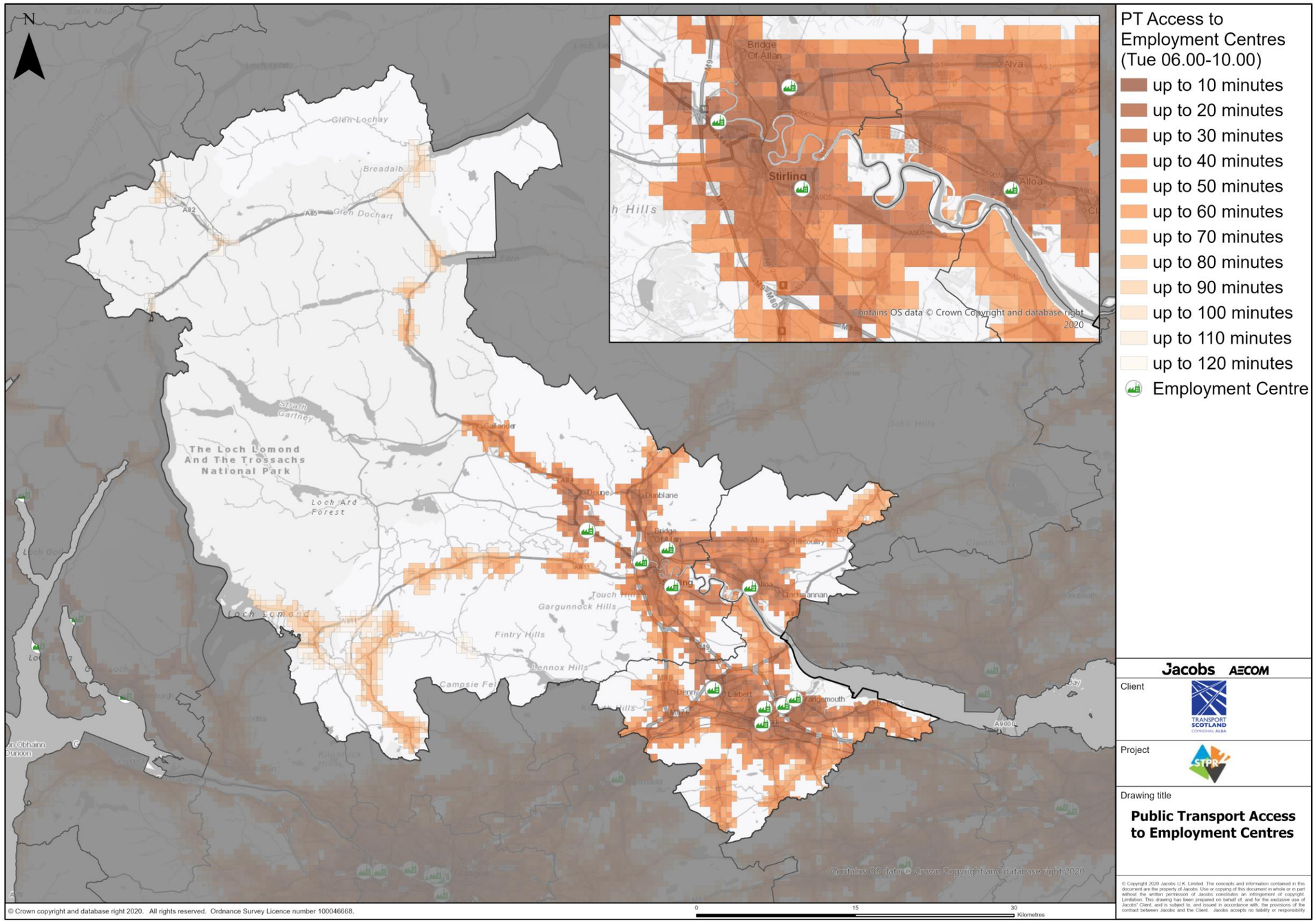


Figure A 5: Public Transport Access to Employment (click image to go back to main report)

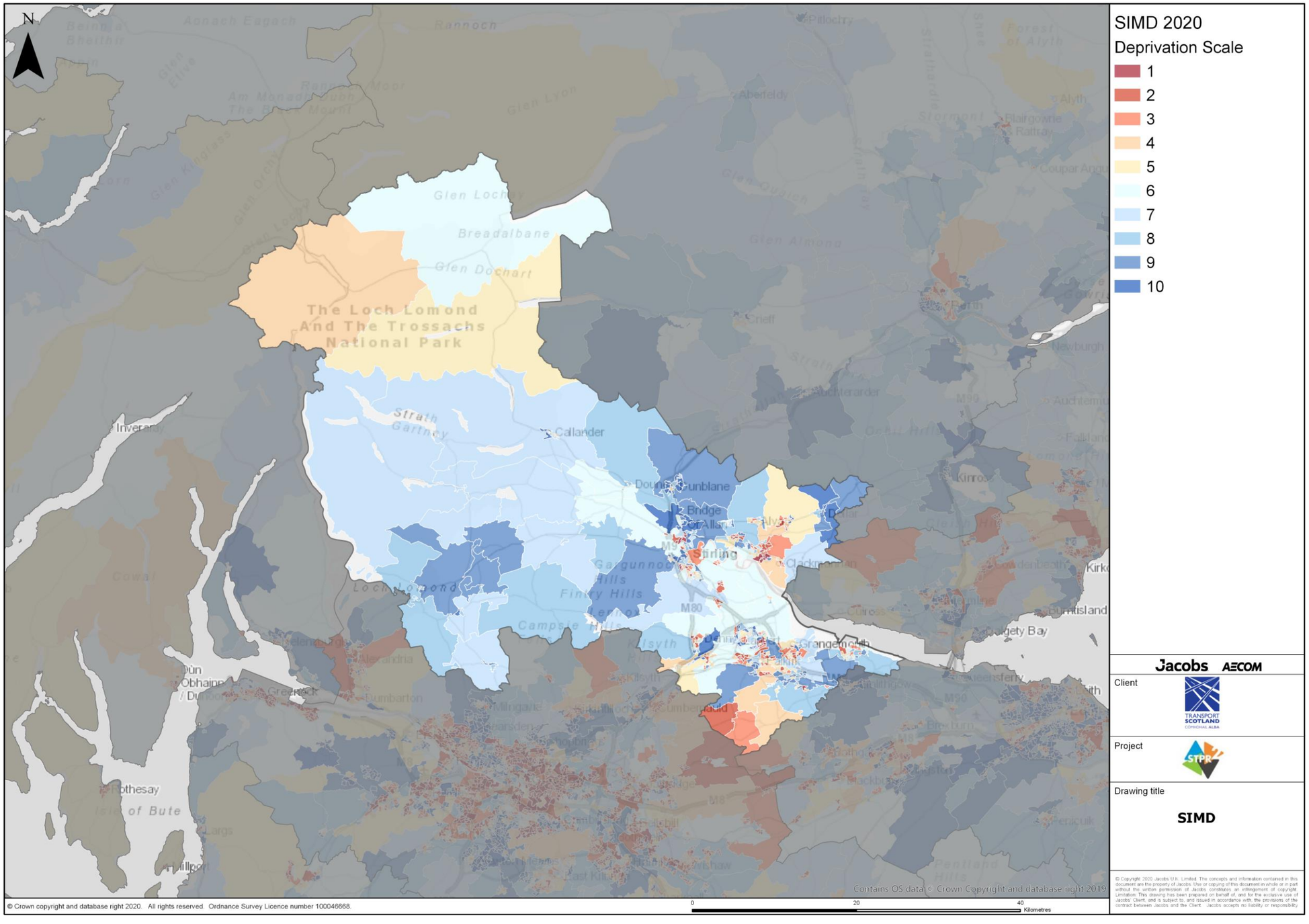


Figure A 6: Scottish Index of Multiple Deprivation 2020 (click image to go back to main report)

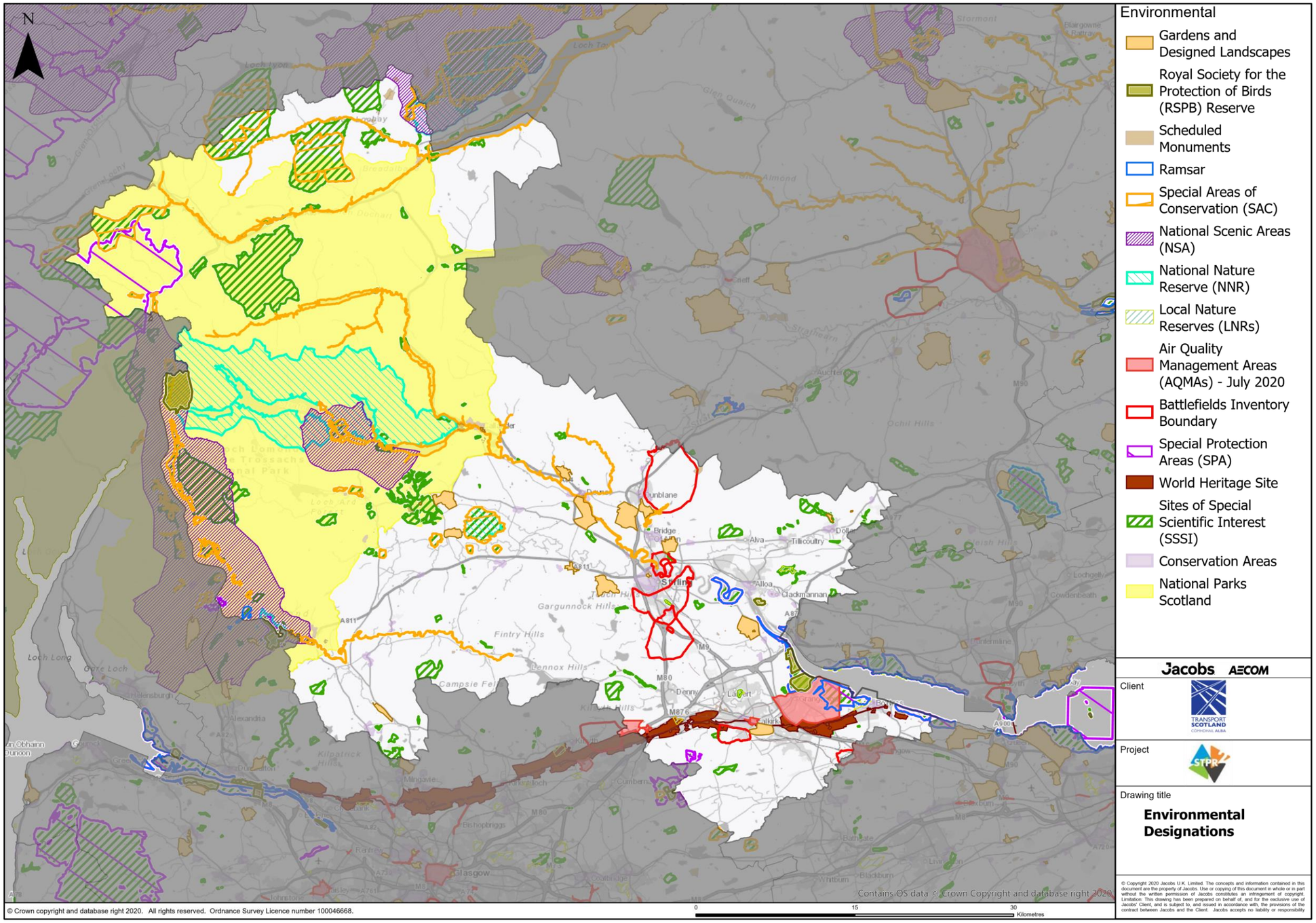


Figure A 7: Environmental Designations (click image to go back to main report)

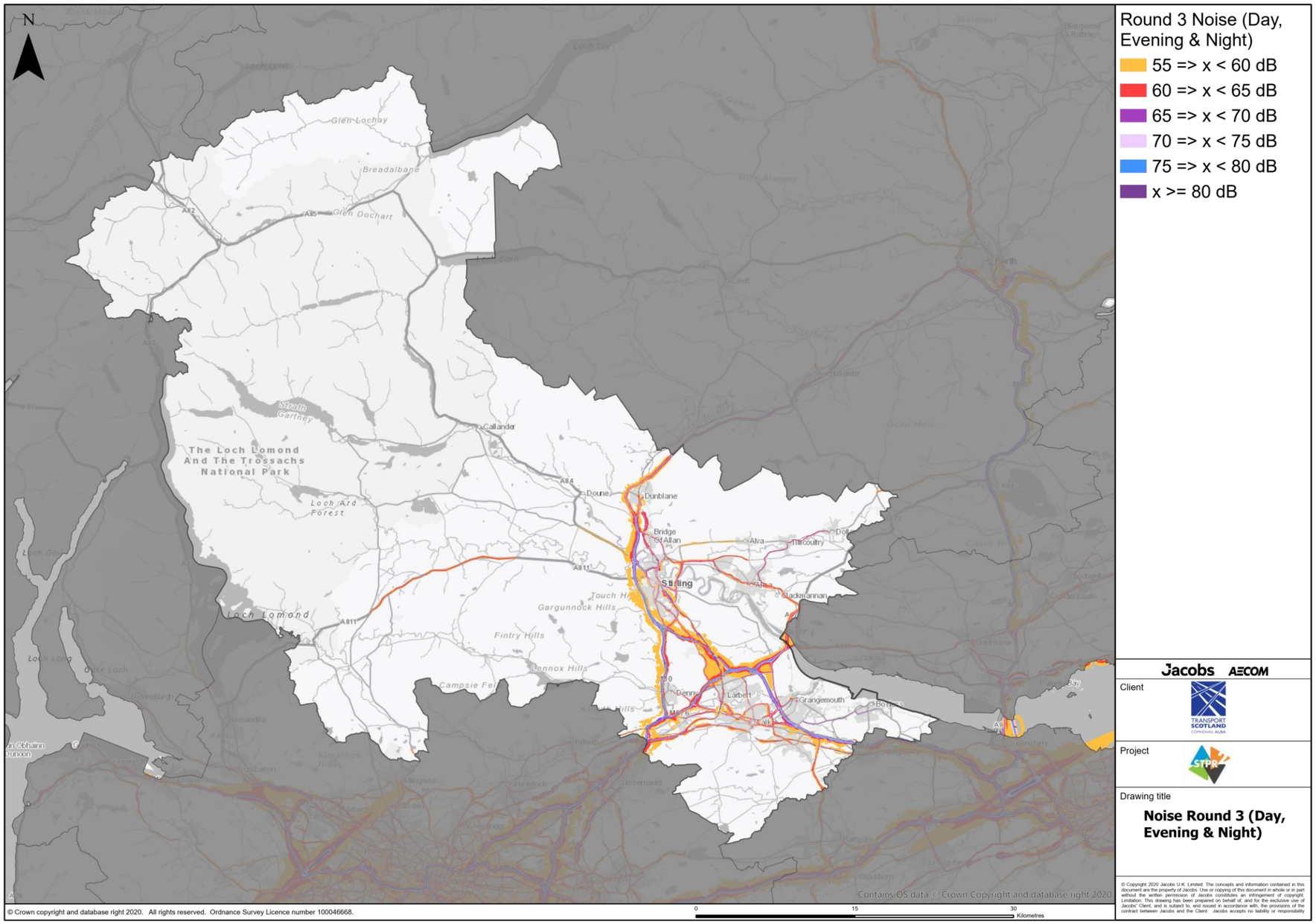


Figure A 8: Noise Mapping (click image to go back to main report)

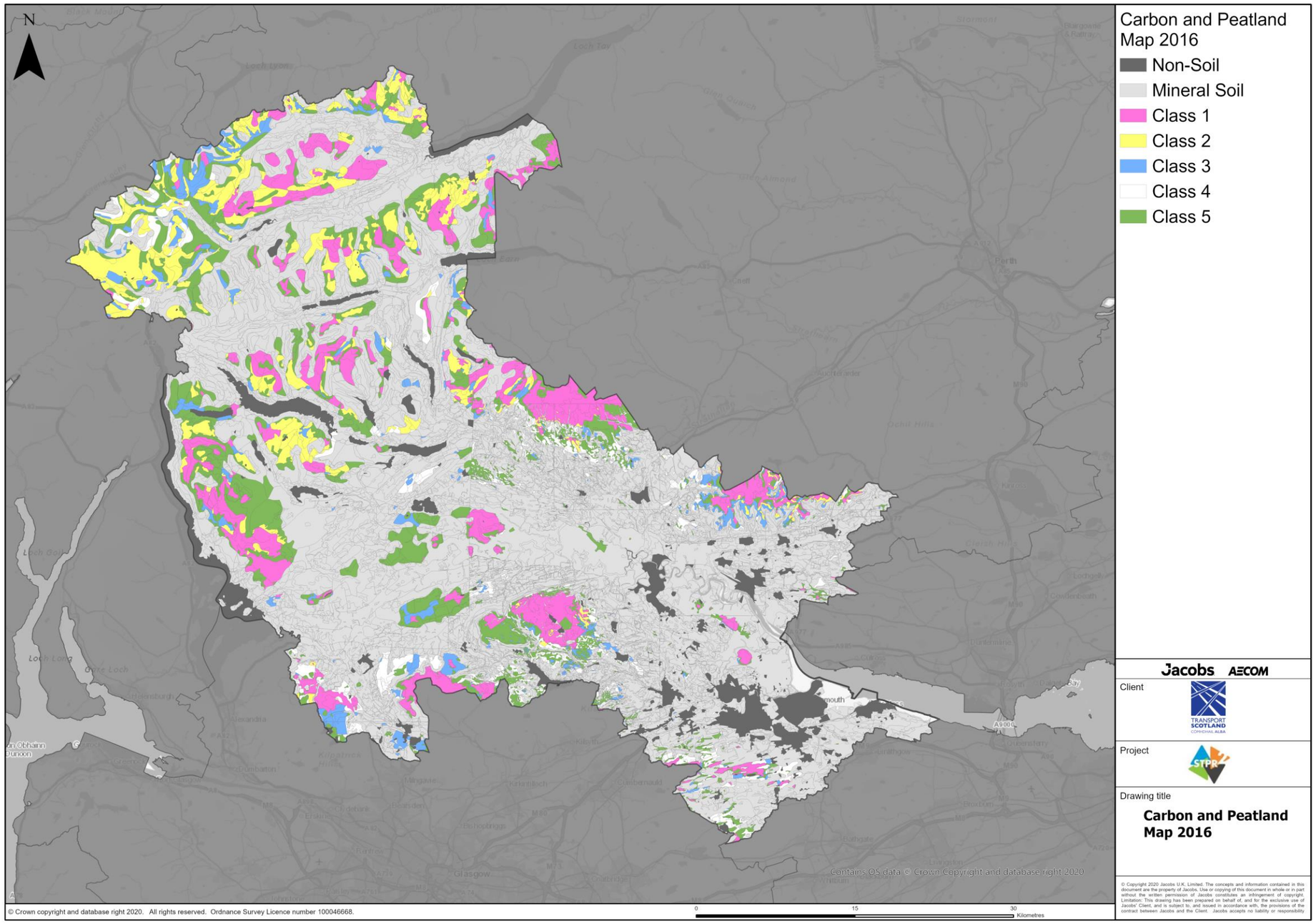


Figure A 9: Carbon and Peatland Map (click image to go back to main report)

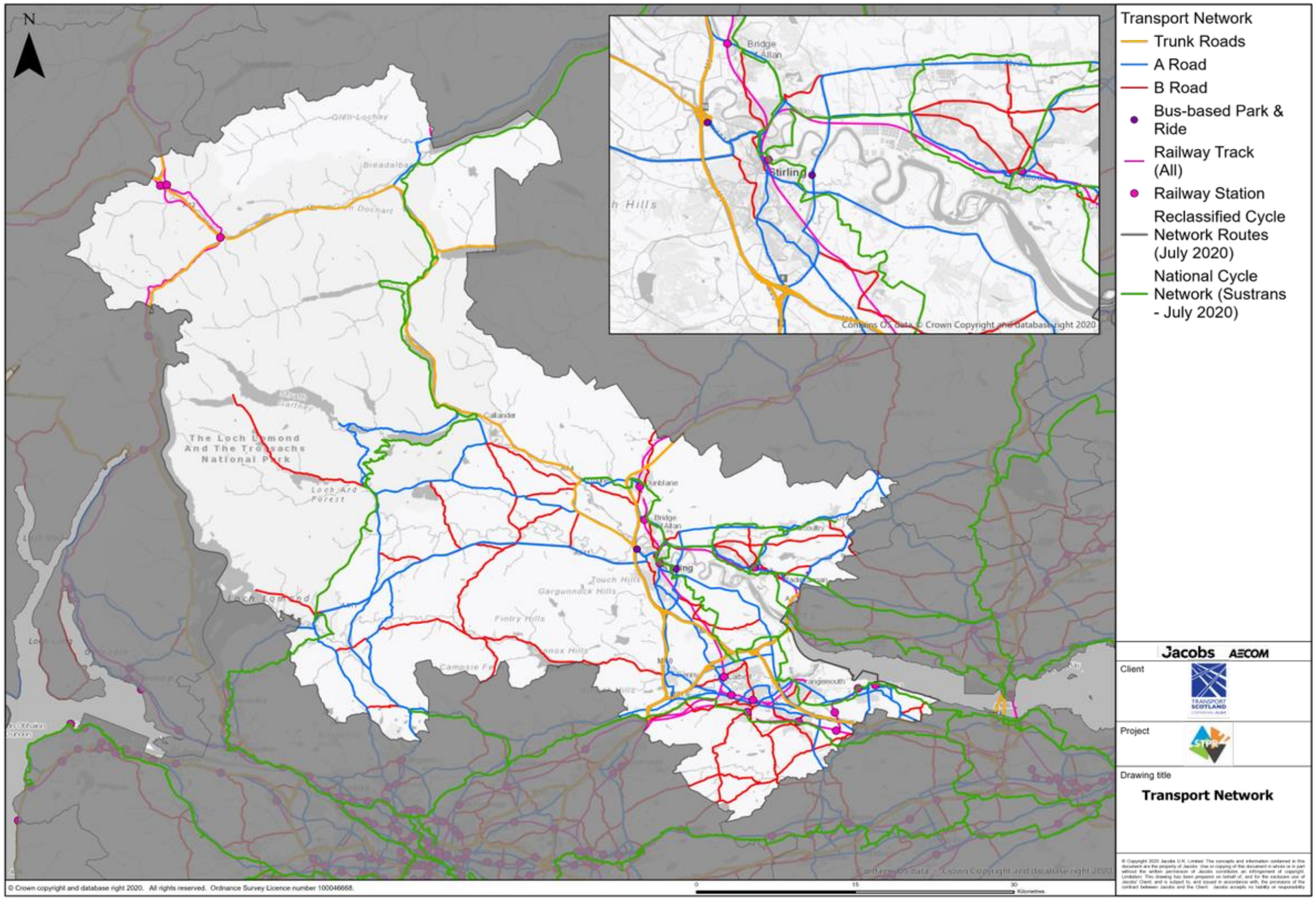


Figure A 10: Transport Network (click image to go back to main report)

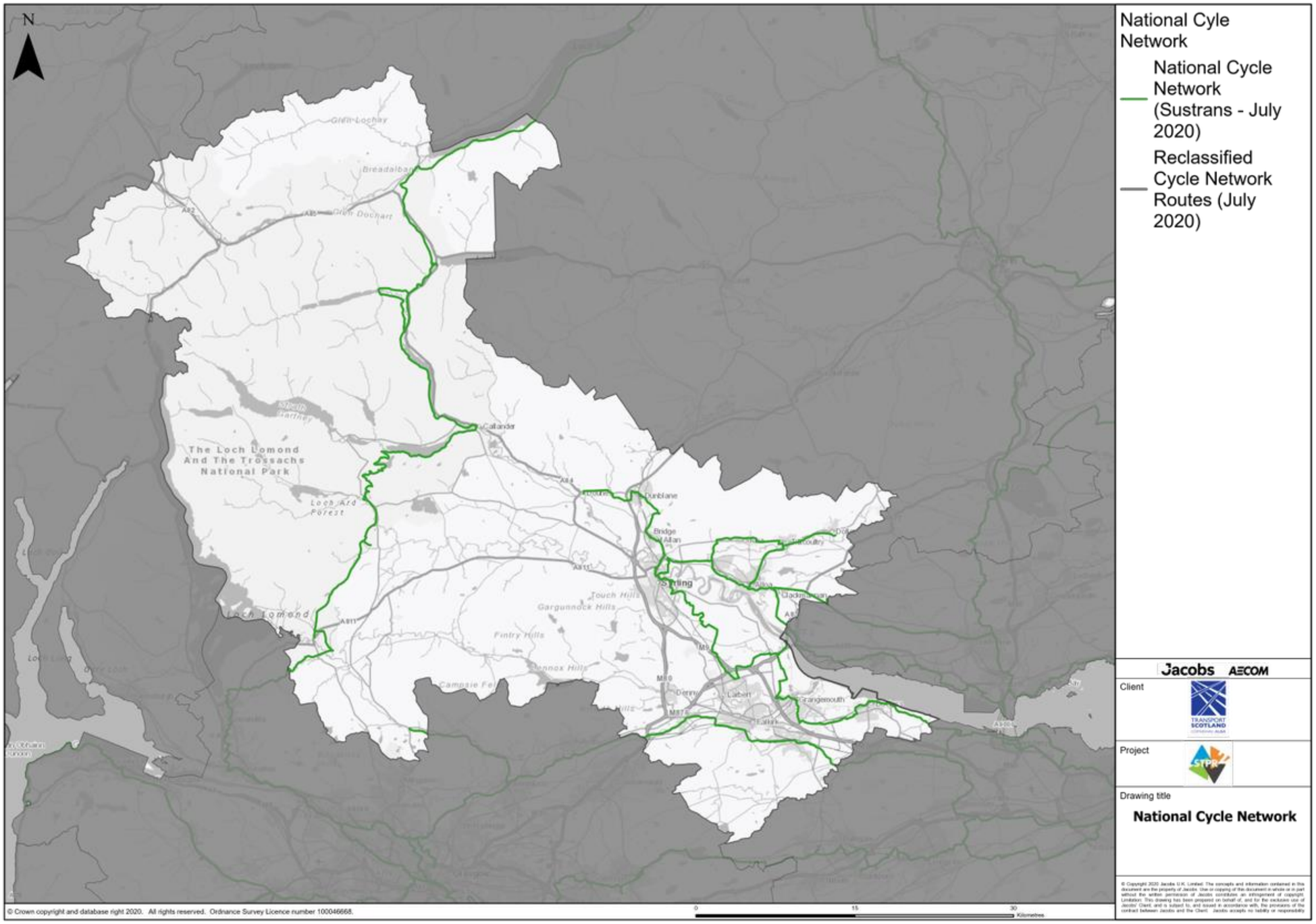


Figure A 11: National Cycle Network (click image to go back to main report)

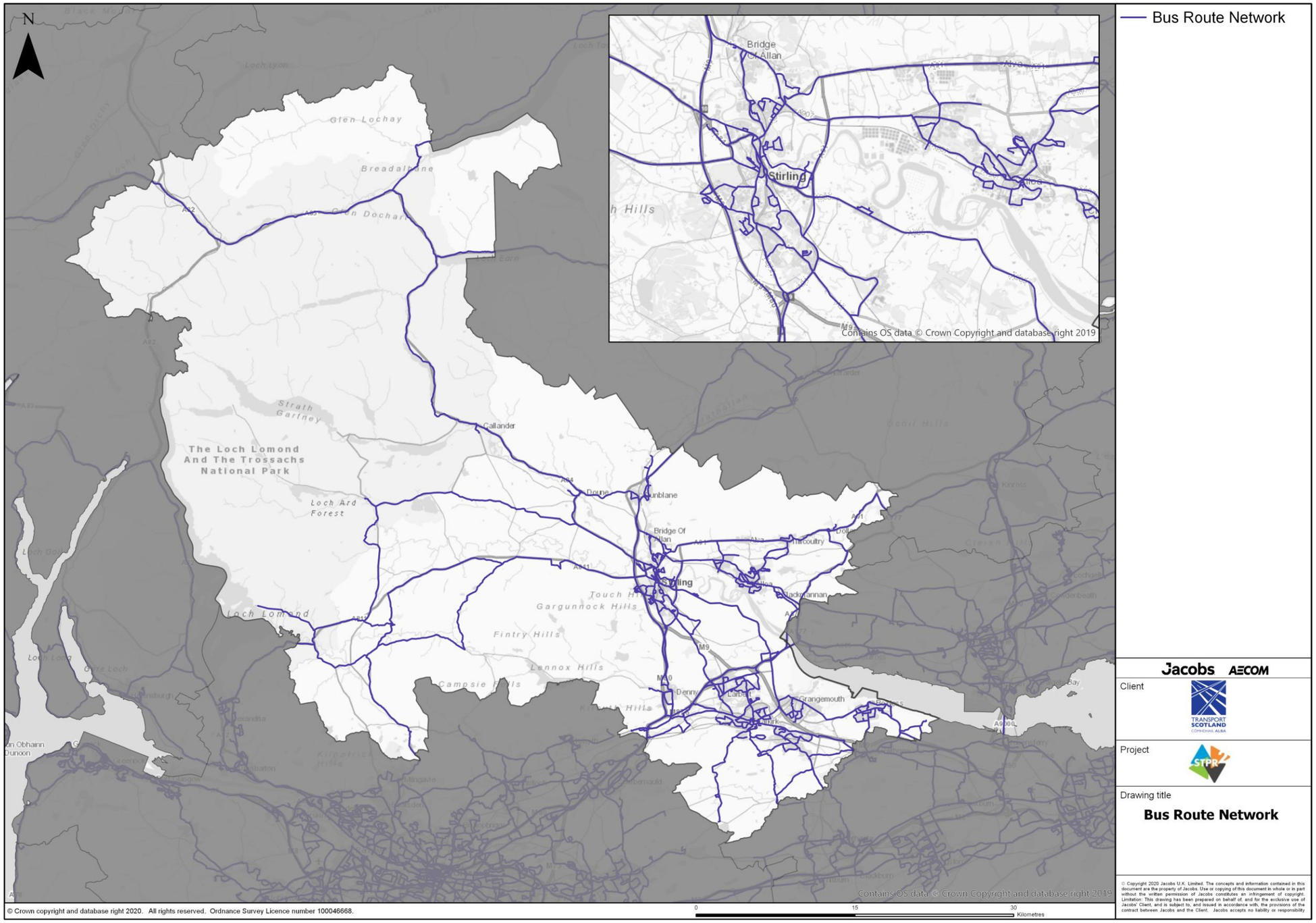


Figure A 12: Forth Valley Bus Routes (click image to go back to main report)

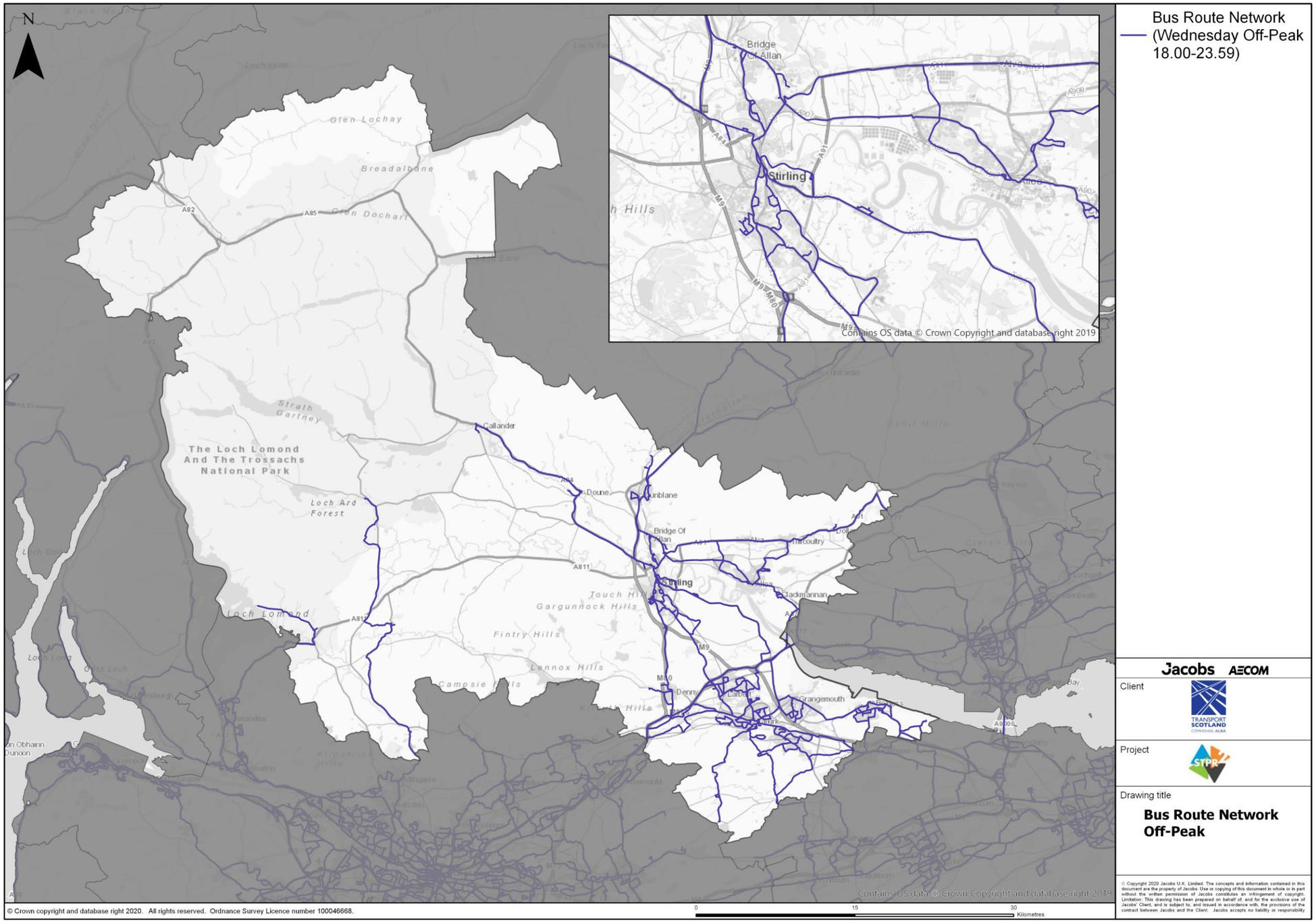


Figure A 13: Wednesday Offpeak (18:00-23:59) Bus Routes (click image to go back to main report)

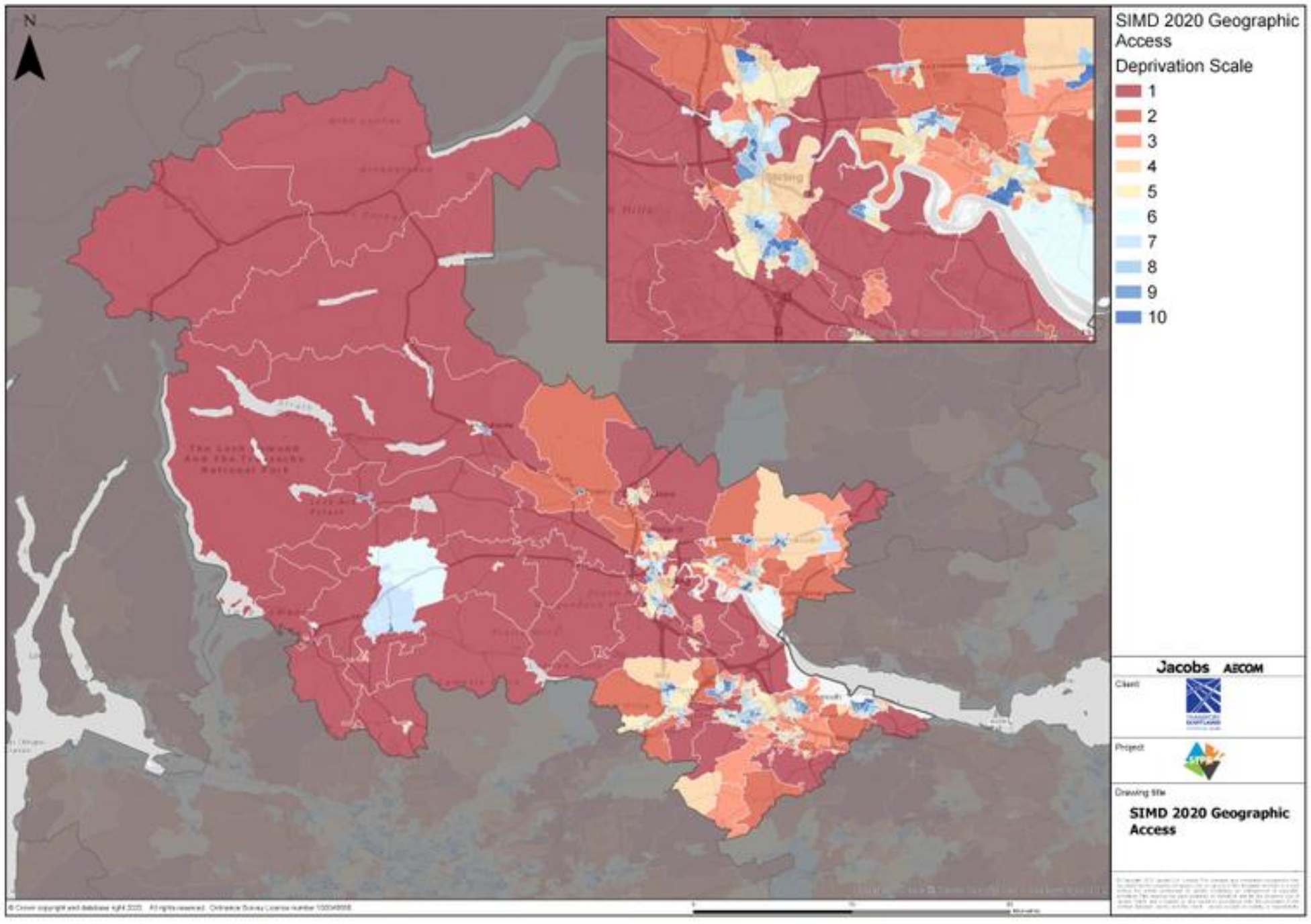


Figure A 14: SIMD 2020 Geographic Access (click image to go back to main report)

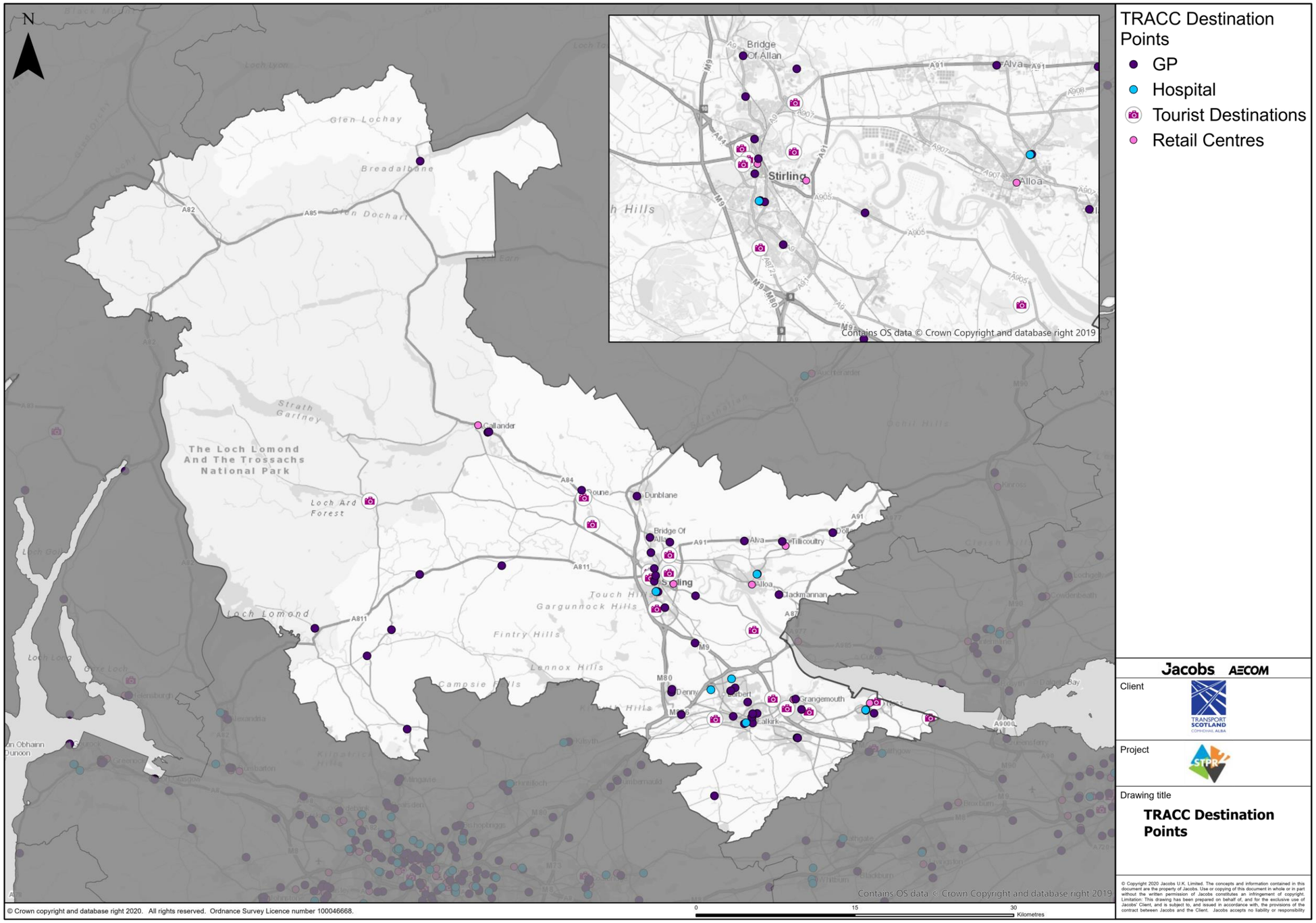


Figure A 15: TRACC Healthcare, Retail and Tourist Destinations (click image to go back to main report)

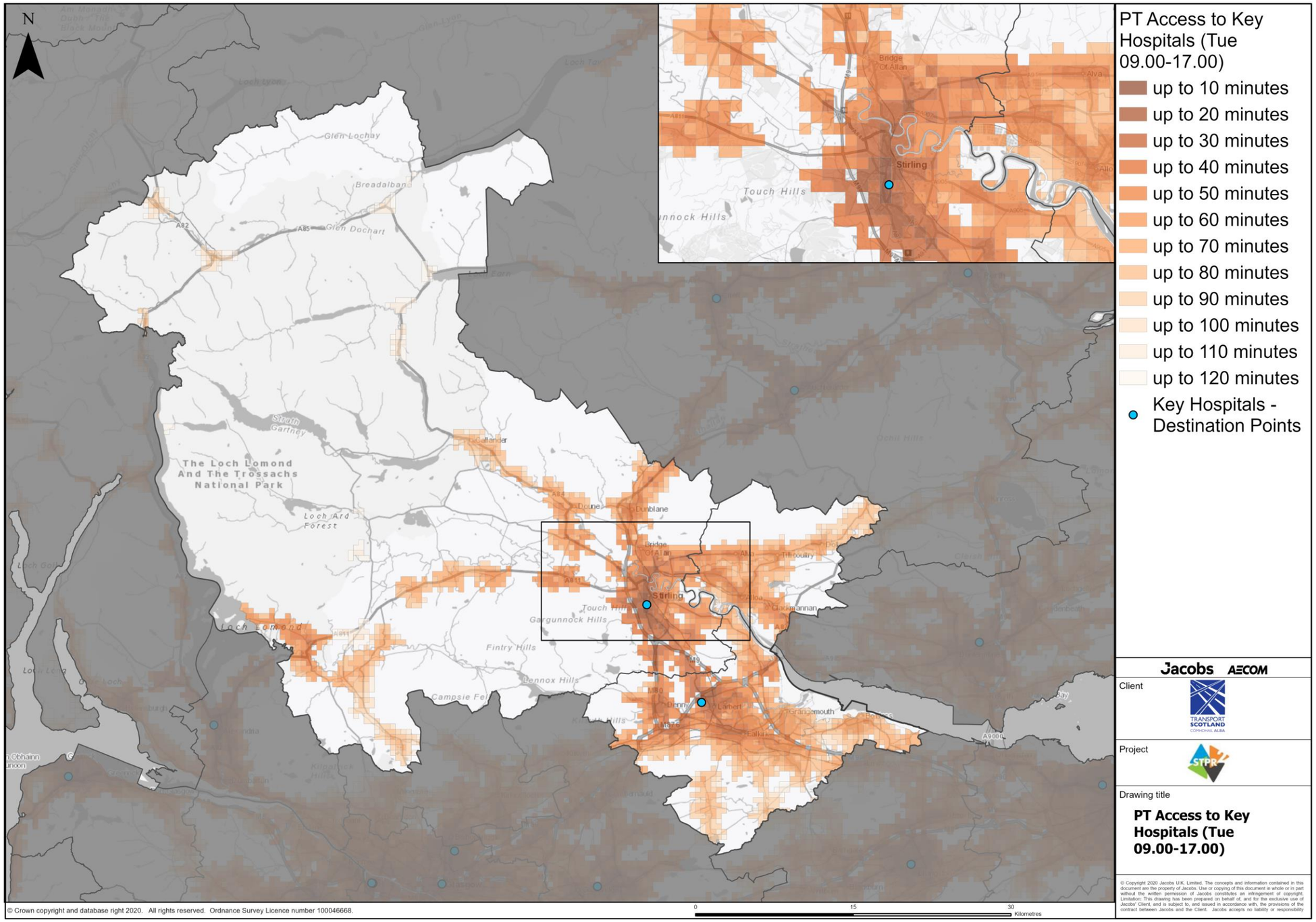


Figure A 16: Public Transport Access to Healthcare (click image to go back to main report)

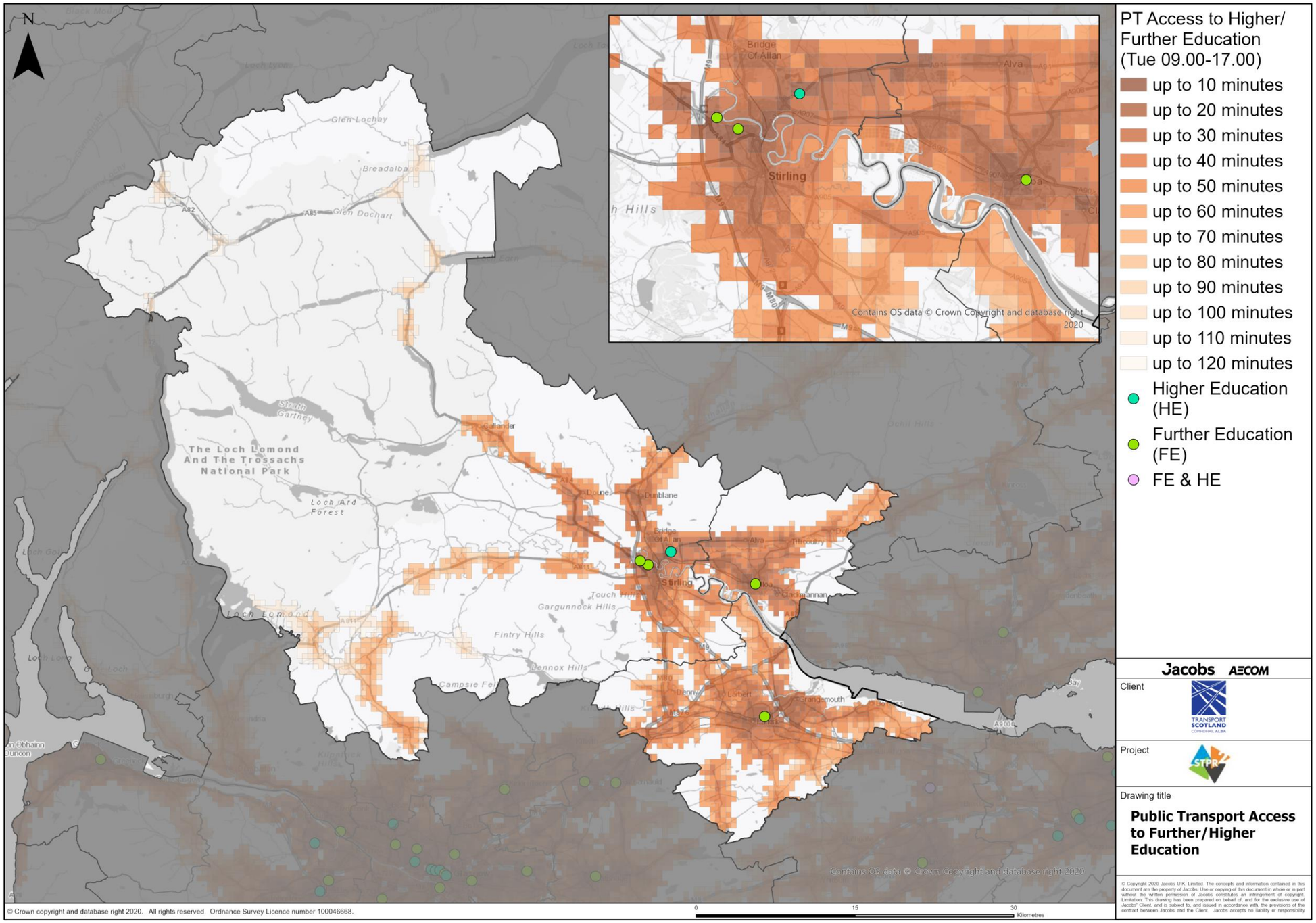


Figure A 17: Public Transport Access to Further / Higher Education (click image to go back to main report)

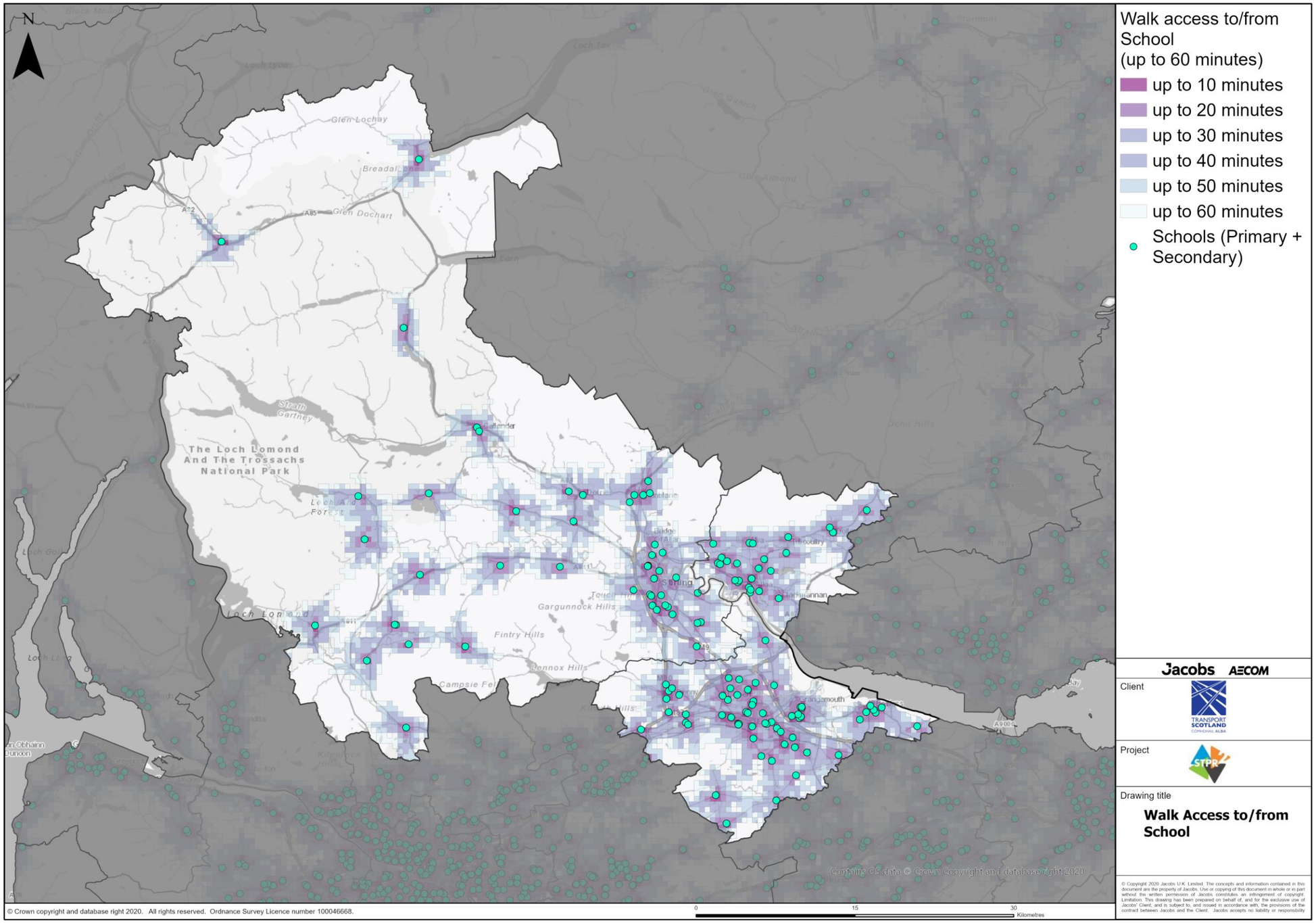


Figure A 18: Walk Access to/from School (click image to go back to main report)

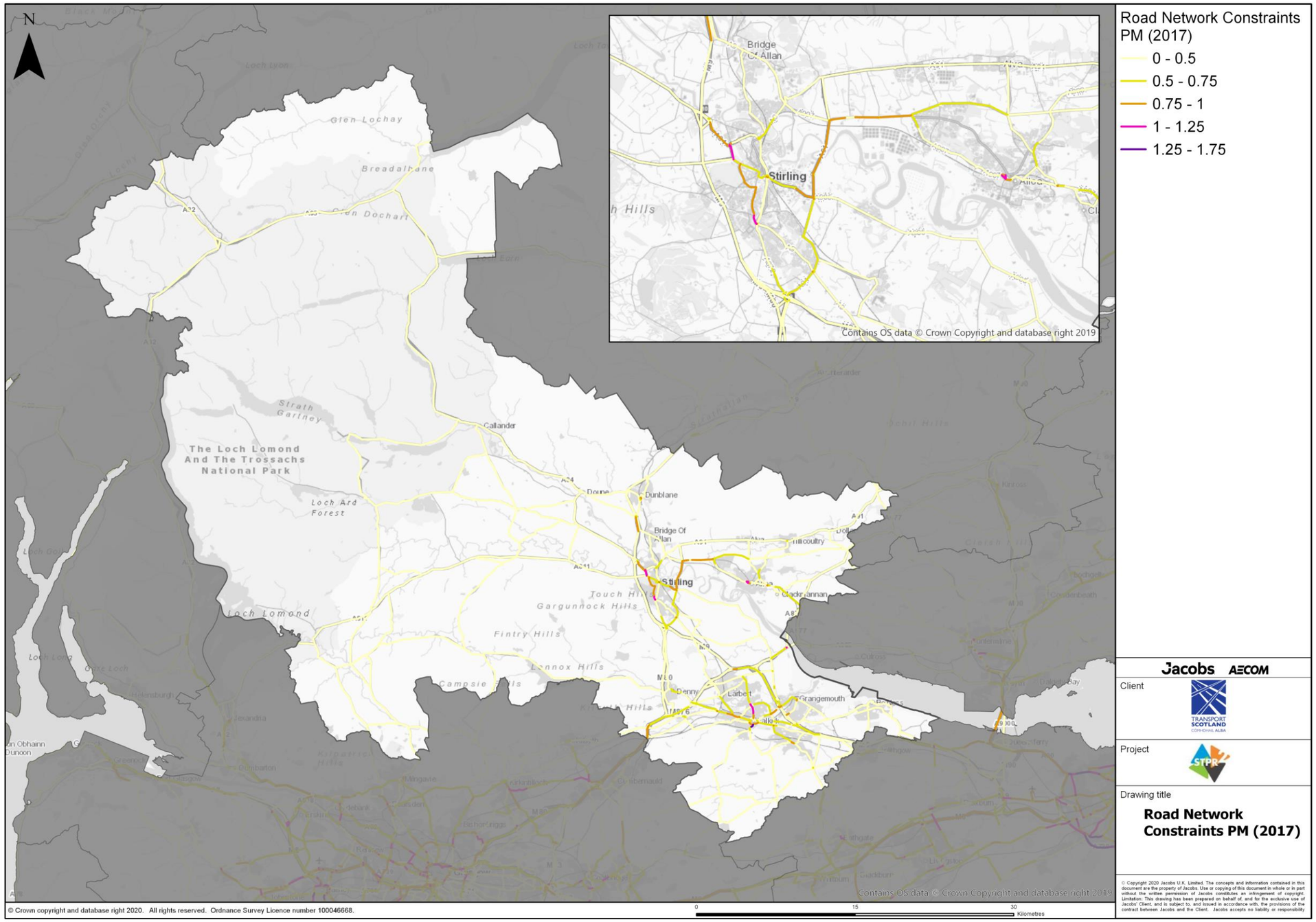


Figure A 19: Road Network Constraints PM 2017 (TMfS) (click image to go back to main report)

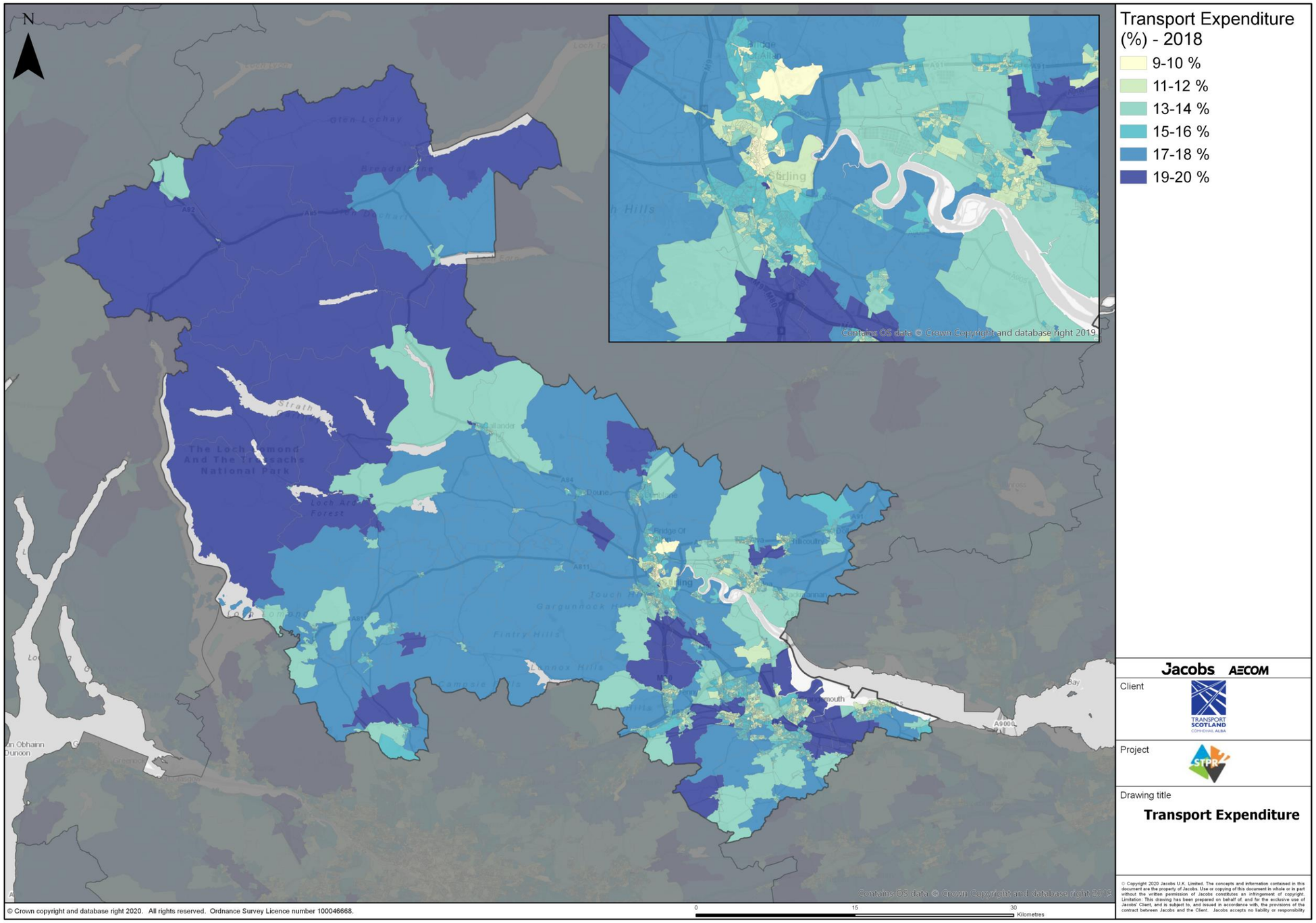


Figure A 20: Transport Expenditure as Percentage of Household Expenditure (click image to go back to main report)

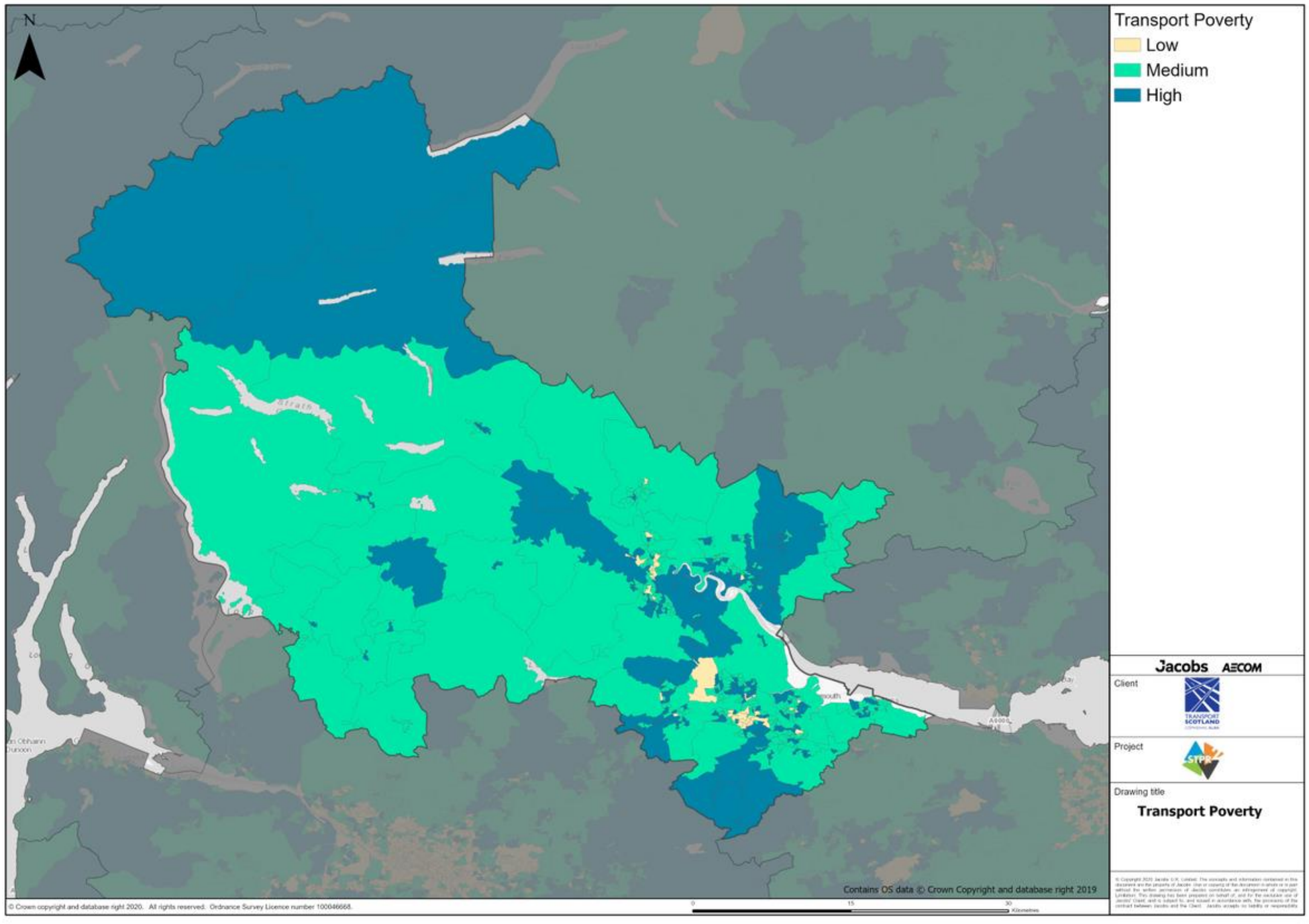


Figure A 21: Transport Poverty 2020 by Datazone (click image to go back to main report)

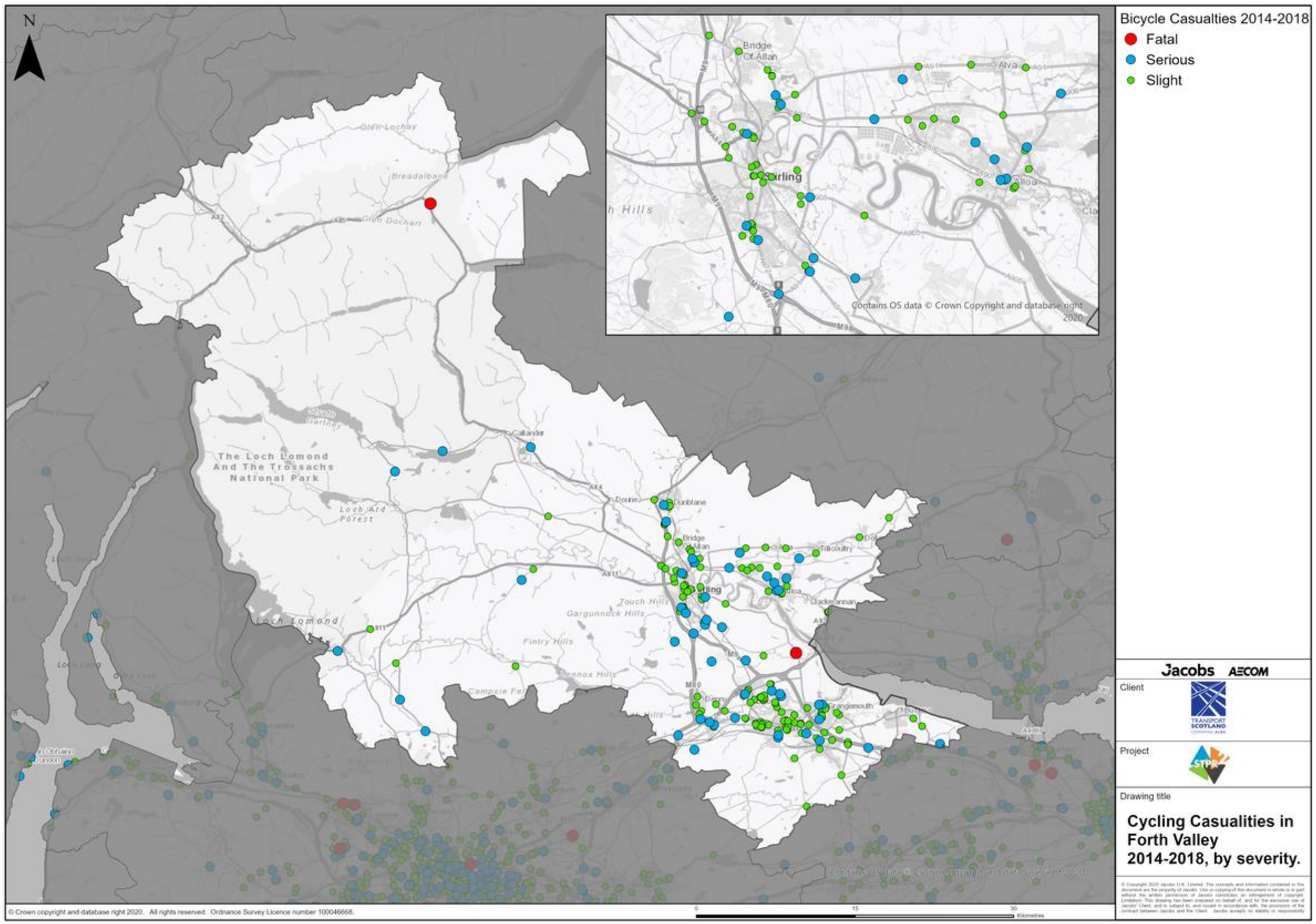


Figure A 22: Cycling Casualties 2014-2018, by Severity (click image to go back to main report)

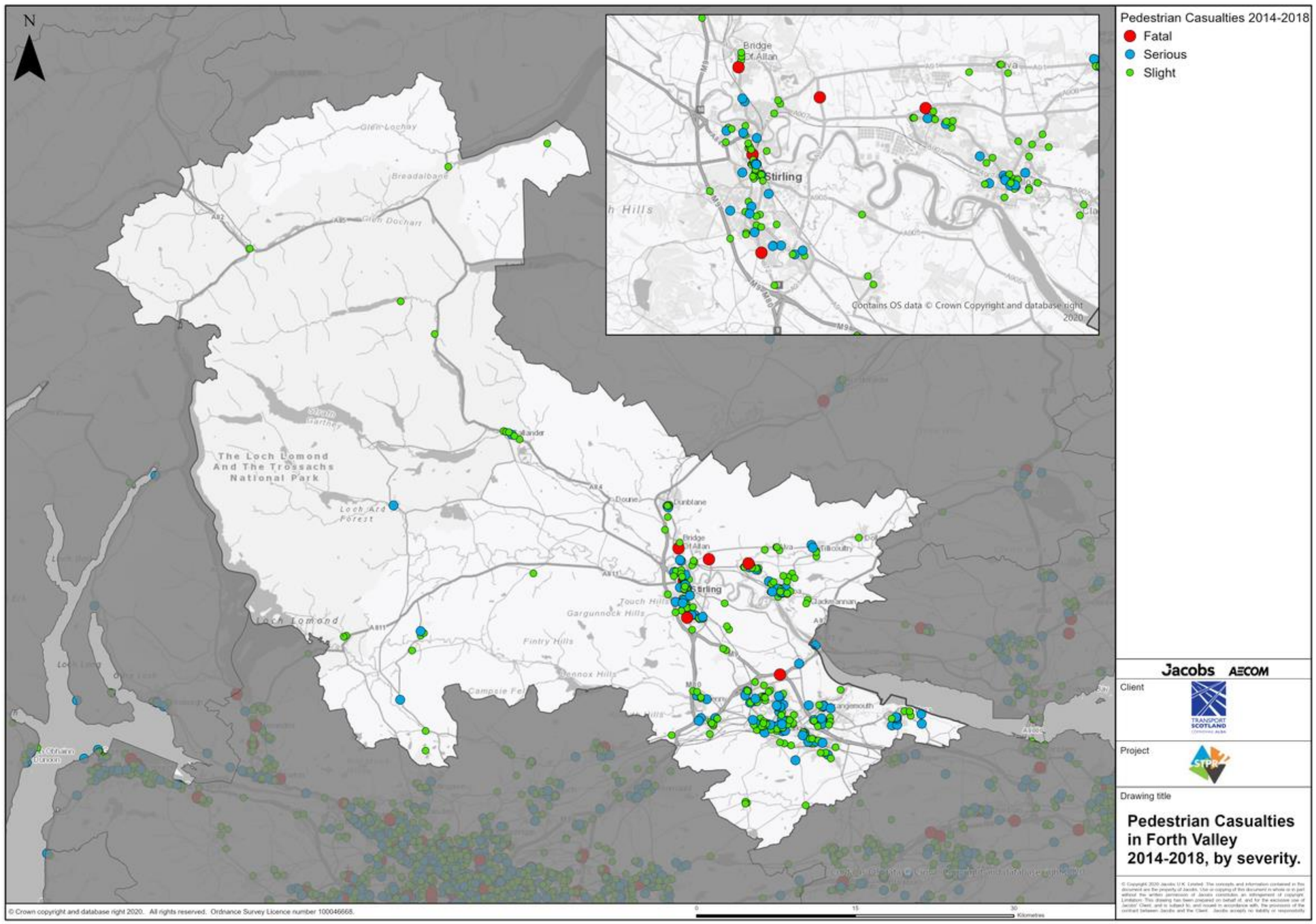


Figure A 23: Pedestrian Casualties 2014-2018, by severity (click image to go back to main report)

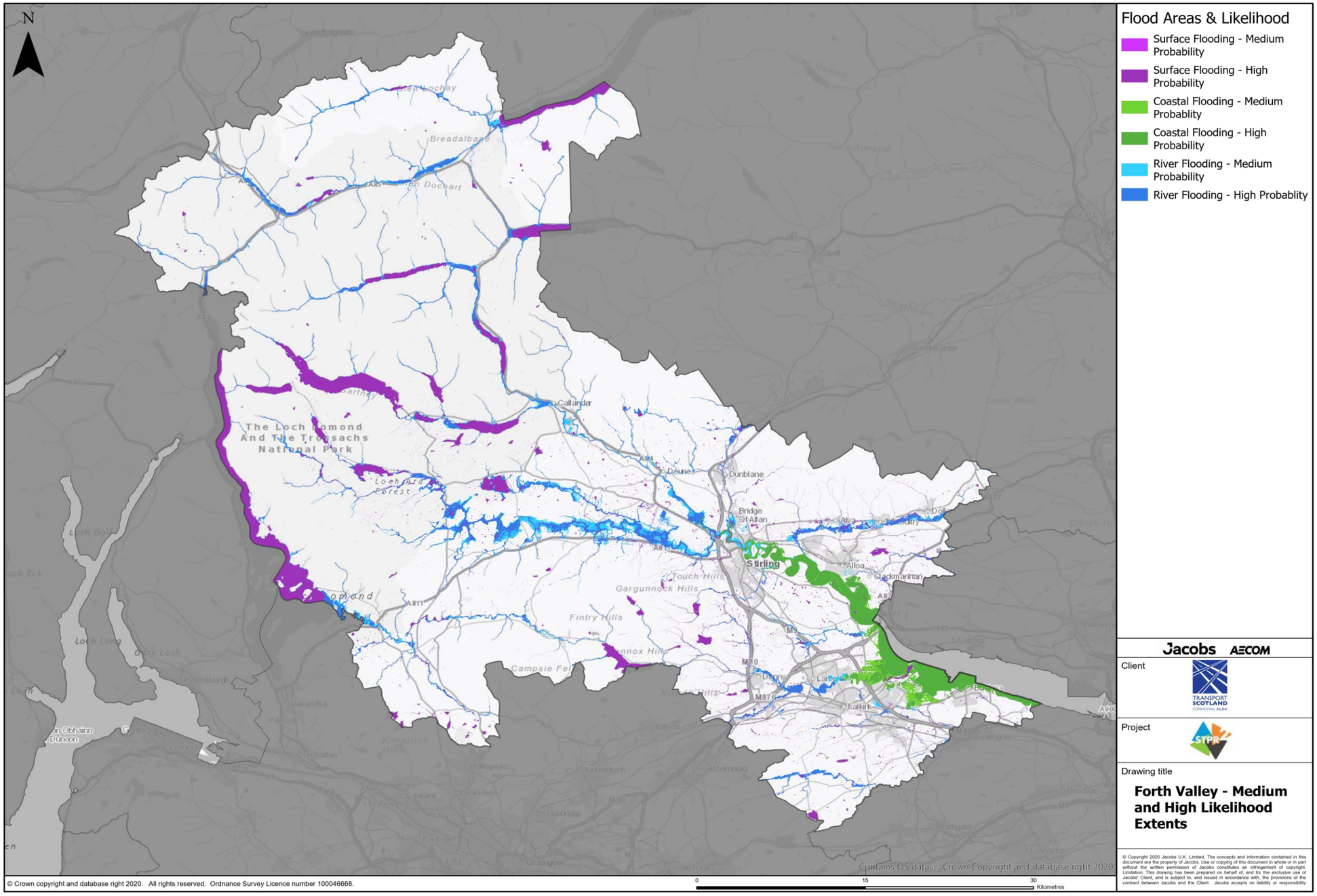


Figure A 24: SEPA Flood Map for Forth Valley Region (click image to go back to main report)

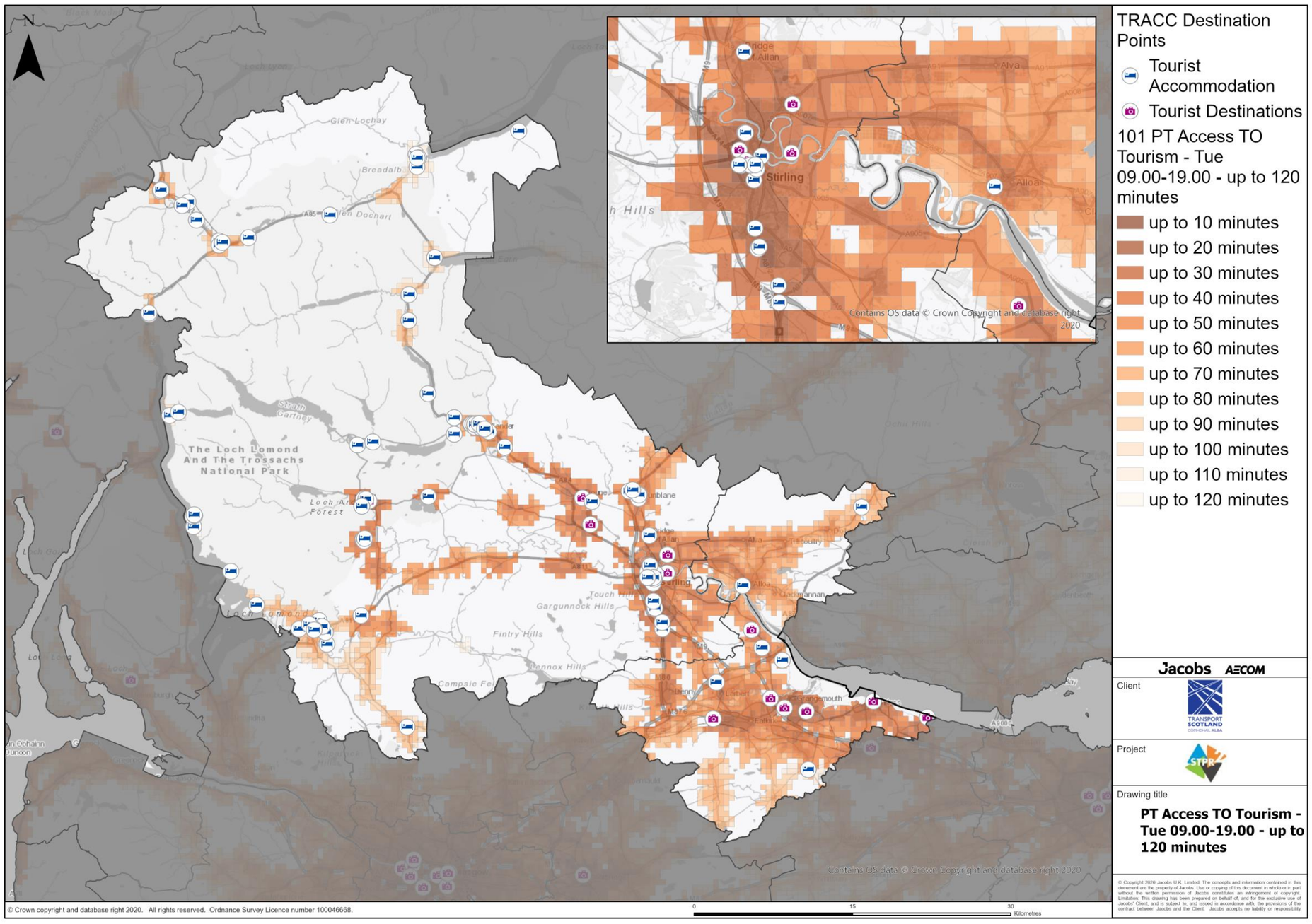


Figure A 25: Public Transport Access to Tourist Destinations (click image to go back to main report)

Appendix B: List of Policy Documents

THEME	TITLE	AUTHOR	YEAR
Development	A Rural Development Strategy for the Forth Valley and Lomond LEADER area	Forth Valley & Lomond LEADER	2015
Development	Clackmannanshire Council Local Development Plan	Clackmannanshire Council	2015
Development	Draft Infrastructure Investment Plan 2021-22 to 2025-26	The Scottish Government	2020
Development	Falkirk Council Local Development Plan	Falkirk Council	2015
Development	Falkirk Council Local Development Plan	Falkirk Council	2018
Development	Falkirk Growth Deal	Falkirk Council	2020
Development	Kelvin Valley and Falkirk LEADER Local Development Strategy 2014-2020	ekos	2014
Development	Loch Lomond and the Trossachs Local Development Plan	Loch Lomond and the Trossachs National Park	2017
Development	Low Carbon Economic Strategy	The Scottish Government	2010
Development	National Planning Framework 3	Scottish Government	2014
Development	Stirling Council Local Development Plan	Stirling Council	2016
Economy	An Economic Strategy for Falkirk	Falkirk Council	2015
Economy	Building Clackmannanshire Economic Development Framework	Clackmannanshire Alliance	2008
Economy	Low Carbon Economic Strategy	Scottish Government	2010
Economy	Scotland's Economic Strategy	The Scottish Government	2015
Economy	Stirling City Region Deal	Clackmannanshire Council, Stirling Council, University of Stirling, Scottish Government, UK Government	2016
Economy	Stirling's Economic Strategy	Stirling Council	no date
Energy	Clackmannanshire Sustainability & Climate Change Strategy	Clackmannanshire Council	2010
Energy	Climate Change Plan Update	Scottish Government	2020
Energy	Going Carbon Neutral Stirling	Keep Scotland Beautiful	2012
Energy	Sustainable Development and Climate Change Strategy for Falkirk Council	Falkirk Council	2012
Energy	Sustainable Stirling: Stirling Council's Public Bodies' Climate Change Duties & Sustainability Report	Stirling Council	2017
Energy	The Future of Energy in Scotland: Scottish Energy Strategy	The Scottish Government	2017
Health	A physical Activity & Wellbeing Plan for Falkirk	Falkirk Community Trust	no date
Health	Clackmannanshire Sport and Active Living Framework	Clackmannanshire Alliance	2018
Other	Clackmannanshire Local Outcomes Improvement Plan 2017 – 2027	Clackmannanshire Alliance	no date
Other	Falkirk Strategic Outcomes and Local Delivery Plan	Falkirk Community Planning Partnership	2016
Other	Protecting Scotland, Renewing Scotland: Programme for Scotland 2020-21	Scottish Government	2020
Other	Stirling Single Outcome Agreement	Stirling Community Planning Partnership	2013
Other	The Stirling Plan Local Outcomes Improvement Plan 2017 – 2027	Stirling Community Planning Partnership	no date
Other	The Upper Forth Sub Regional Inclusive Growth 2050 Draft Prospectus	Scottish Government	2018

THEME	TITLE	AUTHOR	YEAR
Transport	Bridge of Allan Station Relocation	Steer Davies Gleave	2014
Transport	City Area Transport Plan	Stirling Council	2017
Transport	Clackmannanshire Council Local Transport Strategy	Clackmannanshire Council	2014
Transport	Connected Communities	Stirling Council	2017
Transport	Cycling Action Plan for Scotland	Transport Scotland	2017
Transport	Falkirk Council Local Transport Strategy	Falkirk Council	2014
Transport	Let's Get Scotland Walking	Scottish Government	2014
Transport	Longannet Strategic Transport Pre Appraisal – Commercial in Confidence		2017
Transport	National Transport Strategy 2	Transport Scotland	2020
Transport	National Transport Strategy 2 Delivery Plan	Transport Scotland	2020
Transport	Network Rail Scotland Route Study	Network Rail	2016
Transport	Park and Ride Strategy and Action Plan	Tactran	2016
Transport	Parking Strategy	Stirling Council	2017
Transport	Rail Services Decarbonisation Action Plan: Pathway to 2035	Transport Scotland	2020
Transport	Road Asset Management Plan	Stirling Council	2017
Transport	Scotland's Rail Freight Strategy	Transport Scotland	2016
Transport	Scotland's Railways	Transport Scotland	2006
Transport	Scotland's Road Safety Framework to 2030	Transport Scotland	2020
Transport	Scottish Trunk Road Network Asset Management Strategy	Transport Scotland	2018
Transport	SEStran Regional Transport Strategy	SEStran	2015
Transport	Stirling Strategic Park and Ride Study – Case for Change	Tactran	2020
Transport	SEStran Strategic Network	SEStran	2020
Transport	Strategic Road Safety Plan	Stirling Council	2020
Transport	Strategic Road Safety Plan	Transport Scotland	2016
Transport	Strategic Transport Projects Review	Transport Scotland	2009

Appendix C: Stakeholder Engagement

Engagement Type	Date	Venue	Purpose and Details	No. of Attendees
Problems & Opportunities Workshop	Friday 7th June 2019	Falkirk Stadium, Falkirk	Workshop with stakeholders including representatives from transportation, education, health and environmental sectors, in addition to local authority officers, to identify transport-related problems and opportunities in the region.	11
	Tuesday 28th May 2019	Albert Halls, Stirling		12
Structured Interviews	June – September 2019		Structured interviews with key stakeholders, including Senior representatives from Scottish Enterprise and Stirling Council, to identify problems and opportunities and potential options.	5
Interventions Workshop	Thursday 7th November 2019	Hotel Colessio, Stirling	Workshop with stakeholders including representatives from transportation, education, health and environmental sectors, in addition to local authority officers, to identify potential interventions to address problems and opportunities previously identified.	20
Elected Members Briefing / Workshop	Wednesday 29th January 2020	Theatre Bar, Alloa Town Hall, Mars Hill, Alloa	Elected Members from across the region attended a briefing session on emerging findings from STPR2 and to provide feedback on potential interventions that should be considered as the study moves forward.	13
Online Survey	Monday 2nd December 2019 – Friday 10th January 2020	Online	Online survey promoted to members of the public and organisations to validate emerging problems from the STPR2 process and to provide feedback on potential interventions to improve the strategic transport network, across all modes, in the future.	n/a
Schools Engagement	Thursday 14th November 2019	Balfron High School	Pupils were introduced to the role of a Transport Planner and why it is necessary to gather evidence on the positives and negatives of the transport system as a way of informing future improvements. Pupils worked in groups to identify things they like, things they don't like and what they want improved with all modes of transport.	65
	Thursday 8th January 2020	Wallacestone Primary School