



STIRLING STRATEGIC PARK AND RIDE STUDY – CASE FOR CHANGE



SYSTRA

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EXECUTIVE SUMMARY

Overview

SYSTRA was commissioned by regional transport partnership Tactran to consider how best to increase the modal share of public transport for those trips entering, leaving and passing through the Stirling City Area. Funding was allocated to the study as part of Transport Scotland's Local Rail Development Fund.

The work builds on the recommendations of Stirling Council's DPMTAG Transport Appraisal, undertaken to inform Stirling's Local Development Plan (LDP) and Local Transport Strategy (LTS), which concluded that:

- The impacts of the travel demands generated by build out of the LDP to 2027 (74% of the proposed housing) could be accommodated by measures that the Council could implement in its LTS. These packages of measures included everything the Council could reasonably implement in relation to:
 - modal shift;
 - local road capacity improvements; and
 - new local roads.
- However, to enable full build out of the LDP to 2037 (or 100% of proposed housing), additional modal shift and road capacity improvements would be required over and above what the Council could achieve via local modal shift and local road capacity improvements if significant increases in journey times across the network were to be avoided e.g.:
 - Improvements to existing motorway junctions; and
 - Additional motorway junction and strategic park and ride sites on the rail corridor to the north and south of the city.

Context of study and identification of problems, opportunities, issues and constraints

This report has drawn on the outputs of the DPMTAG and further investigated the current transport conditions and impacts associated with the LDP highlighting. The identification of problems, opportunities, issues and constraints was also informed by the stakeholder engagement programme which involved workshop sessions with local representatives including elected members, community councils, public transport operators and council officers. This was supported by a comprehensive public survey which informed the Local Transport Strategy and gave recent views on transport in and around the study area.

The process highlighted the following:

- Socio-economic factors and travel demand:
 - Stirling is an importer of workers coming from surrounding council areas including Falkirk and Clackmannanshire primarily all arriving by car.

- There are significant flow of workers into (63% of workforce) and out of (51% of residents) the Stirling City area which puts pressure on the transport network and is further exacerbated by workers travelling through the study area to the Central Belt from Clackmannanshire.
 - Planned developments are largely on the outskirts of the city where significant increases in journey times and queuing is forecast in 2027 and 2037 on motorway junctions and core routes in the study area.
 - Areas with below average access to employment and services, especially to locations beyond Stirling and Falkirk, and with low car ownership, have been identified in the Eastern Villages.
 - Almost 20% of the study area's datazones are considered to be within Scotland's 20% most deprived datazones (using the overall index of deprivation). These factors include access to services, education and employment. Some of the areas (Cowie and areas in Bannockburn, Cornton and Culterhove) are also within the lowest 40% of national datazones in terms of access to facilities.
- Rail:
- Frequent services to/from Glasgow/Edinburgh and Stirling/Bridge of Allan.
 - Services are well used with steady growth and a good proportion of commuter trips to these destinations using rail.
 - Rail journey times between Glasgow/Edinburgh and Stirling City are competitive with car.
 - EGIP and Revolution in Rail have improved journey times and capacity of rail services in the study area.
 - Two thirds of passengers access bridge of Allan and Stirling stations by car, adding traffic to the surrounding road network.
 - Ten per cent of passengers using Stirling station travel from Clackmannanshire.
- Road:
- Due to the limited number of routes through Stirling City Area, there are a number of pinch points within, and at the gateways to, the Stirling city area through which all traffic passes. Traffic modelling indicates that development proposed within the LDP will significantly increase the journey times and queuing at these locations with consequential adverse impacts likely.
 - Future year traffic modelling has also indicated that the generated traffic associated with the LDP development sites will place added pressure on the local and strategic transport networks, particularly in the south and east of Stirling.
 - Between 38%-44% of all car trips within the study area have either their origin or destination outwith the study area and therefore require some form of strategic intervention.
 - National strategy seeks to encourage a modal shift, including for strategic trips, to reduce carbon emissions and the adverse economic impacts of congestion. This was reflected in Transport Scotland's first Strategic Transport Projects Review which proposed a strategic park and ride site to the south of Stirling to help increase the public transport mode share of trips into Stirling, Glasgow and Edinburgh.
- Bus:

- Stirling has a reasonable commercial bus network, in particular, between Stirling City, Alloa, Stirling University and Falkirk via Larbert, however in recent years there has been a decline in bus use and reduction in service provision across some communities as services have been combined.
- Park and Ride: Two local park and ride sites currently exist enabling a transfer from car to bus for trips into the city. Whilst usage has declined in recent years Stirling Council has adopted a new parking strategy, and consequential charging regime, to support park and ride usage.

Opportunities to address the social, economic and environmental consequences arising from the inability of the current and proposed transport network to accommodate future demands exist within the area. These opportunities include the existing strategic road and rail networks which are served by long-distance bus and coach services which pass in close proximity to both the pinch points on the transport network as well as locations where there are existing and proposed major trip generators. These opportunities also present options to assist in improving access to jobs, services and opportunities for some of the more deprived locations in the study area (as defined by the SIMD).

Constraints were also identified and considered at this stage including the physical constraints associated with the road infrastructure and River Forth and constraints associated with rail including timetabling constraints and impacts on existing passengers.

A review of national, regional and local policy highlighted a commitment to:

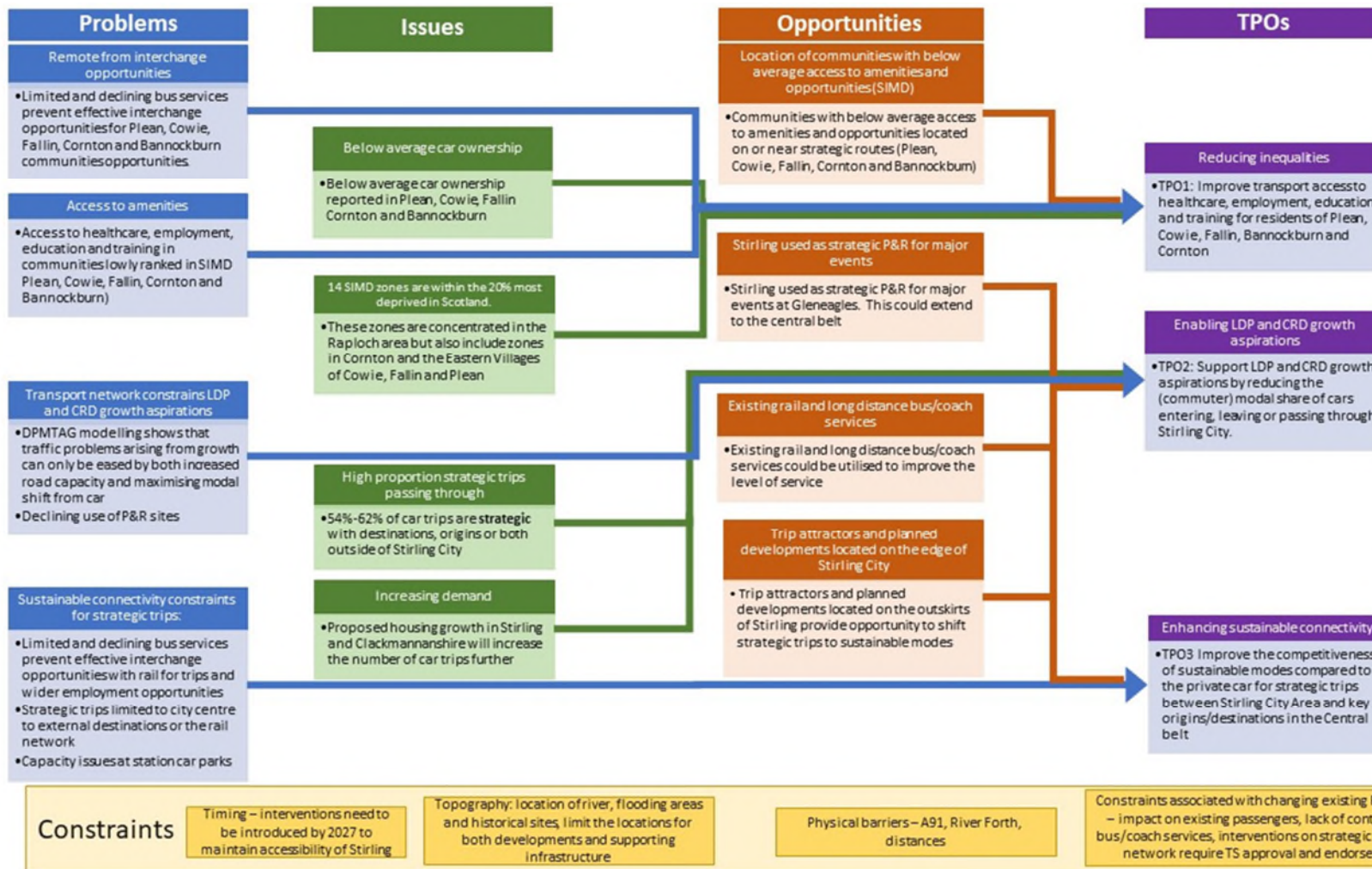
- Improve journey times and connectivity;
- Reduce emissions and the impact of transport on the environment; and
- Improve quality, accessibility and affordability of transport

In addition, Transport Scotland's Strategic Transport Projects Review 1 identified a series of strategic park and ride sites including a site at Bannockburn serving Edinburgh, Glasgow, and Stirling. STPR stated that the site would be served by either rail services or express bus links to and from the city centre and areas of economic activity (STPR Project 8).

Transport Planning Objectives

Based on the problems, opportunities, issues and constraints identified through this process three Transport Planning Objectives were identified:

- TPO1: Improve transport access to healthcare, employment, education and training for residents of Plean, Cowie, Fallin, Bannockburn and Cornton.
- TPO2: Support LDP and CRD growth aspirations by reducing the modal share of cars entering, leaving or passing through the Stirling City Area.
- TPO3: Improve the competitiveness of sustainable modes compared to the private car for strategic trips between Stirling City Area and key origins/destinations in the Central Belt.



TPO Mapping to Problems, Issues, Opportunities and Constraints

Option generation

Following the development of the Transport Planning Objectives a wide range of options which could meet the Transport Planning Objectives were generated which could alleviate the identified problems and address the potential opportunities across the study area.

99 options were generated at this stage. Options were generated across all modes of transports and geographically across the study area, and beyond. Following the development of an initial long list the options were developed and cleaned. This involved clarifying the options to provide further detail and to remove duplicates. Where appropriate, options were also grouped by mode. At this stage 25 options remained.

The final stage of the Option Generation involved a high-level appraisal to determine suitability for further assessment. This appraisal was a qualitative assessment against the TPOs and determined if the option would have a positive, negative or neutral impact against the TPO. Options which would contribute to meeting the TPOs in conjunction with other options were identified as complementary options. Nine options have been recommended for initial appraisal, 14 have been identified as complementary options and 2 have been recommended for rejection.

Table 1. Options recommended for Initial Appraisal

MODE	OPTION	RATIONALE
Bus	Improve coach connectivity - increase in frequency and destinations	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Bus/Coach	Bus/coach Park and Ride opportunities at the following sites: - Pirnhall/South Stirling - Relocated Springkerse site	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Other	Light rail from Pirnhall/ Durieshill (into Stirling)	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Park and Ride/Choose	Potential for other trip attractors to use Prudential bus services (from city centre and around Central Scotland, e.g. Forth Valley College)	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.

MODE	OPTION	RATIONALE
Park and Ride/Choose	Improvements to existing P&R including <ul style="list-style-type: none"> - strategic coach/bus services; - improved frequency; - improved walking and cycling connections/facilities (including Nextbike); - tourism bus; - connections to employment and education destinations; - active travel hub with good connections; - shuttle buses connecting P&R sites - low carbon transport - mix P&R sites with other uses 	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Parking	Increased parking at stations: <ul style="list-style-type: none"> - Stirling; - Dunblane; - Bridge of Allan; - Alloa; - Larbert 	Increased parking at stations increases the car accessibility to interchanges and journey time competitiveness of park and ride journeys (TPO1 and 3) however increased parking may result in an increase in driving trips to stations which may have previously been sustainable trips (neutral TPO2).
Rail	Relocated Bridge of Allan station (closure and reopening)	The relocation of Bridge of Allan station may result in an increased walk-in catchment and improved journey time competitiveness which would reduce the cars accessing the station supporting all three TPOs.
Rail	Improve journey times, frequencies of rail services (frequency of Alloa to Edinburgh for example)	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Rail	New rail stations: <ul style="list-style-type: none"> - Cornton (retaining Bridge of Allan); - Manor Powis; - Cambus; - Causewayhead (Alloa line); - South Stirling/ Cowie/ Bannockburn; - Blackford or Greenloaning; - Clackmannanan. 	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.

1. INTRODUCTION

1.1 Overview

- 1.1.1 SYSTRA Limited (SYSTRA) was commissioned by Regional Transport Partnership Tactran in November 2018 to undertake a multi-modal transport appraisal of transport movements going into and out of Stirling City as part of the Local Rail Development Fund.
- 1.1.2 The appraisal will investigate a range of potential transport options which could contribute to reducing the volume of traffic entering, leaving or passing through the Stirling City area. As these trips are for distances beyond most people's ability to walk or cycle, the appraisal will predominantly, but not be limited to, strategic rail and/or coach park and ride services. The appraisal will consider options that could improve door to door journey times by public transport between the study area and key employment destinations/employee origins outside the study area (Figure 1). For the purpose of this study, the area will be referred to as the Stirling City Area.
- 1.1.3 This Case for Change Report provides the shape and proposed direction of the study, in setting the scene in terms of the evidence base, collation of the problems and opportunities and setting the transport planning objectives.

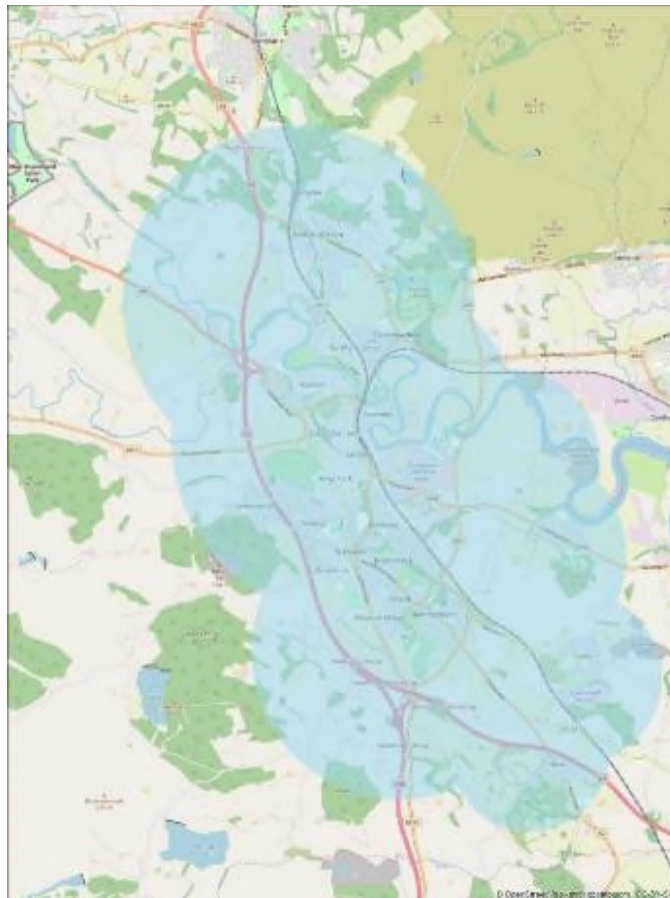


Figure 1. Stirling Study Area (Open Street Map)

1.2 Background to Study: 2016 DPMTAG Appraisal

Overview

- 1.2.1 In 2015/16, Stirling Council undertook a transport appraisal to inform its emerging Local Development Plan ([LDP](#)) and Local Transport Strategy ([LTS](#)). The appraisal was carried out in line with Transport Scotland's *Development Planning and Management: Transport Appraisal Guidance (DPMTAG)* and covered the period 2017-2027, while also looking ahead to 2037.
- 1.2.2 The appraisal considered the transport impacts of the development proposals proposed for the LDP, and proposed relevant responses in both the LTS and the LDP Action Plan.

Approach

- 1.2.3 The process started from a position of a preferred spatial strategy, and sought to identify the potential impact of the various development proposals identified in the LDP, and whether the impacts could be mitigated and what transport interventions will be required to deliver the strategy.
- 1.2.4 The appraisal followed the traditional evidence-led approach of identifying problems, issues, opportunities and constraints, developing Transport Planning Objectives, collating, sifting and packaging of potential transport interventions before conducting a qualitative appraisal against TPOs and STAG criteria, and quantitative evaluation using microsimulation modelling.
- 1.2.5 The appraisal tested a series of transport options that are aligned with national and local planning, transport and economic policies in reducing journey times and improving the quality, accessibility and affordability of transport.

Transport Assessment

- 1.2.6 The appraisal tested five delivery packages, based on increasing levels of intervention in the transport system:
- DP1: Encourage sustainable travel choices (e.g. integrating the bus and rail station and improve city cycle network)
 - DP2: Improve network efficiency (e.g. Upgrade improvements at junctions including Muirton, Millhall and Manor Powis roundabouts)
 - DP3: Local network interventions (e.g. Completion of outer Ring Road with the Kildean to Airthrey Road link across the River Forth and phased dualling of A91)
 - DP4: Strategic network interventions (e.g. M9 Junction 10 Craigforth Improvement)
 - DP5: Additional strategic interventions (e.g. New M9 junction at A811, new rail station)
- 1.2.7 In addition, the study considered future year scenarios with different levels of modal shift towards sustainable modes; 0%, 2.5%, 5% and 10% mode shift.
- 1.2.8 Table 2 below summarises the average PM Peak Hour journey times across Stirling City Area for internal to internal trips; internal to external trips; external to internal trips and external to external trips for each scenario.

Table 2. Network Wide Average Journey Times, PM Peak Hour¹

		Average PM Peak Hour (1630-1730) Journey Time											
		Do Nothing	DP1	DP2	DP3	DP4	DP5	Do Nothing	DP1	DP2	DP3	DP4	DP5
2017	0	06:01						09:26					
	2.5	05:57						09:22					
	5												
	10												
2022	0	09:31						16:02					
	2.5	08:49	09:23					14:59	15:24				
	5	08:27	09:48					14:18	16:07				
	10												
2027	0	X						X					
	2.5		19:14	20:18	09:18	09:19			26:40	26:57	15:03	14:51	
	5		17:52	19:06	08:37	08:44			25:27	25:31	14:15	13:44	
	10		14:19	14:57	07:52	08:06			21:16	21:39	12:27	12:45	
2037	0	X						X					
	2.5		X	X	19:20	16:10	16:38		X	X	29:14	25:11	23:50
	5		X	X	16:56	15:27	14:28		X	X	25:59	24:03	21:06
	10		X	X	13:30	13:23	12:35		X	X	21:57	20:17	19:01
2017	0	09:42						13:21					
	2.5	09:41						13:30					
	5												
	10												
2022	0	12:51						17:37					
	2.5	12:32	12:28					17:40	17:06				
	5	12:10	12:48					17:17	17:42				
	10												
2027	0	X						X					
	2.5		20:00	18:50	14:03	10:34			24:55	24:26	18:27	12:13	
	5		19:45	17:41	13:29	10:14			24:27	23:40	17:56	11:54	
	10		17:17	15:52	12:31	09:54			22:11	21:04	17:05	11:39	
2037	0	X						X					
	2.5		X	X	22:46	14:22	12:15		X	X	24:10	14:39	13:42
	5		X	X	21:39	14:51	11:43		X	X	23:10	14:44	13:13
	10		X	X	17:17	12:47	11:28		X	X	20:43	13:32	13:06

1.2.9 Table 2 indicates that the traffic model failed to run beyond 2027 without the additional interventions on the local transport network contained with DP3 in addition to DP1 and DP2.

1.2.10 Furthermore the modelling suggested that beyond 2027, interventions beyond DP1, DP2 and DP3, i.e. interventions on the strategic network, were required to enable only moderate increases in journey times (compared to 2017) to, from and through the Stirling City area.

Key Findings

1.2.11 The key findings coming from the study included:

- The impacts of the travel demands generated by build out of the LDP to 2027 (74% of the proposed housing) could be accommodated by measures that the Council could implement. These packages of measures included everything the Council could reasonably implement in relation to:
 - modal shift (DP1),
 - local road capacity improvements (DP2), and
 - new local roads (DP3).
- However, to enable full build out of the LDP to 2037 (or 100% of proposed housing), additional modal shift and road capacity improvements would be required over and

¹ Stirling Council DPMTAG Transport Appraisal, 2016

above local modal shift and local road capacity improvements if significant increases in journey times across the network were to be avoided e.g.:

- Improvements to existing motorway junctions (DP4); and
 - Additional motorway junction and strategic park and ride sites on the rail corridor to the north and south of the city (DP5).
- Of note, the traffic modelling highlighted that 38% (AM) to 46% (PM) of vehicular trips had their origin and destination within Stirling City; and 44% (AM) to 38% (PM) of car trips had either their origin or destination outside Stirling City. i.e. approximately 38%-44% of car trips into or out of Stirling City were strategic in nature.
 - In addition, the appraisal highlighted the poor transport opportunities for residents living in the 'eastern villages' of Plean, Cowie and Fallin.

Transport Scotland's Response

1.2.12 In recognition that the cumulative consequences of travel demand generated by the LDP proposals beyond 2027 (e.g. the remaining 26% of housing allocations) cannot be met by Council interventions alone, and that further interventions over and above what the Council can deliver may be required, Transport Scotland's response to the DPMTAG transport appraisal noted:

- "The longer term strategic interventionson the trunk road network from Pirnhall to Kier, require further consideration in terms of rationale, feasibility, potential phasing and deliverability/affordability; and
- further work... would be required to determine potential rationale for the park and ride interventions."

1.2.13 Transport Scotland accordingly awarded LRDF funding to investigate this second point, i.e. to investigate whether strategic park and ride could help reduce the 38-44 % of vehicles entering or leaving Stirling City. These trips that are starting or ending within Stirling City are not just as a consequence of new business and residential developments in Stirling City, but also existing destinations both within Stirling City and the wider travel to work area.

Actions Coming from DPMTAG Study

1.2.14 In terms of addressing the issues highlighted by the DPMTAG study:

- Stirling Council, via its LTS delivery plans (specifically the Stirling City Area Transport Plan), will seek to:
 - promote modal shift away from cars for local trips (including the 38-46% of car trips in the city area which have both their origin and destination in the city i.e. DP1)
 - manage traffic on local roads within the Stirling City area by maximising existing capacity and bringing forward additional road capacity improvements (i.e. DP2 and DP3).

1.2.15 In terms of investigating the *rationale, feasibility, potential phasing and deliverability/affordability* of strategic interventions (i.e. DP4 and DP5):

- Stirling Council is currently investigating the problems generated at and around M9 Junction 10 Craigforth with Transport Scotland and Tactran;
- The Council and Transport Scotland are considering the required improvements at and around M9 Junction 9 Pirnhall in the context of major development proposals in the immediate vicinity;
- Transport Scotland are reviewing the proposed grade separation of M9 Junction 11 Keir Roundabout proposed in the review of STPR; and

1.2.16 In parallel, this study considers how best to increase the modal share of public transport for those trips entering and leaving the Stirling City area to help reduce the volume of vehicles entering and leaving the Stirling City area, including the potential rationale for the park and ride interventions.

Key Point: The transport appraisal undertaken to inform the Stirling LDP and LTS identified the need for interventions beyond modal shift and road capacity improvements within the Stirling City area which could be implemented by Stirling Council to help reduce the proportion of car trips entering and leaving the Stirling City area.

2. METHODOLOGY

2.1 Scottish Transport Appraisal Guidance (STAG)

2.1.1 As required by the conditions of the LRDF, the study has been undertaken in accordance with the Scottish Transport Appraisal Guidance (STAG) process which provides a framework to assess the performance of different transport options to address identified problems and present the results in a consistent manner to inform decision makers. The STAG process comprises four stages as outlined below:

- **Pre-Appraisal (Initial Appraisal: Case for Change):** where the problems, opportunities, issues and constraints are identified and scoped. Study-specific Transport Planning Objectives (TPOs) are then identified and an 'optioneering' and sifting process undertaken to provide a list of possible options to address the problems;
- **Initial Appraisal (Preliminary Options Appraisal):** potential options are appraised against the TPOs, five STAG criteria and factors concerning deliverability, to ensure that they are likely to fulfil the study's requirements;
- **Detailed Appraisal (Detailed Options Appraisal):** involving more detailed consideration of potential options taken forward following the Initial Appraisal, and presenting the outcomes to inform investment decision makers. The Detailed Options Appraisal also includes proposals for monitoring and evaluation; and
- **Post-Appraisal:** key elements of this stage involve the application of the monitoring and evaluation proposals developed as part of the appraisal.

2.1.2 The Case for Change identifies whether there is a problem to be solved. It collates and analyses relevant data and findings from consultation to develop the problems, opportunities, issues and constraints which in turn inform the development of TPOs. The TPOs are initially used to ensure options developed as part of the study will meet the TPOs and also, at a later stage will be appraised against these TPOs.

2.2 Stakeholder Engagement

2.2.1 Participation and consultation are key elements of a STAG study and ensure the interests of stakeholders are considered in an inclusive, open, transparent and appropriate manner. In particular, consultation is useful in the identification and analysis of transport problems and opportunities which forms the starting point of any STAG study.

2.2.2 For this purpose, three workshops were held with stakeholders including representatives from community councils, bus and taxi operators, local councillors and the Strathallan Community Rail Partnership.

2.2.3 In addition to the workshops, this study has been informed by Stirling Council's own consultation exercise undertaken as part of the Local Transport Strategy.

2.2.4 The outputs of the consultation processes have been detailed in Chapter I.

2.3 Collation of Baseline Data

2.3.1 Data used to inform the problems, opportunities, issues and constraints has been collated from a range of sources but primarily the LDP transport appraisal which was undertaken in 2016. Where appropriate, data has been updated and all data has been reviewed and interpreted in the context of the updated Local Transport Strategy and recent planning and policy changes.

2.3.2 Additional sources for this study include:

- Census 2011;
- Scottish Household Surveys;
- Transport Scotland data including transport forecasts;
- Rail User Surveys (2017); and
- South Stirling Park and Ride STAG.

2.4 Project Steering Group

2.4.1 The scope of the study was shaped by input from members of the Project Steering Group:

- Tactran;
- Stirling Council;
- Clackmannanshire Council;
- Sustrans;
- Sustran;
- Transport Scotland; and
- Network Rail.

3. POLICY

3.1 Overview

3.1.1 This chapter sets out the national, regional and local policy backdrop along with the wider context against which the study is being progressed.

3.1.2 For the purpose of this study, the key policies considered are contained within the:

- National Policy:

- The National Transport Strategy (2016 Refresh);
- Strategic Transport Projects Review (2008);
- Scottish Cities Alliance;
- National Planning Framework 3;
- Scotland Route Study, Network Rail, 2016;
- Climate Change Plan (2018);
- Cycling Action Plan for Scotland 2017-2020; and
- Scottish Planning Policy, Scottish Government, 2014.

- Local and Regional Policy:

- Tactran Regional Transport Strategy 2008-2023;
- Tactran Park and Ride Strategy and Action Plan (2016);
- Stirling and Clackmannanshire City Region Deal;
- Stirling Local Development Plan 2017-2027;
- Stirling Local Transport Strategy 2017-2027;
- Clackmannanshire Local Transport Strategy 2010-2014;
- Clackmannanshire Local Development Plan 2015-2025; and
- Stirling Community Planning Partnership Local Outcomes Improvement Plan.

3.2 National Policy

National Transport Strategy

3.2.1 The *National Transport Strategy* (NTS) was first published in 2006 and refreshed in 2016 to reconfirm the high-level objectives set out in the white paper entitled *Scotland's Transport Future* (2004), and the *National Transport Strategy* (2006). They are to:

- Promote economic growth by building, enhancing managing and maintaining transport services, infrastructure and networks to maximise their efficiency;
- Promote social inclusion by connecting remote and disadvantaged communities and increasing the accessibility of the transport network;
- Protect our environment and improve health by building and investing in public transport and other types of efficient and sustainable transport which minimise emissions and consumption of resources and energy;
- Improve safety of journeys by reducing accidents and enhancing the personal safety of pedestrians, drivers, passengers and staff; and

- Improve integration by making journey planning and ticketing easier and working to ensure smooth connection between different forms of transport.

3.2.2 The NTS also sets out three strategic outcomes which are intended to provide the focus for delivering the high-level objectives. The strategic outcomes are to:

- **Improve journey times and connections:** to tackle congestion and the lack of integration and connections in transport which impact on our high-level objectives for economic growth, social inclusion, integration and safety;
- **Reduce emissions:** to tackle the issues of climate change, air quality and health improvement which impact on our high-level objective for protecting the environment and improving health; and
- **Improve quality, accessibility and affordability:** to give people a choice of public transport, where availability means better quality transport services and value for money or an alternative to the car.

3.2.3 The NTS will be superseded by the NTS2 which is currently in draft and consultation. It is understood that publication is imminent. Should this study progress to the next stage, due consideration will be taken of the revised NTS.

Relevance to Study: The scope of the study has the potential to support the NTS Strategic Outcomes to improve journey times and connections and the quality, accessibility and affordability of public transport. The study therefore has the potential to support all three of the NTS's strategic outcomes.

Strategic Transport Projects Review (STPR), 2008

3.2.4 The Strategic Transport Projects Review (STPR), published in December 2008, set out the Scottish Government's 29 transport investment priorities over the period to 2032.

3.2.5 The outcomes of the STPR were structured on a tiered approach to investment, based around the priorities of:

- Maintaining and safely operating existing assets;
- Promoting a range of measures, including innovative solutions, that make better use of existing capacity; and
- Promoting targeted infrastructure improvements where these are necessary, affordable and practicable.

3.2.6 Through Transport Scotland, the Scottish Government are currently taking forward the next review of projects (STPR 2).

Relevance to Study: STPR identified a series of strategic park and ride sites including a site at Bannockburn serving Edinburgh, Glasgow, and Stirling. STPR stated that the site would be served by either rail services or express bus links to and from the city centres and areas of economic activity (STPR Project 8).

Scottish Cities Alliance

- 3.2.7 The Scottish Cities Alliance was established in 2011 to progress the Agenda for Cities with the aim to achieve an economically stronger future for Scotland through the joint efforts of Scotland's seven cities and a long-term investment promotion strategy, in a bid to attract capital investment to Scotland's cities.
- 3.2.8 The Alliance's purpose is to support the inclusive economic growth of Scotland's cities and their regions by:
- Speaking powerfully with a single voice to compete successfully in global markets for investment and jobs.
 - Raising the profile of Scottish cities as smart and sustainable destinations for investment.
 - Informing policy to ensure that the Scottish cities and their regions remain globally competitive.
- 3.2.9 To achieve these objectives the Scottish Cities Alliance identifies the need to improve connections between the cities and with external markets.

Relevance to study: The Scottish Cities Alliance supports the vision of the City Regions and in particular identifies the interventions required to leverage further value from these investments, including infrastructure.

Network Rail: Scotland Route Study, 2016

- 3.2.10 The Scotland Route Study presents a vision of the railway in 2043, and sets out a strategy "for realising this vision in ways that are deliverable and likely to provide value-for-money for passengers and funders."
- 3.2.11 The strategic objectives set in the study aim to enable economic growth by:
- Improving connectivity:
 - To/from the retail, leisure and tourism sectors of the economy;
 - Business to business connectivity; and
 - Connecting communities.
 - Improving accessibility:
 - Improving access to workers for businesses;
 - Access to employment and training opportunities;
 - Reducing carbon and transport sector's impact on the environment;
 - Improving integration across the transport network;
 - Reducing safety risks for the general public; and
 - Improving affordability and value for money.
- 3.2.12 The Scotland Route Study provides an evidence base that informs rail industry investment choices for Control Periods 6 and 7 (2019 – 2029).

- 3.2.13 The long-term planning process is designed to consider the role that the railway plays in supporting the UK economy over the next 30 years. This includes addressing the demands that are likely to be placed in that time, capturing stakeholder aspirations to develop new or improved train services and to present investment choices for funders to accommodate these demands and future aspirations.
- 3.2.14 The following stages in relation to Stirling outline a number of options that have been appraised and discussed for inclusion in future control periods.
- 3.2.15 Options that have been recommended for progression included in the study area:
- Improving signalling headways between Dunblane and Perth:
 - Removes timetabling constraints caused by the 7 – 8min headways on this section of the route.
 - Dunblane to Perth electrification:
 - Linking in with the existing EGIP programme, the product of the extension will possibly include journey time improvements and more efficient and streamlined timetabling and rolling stock utilisation.
- 3.2.16 Included in this study is forecast demand for passenger journeys undertaken wholly within Scotland. Figure 2 shows forecast capacity issues on AM peak trains into Glasgow Queen Street by 2023/24 with particular issues on Aberdeen/Inverness services which are at standing only capacity at Croy. The analysis does not include additional capacity associated with the Revolution in Rail which would relieve some of the crowding identified.

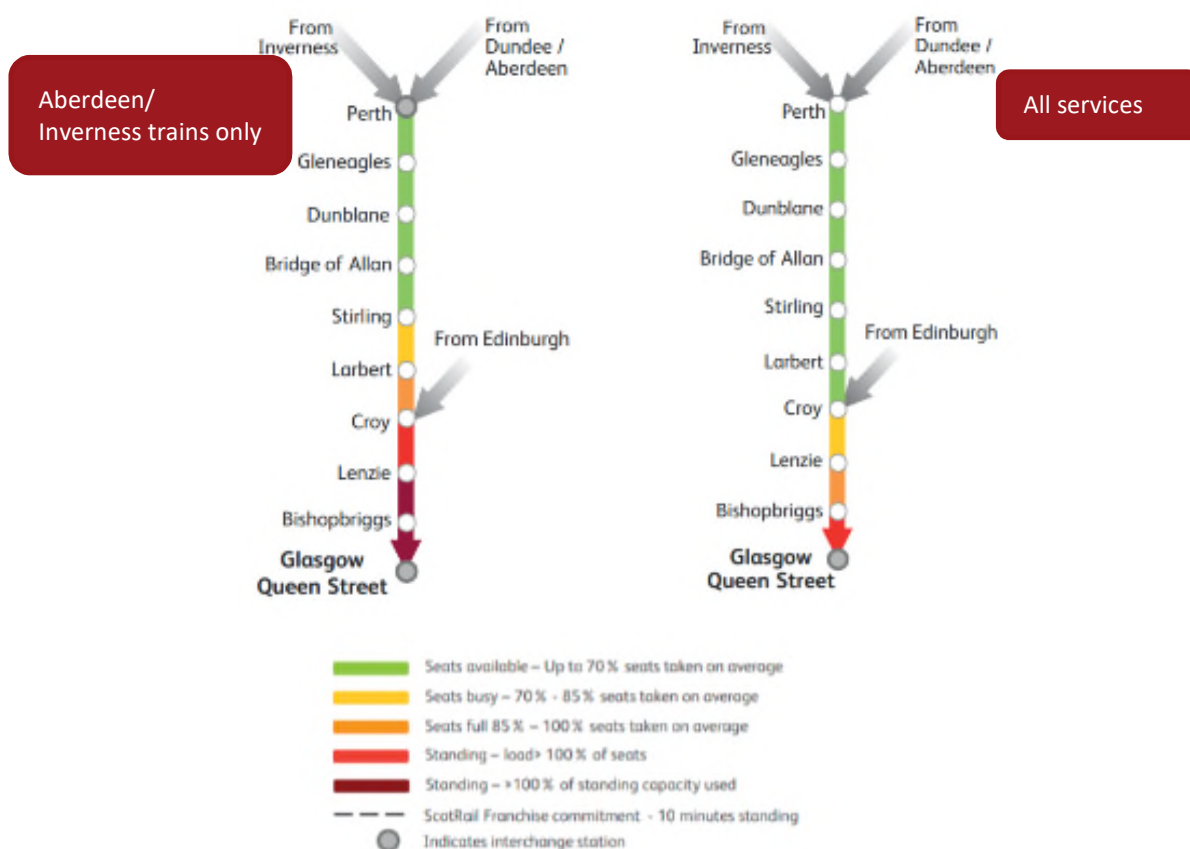


Figure 2. Passenger Numbers in 2023/24 into Glasgow QS (08:00 – 09:00)²

Relevance to Study: The Scotland Route Study shares with this study the aim of encouraging public transport for trips originating or ending in Stirling City. It provides a baseline of proposed improvements which inform the ability to consider further enhancements to increase the number of rail passengers into and out of Stirling City Area. In particular this includes:

- Improving signalling headways between Dunblane and Perth
- Dunblane to Perth electrification

² Network Rail, *Scotland Route Study*, 2016

Climate Change Emergency Related Policies

3.2.17 A number of policies relate to the Climate Change Emergency and commitments at local and Scottish levels to address the emergency. Relevant policies include:

- Climate Change Plan 2018-2032 (RPP3)
 - The Climate Change Plan is the Scottish Government's third report on proposals and policies for meeting its climate change targets. It sets out how Scotland can deliver its target of 66% emissions reductions, relative to the baseline, for the period 2018–2032.
- *Scottish Planning Policy*, Scottish Government, 2014
 - SPP identifies a need to shift to more sustainable modes of transport to help meet the Scottish Government's greenhouse gas emission targets. Tackling congestion will also help support sustainable economic growth. The Policy requires that planning authorities should support development that reduces the need to travel and facilitates travel by walking, cycling and public transport and freight movement by rail and water.

Relevance to Study: The study's aim of promoting modal shift for strategic trips has the potential for supporting the Scottish Government greenhouse gas emission targets.

Cycling Action Plan for Scotland 2017-2020

3.2.18 The third iteration of the Cycling Action Plan for Scotland (CAPS) was published in 2017 and represents six years of shared work by partners and a commitment to the 2020 vision. The Cycling Action Plan has been split into five focuses:

- Leadership and Partnership
- Infrastructure, Integration and Road Safety
- Promotion and Behaviour Change
- Resourcing
- Monitoring and Reporting.

Relevance to Study: Of particular relevance to Stirling is the commitment to improve integration with public transport, through partnership working with ScotRail, bus/coach operators and Regional Transport Partnerships and provide secure cycle storage at key destinations including transport interchanges.

The National Walking Strategy, 2016-26

3.2.19 The National Walking Strategy was launched in 2014 with a vision for a Scotland where everyone benefits from walking as part of their everyday journeys, enjoys walking in the outdoors and where places are well designed to encourage walking. The strategy proposes the following two Strategic Aims.

- Develop a daily walking culture – everyone, everyday
 - To deliver on creating a culture of walking where everyone walks more often as part of their everyday travel and for recreation and wellbeing.
- Develop walkable places and spaces for everyone
 - To achieve better quality walking environments with attractive, well designed and managed built and natural spaces and places for everyone

3.2.20 These themes are supported by additional outcomes and actions including increasing walking within multi-modal journeys.

Relevance to Study: The scope of the study has the potential to support The National Walking Strategy by encouraging modal shift which would achieve the outcome to increase walking within multi-modal journeys.

3.3 Local and Regional Policy

Tactran Regional Transport Strategy 2008-2023

3.3.1 The Tactran Regional Transport Strategy Refresh (RTS) was published in 2015 and sets out a vision and strategy for improving the region's transport infrastructure, services and other facilities to 2036. Tactran's Vision is to deliver:

“a transport system, shaped by engagement with its citizens, which helps deliver prosperity and connects communities across the region and beyond, which is socially inclusive and environmentally sustainable and which promotes the health and well-being of all.”

3.3.2 Six broad objective themes were developed to support this Vision, these are:

- Economy: To ensure transport helps to deliver regional prosperity.
- Accessibility, Equity and Social Inclusion: To improve accessibility for all, particularly for those suffering from social exclusion.
- The Environment: To ensure that the transport system contributes to safeguarding the environment and promotes opportunities for improvement.
- Health and Well-Being: To promote the health and well-being of communities.
- Safety & Security: To improve the real and perceived safety and security of the transport network.

- Integration: To improve integration, both within transport and between transport and other policy areas.

Relevance to Study: This study has the potential to consider interventions which support the RTS objectives relating to economy, accessibility, the environment and integration.

RTS Delivery Plan (2018) and Park and Ride Strategy (2016)

3.3.3 The Tactran Park and Ride Strategy set out to complement and expand the Regional Transport Strategy aspirations identified above by seeking:

- Economy:
 - To ensure that Park & Ride improves access to town / city centres and areas of employment, helping to support economic growth
 - To improve the efficiency and reliability of the transport system through reduced town and city centre traffic levels and associated economic costs.
- Accessibility:
 - To improve access to health, leisure and retail facilities by Park & Ride
 - To improve the physical accessibility of the transport system through the provision of increased Park & Ride.
- Environment:
 - To respect the built environment through reducing the need to build new town and city centre car parks.
- Health and Well-Being:
 - To help limit / manage travel by private car in urban areas to help meet statutory air quality requirements in the Tactran area.
- Safety & Security:
 - To provide the highest levels of safety and security of passengers and vehicles when using Park & Ride.
- Integration:
 - To ensure Park & Ride facilitates integration and is accessible by all modes of transport.
 - To ensure integration between land-use planning and provision of public transport.

3.3.4 The Strategy proposed promoting new bus and rail based Park & Ride and enhancing existing bus and rail based Park & Ride provision. Actions of relevance to Stirling as included in the Tactran RTS Delivery Plan 2016-2021 are:

- PR2: New Bus Based Park & Ride: Develop and implement proposals for new Park & Ride sites to the south, west, east and north of Dundee, to the north and east of Perth and to the south of Stirling
 - PR2.7 Regional Park & Ride facility- South of Stirling: Implement proposals for a new bus Park & Ride site south of Stirling, incorporating multi- modal and other best practice. Maximise the attractiveness of using park and ride to access City centre and beyond
 - New Regional Park & Ride facility – North-east Stirling
- PR3: Park & Ride at New Rail Station Sites: Support the provision of parking space at new rail stations in the region sufficient to match the anticipated parking demand
 - PR3.1 Strategic Park & Ride facility at Bannockburn, Stirling: Park and ride facility at Bannockburn, serving Edinburgh, Glasgow and Stirling
- R5: Support provision of new, relocated and enhanced stations where this will enhance access to the rail network and improve integration with the area being served.
 - R5.6 Investigate whether a relocated Bridge of Allan Station support LTS objectives

Relevance to Study:

- The study specifically takes forward the proposals to investigate the benefit of new or enhanced Park and Ride opportunities around Stirling as proposed in the RTS Delivery Plan
- The RTS P&R Strategy provides best practice guidance for the design of park and ride proposals

Stirling and Clackmannanshire City Region Deal

3.3.5 Stirling Council, in partnership with Clackmannanshire Council and the University of Stirling, has secured an investment of £90.2m, from both the Scottish and UK Governments, in the form of a City Region Deal (CRD). This deal is intended to provide investment in Innovation, Digital, Culture, Heritage and Tourism, Active Travel and Connectivity over the next 10 to 15 years with the core aim of generating inclusive economic growth for the region.

Relevance to Study: Stirling City Region Deal is intended to provide investment in a number of sectors to promote growth in the region. This study recognises the impact growth generated by the City Region Deal may have on the transport network and transport's role in supporting growth aspirations.

Stirling Council Local Development Plan, 2017-2027

- 3.3.6 The Stirling Local Development Plan was adopted in October 2018 and covers the period 2017–2027, while looking to 2037.
- 3.3.7 By 2037, the Plan aims to have contributed to the delivery of high quality new development in places which support local businesses; help sustain and build local communities; contributes to the health and wellbeing of local residents; and are attractive to visitors. The policies include approaches to development which will support growth in a sustainable and inclusive manner.
- 3.3.8 The main themes for the Plan are:
- Placemaking and implementing the Spatial Strategy:
 - Conserving and enhancing the quality and amenity of the places around us with consideration given to reducing health and social inequalities and promoting wellbeing.
 - Climate Change adaptation and mitigation:
 - New development discouraged in places where climate-related hazards are present or predicted, such as flood plains. New development must also be more efficient in its use of resources and enable reductions in traffic generation.
 - Conservation of historic and natural heritage:
 - Recognising the dependence on natural resources and the ways in which local communities interact with these to support employability and health.
 - Managing and utilising local resources:
 - Enable protection, conservation and enhancement of biodiversity, landscapes and the historic environment.

Relevance to Study: The LDP themes of placemaking and implementing the Spatial Strategy align with the study and the plan includes details of a number of developments (referred to in the DPMTAG Transport Appraisal) which will impact on the transport network over the next 20 years. Over 8,000 additional homes are proposed in the LDP generating additional travel demands into and out of the study area. The scale and location of these developments is addressed in Chapter 4.

Stirling Local Transport Strategy, 2017-2027

- 3.3.9 The second Stirling Local Transport Strategy (LTS) was published in December 2016 and covers the period 2017-2027 with the ambition to develop a transport network across Stirling that allows people and goods to get where they need to be safely and efficiently in ways that improve their health and don't damage the environment.
- 3.3.10 This ambition is supported by key objectives including:
- A safer Stirling:
 - Reduce the numbers of both accidents and casualties
 - Ensure that our transport networks and streets feel safe and secure for all users.
 - A connected Stirling:
 - Maintain and improve strategic road and rail transport links between Stirling and Scotland's other cities, and beyond
 - Maintain and improve transport links into Stirling City and its key employment areas
 - Maintain and improve transport links between the City and Stirling's rural towns and villages.
 - An active and sustainable Stirling:
 - Encourage and enable more trips to be made by walking, cycling and public transport
 - Ensure sustainable travel choices are at the heart of an integrated transport network
 - Minimise carbon emissions from transport.
 - An inclusive Stirling:
 - To ensure that jobs, services and opportunities can be accessed by a choice of means of travel
 - Transport networks, including our streets, that are usable by all, including people with mobility difficulties.
 - A quality place:
 - Ensure that our street environments, as the principal public space in our settlements, enhance the quality of Stirling's urban and rural environments
 - Ensure that our street environments are safe, pleasant, easily navigable and connected for all users
 - Continually seek to improve air quality and reduce noise pollution arising from traffic.
 - A quality transport network:
 - Maximise the efficiency of our existing transport networks to support the other LTS objectives
 - Maintain the safety, maximise the utility, and minimise the whole life costs of our transport networks through maintenance programmes.

3.3.11 The LTS identifies a number of measures as part of the City Area Transport Plan including the following:

- Park and Ride/Park and Choose:
 - Extending our park and ride network
 - Introduce a southern park and ride site for local and strategic trips
 - Consider park and ride opportunities for traffic from Clackmannanshire for both local (bus) and strategic (bus or rail) trips
 - Explore low carbon transport and travel hubs at park and choose sites.
- Improving the attractiveness of public transport:
 - Investigate bus priority on commercial and park and ride routes, including: – City Centre to University/Alloa – City Centre to Bannockburn/ Plean – Castlevie P&R to City Centre – Springkerse P&R to City Centre – Emerging P&R sites to City Centre (including southern P&R along Glasgow Rd)
 - Improve integration of Stirling Bus and Rail Stations
 - Improve passenger waiting facilities (shelters/seating).
- Parking:
 - Introduce decriminalised parking enforcement
 - Ensure provision of short-stay parking, prioritising car parking for short stay shopping to meet city centre commercial needs
 - Limit long stay parking within city centre, and relocating majority of long stay parking to park and ride sites
 - Limit city centre parking over spilling into neighbouring residential areas
 - Investigate opportunities for coach parking
 - Ensure that 6% of public on and off-street parking is available for people with mobility difficulties
 - Put in place the parking and traffic management measures required to improve road safety and reduce congestion & pollution and) facilitate access and movement by mobility impaired people, pedestrians, cyclists, public transport and its users, and motorcyclists.
- Durieshill and South Stirling Gateway Transport Package:
 - Work with Transport Scotland to Maintain and enhance access to Stirling City via the trunk road network
 - Southern Park and Ride
 - Roads improvement packages for M9 Junction 9; A91; A872
 - Active travel connections.
- Rail:
 - Support extension of electrification of rail services from Glasgow/ Edinburgh to Dunblane and Dunblane to Perth
 - Investigate whether a new south Stirling and/or a relocated Bridge of Allan Station support LTS objectives.

- Support investigation of the re-introduction of Stirling to Alloa to Dunfermline passenger services
- Work with Network Rail on programmes to improve safety at level crossings.

Relevance to Study: The LTS presents the broader framework of complementary interventions of which this study is an integral element. This study has the potential to support the connected, inclusive and sustainable objectives of the LTS.

Therefore this study will investigate the ability of new park and ride proposals proposed in the LTS to deliver the objectives of a connected and inclusive Stirling.

This includes ensuring sustainable travel choices are at the heart of an integrated transport network by improve the active travel choices for people to interchange opportunities.

Clackmannanshire Local Transport Strategy, 2010-2014

3.3.12 The (current) Clackmannanshire Local Transport Strategy (LTS) covers the period 2010-2014. An updated LTS is currently being prepared

3.3.13 The over-arching aims of the local transport strategy are:

- Support and enhance the local economy by:
 - Developing a sustainable transport system
 - Managing the valuable asset that is the road and footway network Improving connection between people and markets
 - Tackling traffic growth and congestion.
- Manage travel to reduce its environmental impact by:
 - Reducing the need to travel
 - Encouraging greater use of walking, cycling and public transport
 - Promoting eco-driving techniques
 - Reducing greenhouse gases and other pollutants
 - Managing our carbon footprint.
- Improve the transport environment to reduce actual and perceived safety issues by:
 - Reducing the number of people killed or seriously injured in road traffic accidents Improving the quality of lighting in our streets.
- Work towards a seamless transport system to increase social inclusion by:
 - Reducing the number of modal interchanges required to make key journeys.

- Remove barriers to accessibility by enhancing healthy and alternative modes of travel by:
 - Enhancing health and alternative modes of travel Removing barriers to using public transport.
- Integrate land use and transport planning by:
 - Reconciling development and sustainability.
- Maintain and improve the existing infrastructure by:
 - Fully utilising the network Reducing maintenance impact on the environment.

Relevance to Study: The objectives of the LTS broadly align with the study including the aims for supporting and enhancing the local economy and working towards a seamless transport system to increase social inclusion.

Clackmannanshire Local Development Plan, 2015

- 3.3.14 The Clackmannanshire LDP was adopted in 2015
- 3.3.15 The LDP aims to accommodate the growth projected by the General Register Office for Scotland, a population increase from around 50,630 in 2010 to 57,629 in 2035, and an increase in the number of households from around 22,950 to 29,370 over the same period.
- 3.3.16 The LDP also recognises the importance of transport links to neighbouring areas and recent improvements including the introduction of rail passenger services to Glasgow and Edinburgh via Stirling, and the construction of the Clackmannanshire Bridge. The strong links to Stirling in relation to employment, housing, shopping and leisure are also considered with more than half of the Clackmannanshire working population aged 16-64 (54%) travelling outwith Clackmannanshire to work.

Relevance to Study: the LDP recognises the growth targets for Clackmannanshire and the cross-boundary impacts on Stirling – a key destination for employment, housing, shopping and leisure.

Stirling Community Planning Partnership Local Outcomes Improvement Plan (LOIP): 'The Stirling Plan'

- 3.3.17 The Stirling Plan focuses partnership delivery towards four priority outcomes:
- Prosperous: People are part of a prosperous economy that promotes inclusive growth opportunities across our communities
 - Healthy: People are healthy and live active, full and positive lives within supportive communities

- Achieving: People are skilled and supported to make a positive contribution to our communities
- Resilient: People are part of safe and caring communities within an attractive and sustainable environment.

3.3.18 Areas identified that would benefit from collaborative partnership working included:

- Improving access to learning, training and jobs
- Improving/maintaining our places and environment
- Connecting people and places – improving transport and broadband.

Relevance to Study: The LOIP identifies the importance of collaborative partnership working to connect people and places – a key focus of the study, and inclusive growth.

The study will consider interventions that support the LOIP aims of reducing inequalities in Stirling, including by improving access to jobs, services and opportunities for those living in the more disadvantaged communities.

3.4 Summary

- 3.4.1 The review of policies relevant to this study has highlighted parallels at both a national and local level on many objectives including economic growth, social inclusion improvements, the environment and reduced journey times.
- 3.4.2 In addition, a number of options have been identified for the Stirling area of relevance to this study including a Strategic Park & Ride site south of Stirling (STPR) and areas of economic activity (STPR Project 8) and investigating a new south Stirling and/or a relocated Bridge of Allan Station (Stirling LTS).
- 3.4.3 This review of policy has identified not only options to be included as part of the option generation stage but has also highlighted objectives at a national and local level which may align with the TPOs of this study to ensure this study reflects national, regional and local policy objectives.

Key Point: The study will investigate options that will help deliver national, regional and local policy objectives of:

- Promoting sustainable travel to reduce carbon emissions
- Improving inclusivity and access to jobs, services and opportunities to promote inclusive growth.

4. SOCIO-ECONOMIC CONTEXT

4.1 Overview

- 4.1.1 The Stirling City Area is located in the heart of Scotland with a population of approximately 55,000³ (2018), which is expected to continue to grow by 2.5% between 2016 and 2021.⁴ The area comprises Stirling City, Bridge of Allan, Bannockburn and the 'Eastern Villages' of Plean, Cowie and Fallin. The area includes the city centre and associated employment opportunities including Stirling University, Forth Valley College, urban small & medium-sized enterprises (SMEs) along with the tourist industry of Stirling City. There are a number of food, technology and finance businesses in the study area with major employers including Prudential, Capita, Graham's Family Dairies and the Scottish Environment Protection Agency and approximately 33,000 employees in the study area.⁵
- 4.1.2 Stirling is a major tourism destination in Scotland with attractions including Stirling Castle, The National Wallace Monument and the Bannockburn Centre. In 2014, there were 4 million visitors to the Stirling area⁶.
- 4.1.3 Stirling is also home to the University of Stirling which has 14,000 students and 1,500 staff with plans to grow. Growth plans include the development of a new sports complex on campus reinforcing Stirling University's role as Scotland's University for Sporting Excellence and City Regional Deal funding for two research hubs at the University; £17 million for a new Aquaculture Hub and £5 million for an International Environment Centre⁷ (across sites in Alloa and at the university). Forth Valley College, Stirling Campus is located on Drip Road, close to Craigforth and is attended by approximately 800 full time students, 100 employees and includes two evenings of classes a week in addition to term time day classes.
- 4.1.4 In addition to tourist attractions and education establishments Stirling has a number of major employee destinations including the Prudential (over 2,500 employees) and Castle Business Park and health destinations including the Stirling Health and Care Village. Prudential currently operate bus services for employees and other local trip attractors could coordinate with Prudential to make more services viable.
- 4.1.5 This chapter will summarise the socio-economic context for Stirling City Area including the population, age demographics, employment activity and access to car.

³ National Records of Scotland Area Profile, <https://www.nrscotland.gov.uk/statistics-and-data/statistics/stats-at-a-glance/council-area-profiles> accessed on 15/01/2019

⁴ Projection is a council-wide figure. National Records of Scotland Area Profile, <https://www.nrscotland.gov.uk/statistics-and-data/statistics/stats-at-a-glance/council-area-profiles> accessed on 15/01/2019

⁵ Census 2011, <https://www.scotlandscensus.gov.uk>, accessed 15/01/2019

⁶ Invest in Stirling, <http://www.investinstirling.com/key-sectors/tourism/> visited on 13/03/2019

⁷ <https://www.stir.ac.uk/about/city-region-deal/> accessed on 13/03/2019

4.2 Socio-Economic Data

- 4.2.1 The majority of data for the economic baseline are derived from the Office of National Statistics and 2011 Census data for Scotland. It is important to note that there is an element of data lag involved. As with all available data at a national scale, there is usually several years' gap between the data capture and present time. There have been no significant localised events that have affected the region economically which could be expected to significantly alter the picture the available data presents.
- 4.2.2 The level of data disaggregation varies by dataset and in some cases it is not available at the study area level and is instead provided at a local authority level. Where possible, Intermediate Zone Census data has been used, the Intermediate Zones included in the Study Area are shown in Figure 3 and for the purpose of this report will be referred to as Stirling City Area. Please note that the Intermediate Zone which covers the South West of Stirling City is a large zone which extends beyond the geographical boundary of the study area (albeit the additional area covered is sparsely populated).

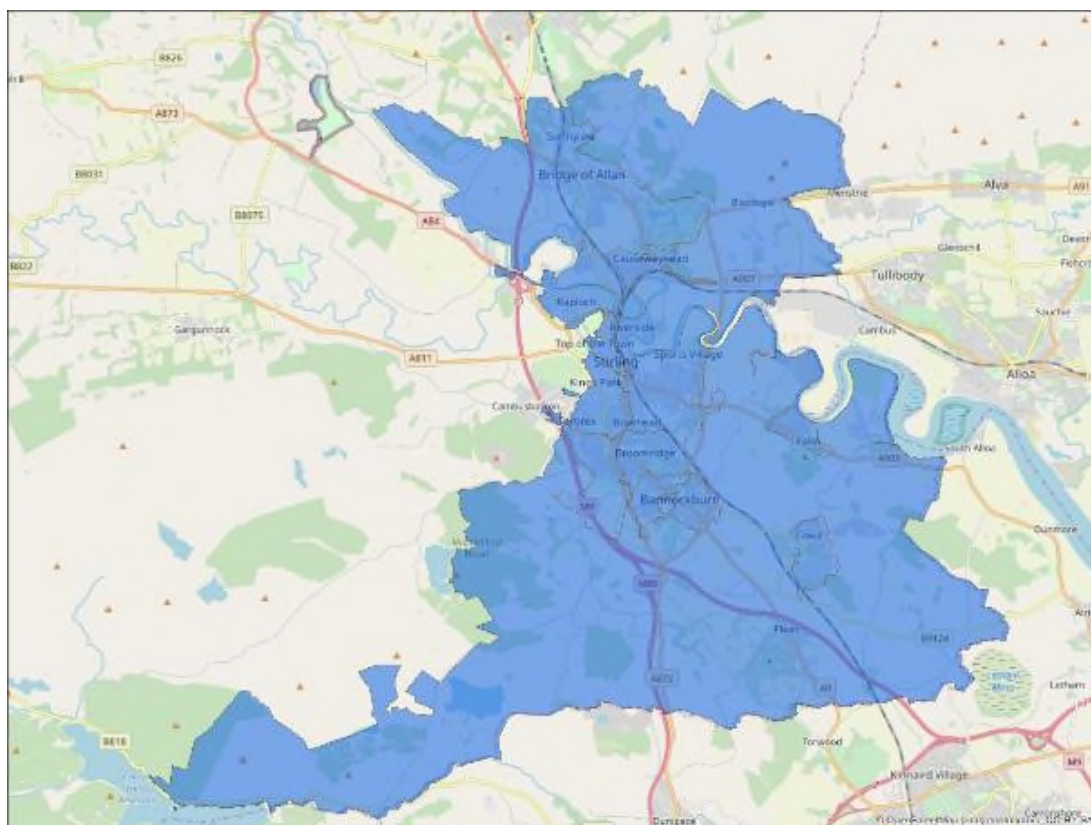


Figure 3. Stirling Study Area Intermediate Zones 2011 (Open Street Map)

4.3 Population

4.3.1 The National Records of Scotland provide details of the study area's population which show that the population has grown steadily above the Scottish average (Table 3). Population projections are not available at the study area level but for Stirling Council show that the Council population is forecast to increase by 4.3% between 2016 and 2026.

Table 3. Population Growth and Projections in Stirling⁸

YEAR	POPULATION	% CHANGE FROM 2008	SCOTLAND % CHANGE FROM 2008
2008	51,709		
2012	53,656	3.8%	2.1%
2016	54,554	5.5%	2.8%
2018	54,760	5.9%	3.5%

4.3.2 These figures represent growth across the council areas however the projections reflect growth in key areas of development highlighted in the Local Development Plan. These include:

- City Consolidation: 1,678 homes
- Strategic Development Sites in Stirling include:
 - South Stirling Gateway (800 homes)
 - Durieshill (2,500 homes)
- Core Area Regeneration Sites including:
 - Cowie (535 homes)
 - Fallin (424 homes)
 - Plean (695 homes)

4.3.3 The LTS notes that Stirling Council expects to have increased the number of homes in and around the city by 24% by 2037 which is likely to increase traffic levels by 22% at the busiest times (further detail in Chapter 5). As detailed above, many of these sites are to the South and East of the city, with major growth areas such as South Stirling Gateway and Durieshill having a significant impact on travel demands on the southern flank of the city.

⁸ National Records of Scotland Area Profile, <https://www.nrscotland.gov.uk/statistics-and-data/statistics/stats-at-a-glance/council-area-profiles> accessed on 15/01/2019

4.3.4 The Local Development Plan also details the planned employment sites within the study area. These areas will be trip attractors and the main sites identified in the Spatial Strategy include the following:

- Bandeath North (43 ha) and West (41 ha); and
- Retail sites at Durieshill, South Gateway and Springkerse.

4.3.5 Figure 4 illustrates both residential and employment sites identified in the LDP.

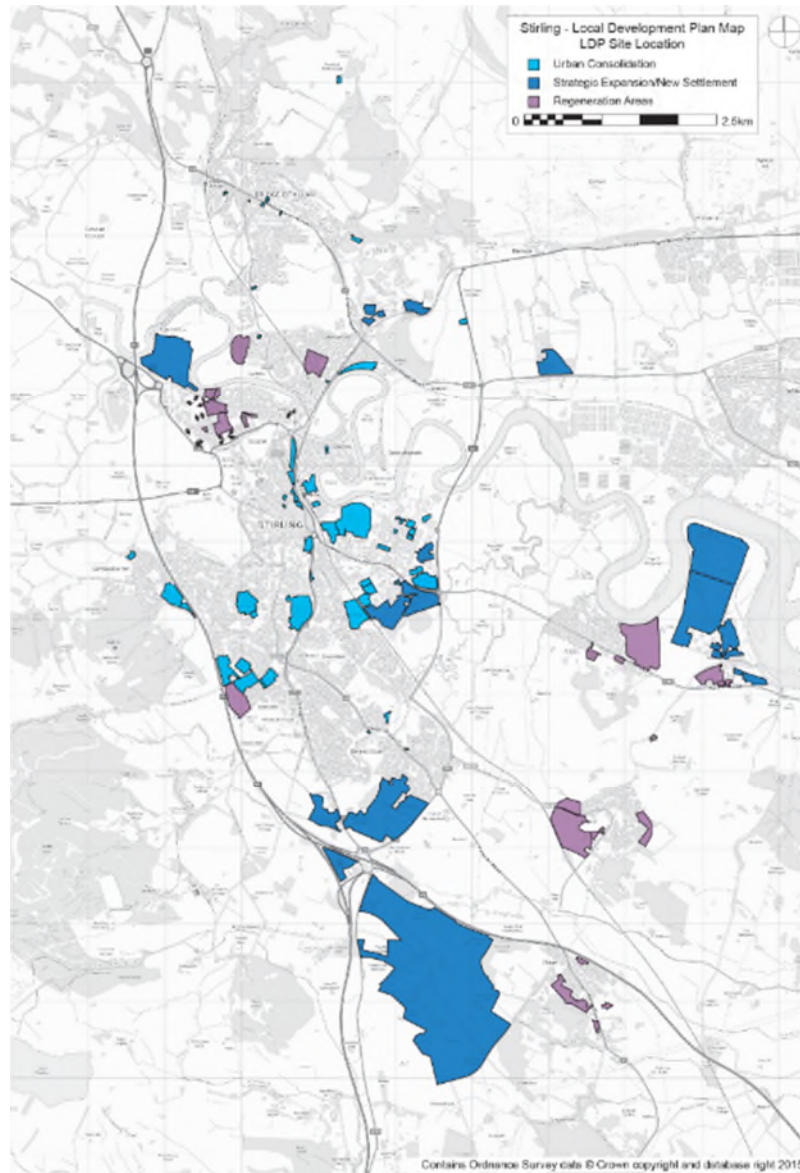


Figure 4. Local Development Plan Sites

Key Point: Stirling City area is forecast to grow with an ambitious Local Development Plan leading to increased growth in population and jobs in the area above the Scottish average. The major development sites are largely around the western, southern and eastern edges of the city.

4.4 Scottish Index of Multiple Deprivation

- 4.4.1 The Scottish Index of Multiple Deprivation (SIMD) 2016 is the Scottish Government official tool for identifying the most deprived areas in Scotland.
- 4.4.2 SIMD shows where Scotland's most deprived areas are across a number of indicators including income, education, employment, health and access to services. The index can be used to help identify areas which may require specific targeting.
- 4.4.3 14 of the 69 zones in the study area are within the 20% most deprived in Scotland using the overall index of deprivation. These zones are shown in Figure 5 and are concentrated in the Raploch area but also include zones in Cornton, Culterhove, Bannockburn and the Eastern Villages of Cowie, Fallin and Plean. Outwith the boundaries of Stirling but within the catchment for Stirling's services, Tullibody and Alloa have pockets of deprivation.
- 4.4.4 The 'Access to Services' index includes: the average drive time to a petrol station, a GP surgery, a post office, a primary school, a secondary school, a retail centre, and the public transport travel time to a GP surgery, a post office and a retail centre. Although the indicator does not take into account the frequency or quality of services and is weighted 2/3 in favour of drive time (and hence the indicator needs to be considered alongside car ownership data) it does give an indication of accessibility across the area.
- 4.4.5 When considered independently, the Access to Services SIMD indicator shows a different pattern across the area reflecting that Raploch is ranked among the least deprived areas when it comes to access to services. Cowie and areas in Bannockburn, Cornton and Culterhove feature in the lowest 40% of datazones in both the overall and access deprivation indices.

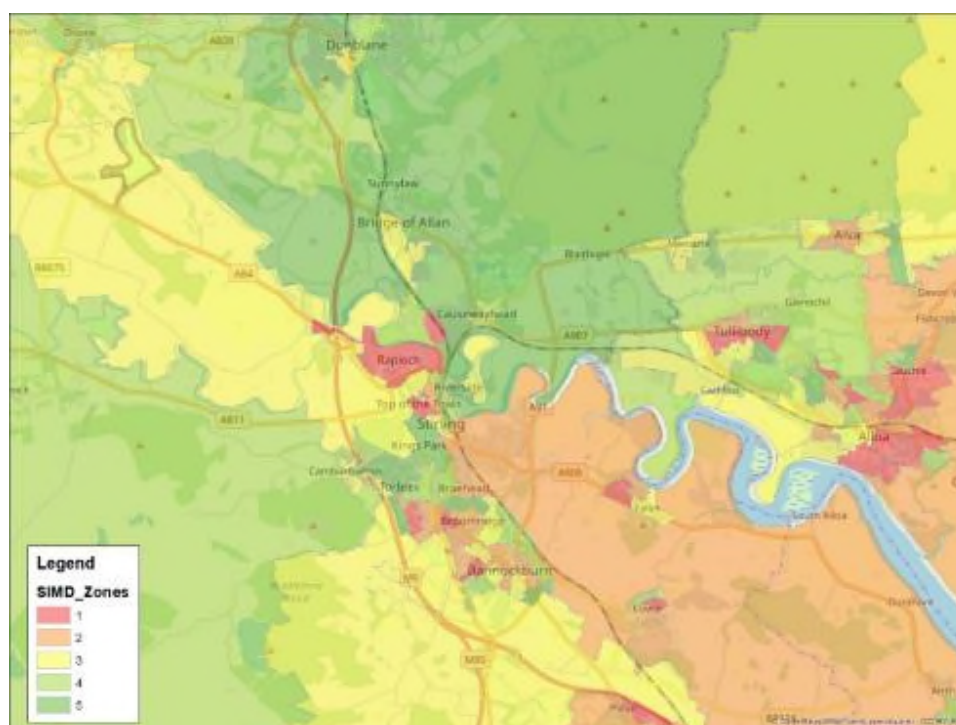


Figure 5. SIMD Quintiles⁹

⁹ Scottish Index of Multiple Deprivation 2016, <http://simd.scot/2016> (Mapped by SYSTRA)

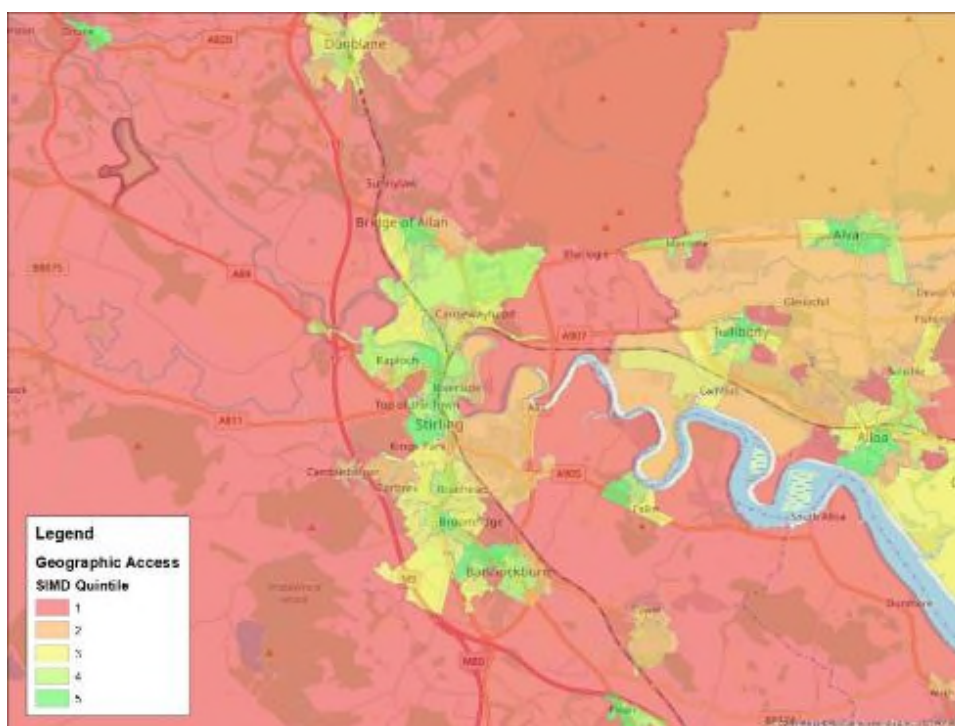


Figure 6. Geographic Access, SIMD Quintiles¹⁰

Key Point: Almost 20% of the study area's datazones are considered to be within Scotland's 20% most deprived datazones (using the overall index of deprivation). These factors include access to services, education and employment. Some of these areas (Cowie and areas in Bannockburn, Cornton and Culterhove) are also within the lowest 40% of national datazones in terms of access to facilities. Section 5.3 contains further details of public transport access to amenities across the study area.

4.5 Car Availability

- 4.5.1 Looking in more detail at some of the factors which influence the SIMD, the Census 2011 outputs show that the percentage of households with no access to a car in the study area is 29% compared to 31% for Scotland, however this average masks the range across the study area as a whole.
- 4.5.2 0 summarises the concentrations of low car ownership and shows that there are pockets of below average car ownership in the study area, in particular, the city centre and Raploch.

¹⁰ Scottish Index of Multiple Deprivation 2016, <http://simd.scot/2016> (Mapped by SYSTRA)

Table 4. Households with No Access to a Car – Intermediate Zone Level¹¹

Intermediate Zone	Percentage of households with no car or van available
City Centre	56%
Raploch	54%
Braehead	33%
Borestone	32%
Forth	29%
Cowie	29%
Cornton	29%
Fallin	28%
Broomridge	27%
Hillpark	25%
Plean and Rural SE	24%
Bannockburn	21%
Bridge of Allan and University	18%
King's Park and Torbrex	17%
Causewayhead	16%
Scotland	31%
Study Area	29%

4.6 Economic Activity

- 4.6.1 The proportion of unemployed persons in the Stirling City Area is 5%, which is in line with the Scottish average. Higher levels of unemployment are found in the Raploch area, Cornton, Cultenhove, Plean and Fallin which overlaps with the below average access to car/van. Similarly, areas of Tullibody and Alloa also show a high level of unemployment overlapping with below average access to car/van.

¹¹ Census 2011, <https://www.scotlandscensus.gov.uk>, accessed 15/01/2019

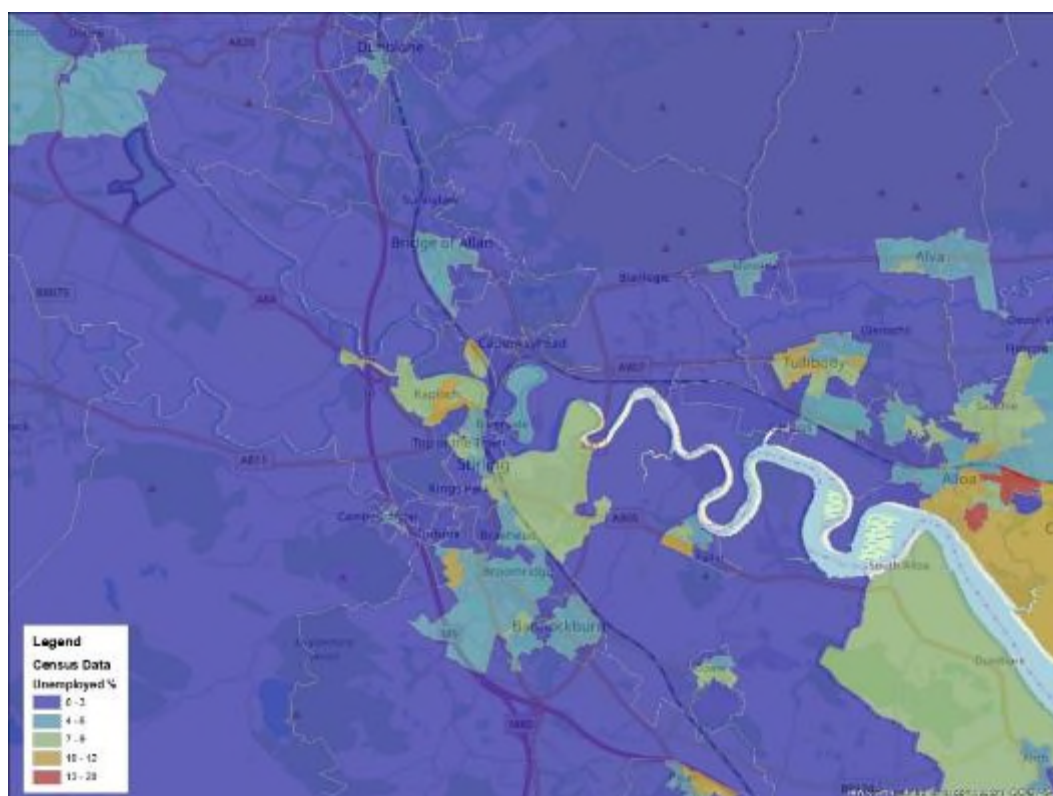


Figure 7. Census 2011 Households Economically Active: Unemployed (%)¹²

Key Point: Whilst economic activity is broadly in line with the Scottish average, there is variation across the study area with pockets of high levels of unemployment in Plan, Fallin, Culterhove and Cornton.

4.7 Socio-Economic Summary

4.7.1 The key points arising from the socio-economic analysis are summarised below:

- Stirling City area is forecast to grow with an ambitious Local Development Plan leading to increased growth in population and jobs in the area above the Scottish average. The major development sites are largely around the western, southern and eastern edges of the city.
- Between 2008 and 2018 Stirling Council's population grew by 5.9% compared to the Scottish average of 3.5% with further projections to grow above the Scottish average supported by planned developments to the south and east of the city equivalent to a 24% increase in homes by 2037.
- 20% of the study area's datazones are considered to be within Scotland's most deprived (using the overall index of deprivation). These factors include access to services, education and employment. Some of these areas (Cowie and areas in Bannockburn, Cornton and Culterhove) are also within the lowest 40% of national datazones in terms of access to facilities. Section 6.3 contains further details of public transport access to amenities across the study area.

¹² Census 2011, <https://www.scotlandscensus.gov.uk>, accessed 15/01/2019 and mapped by SYSTRA

- Whilst economic activity is broadly in line with the Scottish average, there is variation across the study area with pockets of high levels of unemployment in Plean, Fallin, Culterhove and Cornton.
- Households without access to a car in those areas which are within the lowest 20% of SIMD datazones ranges from 24-56% compared to the study area average of 29% and the Scottish average of 31%.

5. TRANSPORT NETWORK AND DEMAND

5.1 Overview

5.1.1 As part of the 2016 DPMTAG transport assessment supporting Stirling Council's Local Development Plan, a review was carried out of general access to transport across the Stirling area. This chapter reviews, summarises and updates, where necessary, to reflect 2019 and covers the following topics:

- Rail survey data;
- Census Travel to Work data;
- Public transport service information;
- Public transport accessibility to services; and
- Road network performance.

5.2 Employment and Travel to Work

5.2.1 The Scottish Census 2011 provides details of origins and destinations of workers. Table 5 shows that 32,519 people work in the Stirling City Area with 12,108 (37%) of workers coming from within the study area (excluding working from home).¹³ The majority of the remaining workforce travel predominately from Falkirk (18%) and Clackmannanshire (16%). Car or van driver or passenger is the most common mode of transport for all origins including 60% of all Stirling City Area residents travelling to work in the Stirling City Area. Rail use for employees in the study area is low for all origins excluding Glasgow residents, 28%.

Table 5. Travel to Work Origins for Stirling City Area Employees and Mode of Travel *¹⁴

Origin of Stirling City Area employees	Persons	%	Train	Bus	Car	On foot or cycling
Stirling City Area	12,108	37%	0%	15%	60%	23%
Falkirk	5,885	18%	4%	11%	84%	0%
Clackmannanshire	5,106	16%	2%	12%	86%	1%
'Rural' Stirling	3,211	10%	2%	6%	85%	6%
North Lanarkshire	1,175	4%	5%	5%	90%	1%
Perth and Kinross	812	2%	2%	3%	93%	1%
Glasgow City	799	2%	28%	1%	69%	2%

*(excluding working from home)¹⁵

¹³ Intermediate Zones as per Figure 3

¹⁴ Census 2011, <https://www.scotlandscensus.gov.uk>, accessed 15/01/2019

¹⁵ Other modes of travel not included. Figures may not sum to 100%

- 5.2.2 Table 6 shows that 49% of the Stirling City Area residents work within the study area with Glasgow, Falkirk and Edinburgh also attracting employees. The table suggests that the principal destinations outwith the study area lie to the south with car being in the dominant mode of travel this puts pressure on the M9, M80 and associated junctions. In addition, Clackmannanshire residents will travel through the study area on road and rail to access jobs in Glasgow (2%), North Lanarkshire (1%), and, to a lesser degree, Falkirk (7%) depending on the workplace and resident location in Clackmannanshire and Falkirk.
- 5.2.3 Bus use is low for all destinations excluding the Stirling City Area (15%) but rail travel to Glasgow (44%) and Edinburgh (34%) is more competitive with car/van drivers/passengers.

Table 6. Census Travel to Work destinations for Stirling residents and mode of travel¹⁶¹⁷

Work destination of Stirling City Area Residents	Persons	%	Train	Bus	Car	On foot or cycling
Stirling City Area	12,108	49%	0%	15%	60%	23%
Working at home	2,797	11%	0%	0%	0%	0%
No fixed place of work	2,251	9%	2%	4%	85%	6%
Falkirk	1,945	8%	3%	6%	90%	1%
Glasgow City	928	4%	44%	2%	52%	1%
'Rural' Stirling	924	4%	3%	7%	82%	6%
Clackmannanshire	866	4%	2%	6%	90%	1%
City of Edinburgh	848	3%	34%	6%	59%	0%

- 5.2.4 The Census also gathers the distance to place of work. The data for Stirling City area residents is presented below in Figure 8 and shows that 50% of residents travel more than 5km to work, a distance which is likely to be beyond most people's ability to walk or cycle.

¹⁶ Other modes of travel not included. Figures may not sum to 100%

¹⁷ Census 2011, <https://www.scotlandscensus.gov.uk>, accessed 15/01/2019

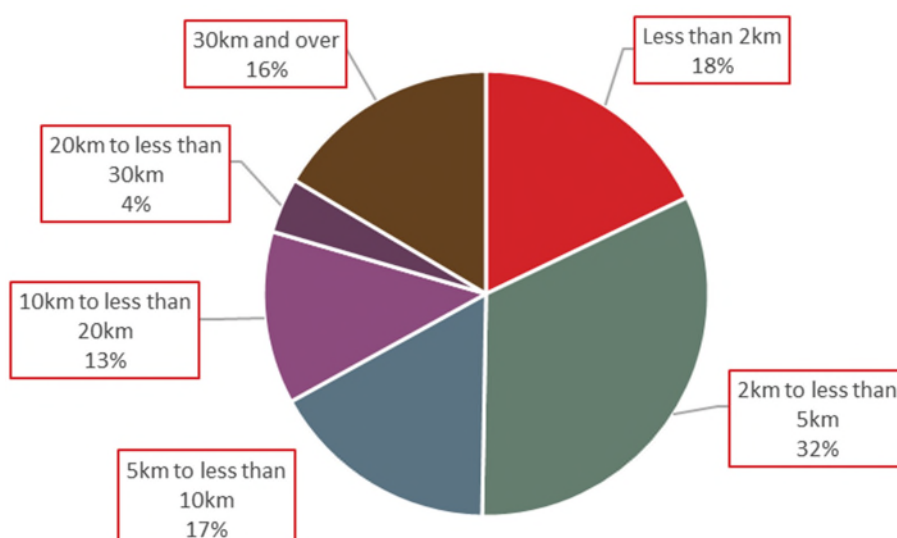


Figure 8. Distance Travelled to Work for Stirling City area residents¹⁸

Key Point: the data shows that there is a significant inflow and outflow of commuters with the study area being a net importer of workers coming from surrounding council areas including Falkirk and Clackmannanshire primarily all arriving by car. This flow of workers into the area puts pressure on the transport network (NB which is further exacerbated by workers travelling through the study area to the Central Belt from Clackmannanshire). The travel to work data also suggests that rail is an attractive option for Stirling City Area residents working in Glasgow and Edinburgh, but not to or from other key destinations such as Falkirk.

5.3 Access to Employment

- 5.3.1 SYSTRA has recently undertaken accessibility analysis modelling for Tactran to facilitate the [monitoring](#) of the Regional Transport Strategy. The analysis included the use of the accessibility software, TRACC, which measures and analyses the time taken to travel to various destinations using car, public transport and active travel modes. This modelling includes analysis of access to employment with outputs shown in Figure 9.
- 5.3.2 The mapping shows accessibility to employment centres and a score of how many are within 30 minutes by public transport. The outputs have similarities to the SIMD access to Services mapping and show that there are areas with a significantly reduced access to employment centres. For example, Cowie, Bannockburn, Cultenhove, Causewayhead and parts of Plean can only access three employment centres within 30 minutes compared to the 5-9 employment centres the majority of the study area can access.
- 5.3.3 The problem is further exacerbated for those in the Eastern Villages whose ability to access opportunities (e.g. employment, education and training plus strategic interchange) is limited by the barriers to active travel such as the distance to Stirling City and the crossing of the A91.

¹⁸ Census 2011, <https://www.scotlandscensus.gov.uk>, accessed 15/01

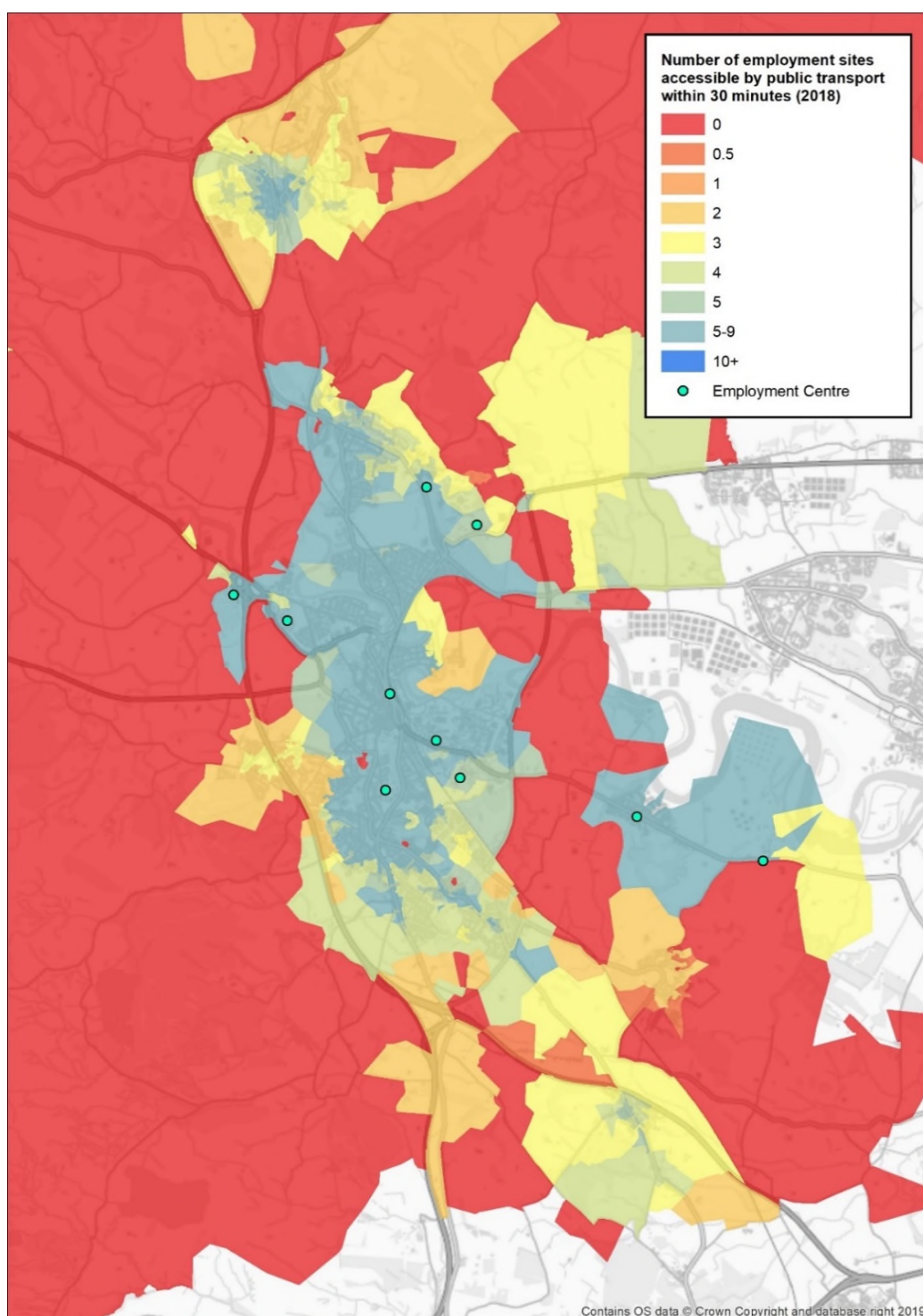


Figure 9. Accessibility to Key Employment Centres¹⁹ (TRACC, SYSTRA)

¹⁹ Tactran, *Monitoring Framework 2018 Progress Report (Draft)*, 2018.

Score of how many employment centres are within 30 minutes based on a value of 1 being those accessible to most people and 0.5 for those of higher skill which will be open to fewer individuals e.g. academic / hospitals etc

5.4 Public Transport: Bus

5.4.1 Bus operator *First Group* operates a comprehensive network of commercial services across the study area with competition from local operators. Stirling Council subsidises some early morning, evening, and Sunday journeys as well as daytime services in the areas that would otherwise be unserved. Figure 10 summarises the First services in the Stirling area and the following sections give details of the frequency and routing of the services to several communities of First services.

5.4.2 Bus service information was also collated for the DPMTAG transport assessment and has allowed for a comparison between the network in 2015 and 2018. This comparison shows that there have been a large number of services withdrawn or revised, resulting in them no longer serving particular communities. For example, Service 55 has been withdrawn and no longer serves Thorsk and Service 59 previously operated from Callander to Falkirk, it now terminates in Stirling and does not serve Fallin.

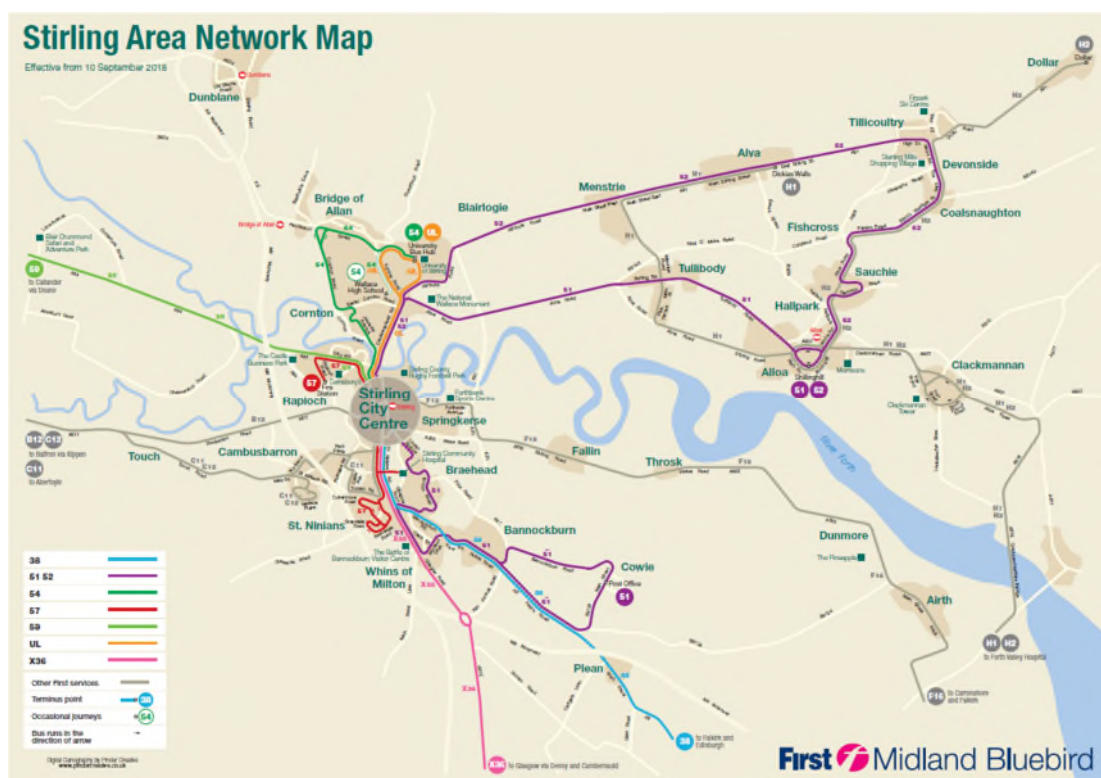


Figure 10. Stirling Area Bus Service Network Map²⁰

5.4.3 The table below summarises the bus services for a range of communities highlighted in Section 5.3 as having lower accessibility to services. There have been recent changes to bus services impacting on accessibility including the following:

- Services through Thorsk have changed significantly with the removal of the Falkirk to Callander and Thorsk to Stirling services replaced with the F16. This represents a reduction in coverage and frequency for Thorsk residents.

²⁰First Group South East and Central Scotland, <https://www.firstgroup.com/south-east-and-central-scotland>, accessed on 15/01/2019

- Service 60, Stenhousemuir to Clackmannan, which previously served the Pleian area no longer operates.
- Service 38 Stirling to Falkirk no longer serves Cowie.
- The frequency of the F16 has recently reduced and Service 59 now terminates at Stirling and does not serve Falkirk via Fallin.
- Forth Valley Hospital (FVH) is served by two direct connections to Stirling. The number and frequency of services to Forth Valley Hospital has changed with the removal of Services 59 and 60 resulting in no direct service from Callander to Forth Valley Hospital.

Table 7. Bus Services

	ROUTE	SERVICE	FREQUENCY	FROM/TO	DAYS
Raploch	Falkirk - Callander	59	1 hour	06:00-00:00	7 days
	Cromlix Road End - Bannockburn	C48	2 hours	07:00-17:00	Mon-Sat
	Raploch - City Centre - Community Hospital - St Ninians	57	30 min	07:30-07:30	7 days
Cornton	City Centre - Cornton - Bridge of Allan - University	54	30 min	06:00-23:00	7 days
	Cromlix Road End - Bannockburn	C48	2 hours	07:00-17:00	Mon-Sat
Cowie	Stirling - Menstrie - Tillicoultry - Sauchie - Alloa	52	30 min	06:00-23:00	7 days
	Alloa - Tullibody - Stirling - Bannockburn - Cowie	51	15 min	06:00-23:00	7 days
Fallin	Stirling - Fallin - Airth - Carronshore - Falkirk - Westquarter	F16	1 hr	06:00-21:00	7 days

	ROUTE	SERVICE	FREQUENCY	FROM/TO	DAYS
Plean	Stirling - Plean - Larbert - Falkirk - Linlithgow - Kirkliston - Edinburgh	38	30 min	06:00-00:00	7 days
Throsk	Stirling - Fallin - Airth - Carronshore - Falkirk - Westquarter	F16	1 hr	06:00-21:00	7 days
Forth Valley Royal Hospital	Stirling - Plean - Larbert - Falkirk - Linlithgow - Kirkliston - Edinburgh	38	30 min	06:00-00:00	7 days
	Cromlix Road End – Bannockburn	C48	2 hours	07:00-17:00	Mon-Sat

5.5 Scottish Household Survey

5.5.1 The Scottish Household Survey records use of buses and perception of public transport. In 2017, “everyday use or almost every day use” of local bus services in the Stirling Council area has declined by 2% when compared to 2014. This is in contrast to the Scottish figures which have remained relatively stable across all frequencies. This may reflect the reduction in services across the area. Note these figures are for the whole Stirling Council area, not the study area.

Table 8. Use of local Bus services in Stirling Council and Scotland from 2014– 2017 (%)²¹

	2014		2015		2017	
	Stirling	Scotland	Stirling	Scotland	Stirling	Scotland
Every day or almost every day	6.7	9.7	8.0	11.7	4.7	9.7
2-3 times per week	8.1	11.3	7.2	11.6	5.3	10.6
About once a week	6.3	7.6	10.0	8.1	9.1	7.9
About once a fortnight or once a month	11.1	13.6	12.1	14.3	9.7	14.7
Not used in past month	68.0	57.7	62.6	54.2	71.2	57.1

5.5.2 Table 9 presents the perception of local public transport services in Stirling compared to Scotland and shows that there has been a decline in the percentage of people who consider public transport to be very or fairly convenient from 76.1% in 2011/12 to 68% in 2017. The Scottish average remains consistent at 84.1% and 82.4%.

Table 9. Adults (16+) views on the convenience of public transport in their area (%)²²

	2011/12		2014		2017	
	Stirling	Scotland	Stirling	Scotland	Stirling	Scotland
Very convenient	33.6	47.9	36.9	48.2	32.1	43.8
Fairly convenient	42.5	36.2	40.0	35.4	35.9	38.6
Neither	5.2	4.0	5.3	4.6	18.1	5.7

²¹ SHS Local Area Analysis, <https://www2.gov.scot/Topics/Statistics/Browse/Transport-Travel/TablesPublications/TransportAcrossScotland>

²² SHS Local Area Analysis, <https://www2.gov.scot/Topics/Statistics/Browse/Transport-Travel/TablesPublications/TransportAcrossScotland>

	2011/12		2014		2017	
	Stirling	Scotland	Stirling	Scotland	Stirling	Scotland
Fairly inconvenient	6.1	4.6	6.9	4.9	5.2	5.7
Very inconvenient	8.3	3.8	4.8	3.1	5.6	3.5

5.5.3 As part of the consultation phase, attendees of the workshops, including bus operators, identified issues arising which impact on bus services including the low level of remuneration for concessionary passes and impact that rail timetable changes can have on bus operations. The electrification of the Glasgow-Dunblane route has resulted in rail timetable changes and subsequently requires bus services to be retimed to meet services. This has implications as timetable changes require a notice period of eight weeks and changing routes to meet rail services can have a knock-on impact on the rest of the route.

Key Point: Stirling has a reasonable commercial bus network, in particular, between Stirling City, Alloa, Stirling University and Falkirk via Larbert, however in recent years there has been:

- a reduction in service provision across some communities as services have been combined. TRACC modelling and SIMD data shows that although there is a reasonable bus network there are many locations within the study area with a below average access to employment, health and education.
- a decline in bus use
- a decline in perception of convenience.

5.6 Public Transport: Rail

Rail Passenger Numbers

- 5.6.1 The Office of Rail and Road (ORR) publish estimates of the total numbers of people entering, exiting and changing at each station in Great Britain each year and Figure 11 presents a time series of station estimates from 2004-05 for Stirling and Bridge of Allan (in the study area) and Dunblane (Stirling Council), Larbert (Falkirk Council) and Alloa (Clackmannanshire Council) stations which due to their proximity to the study area are expected to impact on travel choices within the Stirling City area. Stirling and Bridge of Allan have seen steady increases in rail patronage since 2004 with a small drop in entries and exits in 2016-17 (reflecting national trends).

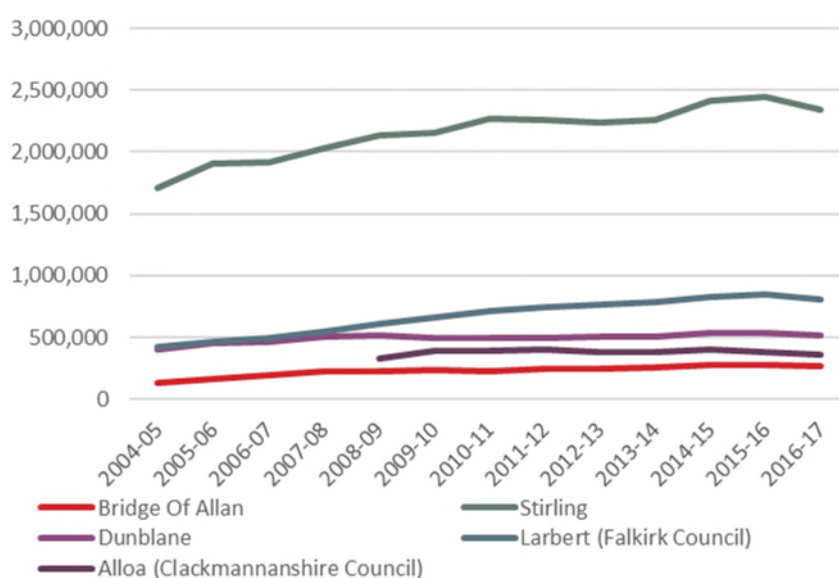


Figure 11. Office of Rail and Road Station Estimates Time Series²³

- 5.6.2 Data from the *Scottish Household Survey*, summarised in Table 10, indicates that the uptake of rail services in the Stirling Council area is slightly higher than that of the Scottish average, reflecting that the City and Bridge of Allan have access to a good rail service which is attractive to use, especially for trips into Edinburgh and Glasgow.

²³ Office of Rail and Road, <https://orr.gov.uk/statistics>

Table 10. Use of Local Train Services in Stirling Council and Scotland from 2014 – 2017 (%)²⁴

	2014		2015		2017	
	Stirling	Scotland	Stirling	Scotland	Stirling	Scotland
Every day or almost every day	2.3	2.2	0.2	2.1	2.0	2.6
2-3 times per week	4.7	2.1	4.8	2.5	2.1	2.2
About once a week	5.6	5.0	5.5	4.4	7.3	4.3
About once a fortnight or once a month	23.5	21.2	24.9	20.7	22.4	21.9
Not used in past month	63.9	69.5	64.6	70.2	66.1	69.0

Rail Services

- 5.6.3 The existing service provision (Dec 2019 timetable) is summarised in Table 11 with the number of service and journey time for a range of origin/destinations from/to Stirling stations in the AM peak. This gives an indication of the overall service and fares. Glasgow Queen Street has the better service and this reflects the Census Travel to Work data which has the highest number of workers travelling by rail to Glasgow (44%, 405) compared to Edinburgh (34%, 290 workers). Compared to typical coach and road journey times, rail compares favourably with 77 (Edinburgh) and 45 (Glasgow) minute coach journey times and 62 (Edinburgh) and 39 (Glasgow) minute road journey times from Stirling station.²⁵
- 5.6.4 As part of the Revolution in Rail, announced in 2016, 20,000 more seats and 200 new services are to be introduced across ScotRail services. In addition, journey times have improved on the corridor following the electrification of the Stirling, Alloa and Dunblane lines. Many of the services described above have benefited from increased carriages resulting in less crowding on routes and improved frequencies and journey times. In 2020 and 2021 further Revolution in Rail improvements are planned including the following²⁶:
- Half hourly service to be introduced between Stirling and Alloa (with most services continuing to / from Glasgow):
 - Hourly service between Inverness and Perth with services continuing to / from Edinburgh or Glasgow:
 - Hourly service between Dundee and Glasgow: and

²⁴ SHS Local Area Analysis, <https://www2.gov.scot/Topics/Statistics/Browse/Transport-Travel/TablesPublications/TransportAcrossScotland>

²⁵ Tactran, *Monitoring Framework 2018 Progress Report (Draft)*, 2018

²⁶ ScotRail consultation

- This final phase will enable average journey times on intercity services between the central belt and Aberdeen and Inverness to reduce by between 5 and 10 minutes.

Table 11. Dec 2019 Rail Provision (ScotRail)

ROUTE	NUMBER OF SERVICES BETWEEN 8-9AM	JOURNEY TIME	ANYTIME DAY RETURN
Stirling – Glasgow Queen Street (QS)	4	28-40 min	£14.20
Glasgow QS – Stirling	4	27-35 min	£14.20
Edinburgh Waverley (W) – Stirling	2	43-45 min	£16.10
Stirling – Edinburgh W	3	48-50 min	£16.10
Stirling - Perth	2	35-36 min	£16.80
Perth - Stirling	2	32-35 min	£16.80
Bridge of Allan – Glasgow QS	1	44min	£14.20
Bridge of Allan – Edinburgh W	2	53-57 min	£16.10

Cornton Level Crossing

- 5.6.5 The B823 Cornton Road currently crosses the Stirling - Perth railway line at Cornton and given Network Rail's commitment to meet its safety commitments to the Office of Rail and Road (ORR), it has announced plans to upgrade the crossing to a full-barrier controlled crossing. . The installation of the full barrier crossing is estimated to result in the closure of the B823 for approximately 50% of an hour with associated impacts on traffic, bus operations and active travel connections.

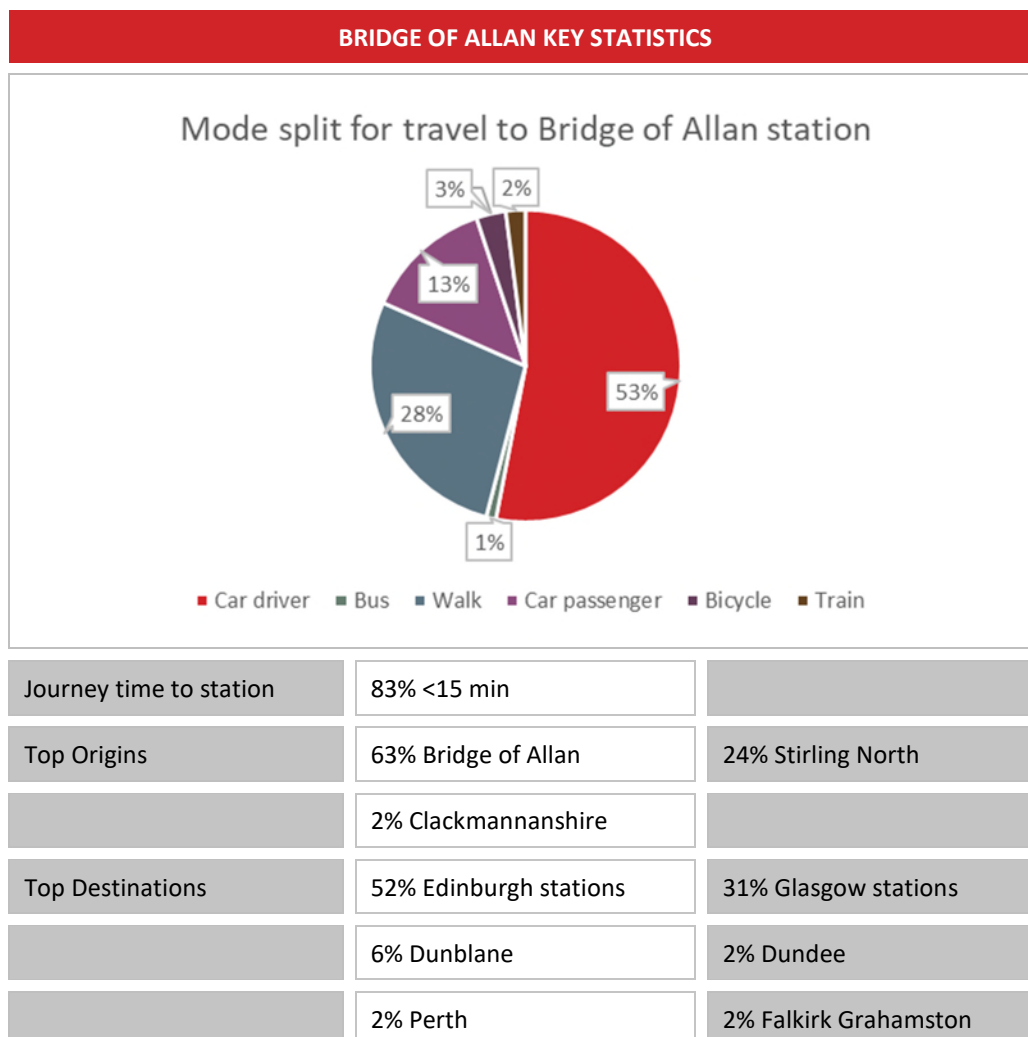
5.7 Rail User Surveys – Bridge of Allan and Stirling

- 5.7.1 Tactran, on behalf of Strathallan Community Rail Partnership (SCRIP), and Stirling Council commissioned SYSTRA in 2016 (before Revolution in Rail timetable changes) to organise AM peak period rail passenger travel surveys. The results provide a useful overview of how rail stations are used in the area, how people travel to the stations and where they come from. The results for Bridge of Allan and Stirling stations are summarised below.

Bridge of Allan

- 5.7.2 Bridge of Allan Rail Station is located on the western edge of the town. An unattended, free of charge 125 space car park is provided at the station and includes 9 parking spaces for blue badge holders. Cycle storage is available with 20 sheltered racked spaces and 4 lockers available. 248 passengers were observed during the survey period and 98 were interviewed. The car park is regularly operating at capacity, with overspill parking affecting nearby access roads and residential streets.
- 5.7.3 **Error! Reference source not found.** summarises the key statistics for Bridge of Allan which show that 66% of users arrive by car at Bridge of Allan station with 31% walking or cycling. 63% of those using the station travel from within Bridge of Allan a further 24% travelling from Stirling North and 2% from Clackmannanshire. The main reason for choosing Bridge of Allan station was that it was *Closest to Origin* (87%). Parking availability (6%) was also cited as a reason.

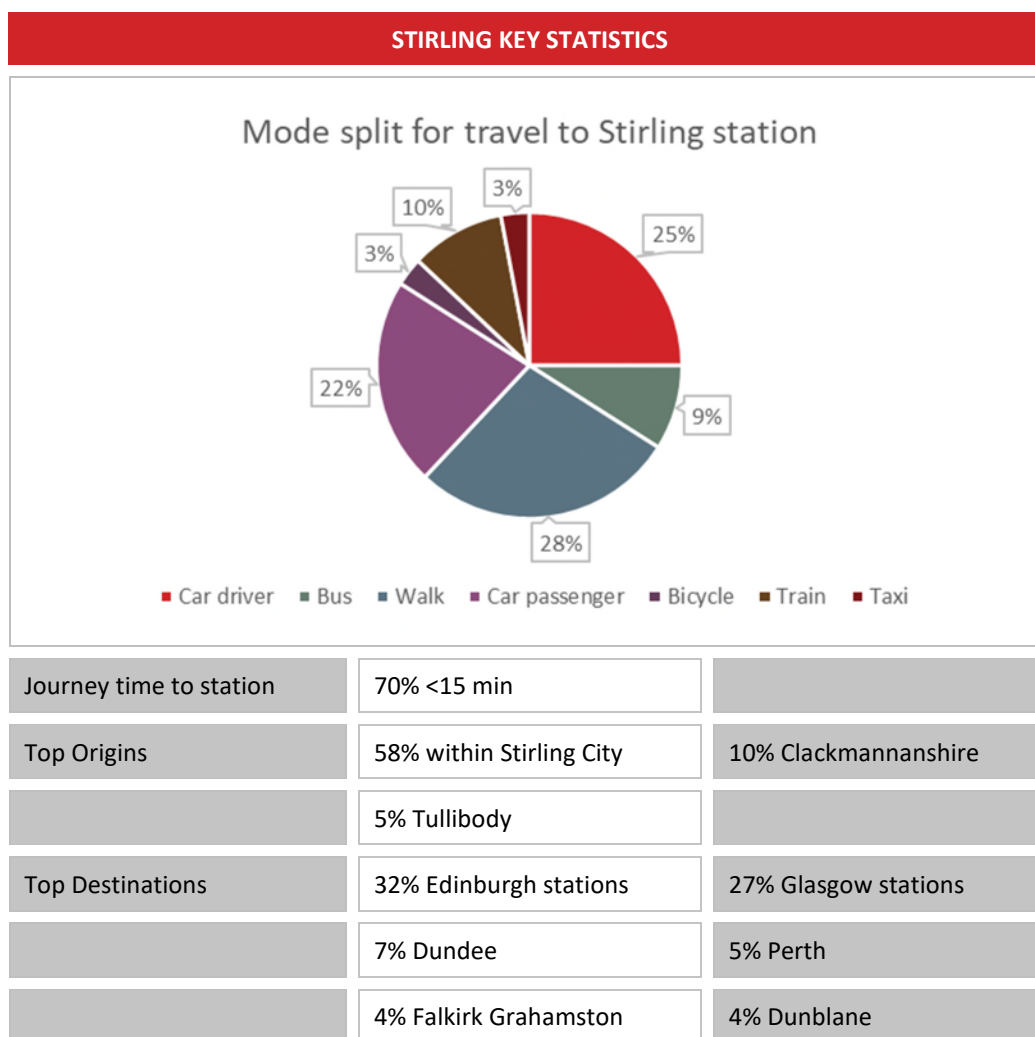
Table 12. Bridge of Allan Key Statistics



Rail User Surveys – Stirling

- 5.7.4 Stirling Rail Station is located in the centre of Stirling with a 100 space Season Ticket Holders car park provided to the north of the station including 3 parking spaces for blue badge holders. To the south is a Pay on Foot 177 space car park that includes 5 parking spaces for blue badge holders. Cycle storage is provided for 88 cycles. The two car parks are operating at capacity, with the nearby Forthside car park also being used by rail passengers.
- 5.7.5 Over the survey period, 1,299 passengers were observed boarding train services. Of the 1,299 225 were interviewed, giving an effective sample rate of 17%.
- 5.7.6 Table 13 summarises the key statistics for Stirling which show that 47% of users travel by car (passenger or driver) to Stirling with 58% travelling from within Stirling City. 10% of users surveyed travelled from Clackmannanshire with 52% of them travelling by car to Stirling station, 26% by train and 13% by bus.

Table 13. Stirling Key Statistics



5.8 Cycle Hire Scheme at Stirling and Bridge of Allan Stations

- 5.8.1 NextBike operate a cycle hire scheme at Stirling and Bridge of Allan stations with 60 bikes in locations across the city and at key destinations such as the University, College and Park and Ride sites. The scheme has proved popular with recent research showing it has the second highest simultaneous use of bikes in the UK (Behind Glasgow) of 11.5%²⁷.

5.9 Recent Public Transport Studies

Stirling Stations Study – Stirling Area Stations’ Feasibility (2017)

- 5.9.1 The DPMTAG transport appraisal Stirling Council undertook to inform their Local Development Plan highlighted requirements to investigate strategic transport interventions to prevent the congestion within the Stirling City area.
- 5.9.2 The Stirling Stations Study report reviewed whether there were any ‘physical show stoppers’ to potential strategic rail transport interventions of a Stirling South station and ‘relocated’ Bridge of Allan station and considered passenger demand forecasts for the options.
- 5.9.3 If and when appropriate, the data collected in these studies will be used in later stages of this study.

Tay Estuary Rail Study (2003)

- 5.9.4 A potential rail halt at Bannockburn emerged from the Scottish Executive’s Central Scotland Corridor Study and subsequent work. The intervention was investigated further through the Tay Estuary Rail Study (TERS) which was carried out by the regional transport partnership – Tactran. It was identified that at that time (i.e. pre-EGIP improvements) there was a physical barrier of the headway on some services which would be compounded further with additional stops and services should a rail halt be instated.
- 5.9.5 The Extended Tay Estuary Study (2009) identified a potential new station located with access from the A91 south of Stirling. Three potential locations were identified in the Engineering and Operations Report and discussed further. The report identified that there were concerns within the rail industry regarding performance impacts of a potential station at Bannockburn, both on the current and proposed EGIP timetables and the associated dis-benefits for existing users. The study catchment model estimated new patronage generated by a station at Bannockburn to be 63,000 journeys per annum providing revenue of £241k per annum (at 2008 prices). Actual demand at Bannockburn will be higher but this will be abstracted from Stirling – giving congestion and air quality benefits rather than economic and also potentially releasing car parking spaces at Stirling to meet currently suppressed demand, which may result in the generation of more rail journeys.
- 5.9.6 The study suggested that a new station would cost between £5.5m and £8m. Based on these 2009 figures, the new rail halt would not generate sufficient new revenue to cover journey time dis-benefits for existing passengers or the annual station operating cost.

²⁷ <https://www.bbc.co.uk/news/uk-scotland-39291959> accessed 28/03/19

- 5.9.7 The subsequent Stirling Stations Study suggested that following the signalling improvements instigated by the Edinburgh to Glasgow Improvement Programme (EGIP), both the headroom issue had been removed (although performance issues associated with shorter turnarounds may exist) and that public transport trips would increase by between 40-66,000 per year²⁸ with the introduction of a new station to the south of Stirling or relocated Bridge of Allan station.²⁹

South Stirling Park and Ride

- 5.9.8 Transport Scotland's Strategic Transport Projects Review in 2008 identified a Strategic Park & Ride site at Bannockburn serving Edinburgh, Glasgow, and Stirling. The site would be served by either rail services or express bus links to and from the city centres and areas of economic activity (STPR Project 8). This aligned with proposals in both the Stirling LTS and the Tactran RTS.
- 5.9.9 In 2010, a study investigated the feasibility of a new Park & Ride site to the south of Stirling. The study followed the principles of STAG. The study found that two potential sites could fulfil the objectives of a Park and Ride to the South of Stirling. The locations were:
- West of the A872 Glasgow Road between the Pirnhall Road crossroads and the Milton Roundabout; and
 - East of the A872 Glasgow Road just east of Hillhead.
- 5.9.10 The latter site was identified as the preferred location based on land use objectives.
- 5.9.11 The study concluded that a P&R facility located off the A872 Glasgow Road was likely to attract its patronage from local trips into and out of Stirling and also from those wanting to use strategic bus services to other major cities such as Edinburgh and Glasgow with predicted daily trips of 376 by 2022.

Key Points:

- Frequent rail services to/from Glasgow/Edinburgh and Stirling/Bridge of Allan.
- Services are well used with steady growth and a good proportions of commuter trips to these destinations using rail
- Rail journey times between Glasgow/Edinburgh and Stirling City are competitive with car
- EGIP and Revolution in Rail have increased frequency and capacity of rail services in the study area
- Two thirds of passengers access Bridge of Allan and Stirling stations by car, adding traffic to the surrounding road network
- Ten per cent of passengers using Stirling station travel from Clackmannanshire

²⁸ Rail patronage varies depending on the combination of stations tested and locations.

²⁹ Note: the rail halt was not included in the Edinburgh to Glasgow Improvement Programme (EGIP) as it did not conform to the core objectives of the project.

5.10 Road Network

Existing Situation

- 5.10.1 As part of the DPMTAG transport appraisal, a detailed review of the existing road situation was undertaken. This process identified a number of key pinch points on the network where queueing currently occurs during both peak periods, including:
- Craigs Roundabout: Queues can form on all arms but most notably on the Kerse Road (500m), Goosecroft Road (450m) and Wellgreen Road (330m) approaches.
 - Customs (or Clock) Roundabout: During the morning and evening peak period, long queues can form on the principal links, with traffic sometimes blocking back to the Sainsbury's junction to the west (350m) or to Dumyat Road to the north (860m).
 - Borestone Roundabout: Queues can manifest on most of the approaches during the peak periods; 500m on Burghmuir Road North, 370m on A9 Bannockburn Road and 840m on Borestone Crescent/Randolph Terrace.
 - The A91 experiences significant congestion during the peak periods, particularly the evening peak period with rolling queues often developing between most of the key connections; 2.27km southbound towards Pirnhall, 500m southbound approaching Millhall Roundabout, and 600-800m on all approaches to Manor Powis Roundabout.
 - M9 Junction 9 Pirnhall: Regularly experiences queues on the southbound approach out of Stirling and on the westbound off-ramp from the motorway.
 - M9 Junction 11 Keir Roundabout: The junction experiences long queues during the peak periods, most notably southbound during the PM peak from the A9 where the queue can typically reach 1.5-2.0km.

Future Situation

- 5.10.2 Figure 4 (Chapter 4) illustrated the key sites identified in Stirling Council's LDP. These sites will become major trip generators and attractors, and include South Stirling Gateway and Durieshill developments in close proximity to the congested Pirnhall junction, Prudential located next to Craigforth and Cowie, Fallin and Plean developments to the south east of the city. Each of these existing and planned attractors and generators is located on the outskirts of the city and will result in additional vehicular movements putting increasing pressure on the pinch points whether traffic is travelling into or out of Stirling City.
- 5.10.3 Figure 12 illustrates a potential Do-Nothing situation i.e. assigning the 2027 vehicular demands to an unchanged (2017) road network. It includes the potential impact of the generated traffic associated with the Local Development Plan, and suggests significant pressure will be placed on key routes across the city.
- 5.10.4 In Paramics, the yellow circles are termed 'hotspots' and reflected where traffic is essentially running at or near a queued state. With all of the development traffic loaded onto the road network, most of the internal routes in and around Stirling are predicted to be fully queued for large parts of the day. "Hotspots" are identified on key approaches to the city including the A91 North of Skeoch Road Roundabout, Pirnhall Road, A9 Falkirk Road and the A84 approach to the city.

- 5.10.1 The traffic modelling also indicated that 38-44% of all car trips in the model area have their origins or destinations outside the Stirling City area which reflects both the high proportion of people travelling into or out of Stirling City area to work (Stirling is a net importer of jobs) and also that the car is the dominant mode and this is likely to continue without intervention.

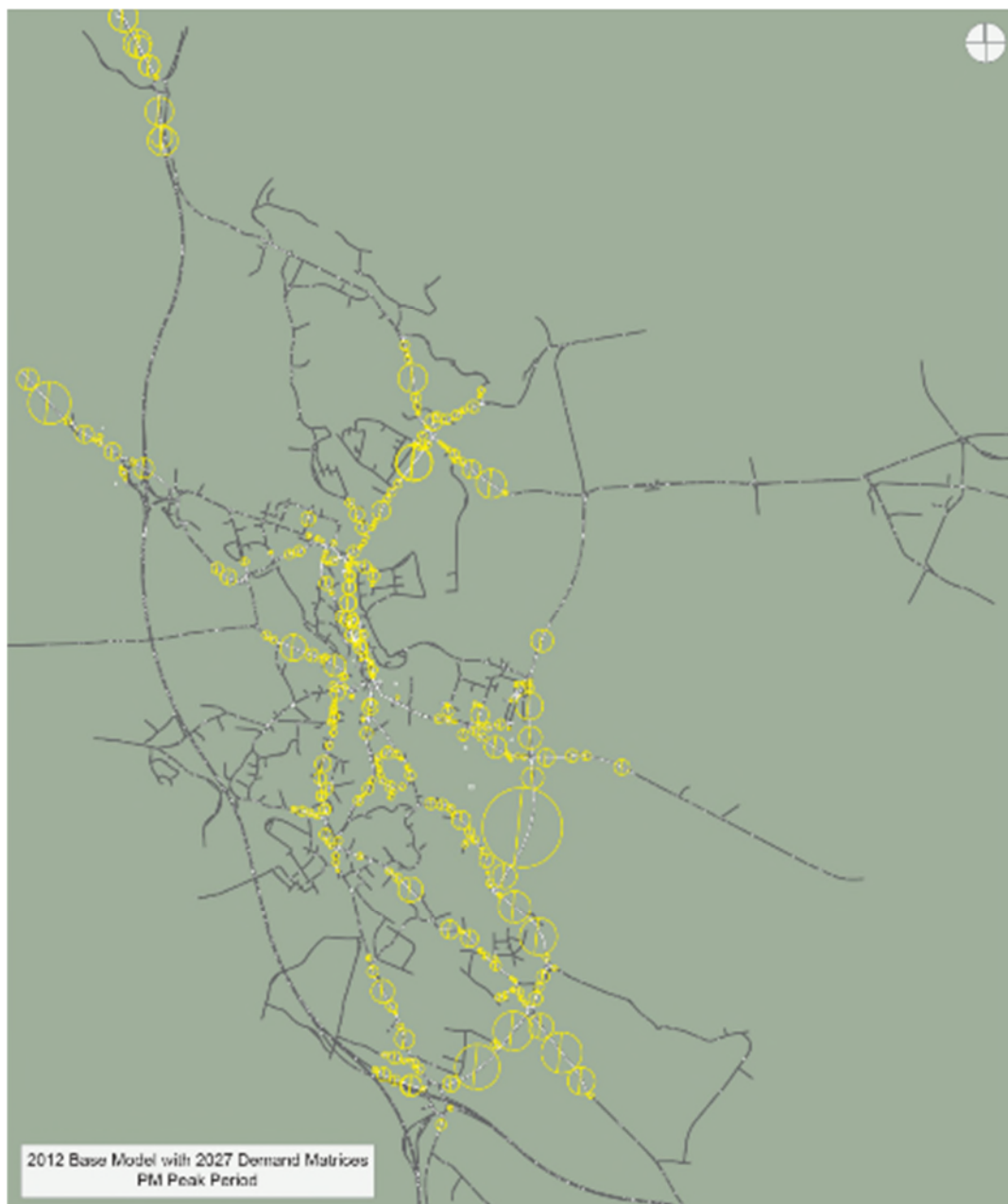


Figure 12. 2027 Do-Nothing³⁰

³⁰ Stirling Council, Stirling Local Development Plan DPMTAG Study, 2016

5.11 Journey Times Comparison

5.11.1 To further evidence the predicted impact on potential delays in Stirling, Table 14 summarises the predicted differences in average journey times for a number of key route sections in the study area (Appendix F presents details of all journey times). The figures compare 2017 and forecast future years of 2027 and 2037 with the Local Development Plan allocations in place and interventions identified in the DPMTAG Study referred to as Delivery Packages 1-3. Interventions include the following:

- DP1: Encourage sustainable travel choices (e.g. integrating the bus and rail station and improve city cycle network)
- DP2: Improve network efficiency (e.g. Upgrade improvements at junctions including Muirton, Millhall and Manor Powis roundabouts)
- DP3: Local network interventions (e.g. Completion of outer Ring Road with the Kildean to Airthrey Road link across the River Forth and phased dualling of A91)

5.11.2 Table 14 and Figure 13 show route sections with significant journey time increases between 2017 and 2037 (with DP1-3 interventions). The identified sections are on routes which act as gateways to the city and are located close to planned trip attractors and generators. This highlights the impact planned development is likely to have on vehicle traffic in the study area in future years even following mitigation in the form of DP1-3. Many of these routes also serve as access points to the current transport interchanges of Stirling Bus and Rail station and Castleview P&R highlighting that more sustainable transport options will also be impacted by the growing traffic issues in the study area.

5.11.3 No significant journey time increases were highlighted to the north of the study area which is directly related to the completion of outer Ring Road with the Kildean to Airthrey Road link across the River Forth relieving pressures to the north.

Table 14. PM Peak Hour Journey Times (2017, 2027 and 2037)

JOURNEY TIME COMPARISON PM PEAK HOUR	2017*	2027*	2037*
A - A9 NB from Plean	05:29	10:24	25:36
B - B9124 WB	03:48	10:07	19:50
C - Glasgow Rd SB	03:49	06:04	16:28
D - A872 NB	02:48	10:32	14:35
E - Snowden Pl / Queens Rd SB	02:16	02:21	02:32
F - Snowden Pl / Queens Rd NB	01:59	01:59	02:05
G - Millennium Way WB	02:46	06:04	16:48
H - A84 EB	01:55	04:33	15:38
I - A91(Manor Powis - Muirton) NB	02:01	11:32	18:15

JOURNEY TIME COMPARISON PM PEAK HOUR	2017*	2027*	2037*
J - A91 (Pirnhall - Greencornhills) SB	01:10	03:08	10:37

* mm:ss

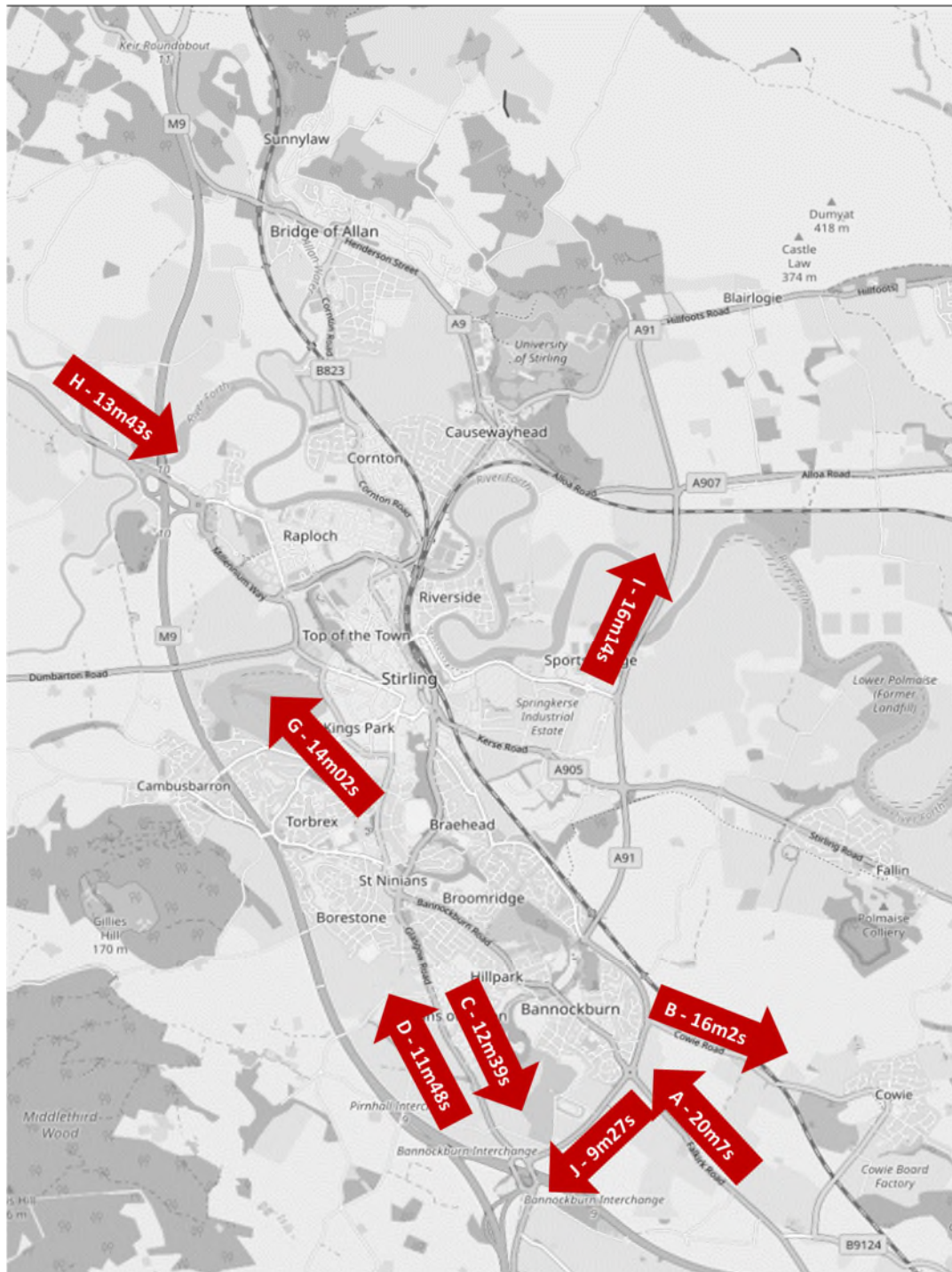


Figure 13. PM Peak Hour Change in Journey Times (2017 to 2037)

Key Point: Due to the limited number of routes through the Stirling City Area, there are a number of pinch points within, and at the gateways to, the Stirling City Area through which all traffic passes as identified in the “hotspots” above.

Traffic modelling indicates that development proposed within the LDP will significantly increase the journey times and queuing at these locations with consequential adverse impacts likely. Journey time comparisons show that routes on approach to the city and transport interchanges are forecast to have increased journey times even following the introduction of mitigation measures identified in the DPMTAG.

5.12 Parking

- 5.12.1 There are a total of [37 public car parks](#) within the Stirling Council area. These car parks are free or operate as Pay & Display. Appendix D summarise the availability of parking in the city centre operated by Stirling Council and other operators.
- 5.12.2 In total, there are around 3,400 public parking spaces in the city centre. There are many more public on and off-street parking spaces available across the city area, as well as substantial private parking at Prudential, Castle Business Park, University of Stirling, Burghmuir and Stirling retail parks. In addition to 276 parking spaces available at Stirling railway station, there are 102 parking spaces at Dunblane railway station and Bridge of Allan railway station currently has 154 spaces.
- 5.12.3 Given parking in the Stirling City Area is readily available and relatively low cost compared to alternative modes of transport, this situation makes it increasingly challenging to encourage a switch to the existing Park and Ride sites for trips into the City and sustainable travel options. For example, parking for a family of four at the Forthside Car Park is £1.40 compared to £3.60 from the Park and Ride (2 adults and 2 children).
- 5.12.4 Stirling Council have adopted a new car parking [policy and community parking management plan](#) to help redress this issue and bring forward a parking regime which both supports city centre retail while also promoting more sustainable modes for commuter travel.

Key Points: A charging regime is being introduced to ensure that Council operated public car parking charges complement the existing park and ride services. Nonetheless, there remains significant public car parking in the City Centre and private non-residential parking around the City.

5.13 Park & Ride

- 5.13.1 There are currently two Park & Ride (P&R) sites serving trips into Stirling City. The Castlevue site is at the west of Stirling City, just off Junction 10 of the M9 motorway and the Springkerse site is at the east of Stirling City, just off the A91 at Springkerse Retail Park. Both sites offer regular services to Stirling City Centre however there are no longer distance options (e.g. to Glasgow or Edinburgh).

5.13.2 The Stirling Council Annual Monitoring Statement provides a good source of key facts around the Springkerse and Castlevie P&R services:

- The Springkerse P&R facility provides parking for around 215 cars while Castlevie offer parking for up to 200 cars.
- Springkerse P&R opened in September 2006 followed by Castlevie P&R opening in September 2008. Usage peaked in 2010 and 2011 with 355,877 passenger journeys at Castlevie in 2010 and 141,422 in 2011 at Springkerse Figure 14.
- Usage has declined in recent years with a 17% reduction for Castlevie since 2010 and 63% reduction since 2011 for Springkerse.

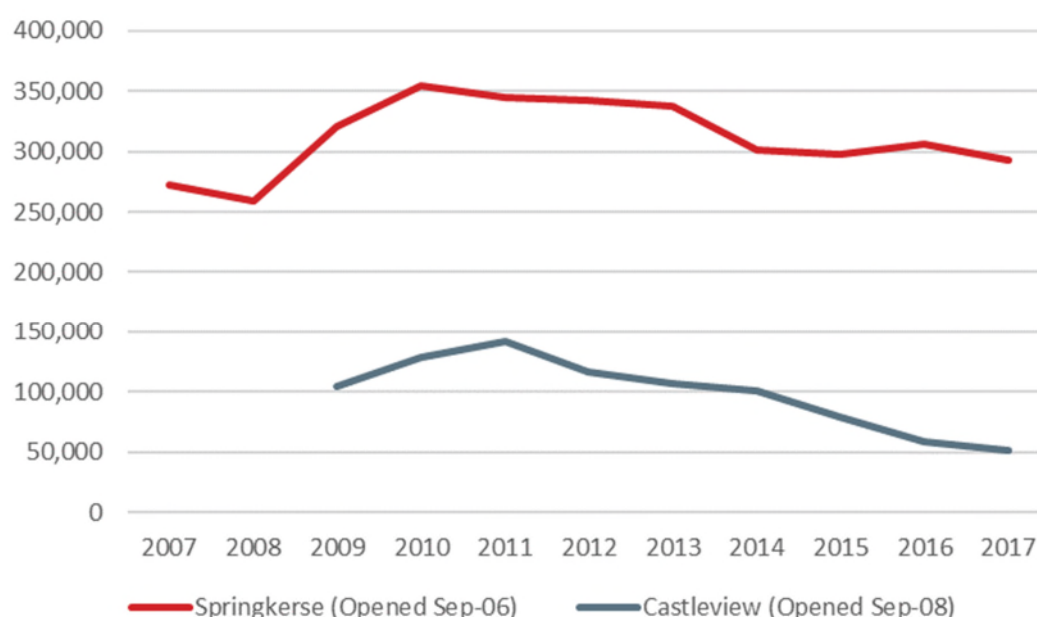


Figure 14. Park and Ride Use ³¹

5.13.3 As discussed previously, the parking availability in Stirling City impacts on the attractiveness of park and ride. The DPMTAG study compared the cost of using P&R with the cost of parking in Stirling railway station, Wellgreen, Goosecroft Road, Forthside, or Linden Avenue car park and found that the costs are comparable and therefore there is no incentive to encourage the use of the P&R facility. In addition, the modelling forecasts for Stirling show that congestion on the outskirts of the city is expected to grow which would impact on the attractiveness of Springkerse as a park and ride.

5.13.4 This situation makes it increasingly challenging to encourage a switch to Park and Ride and sustainable travel options with traffic contributing to entering and leaving the area. In 2010 a Parking Strategy was introduced in Stirling to simplify parking charges which resulted in a significant reduction in charges for some parking areas, for example, Linden Avenue and Forthside car parks were reduced from £2.60 to £1 in 2010. These parking changes coincided with a drop in patronage at both park and ride sites.

³¹ Stirling Council data

5.13.5 Stirling Council subsequently adopted a new Parking Strategy in 2019 that aims to support park and ride, therefore, this study will focus on complementary measures to induce a modal shift into and out of the Stirling City Area whilst reinforcing the need to maintain a complementary parking strategy.

Key Points: Two local Park & Ride sites currently exist enabling a transfer from car to bus for trips into the city. Whilst usage has declined in recent years Stirling Council has adopted a new parking strategy, and consequential charging regime, to support park and ride usage.

5.14 Summary of Transport Network

5.14.1 There are a number of existing transport problems and issues in Stirling and the surrounding settlements that act as a barrier to movement and as a disincentive to travel by sustainable and active modes:

- Rail summary:
 - Frequent services to/from Glasgow/Edinburgh and Stirling/Bridge of Allan.
 - Services are well used with steady growth and a good proportions of commuter trips to these destinations using rail
 - Rail journey times between Glasgow/Edinburgh and Stirling City are competitive with car
 - EGIP and Revolution in Rail have increased frequency and capacity of rail services in the study area
 - Two thirds of passengers access bridge of Allan and Stirling stations by car, adding traffic to the surrounding road network
 - Ten per cent of passengers using Stirling station travel from Clackmannanshire.
- Road summary:
 - Due to the limited number of routes (six) through Stirling City Area, there are a number of pinch points within, and at the gateways to, the Stirling city area through which all traffic passes. Traffic modelling indicates that development proposed within the LDP will significantly increase the journey times and queuing at these locations with consequential adverse impacts likely.
 - Future year traffic modelling has also indicated that the generated traffic associated with the LDP development sites will place added pressure on the local and strategic transport networks, particularly in the south and east of Stirling.
 - The traffic model suggests 38-44% of all car trips in the model area are external-internal trips which reflects that Stirling is a net importer of jobs and car is the dominant mode.
 - The projected LDP development, particularly at locations at and around the edge of the City, will see the amount of traffic in the city grow by around 24% compounding the problems at already busy junctions. In particular:
 - A91 corridor from Manor Powis to M9 Junction 9 Pirnhall
 - Craigforth/Keir
 - Clock Roundabout/Causewayhead Road

- Craigs roundabout
 - Main routes into the City Centre restricting access to rail and coach services the Stirling Rail and Bus Stations.
- Bus summary:
 - Stirling has a reasonable commercial bus network, in particular, between Stirling City, Alloa, Stirling University and Falkirk via Larbert, however in recent years there has been a:
 - reduction in service provision across some communities as services have been combined. TRACC modelling and SIMD data shows that although there are a reasonable bus services on key corridors there are many locations within the study area with a below average access to employment, health and education.
 - decline in bus use
 - decline in perception of convenience.
- Park and Ride summary:
 - Two Local park and ride sites currently exist enabling a transfer from car to bus for trips into the city. Whilst usage has declined in recent years Stirling Council has adopted a new parking strategy, and consequential charging regime, to support park and ride usage.

6. CONSULTATION

6.1 Workshop Consultation

6.1.1 Participation and consultation are key elements of a STAG study and ensure the interests of stakeholders are considered in an inclusive, open, transparent and appropriate manner. In particular, consultation is useful in the identification and analysis of transport problems and opportunities which forms the starting point of any STAG study.

6.1.2 For this purpose, three workshops were held:

- A steering group workshop was held with representatives from Stirling Council, Clackmannanshire Council, Sustrans, Sustrans, Transport Scotland, Tactran and Network Rail on January 16th 2019
- Two stakeholder workshops held on February 20th and 21st 2019 attended by local community councils³², bus and taxi operators, local councillors and the Strathallan Community Rail Partnership.

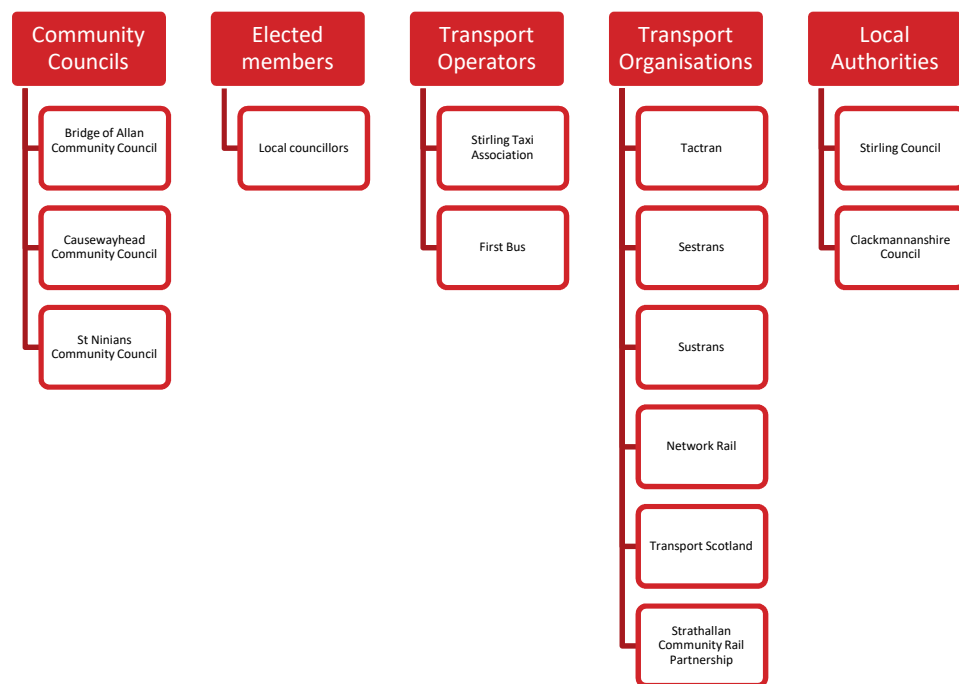


Figure 15. Stakeholders Consulted

6.1.3 The workshops were well attended with a combined attendance of 20-30 persons attending the wider stakeholder sessions. Following a brief introduction to the study, participants were invited to consider the problems, opportunities, issues and constraints across the study area, before going on to discuss a range of potential interventions to be appraised as part of the study. Full details of the sessions are included in Appendices A and B.

³² At the time of the workshop there were no Community Councils covering the Eastern Villages.

6.1.4 In addition, some of those organisations unable to attend the stakeholder workshops including Forth Valley College, Stirling University and Forth Valley College were contacted by email, phone, or face to face to gather views.

6.1.5 A number of themes emerged from the three events including the following:

- Convenience of public transport including cost and availability:
 - A number of stakeholders highlighted that access to public transport services ranged across the study area. This included:
 - the location of stations in relation to resident populations resulting in driving to stations and
 - accessibility of buses and rail stations (Bridge of Allan in particular). Bus timetabling was raised by a problem for both operators and users, in particular services outwith the peak and timetable changes impacting on connections to bus services.
 - These comments are supported by survey data (Section 5.7) showing that stations have a high drive in catchment.
 - Ticketing and fare costs were raised by a number of stakeholders highlighting that ticketing structures are complex and multi-modal ticketing systems would make public transport more attractive (Table 11).
 - Reliability issues were also highlighted, in particular increased congestion impacting on journey times and the attractiveness of the Park and Ride sites (5.10).
- Mixed views on parking in the study area:
 - There were mixed views on parking in the study area with problem parking in vicinity of Bridge of Allan station and Stirling University but an acknowledgement that the lack of parking enforcement in the city can attract drivers in (5.12).
- Perception of congestion on a number of routes impacting on travel through the city:
 - A number of stakeholders raised issues of congestion on a number of approaches including Craigforth, Clock Roundabout and the A91. As above, this impacts on the attractiveness of bus travel (5.10).

6.1.6 For a full list of the outcomes from the stakeholder events, refer to Appendices A and B.

6.2 Stirling Council Local Transport Strategy Consultation

6.2.1 In addition to the workshops, the study has been informed by Stirling Council's own consultation exercise undertaken as part of the Local Transport Strategy.

6.2.2 The Stirling Council Local Transport Strategy (LTS) was updated in 2016 and included an extensive consultation exercise which has informed this Case for Change process. The approach included engaging with key stakeholder organisations, and residents via a series of meetings, public consultation events including an online survey which received over 500 responses. This consultation exercise has been used to inform the baseline reporting, problems, opportunities, issues and constraints section of this study and supported by further

consultation undertaken with key stakeholders including community councils and transport operators.

- 6.2.3 A number of key issues emerged from the consultation exercise and give an insight into how travel is portrayed by residents in the study area.
- 6.2.4 On the topic of increased travel times, the majority of 290 respondents (75%) would be prepared to accept no more than a 10 minute increase in bus or car journey time because of an increase in traffic congestion.
- 6.2.5 When asked what they would be prepared to do to minimise congestion in the long term 56% of 304 respondents stated they would use public transport more often, 48% said they would cycle more often, 38% said they would walk more often and 20% said they would be travel less often, if their journeys permitted.
- 6.2.6 Of those who travel by car, 49% do have the option of using a different mode of travel, for example: walk; cycle; car share; use bus or rail and could make this travel choice five days a week (42% down to one day a week (12%).
- 6.2.7 47% of responded stated that “nothing” would encourage them to use park and ride with reasons including time constraints, lack of trust in buses, inconvenient and, in some cases, the respondent already used park and ride. Of those who would consider park and ride a more reliable bus service, parking in city centre being limited/ expensive and a Nextbike station at the park and ride were cited as changes which would encourage them to try P&R.

7. PROBLEMS, OPPORTUNITIES, ISSUES AND CONSTRAINTS

7.1 Overview

- 7.1.1 The identification of actual and perceived problems and opportunities form the starting point and ultimately the rationale for a STAG study. It is important for problems and opportunities to be considered in the wider context, and issues and constraints are therefore also taken into consideration.
- 7.1.2 Problems, Opportunities, Issues and Constraints, as defined by the STAG guidance, are:
- Problems: existing and future problems with the transport system which result in a shortfall in meeting objectives, e.g. lengthy journey times, poor transport access to services;
 - Opportunities: possibilities to improve the transport system and the way it is used, e.g. improve journey times;
 - Issues: factors that influence how people use the transport networks and therefore may be underlying issues that influence the problems and opportunities
 - Constraints: the bounds within which the study is being undertaken, e.g. available funding, policy or environmental designations.
- 7.1.3 Previous work should always form part of the proportionate approach to STAG appraisal, avoiding unnecessary and costly duplication of effort. The DPMTAG study, completed in 2016, included a thorough review of baseline data and identification of problems, opportunities, issues and constraints. These have been used as the starting point and amended, added to or updated, where appropriate.
- 7.1.4 The identification of problems, opportunities, issues and constraints has been informed by the outcomes from the Socio-Economic Context and Transport Network chapters.

7.2 Problems

Transport network constrains Local Development Plan and City Region Deal aspirations

- 7.2.1 As described in Section 1.2, Stirling Council undertook a transport appraisal to inform its emerging Local Development Plan and Local Transport Strategy. This appraisal considered the transport impacts of the development proposals proposed for the LDP. Modelling was undertaken and identified that the impacts of travel generated by the development and traffic growth within the area would lead to significant increases in traffic and associated journey time increases.
- 7.2.2 Across a range of journey time routes within the study area there are forecast to be significant increases in journey times by 2027 and 2037, so much so that the model was unable to run during some time periods without interventions in place.
- 7.2.3 The modelling outcome was that the impacts of the travel demands generated by 74% of the proposed housing (to 2027, as defined in the LDP) could be accommodated by measures that the Council could implement. These packages of measures included everything the Council

could reasonably implement in relation to: modal shift, local road capacity improvements, new local roads.

- 7.2.4 The study concluded that to enable full build out of the LDP to 2037 (or 100% of proposed housing), and limit the constraints on development, additional modal shift and road capacity improvements would be required over and above local modal shift and local road capacity improvements e.g. improvements to existing motorway junctions and additional motorway junction and strategic park and ride sites on the rail corridor to the north and south of the city. Without these further interventions, the development plans for the study area would be constrained by the transport network.
- 7.2.5 The success and competitiveness of the City Region Deal proposals within Stirling City are likely to be undermined by congestion affects (e.g. queuing and increased journey time) around the edge of the city by decreasing their accessibility to those outwith the city.
- 7.2.6 This evidence aligns with the Draft National Transport Strategy which acknowledges that:

Our cities are growing. A limited supply of affordable city centre housing has led to more suburban areas with greater numbers of housing developments impacting on travel needs and patterns, particularly to city centres...More vehicles also means more congestion, and businesses located in or supplying firms in city centres are seeing increasing journey times, thus impacting on costs and overall business performance. Due to these congestion effects, there is a growing recognition of the need to tackle the volume of vehicles through measures to effectively manage demand and encourage more sustainable travel options.

Key Point: Transport network constrains Local Development Plan and City Region Deal aspirations. DPMTAG modelling shows that traffic problems arising from growth can only be eased by both increased road capacity and maximising modal shift from car.

Use of existing bus based Park and Ride declining, exacerbating traffic issues

- 7.2.7 There are currently two bus based local Park & Ride sites in Stirling as described in section 6.14.
- 7.2.8 The current decline in use at the bus P&R facilities is not impacting significantly on travel in the area, however, as highlighted above, traffic growth is anticipated to constrain development, and this growth in traffic alongside a declining use of bus P&R will exacerbate the situation in the coming years. It is therefore important to understand what is contributing to the decline in use.
- 7.2.9 A number of factors are considered to have impacted on the decline in use including:
- The termination of the Castlevue tourist bus service to Stirling Council; and
 - Availability and low cost of parking in Stirling City affecting the attractiveness of Park and Ride.
- 7.2.10 It is hoped however that this issue will be addressed by introducing Stirling's Parking Policy & Community Parking Management Plans.

7.2.11 In addition, future year traffic modelling forecasts for Stirling suggest that:

- Delays on the outskirts of the city are expected to increase around the Springkerse P&R. This would impact on the attractiveness of Springkerse as a Park and Ride option, with the P&R site lying within the congested area.
- Delays on the main corridors into the city centre will decrease the attractiveness of bus based park and ride. Due to the nature of the corridors, there are limited opportunities to introduce bus priority measures along the route and at junctions along the route.

Key Point: Use of existing bus based Park and Ride declining, which if not addressed could exacerbate traffic issues in the future.

Access to jobs, services and opportunities:

7.2.12 Sections 4.4 (Deprivation), 4.5 (Car availability) and 5.3 (Access to employment) identify that 14 of the study area's 69 SIMD zones are within the 20% most deprived in Scotland using the overall index of deprivation and a number of areas, including Cowie are considered to have low Access to Services (20-40% most deprived). This reflects the bus service provision and interchange opportunities for these communities.

7.2.13 Accessibility modelling (see section 5.3) shows that, with regards to access to major employment sites with 30 minutes travel time by public transport, Cowie, Bannockburn, Cultenhove, Causewayhead and parts of Plean can access three employment centres within 30 minutes compared to the 5-9 centres the majority of the study area can access. These areas contain most of the 14 datazones within the study area that are within the lowest 20% of datazones as defined by SIMD.

7.2.14 The accessibility issues highlighted above have been exacerbated further by recent changes to the bus network (see section 5.4). A comparison between the bus network in 2015 and 2018 shows that there have been a large number of services withdrawn from the network or revised resulting in them no longer serving particular communities including the following:

- Services through Throsk have changed significantly with the removal of the Falkirk to Callander and Throsk to Stirling services replaced with the F16. This represents a reduction in coverage and frequency for Throsk residents.
- Service 60, Stenhousemuir to Clackmannan, no longer operates.
- Service 38 Stirling to Falkirk no longer serves Cowie.
- The frequency of the F16 has recently reduced and Service 59 now terminates at Stirling and does not cover Falkirk via Fallin.

7.2.15 Services operate from the various communities to Stirling City but the reduction in services highlights the lack of connectivity experienced by some communities, including the Eastern Villages, to opportunities beyond Stirling. Consultees reported an increased number of students driving from Clackmannanshire to education destinations in Stirling due to reductions in bus services with Forth Valley College identifying the connectivity of bus/rail services beyond Stirling as reducing the attractiveness of attending the college. Cost and convenience of interchange between modes was also identified.

- 7.2.16 As part of the consultation phase, attendees of the workshops, including bus operators, identified issues which impact on bus services including the low level of remuneration for concessionary passes and the impact that rail timetable changes can have on bus operations. The electrification of the Stirling-Dunblane-Alloa line has resulted in rail timetable changes and subsequently requires bus services to be retimed to meet rail services. This has implications as timetable changes require a notice period of eight weeks and changing routes to meet rail services can have a knock-on impact on the rest of the route.
- 7.2.17 The problem is further exacerbated for those in the Eastern Villages whose ability to access opportunities (e.g. employment, education and training plus strategic interchange) is limited by the barriers to active travel such as the distance to Stirling City and the crossing of the A91.

Key Points:

Areas of deprivation in the communities of Plean, Cowie, Fallin, Cornton and Bannockburn are remote from interchange opportunities and have a lower level of access to services compared to the local and national average.

This is exacerbated by a limited and declining bus service preventing effective interchange opportunities for trips to wider employment opportunities.

Access to Rail Stations

- 7.2.18 Tactran, on behalf of Strathallan Community Rail Partnership (SCRP), commissioned SYSTRA in 2016 to organise AM peak period rail passenger travel surveys in the SCRPA area. The results provide a useful overview of how rail stations are used in the area, how people travel to the stations and where they come from. The key statistics show that the drive-in proportion for both Bridge of Allan and Stirling stations is high with 66% of users arriving by car at Bridge of Allan and 47% at Stirling stations. This is contributing to parking capacity problems at Bridge of Allan in particular, with consultees reporting overflow parking problems in the surrounding area.
- 7.2.19 To Bridge of Allan station, 63% of all passengers are travelling from within Bridge of Allan and a further 24% travelling from Stirling North. At Stirling station 58% travel from within Stirling City with a further 10% travelling from Clackmannanshire. Of those travelling from Clackmannanshire, 52% of them travel by car to Stirling station, 26% by train and 13% by bus.
- 7.2.20 This data shows that a high proportion of short trips to Bridge of Allan are completed by car and Stirling station attracts car trips into the city centre, including car trips from Clackmannanshire (bringing traffic into the city centre via either the congested Clock or Craigs Roundabouts). In the AM peak, car park occupancy was at 88% at Stirling and 94% at Bridge of Allan³³ however feedback from consultation suggests that the Bridge of Allan car park is regularly overcapacity with commuter parking on residential streets.
- 7.2.21 Although the problems at Bridge of Allan (parking issues) and Stirling (increased traffic in Stirling city centre) manifest themselves in different ways at each location, the root cause of the problem is the same – accessibility of the station and mode choice.

³³ Rail User Surveys - 2016

- 7.2.22 The dominance of the car in accessing rail opportunities is likely to be a consequence of many factors including:
- evening bus service availability;
 - coordination of timetables and; and
 - the ability to provide bus priority on corridors linking to Stirling station.
- 7.2.23 The ability to use active travel to access the rail interchange opportunities is also limited from Plean, Cowie and Fallin due to both the distance from these locations as well as the physical barrier of the motorway.

Key Point: Current access to rail stations and car park capacities are contributing to road traffic on approaches to Stirling station and parking issues at Bridge of Allan station. The root cause of the problem is accessibility of the station and mode choice. The extent of bus interchange at stations (especially off-peak), severance issues for active travel from eastern villages, and station parking put constraints on the ability to get more people onto the rail network in the study area.

7.3 Opportunities

Trip attractors and planned developments are located on the edge of Stirling City providing the opportunity to shift strategic trips to sustainable modes.

- 7.3.1 Many of Stirling's key trip attractors and generators, (see section 4.1), and development sites, are located close to major road junctions and the rail network or are located outside of the city. These include Prudential and Forth Valley College located at M9 Junction 10 Craigforth and South Stirling Gateway and Durieshill and are expected to have a significant impact on travel demands on the southern flank of the city.
- 7.3.2 The location of these existing and planned trip attractors and generators on the outskirts of the city could provide an opportunity to capture car trips travelling on the strategic road network on bus and coach and rail network.
- 7.3.3 In addition to serving these planned developments there are a number of communities with below average access to services, but which have also been identified as residential growth areas. These communities are also located on or near strategic routes (e.g. Plean, Cowie, Fallin) and could benefit from these improved strategic connections.
- 7.3.4 Modelling undertaken to assess the impact of the planned developments showed that 44% (AM) to 38% (PM) of car trips had either their origin or destination outside the Stirling City area and are therefore strategic in nature. These trips could be captured via park and ride/choose opportunities on the outskirts of the city.
- 7.3.5 Figure 16 shows the location of these trip attractors and highlights the potential for connecting to these sites on the outskirts of Stirling or key approach roads into the centre.

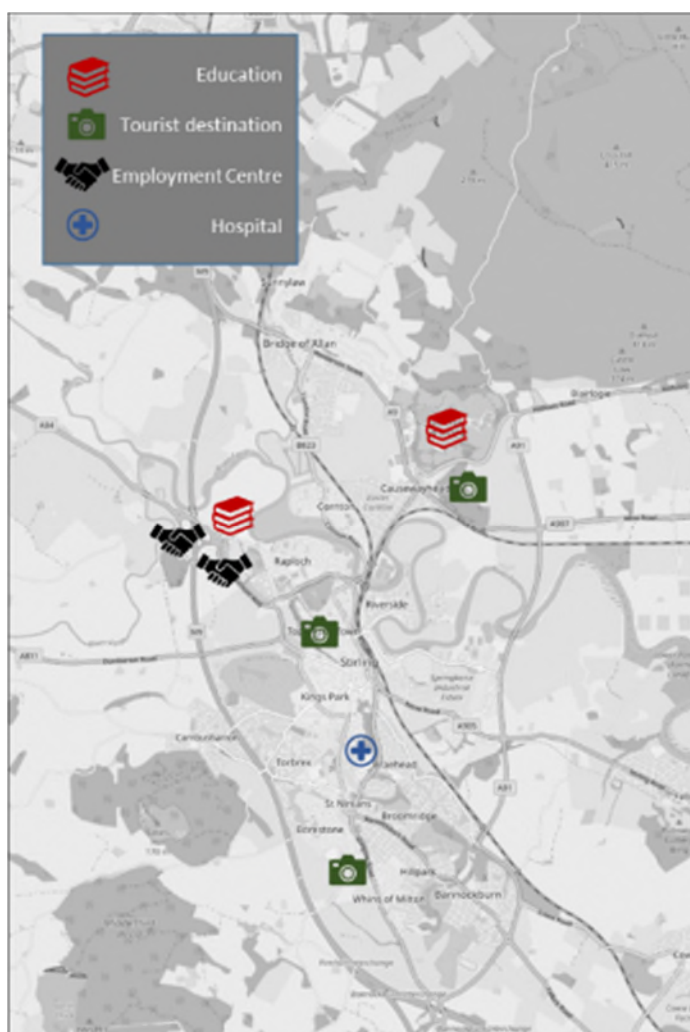


Figure 16. Stirling Trip Attractors

Stirling's ability to be used as a strategic park and ride site for major events at Gleneagles and across central Scotland

- 7.3.6 Stirling's central location in Scotland makes it suitable to act as a strategic Park and Ride or active travel hub interchange for major events in central Scotland, for example as was the case for the 2014 Ryder Cup and 2019 Solheim Cup at Gleneagles. This could reduce congestion on the approaches to Glasgow on the M80 and Edinburgh on the M9.

Existing rail and long-distance bus/coach services

- 7.3.7 There are currently two bus-based P&R sites in Stirling; Castlevie and Springkerse. These sites are served by local bus services yet long distance bus and coach services regularly pass in close proximity to existing Castlevie P&R site adjacent to M9 (J10) and potential park and ride sites. Examples of existing services which could be altered to serve existing or new park and ride sites include:

- Citylink/Megabus M8, M9 and 909 services – Serving Stirling and depending on the service, coaches travel in along the A872 and onwards directly to the M9 (when heading north), to Bridge of Allan or return south to Glasgow or Edinburgh;
- Citylink/Megabus M10 service – Glasgow to Inverness along the M9 corridor;
- First services 38 and X36 from Falkirk and Denny along Falkirk/Bannockburn Road and Glasgow Road to Stirling; and
- First Services 51 and 52 from Clackmannanshire to Stirling along Hillfoots Road and Alloa Road.

7.3.8 These long-distance services could be utilised to increase the number of accessible destinations both into the Stirling City Area and also as an interchange for strategic trips and to a wider range of local destinations.

7.3.9 With regard to rail, again, many of the existing and proposed trip generators lie to the north and south of the City in close proximity to rail lines with regular services to Edinburgh, Glasgow and Perth (see 5.6.3).

7.4 Issues

Low Access to Car in Some Areas including Plean, Fallin, Cowie, Cornton and Raploch

7.4.1 Access to car across the study area is marginally lower than the Scottish average however this masks variations across the area. Plean, Fallin, Cowie, Cornton and Raploch are highlighted as having significantly above the Scottish average with up to 45% not having access to a car. Coupled with the public transport provisions discussed above this limits the access to jobs, services and opportunities for these communities.

Commuter Movements Impacting on the road network

7.4.2 The Scottish Census 2011 provides details of origins and destinations of workers. Sixty-three per cent of those working in the Study Area travel in from outwith the area and 40 of residents in the study area commute out of the area. The data shows that the Stirling City Area is a net importer of employees putting a strain on the transport network.

7.4.3 12,108 (37%) of workers come from within the Stirling City Area (excluding working from home) and the majority of the remaining workforce travel from Falkirk (18%) and Clackmannanshire (16%). Car or van driver or passenger is the most common mode of transport for all origins including 60% of all Stirling City Area residents travelling to work in the study area. 49% of Stirling City Area residents work in the study area with Glasgow, Falkirk and Edinburgh also attracting employees³⁴. These destinations show that the majority of the movements are to and from the south. With car being the dominant mode of travel, this puts pressure on the M9, M80 and associated junctions.

7.4.4 In addition, Clackmannanshire residents travel through Stirling Council on road and rail links to access jobs in Glasgow (2% of Clackmannanshire residents), North Lanarkshire (1%), and

³⁴ 11% work from home.

Falkirk (7%). Proposed housing growth in Clackmannanshire and Stirling Council will continue to put increasing demand of travel into and through the study area.

Impact on Existing Passengers

7.4.5 The introduction of a new service or stop, be it rail, bus or coach, may have an impact on existing users. The impact on existing users can arise in two ways:

- The introduction of a new stop may result in a service reduction at another community on the bus route or rail line to balance the additional journey time. In the case of bus routes, consultation would not be required to make this change.
- An additional stop will also result in additional journey time for existing passengers. For rail, this is anticipated to be between two and three minutes.

7.5 Constraints

Timing

- Interventions need to be introduced by 74% of LDP build out (LDP predicts this to be 2027) to help maintain accessibility of Stirling City area as transport modelling indicates significantly increased delays at this point.

Physical Constraints

- Historical battlefield areas throughout Stirling Council.
- The River Forth travelling through Stirling and the surrounding areas.

Timetable / signalling will constrain ability to introduce new stops

7.5.1 A previous study³⁵ reviewed the impacts of a new rail station on timetabling. The analysis was based on the assumption that the Stirling 'local' services (which are Dunblane – Edinburgh and Alloa/Stirling – Glasgow Queen St) could call at a station on the line. This analysis was undertaken prior to the release of the December 2018 timetable.

7.5.2 The analysis assumed an additional two minutes extra time added to the Larbert to Stirling (and reverse) running times to allow for the call at a new station. As a result of the change, the turnaround time at Alloa or Dunblane would need to be reduced. Subject to the turn around windows at Alloa and/or Dunblane resulting from the Revolution in Rail timetable changes this may reduce the turnaround window, below the five minutes recommended minimum allowed in the Network Rail Planning Rules. It could also limit the possibility of extending further services to Alloa.

³⁵ Stirling Stations Study – Stirling Area Stations' Feasibility (2017)

Implications of Full Barrier Crossing at Cornton.

- 7.5.3 The B823 Cornton Road currently crosses the railway line at Cornton and given Network Rail's commitment to meet its safety commitments to the Office of Rail and Road (ORR), it has announced plans for the installation of an upgraded crossing to full-barrier control. The location of the crossing is likely to affect options associated with rail stations on that section of the line (see para 6.6.5).

7.6 Summary

- 7.6.1 A baseline review of transport data and national, regional and local planning policy has led to the identification of a number of problems, opportunities, issues and constraints.
- 7.6.2 These show a growing and attractive city which draws employees, tourists and shoppers to the area but with significant increases in journey times and delays forecast as a consequence of the build out of the Local Development Plan proposals across a City area with limited route choices. Traffic modelling for Stirling's LDP has shown that a significant modal shift away from single occupancy car use is required for both trips within and into and out of the City area.
- 7.6.3 Many of the existing major trip generators are to the western and eastern edges of the study area, while most of the development proposals are on the southern and eastern edges of the study area. In addition, 38%-44% of current car trips have their origin or destination outwith the City area.
- 7.6.4 Areas with below average access to employment and low car ownership have also been identified in the Eastern Villages and Cornton. The Eastern Villages have also been identified in the LDP as locations for significant housing development.
- 7.6.5 There is both a need to enable a modal shift for current strategic trips entering and leaving the Stirling City area, as well as an opportunity to capture the trips originating and ending at existing and proposed trip generators around the edge of the City area on or near corridors served by strategic coach or rail.

8. TRANSPORT PLANNING OBJECTIVES

8.1 Overview

- 8.1.1 STAG appraisals are objective-led rather than solution-led. Therefore, Transport Planning Objectives (TPOs) have been developed to reflect the problems, opportunities and parameters analysed in Chapter 7 and also the established national, regional and local policy framework set out in Chapter 3. The TPOs essentially reflect the outcomes sought and will directly inform the appraisal of the performance of different options.
- 8.1.2 It is acknowledged that TPOs may not be fully SMART at the earlier stages of the appraisal process, however, they should be subject to review and refinement as the process develops and more detail comes forward. This is important to ensure study objectives provide a framework against which performance can be assessed as part of monitoring and evaluation activities following the implementation / construction of measures.

8.2 Study Objectives

- 8.2.1 The consideration of the inter-related problems and opportunities, stakeholder consultation carried out as part of this study and review of the wider national, regional and local policy setting has informed the development three study objectives.
- 8.2.2 Access to employment opportunities and to services, other than within Stirling, are limited for communities outside of the city, especially given recent reductions in bus services. These problems, combined with an understanding that there is above average unemployment and below average car ownership in some areas, have led to the development of **TPO1 - Improve transport access to healthcare, employment, education and training for residents of Pleau, Cowie, Fallin, Bannockburn and Cornton.**
- 8.2.3 Journey time delays through and on approach to the city occurs close to key trip attractors with these pinch points expected to be exacerbated following the development of proposals contained within the LDP and the location. The location of these existing and planned major trip attractors close to the strategic road and rail networks provide an opportunity to address these problems and have led to the development of **TPO2 - Support LDP and CRD growth aspirations by reducing the modal share of cars entering, leaving or passing through the Stirling City Area.**
- 8.2.4 Stirling City and communities in the Stirling City Area are well located on the strategic transport network, yet opportunities to transfer to sustainable modes for strategic trips face a number of existing and potential future constraints.
- 8.2.5 Currently, vehicular access to rail stations is contributing to traffic on approaches to, and parking issues at both Stirling and Bridge of Allan rail stations. As the level of traffic increases as a result of the development proposals in the LDP, further pressure will be put on the key routes serving the stations and the availability of parking at the stations.
- 8.2.6 Local, regional and national economic and transport policies all seek to improve the accessibility between our major settlements by public transport. TPO3 was developed to build upon these problems and opportunities with an understanding of the constraints associated with changes to rail infrastructure and service provision. **TPO3 - Improve the**

competitiveness of sustainable modes compared to the private car for strategic trips between Stirling City Area and key origins/destinations in the Central Belt

TPO1: Improve transport access to healthcare, employment, education and training for residents of Plean, Cowie, Fallin, Bannockburn and Cornton.

- **Measurements: Accessibility mapping comparing baseline and future year public transport timetables to a range of destinations/services.**

TPO2: Support LDP and CRD growth aspirations by reducing the modal share of cars entering, leaving or passing through the Stirling City Area.

- **Measurements: Census Travel to Work mode share data, Mode share surveys, ANPR surveys, (INRIX and Bluetooth) journey time and queuing.**

TPO3: Improve the competitiveness of sustainable modes compared to the private car for strategic trips between Stirling City Area and key origins/destinations in the Central Belt

- **Measurements: Generalised journey time comparison between car (modelled times or INRIX journey times) and public transport including interchange and service interval penalties.**

- 8.2.7 To ensure all problems, opportunities, issues and constraints were considered and addressed as part of the Transport Planning Objectives a mapping process was undertaken to show linkages and is presented in Figure 17.

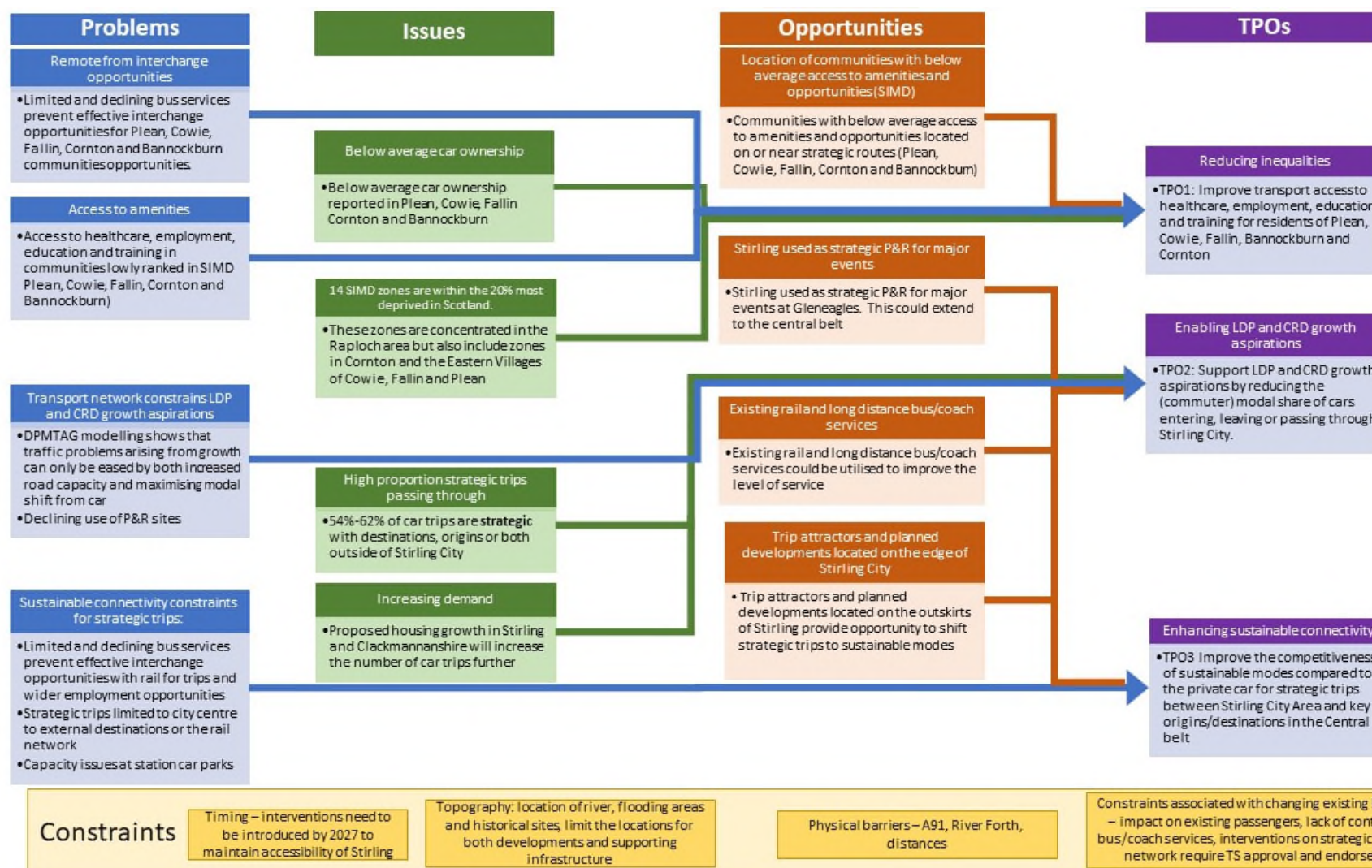


Figure 17. TPO Mapping to Problems, Issues, Opportunities and Constraints

9. OPTION GENERATION

9.1 Overview

9.1.1 This chapter describes the option generation process undertaken. The purpose of this stage is to derive a range of options which should be informed by the study's Transport Planning Objectives (TPOs), STAG Criteria and alleviate the problems or address the opportunities identified. It is important that the option generation, and the subsequent sifting and development that follows, is carried out in a logical and transparent manner.

9.2 Option Generation Process

9.2.1 In line with STAG, options were informed by the TPOs and were generated through a number of methods, including:

- consideration of previous studies
- through the statutory planning process (transport and land use plans)
- consultation workshops
- consideration of known problems and opportunities
- a gap analysis of the existing transport network and committed measures
- professional judgement flowing from a structured decision making process by the study team.

Consideration of Previous Studies

9.2.2 While it was important not to approach the study with pre-conceptions, it was also prudent to draw on the findings of previous work that looked into the transport problems and future requirements of Stirling.

The Statutory Planning Process

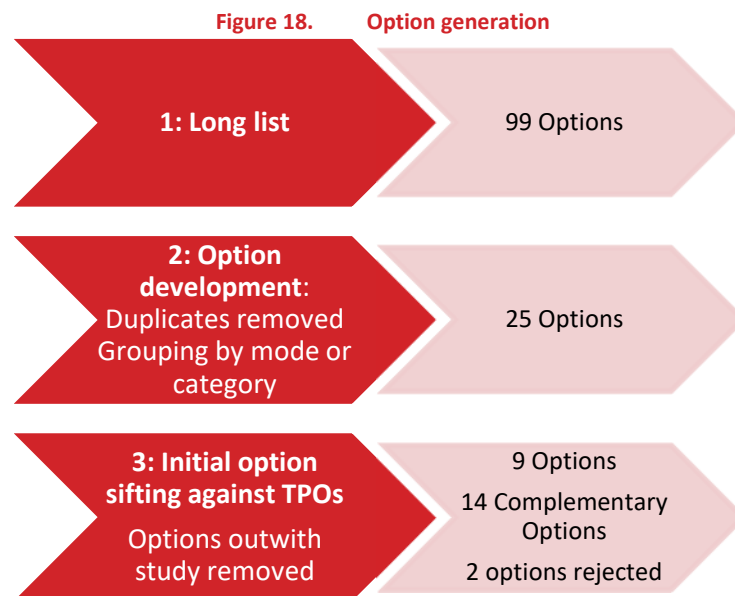
9.2.3 Documents produced through the statutory planning process, such as the Local Transport Strategy (LTS) and the Local Development Plan, include examination of transport problems and opportunities within the study area. As such, potential transport solutions presented in these documents were considered in relation to the study's TPOs and, where appropriate, were used as inspiration for the options generated.

9.3 Option Generation

9.3.1 Through this option generation process 99 individual interventions were generated as part of the initial long list of interventions (details of all "long-list" options are in Appendix E). Options were generated across all modes of transports and geographically across the study area, and beyond. To appraise these options comprehensively a process was developed to consolidate these individual interventions to a manageable number of clean options. This process enabled options and combinations of options to be sifted using the following steps:

- Following the development of an initial long list the options were developed and cleaned. This involved clarifying the options to provide further detail and to remove duplicates. Where appropriate, options were also grouped by mode. At this stage 25 options remained.
- The final stage of the Option Generation involved a high-level appraisal to determine suitability for further assessment. This appraisal was a qualitative assessment against the TPOs and determined if the option would have a positive, negative or neutral impact against the TPO. Options which would contribute to meeting the TPOs in conjunction with other options were identified as complementary options.

9.3.2 This process is summarised in Figure 18 below:



9.3.3 Table 15 presents the output of this high-level appraisal and recommends 9 options are progressed for further appraisal alongside 14 complementary options (which would contribute to TPOs as part of a package) and two options are recommended for rejection as they were considered to fall outwith the scope of the study.

Table 15. Options generated

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Accessibility	More disabled access taxis	+	0	+	Select - complementary option	As a component of a wider range of accessibility approaches this option would improve transport access to specific communities and potentially increase access to transport interchanges.
Bus	Improve coach connectivity - increase in frequency and destinations	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Bus	Bus priority/gates on city centre approaches	0	+	+	Select - complementary option	Option would support TPO2 and 3 by encouraging modal shift from car to PT and improving the competitiveness of PT journey times.
Bus	Improve bus connections at rail stations	+	+	+	Select - complementary option	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Bus	Measures to increase the attractiveness of public transport including sustained investment in new buses.	0	+	0	Select - complementary option	As a component of a wider range of measures to increase the attractiveness of public transport this option would support TPO2 by encouraging modal shift

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Bus/Coach	Bus/coach Park and Ride opportunities at the following sites: - Pirnhall/South Stirling - Relocated Springkerse site				Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Cycling	Segregated, designated walking and cycling routes to key destinations such as the City Centre, University and Park and Ride sites.	+	0	0	Select - complementary option	As a component of a wider range of accessibility approaches to improve access to interchanges this option would improve transport access for specific communities and potentially increase access to transport interchanges.
Cycling	Widen the NextBike cordon out of the city and promote	+	0	0	Select - complementary option	As a component of a wider range of accessibility approaches to improve access to interchanges this option would improve transport access for specific communities and potentially increase access to transport interchanges.
Initiatives	Improve car sharing offering in the study area by incentivising car sharing and encouraging more car clubs	0	+	+	Select - complementary option	Option would support TPOs 2 and 3 by improving access to services and encouraging modal shift by increasing more sustainable transport options available.

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Integration	Improve bus and cycle integration at bus shelters and on buses by allowing bikes on buses and installing cycle parking at shelters	+	0	0	Select - complementary option	As a component of a wider range of accessibility approaches to improve access to interchanges this option would improve transport access for specific communities and potentially increase access to transport interchanges.
Integration	Create a multi-modal ticketing system and optimise pricing structure	0	+	+	Select - complementary option	As a component of a wider range of measures to increase the attractiveness of public transport this option would support TPO2 and TPO3 by encouraging modal shift and improving the competitiveness of public transport.
Integration	Promote activities to encourage more sustainable travel including travel plans, Low Emission Zones, car-free days, incentives to leave the car at home and Workplace Parking Levy	0	+	+	Select - complementary option	As a component of a wider range of measures to increase the attractiveness of public transport this option would support TPO2 by encouraging modal shift.
Land use planning	Change in land-use policy e.g. develop industry close to housing, relocate University to city centre campus.	0	0	0	Reject	Although a change in land use and location of trip attractors and generators would impact on travel in the study area it is outwith the scope of the study.

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Other	Community transport - target at interchange opportunities	+	0	+	Select - complementary option	As a component of a wider range of accessibility approaches this option would improve transport access to specific communities and potentially increase access to transport interchanges.
Other	Consider changing school times to mitigate school traffic				Reject	Although a change in school times may mitigate transport problems in the study area it is outwith the scope of the study.
Other	Light rail from Pirnhall/ Durieshill (into Stirling)	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Park and Ride/Choose	Potential for other trip attractors to use Prudential bus services (from city centre and around Central Scotland, e.g. Forth Valley College)	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Park and Ride/Choose	Improvements to existing P&R including - strategic coach/bus services; - improved frequency; - improved walking and cycling connections/facilities	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
	(including Nextbike); - tourism bus; - connections to employment and education destinations; - active travel hub with good connections; - shuttle buses connecting P&R sites - low carbon transport - mix P&R sites with other uses					
Parking	Manage parking in the city centre – review the parking policy in the city; charging/fares for park and ride; and consider different roles for bays throughout the day/night	0	+	+	Select - complementary option	As a financial incentive to shift to public transport the rebalancing of parking charges in the study area would contribute towards TPO2 and 3 by supporting modal shift and making public transport more competitive.
Parking	Increased parking at stations: - Stirling; - Dunblane; - Bridge of Allan; - Alloa; - Larbert	+	0	+	Select	Increased parking at stations increases the car accessibility to interchanges and journey time competitiveness of park and ride journeys (TPO1 and 3) however increased parking may result in an increase in driving trips to stations which may have previously been sustainable trips (neutral TPO2).

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Rail	Relocated Bridge of Allan station (closure and reopening)	+	+	+	Select	The relocation of Bridge of Allan station may result in an increased walk-in catchment and improved journey time competitiveness which would reduce the cars accessing the station supporting all three TPOs.
Rail	Improve journey times, frequencies of rail services (frequency of Alloa to Edinburgh for example)	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Rail	New rail stations: - Cornton (retaining Bridge of Allan); - Manor Powis; - Cambus; - Causewayhead (Alloa line); - South Stirling/ Cowie/ Bannockburn; - Blackford or Greenloaning; - Clackmannanan.	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
Road	Road improvements: - More access points from the M9; - Improve A91/A905 network; - Kildean to Cornton access	0	0	0	Select - complementary	Road improvements to support the efficient working of park and ride services and accesses to rail stations may improve the competitiveness of bus/coach park and ride with better journey times, however, better

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
						road journey times may incentivise drivers to drive instead of using public transport.
Technological Improvements	Technological improvements to improve flow of traffic: - Intelligent Transport Systems directing to P&R with spaces - Smart motorways/towns - Traffic light prioritisation for public transport - Bus real time information - Electric taxis and buses	0	+	+	Select - complementary option	As a component of a wider range of measures to increase the attractiveness of public transport this option would support TPO2 and TPO3 by encouraging modal shift and improving the competitiveness of public transport.

10. REFERENCE CASE AND DO-MINIMUM

Do-Minimum Case

- 10.1.1 In order to develop the options, and propose improvements to transport into Stirling, it is necessary to first understand the Do-Minimum case. This Do-Minimum scenario includes relevant transport and planning developments that may affect the study, and will be the baseline against which each option is appraised. This represents the outcome scenario if no options from this study are taken forward.
- 10.1.2 There can be a number of different do minimum scenarios and this has been considered as part of the Do Minimum specification however, at this stage, one Do Minimum has been proposed and includes:
- Local Development Plan allocations as per LDP 2014.

Reference Case

- 10.1.3 In addition to the Do-Minimum Case a Reference Case has also been included. A Reference Case includes other non-controversial but as yet uncommitted transport schemes and/or development profiles, which can be used as a baseline for option comparison. A Reference Case may be included as part of the appraisal, its inclusion will be confirmed in the Initial Appraisal.
- To be confirmed.

11. SUMMARY

- 11.1.1 SYSTRA was commissioned by regional transport partnership Tactran to collate the evidence behind a Case for Change in considering how best to increase the modal share of public transport for those trips entering and leaving the Stirling City Area.
- 11.1.2 The work builds on the recommendations of Stirling Council's DPMTAG Transport Appraisal supporting the Local Development Plan and will help to reduce the volume of vehicles entering and leaving the Stirling City Area, and increase the potential for the park and ride interventions.
- 11.1.3 The LDP builds on these ambitions with planned housing developments and job opportunities. In 2015/16, Stirling Council undertook a transport appraisal in line with DPMTAG to inform its LDP and LTS. The DPMTAG highlighted that without providing both alternatives to the car, as well as additional road capacity, for existing and new trips expected via the LDP and City Deal proposals, modelling predicts that Stirling could suffer from traffic delays with a corresponding impact on the economic performance. The DPMTAG process highlighted a need for change and proposed to investigate these issues further and identify and appraise potential interventions to reduce car trips into/out of Stirling.
- 11.1.4 This report has drawn on the outputs of the DPMTAG and further investigated the current transport conditions and impacts associated with the LDP highlighting:
- Stirling is an importer of workers coming from surrounding councils including Falkirk and Clackmannanshire primarily all arriving by car.
 - This flow of workers into the area puts pressure on the transport network and is further exacerbated by workers travelling through Stirling to the Central Belt from Clackmannanshire.
 - Planned developments are largely on the outskirts of the city where congestion is forecast in 2027 and 2037 on motorway junctions and these developments and locations on the strategic road and rail network have been identified as opportunities to reduce car trips into Stirling and also improve access from the Eastern Villages.
 - Areas with below average access to employment and services, especially to locations beyond Stirling and Falkirk, and with low car ownership, have been identified in the Eastern Villages.
- 11.1.5 Opportunities to address these problems exist within the area. Opportunities include the existing strategic road and rail network in the area and current long-distance bus and coach services passing in close proximity.
- 11.1.6 Constraints were also identified and considered at this stage including the physical constraints associated with the road infrastructure and River Forth and constraints associated with rail including.
- 11.1.7 These problems, opportunities, issues and constraints demonstrate that there is a case for change and the following Transport Planning Objectives have been built upon them. As the study progresses, they will be SMARTened to ensure they are relevant and effective for both the appraisal and any subsequent monitoring and evaluation:

- TPO1: Improve transport access to healthcare, employment, education and training for residents of Plean, Cowie, Fallin, Bannockburn and Cornton.
- TPO2: Support LDP and CRD growth aspirations by reducing the modal share of cars entering, leaving or passing through the Stirling City Area.
- TPO3: Improve the competitiveness of sustainable modes compared to the private car for strategic trips between Stirling City Area and key origins/destinations in the Central Belt

11.1.8 The opportunities identified were built upon to develop options which would meet the Transport Planning Objectives. A large number of options have been identified to address these problems and these options have been refined to be taken forward for Initial Appraisal.

SYSTRA provides advice on transport, to central, regional and local government, agencies, developers, operators and financiers.

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Northern Europe:

Astana, Copenhagen, Kiev, London, Moscow, Riga, Wroclaw

Southern Europe & Mediterranean: Algiers, Baku, Bucharest, Madrid, Rabat, Rome, Sofia, Tunis

Middle East:

Cairo, Dubai, Riyadh

Asia Pacific:

Bangkok, Beijing, Brisbane, Delhi, Hanoi, Hong Kong, Manila, Seoul, Shanghai, Singapore, Shenzhen, Taipei

Africa:

Abidjan, Douala, Johannesburg, Kinshasa, Libreville, Nairobi

Latin America:

Lima, Mexico, Rio de Janeiro, Santiago, São Paulo

North America:

Little Falls, Los Angeles, Montreal, New-York, Philadelphia, Washington

Report Appendix A – Steering Group Workshop

INFORMATION NOTE

STIRLING STRATEGIC PARK AND RIDE APPRAISAL

STEERING GROUP WORKSHOP

IDENTIFICATION TABLE

Client/Project owner	Tactran
Project	Stirling Strategic Park and Ride Appraisal
Title of Document	Steering Group Workshop
Type of Document	Information Note
Date	28/01/2019
Reference number	107755
Number of pages	9

1. INTRODUCTION

- 1.1.1 SYSTRA Limited (SYSTRA) was commissioned by Regional Transport Partnership Tactran in November 2018 to undertake a multi-modal transport appraisal of transport movements in Stirling.
- 1.1.2 This study is focused on investigating options to reduce the level of traffic travelling into and out of the City, from origins and to destinations, which are beyond most people's ability to walk or cycle. As ScotRail and Network Rail are continuing to pursue programmes to improve train capacity and journey times, the study will focus primarily, but not exclusively, on bus/coach and rail park & ride opportunities to help get people into and out of the Stirling City area.
- 1.1.3 As part of the Pre-Appraisal (Case for Change) stage of the study the Steering Group was invited to take part in a Workshop focussing on Problems, Opportunities, Issues and Constraints, Transport Planning Objectives and Option Generation. The workshop took place on January 16th at Tactran's offices in Perth.
- 1.1.4 This note summarises the discussions at this workshop and should be read in conjunction with Appendix D Workshop Presentation on which the group were commenting. This presentation was amended to take into consideration the points made at the workshop.



1.2

Attendees

ATTENDEE	ORGANISATION
Carol Barclay	Network Rail
Ross Miller	Sustran
Kevin Argue	Stirling Council
Lesley Deans	Clackmannanshire Council
Iain Clement	SYSTRA
Claire Mackay	SYSTRA
Jonathan Padmore	Tactran
Stuart Tilston	Transport Scotland



2. PROBLEMS, OPPORTUNITIES, ISSUES AND CONSTRAINTS

2.1 Overview

The identification of actual and perceived problems and opportunities form the starting point and ultimately the rationale for a STAG study. It is important for problems and opportunities to be considered in the wider context, and issues and constraints are therefore also taken into consideration.

Problems, Opportunities, Issues and Constraints, as defined by the STAG guidance, are:

Problems: existing and future problems with the transport system which result in a shortfall in meeting objectives, e.g. lengthy journey times, poor transport access to services;

Opportunities: possibilities to improve the transport system and the way it is used, e.g. improve journey times;

Issues: uncertainties that the study may not be in a position to resolve, but must work in the context of, e.g. impact of new developments; and

Constraints: the bounds within which the study is being undertaken, e.g. available funding, policy or environmental designations.

2.1.1 The baseline transport conditions were presented by the SYSTRA project team to the Steering Group. Attendees were then invited to comment on or contribute to the initial Problems, Opportunities, Issues and Constraints identified by SYSTRA.

2.1.2 Additional Problems, Opportunities, Issues and Constraints identified by the Steering Group are noted below and supporting data will be sourced where possible.

2.2 Problems

- Perceived high cost of public transport which is connected to a decline in bus use and therefore service. For example, Park and Ride is the most expensive way to travel just now for a family paying a fare for each member.
- Inconvenience of Public Transport
- Transport poverty which could mean that someone is forced into owning a car because there is no public transport option for travel to work/study.
- In Bridge of Allan, passengers are driving distances to the station of less than 1.5 miles.

2.3 Opportunities

- Low Emission Zones, similar to those in Glasgow and Edinburgh, could make sustainable modes more attractive.
- Opportunities arising from Stirling's City Region Deal
- Maximise the competitiveness of rail (v car journey times)
- Congestion on the A91 could encourage a move towards sustainable modes of travel
- Effectiveness of the parking strategy to discourage driving into the city



2.4 Issues

- Introducing new stops (rail and bus) could have a knock on impact on other users – increased journey times or stops removed.
- Declining bus service impacted by congestion on the road network

2.5 Constraints

- New developments severed by the existing infrastructure (motorway, railway line etc)



3. TRANSPORT PLANNING OBJECTIVES

Transport Planning Objectives clarify what the study aims to achieve and are the basis for directing and guiding the study process. They can evolve through the life of the study and must reflect the evidence base and established policy directives. The following points were made by the attendees:

- TPOs should take cognisance of the other council areas travelling to or through Stirling.
- Tourism – want to encourage sustainable travel to Stirling as a tourist destination (noting that the Castle car park is in the Castle Esplanade)
- Support the vitality of Stirling City Centre.

3.1.1 The following TPOs were discussed and proposed by the group to be refined further:

- Reduce the volume of traffic entering, leaving or passing through the Stirling Core Area
- Improve the attractiveness and affordability of sustainable modes for local trips:
 - Bridge of Allan and North Stirling to Stirling City Centre
 - Stirling's Eastern Villages to Stirling City Centre
- Improve the attractiveness and affordability of sustainable modes for strategic trips:
 - To Scotland's Major Cities and the Forth Valley Royal Hospital

3.2 Option Generation

Rail

- New Bannockburn/South Stirling Rail Station and service (DPMTAG/LTS/STPR). Potential location at Cowie.
- Relocated Bridge of Allan station (closure and reopening) (DPMTAG/LTS)
- Improve journey times, frequencies of rail services (frequency of Alloa to Edinburgh)
- Clackmannan P&R (rail halt)
- Dunfermline to Stirling rail connectivity
- Increased parking at Stirling railway station

Park and Ride

- A southern park and ride site for local and strategic trips (LTS)
- Low carbon transport and travel hubs at park and choose sites (LTS) at all potential sites
- Consider park and ride opportunities for traffic from Clackmannanshire, potentially NE Stirling (LTS/LDP)
- Increase park and ride capacity at Bridge of Allan station
- Investigate bus priority on key commercial and park and ride routes (LTS)
- Potential to mix P&R sites with other uses (eg. park and ride sites to be used by freight)

- Strategic coach services calling at existing P&R
- Park and ride opportunity at Alloa (currently 40-50 spaces)

Bus

- Improve journey times, frequencies and destinations of bus/coach (LTS)
- Bus gates in Stirling City Centre

Integration

- Improve integration of Stirling Bus and Rail Stations (LTS)
- Bus and cycle integration at bus shelters (cycle parking at shelter etc)
- MaaS - Ticketing, car sharing, car hubs
- Opportunities to put bikes on buses

Parking

- Manage parking in the city centre (LTS) – review the charging mechanism for park and ride, for example, a standard charge for parking in place of bus fares. Depends on location (ie close to a retail park with spaces)
- Travel plans
- Workplace parking levy
- Additional parking at Larbert
- Different roles for parking – loading bay during the day, available for parking during the night

Cycling

- Widen the NextBike cordon out of the city
- Community transport
- Improved sustainable access to big employers and large events

Fares

- Reduced fares for bus and rail/integrated/flexible ticketing. Integrate car share, bike, bus, train
- Optimise ticket pricing structure to attract users

Technological improvements

- Electronic/Live LTS coming into Stirling. Direct visitors to P&R with space. Information on the way into the city and online
- Smart motorways/Smart towns – changing the speeds, closing the routes
- Traffic lights – change in prioritization of flows depending on congestion/air quality
- New technology and the negative impact it can have on driver behavior (eg. Reliance on satnav)



Initiatives

- Travel plans and promotions (LTS)
- Travel plans and promotions across council boundaries
- LEZ, car free zones/days, restricting car access to the city. Car free days working its way round the city.
- Encourage staff not to drive – reduced business rates as an incentive. Would be cross boundary issues

3.3 Other Comments

3.3.1 The following additional points were raised during discussion:

- Prudential is the biggest bus service provider in Stirling and there are still parking issues at their sites.
- Clackmannanshire has a high use of bus and the majority of rail journeys from Alloa are to Glasgow (not Edinburgh which has one service a day in each direction)
- Following the development of Stirling's Parking Strategy they intend to introduce Community Parking Management Plans (CPMP) in Stirling to generate a higher turnover of parking in Stirling.



APPROVAL

Version	Name		Position	Date	Modifications
1	Author	Claire Mackay	Principal Consultant	30/01/2019	Draft
	Checked by	Claire Mackay	Principal Consultant	30/01/2019	
	Approved by	Iain Clement	Associate Director	30/01/2019	
2	Author			DD/MM/YY	
	Checked by			DD/MM/YY	
	Approved by			DD/MM/YY	



Report Appendix B – Stakeholder Workshop

INFORMATION NOTE

STIRLING STRATEGIC PARK AND RIDE APPRAISAL

STAKEHOLDER WORKSHOP

IDENTIFICATION TABLE

Client/Project owner	Tactran
Project	Stirling Strategic Park and Ride Appraisal
Title of Document	Stakeholder Workshop
Type of Document	Information Note
Date	27/02/2019
Reference number	107755
Number of pages	9

1. INTRODUCTION

- 1.1.1 SYSTRA Limited (SYSTRA) was commissioned by Regional Transport Partnership Tactran in November 2018 to undertake a multi-modal transport appraisal of transport movements in Stirling.
- 1.1.2 This study is focused on investigating options to reduce the level of traffic travelling into and out of the City, from origins and to destinations, which are beyond most people's ability to walk or cycle. As ScotRail and Network Rail are continuing to pursue programmes to improve train capacity and journey times, the study will focus primarily, but not exclusively, on bus/coach and rail park & ride opportunities to reduce the level of traffic entering and passing through Stirling City area.
- 1.1.3 As part of the Pre-Appraisal (Case for Change) stage of the study stakeholders were invited to take part in a Workshop focussing on Problems, Opportunities, Issues and Constraints, and Option Generation. The workshops took place at the Mayfield Centre on February 20th 2019 (10.30am-midday) and at Wallace High on February 21st (7pm-8.30pm).
- 1.1.4 This note summarises the discussions at this workshop
- 1.1.5 Representatives from the following organisations were represented:
- Stirling Taxi Association
 - Councillors
 - Causewayhead Community Council
 - Bridge of Allan Community Council
 - St Ninians Community Council
 - First Bus
 - Strathallan Community Rail Partnership
 - Stirling Council
 - Tactran
 - SYSTRA

2. PROBLEMS, OPPORTUNITIES, ISSUES AND CONSTRAINTS

2.1 Overview

The identification of actual and perceived problems and opportunities form the starting point and ultimately the rationale for a STAG study. It is important for problems and opportunities to be considered in the wider context, and issues and constraints are therefore also taken into consideration.

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Constraints: the bounds within which the study is being undertaken, e.g. available funding, policy or environmental designations.

2.1.1 The baseline transport conditions were presented by the SYSTRA project team to the Stakeholders. Attendees were then invited to comment on or contribute to the initial Problems, Opportunities, Issues and Constraints identified by SYSTRA.

2.1.2 Problems, Opportunities, Issues and Constraints identified by the Stakeholders are noted below.

2.2 Problems

Rail

- Location of station to key parts of Bridge of Allan
- Timetable changes and cancellations following new timetable is a deterrent

Bus

- Lack of bus and taxi priority
- Accessibility of buses
- Bus service in Bridge of Allan outwith peak
- Bus service in Menstrie outwith peak

General Public Transport

- Allow payment by smart devices and an easier method to pay/use transport in/out

- Public transport - additional time taken for end to end journey
- Lack of funding (the percentage of fares)
- There is not a multi-modal ticketing system available
- Cost of transport is a deterrent and the pricing structure is complex
- Inconvenience of public transport - timing outwith peak times

Parking

- City Centre parking charges and availability of parking
- The parking and volume of cars that are accessing the University
- Overspill parking near train stations
- Lack of parking enforcements
- Overspill parking for University
- Parking dispersal from Bridge of Allan station, Northern Villages, University and Dunblane
- Inequity of parking fees

Park and ride

- Suitable locations far enough out for park & ride sites
- No park & ride site towards the south

Road

- Continual flooding and closure of the A907 (Alloa Road)
- No entrance/exits from A811 to the M9
- Prudential and Craigforth Roundabout
- Congestion at Clock Roundabout
- Congestion on the A91
- Congestion on Glasgow Road if park & ride at Pirnhall

Other

- Full barrier closure
- Tourist access
- Live at home students

Environment

- Vehicle Emissions

Accessibility

- Access to care village
- Disabled access to/from Northbound platform at Bridge of Allan to disabled parking spaces is impossible
- Restrictions on use of taxis - Taxi Card, dial a journey 24hrs notice
- Accessibility and booking wheelchair space on rail services



- Lack of safe cycle routes and need more cycle parks - as in Clacks
- Unsafe routes for cyclists- Airthrey Road/WHS dual pavement confusion

2.3 Opportunities

- Availability of city deal Funding
- Build upon the existing and well established park & rides sites available
- Broad area of surrounding land to build/create peripheral transport options
- Convenient locations for bus and rail stops/interchanges
- Strong cycling community and E-bikes will become available
- Increasing number of cyclists
- Liaise with local employers e.g. University
- Influence University development plan- campus in city, accommodation

2.4 Issues

- Low adoption of low emission buses
- Road closures, facilities and road traffic accidents impacting on congestion/reliability
- Lack of preparation during winter for road surfaces
- No joined up agreements of rail, taxi and bus services
- Low cost of city centre parking
- Developing better road routes
- Parking charges are punitive to those who cannot pay
- Congestion reduces appeal of public transport
- Transit from other areas
- Increase of home delivery (exponential increase)
- Encouraging younger generation to use more public transport
- Where are Bridge of Allan rail users coming from?

2.5 Constraints

- Existing roads that cannot be better developed
- Need to change buses and taxis to ultra low emission vehicles
- Partnership agreements to allow investments
- Cost, dispensation for taxi/bus operators to ensure investment
- Road network limits for bus land adoption
- Major events in Edinburgh and Glasgow putting pressure on public transport
- Legal set up for bus services



Rail

- Relocated Bridge of Allan station (closure and reopening)
- Improve rail journey times
- Improve Alloa to Edinburgh rail frequency
- Increase parking at Stirling railway station
- Do not relocate Bridge of Allan Station
- Increase parking at Bridge of Allan station
- Improve parking at and signage to train stations
- Connect rail to the West Coast Mainline
- Re-open the Alloa to Dunfermline Railway
- Rail station at Bannockburn/South Stirling
- Clackmannan rail park and ride
- Station at Cornton/Causewayhead (in addition to Bridge of Allan)
- Station at Manor Powis (park and ride)
- Station at Cambus
- Station at Causewayhead
- Station at Cowie
- Park and ride opportunity at Alloa (currently 40-50 spaces)
- Station at Blackford or Greenloaning
- Station at Plean

Park and Ride / Choose

- A southern park and ride site for local and strategic trips
- Investigate bus priority on key commercial and park and ride routes
- Strategic coach services calling at existing P&R
- Provide park & ride sites at Pirnhall
- Bus park & ride for Clackmannanshire Residents
- Tourism bus from park & ride site
- Higher frequency of park & ride
- Green Travel Hub at Springkerse, swap to other side of A91, EV charging, café/tourist draw on top floor to take advantage of the view, bridge to cycle/walking routes
- Park & choose with high quality walking/cycling routes to City Centre

Bus

- Improve journey times, frequencies and destinations of bus/coach
- Bus gates in Stirling City Centre
- Growth of passengers on buses by sustained investment for new buses
- Bus lanes on the A91, A907 and Causewayhead Road
- Bus services at rail stations

Integration

- Improve integration of Stirling Bus and Rail Stations
- Integration of ticketing schemes



Cycling

- Widen the NextBike cordon out of the city and encourage its use
- Designated cycle/walking routes connecting busy areas

Fares

- Optimise ticket pricing structure to attract users
- Junction improvements on Dumbarton Road to alleviate congestion
- Improve A91/A905 network
- More access points from the M9
- Ensure bus routes are given priority by gritters when there is snow

Accessibility

- More disabled access taxis

Other

- City Centre campus for University
- Develop industry close to housing- developer's contribution
- Change school times like St. Modan's to reduce school traffic on Causewayhead Road
- Improve longer distance public transport links e.g. coach and rail
- Provide easier access to/from Cumbernauld and Motherwell
- Lightrail from Pirnhall/Durieshill.



APPROVAL

Version	Name		Position	Date	Modifications
1	Author	Claire Mackay	Principal Consultant	27/02/2019	Draft
	Checked by	Claire Mackay	Principal Consultant	27/02/2019	
	Approved by	Iain Clement	Associate Director	27/02/2019	
2	Author			DD/MM/YY	
	Checked by			DD/MM/YY	
	Approved by			DD/MM/YY	



Report Appendix C – Steering Group Workshop Presentation



16th January 2019

Stirling Strategic Park and Ride Study Steering Group Workshop



Agenda



Time	Session
12.50-13.00	Introductions and background
13.00-13.35	Problems, opportunities, issues and constraints
13.35-14.20	Setting the Transport Planning Objectives
14.20-14.30	Tea and coffee break
14.30-15.10	Option Generation Workshop

Introductions and background



Study Background

Stirling Council DPMTAG outcomes:

- Without both providing alternatives to the car, and additional road capacity, for both existing and new trips (expected via the LDP and City Deal proposals), Stirling could suffer from congestion with a corresponding impact on the economic performance, as well as the social impacts of deteriorating air quality
- The eastern villages of Plean, Cowie and Fallin, where an additional 1500 homes are proposed, are relatively poor communities with poor transport links to jobs, services and opportunities. Especially to locations beyond Stirling City and Falkirk
- The appraisal identified that addressing the trips entering/leaving Stirling City (approximately 44% of car trips in the am peak) would be likely to require strategic interventions

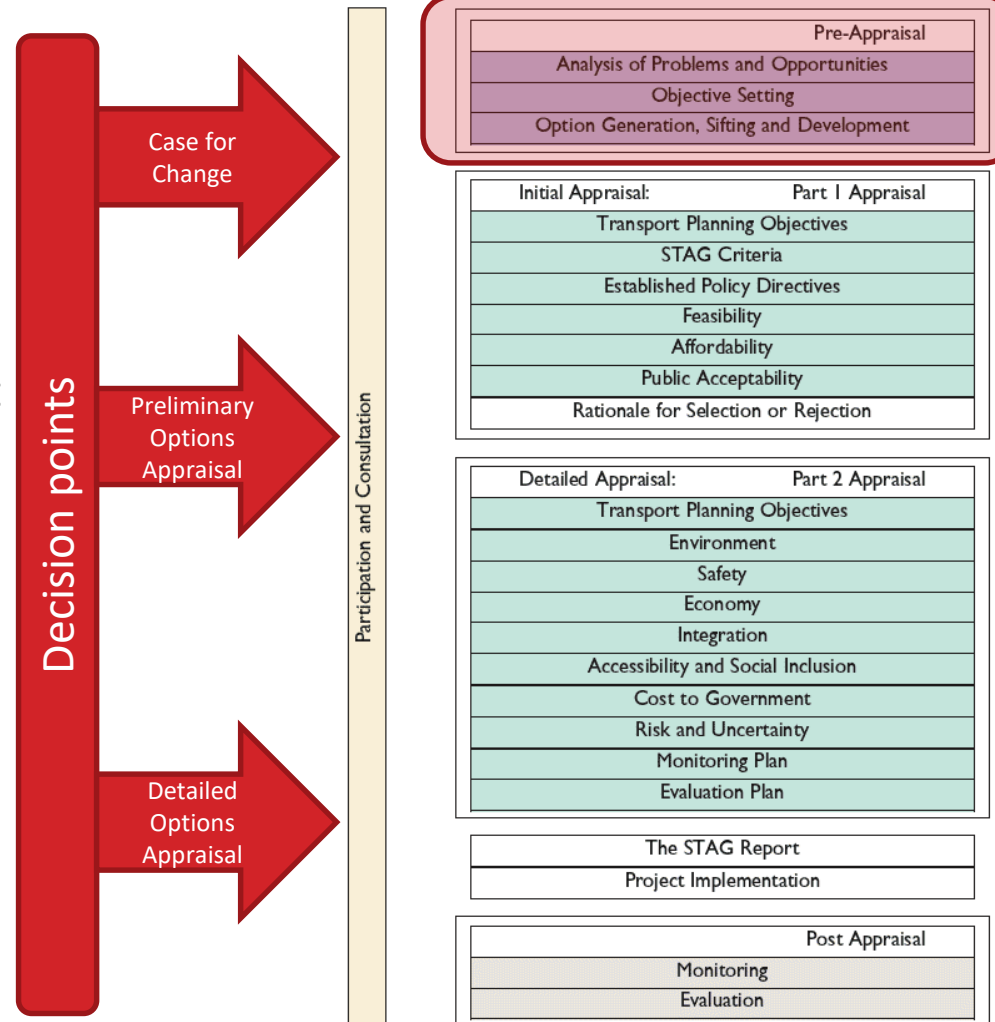
To investigate these issues further and identify and appraise interventions to reduce car trips into/out of Stirling City funding has been provided as part of the Local Rail Development Fund (LRDF) from Transport Scotland

Where are we?

LRDF Study will follow the STAG process

Input from this Steering Group

There will be decision points throughout the study



Baseline Review, Problems, Opportunities, Issues and Constraints



Baseline Review: Policy



Planning Policy

- ◉ National Planning Framework 3
- ◉ Stirling Local Development Plan 2017-2017

Transport Policy

- ◉ Tactran Regional Transport Strategy 2008-2023
- ◉ Park and Ride Strategy and Action Plan (2016), Tactran
- ◉ Stirling Local Transport Strategy 2017-2027
- ◉ Clackmannanshire Local Transport Strategy 2010-2014

Economic Policy

- ◉ Stirling and Clackmannanshire City Region Deal

Social Policy

- ◉ Stirling CPP Local Outcome Improvement Plan

Baseline Review: Previous Relevant Studies

- ◉ Stirling Stations Study – Stirling Area Stations' Feasibility (2017)
- ◉ Bannockburn Rail Halt
- ◉ South Stirling Park and Ride
- ◉ Extended Tay Estuary Study
- ◉ South Stirling P&R Demand Modelling
- ◉ Bridge of Allan Station Relocation Demand Forecasting
- ◉ Stirling LDP/LTS (DPMTAG) Transport Appraisal

Baseline Review: Socio-economic

- Population growth above the Scottish average
- Above average growth in over-65s
- Older populations are concentrated in the rural areas
- 14 SIMD zones within the 20% most deprived in Scotland.
- Low access to car in Raploch and Eastern Villages
- Below average unemployment but higher levels of unemployment in the Raploch area, Plean and Fallin

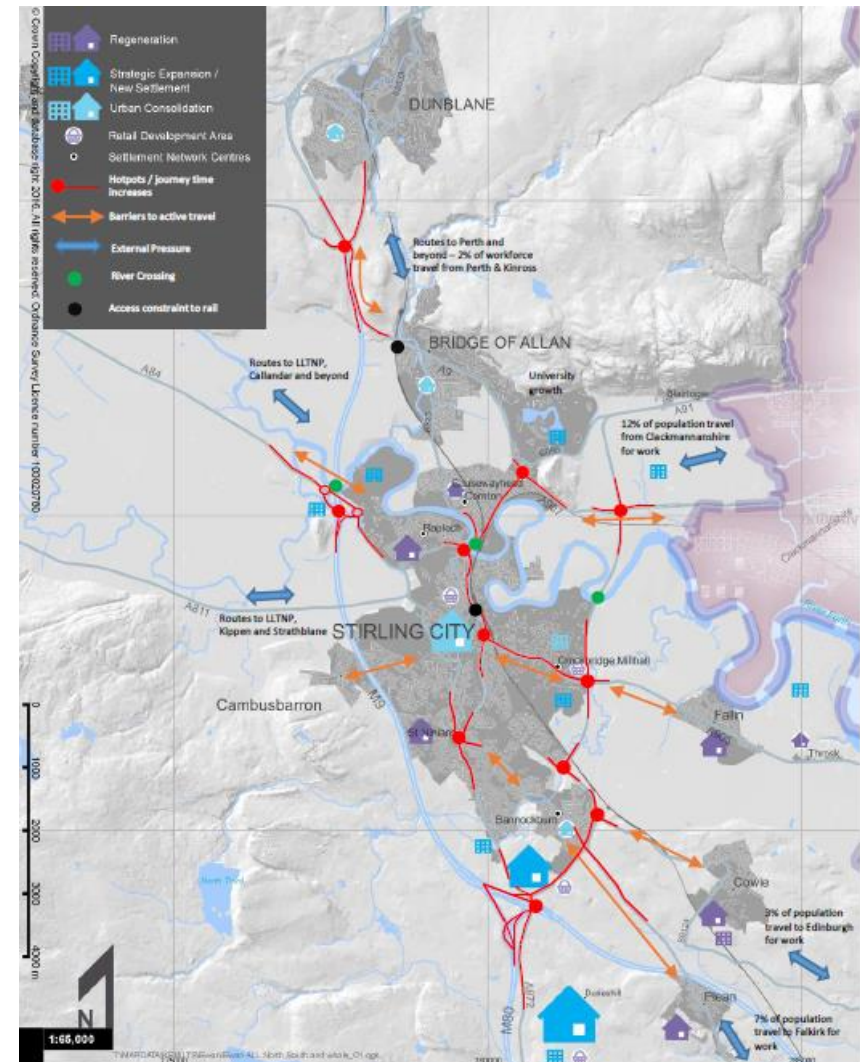
Baseline Review: Population and Growth

Existing key trip generators

- City Centre
- University
- Prudential / Forth Valley College / Castle Business Park
- Springkerse

Growth Areas

- Forthside
- Kildean
- South Stirling Gateway / Durieshill
- Plean/Cowie/Fallin



Baseline Review: Travel to Work (excludes study)

To Stirling

- 51% of workers coming from within Stirling district (excluding working from home)
- From Falkirk (16%) and Clackmannanshire (14%)
- 66% of all Stirling residents travelling to work in Stirling use car
- Rail use for employees in Stirling is low for all origins excluding Glasgow residents, 23%.

From Stirling

- 47% of Stirling residents work within the Stirling Council area
- Bus use low for all destinations excluding Stirling (11%)
- Rail travel to Glasgow (26%) and Edinburgh (35%) is more competitive with car/van drivers/passengers

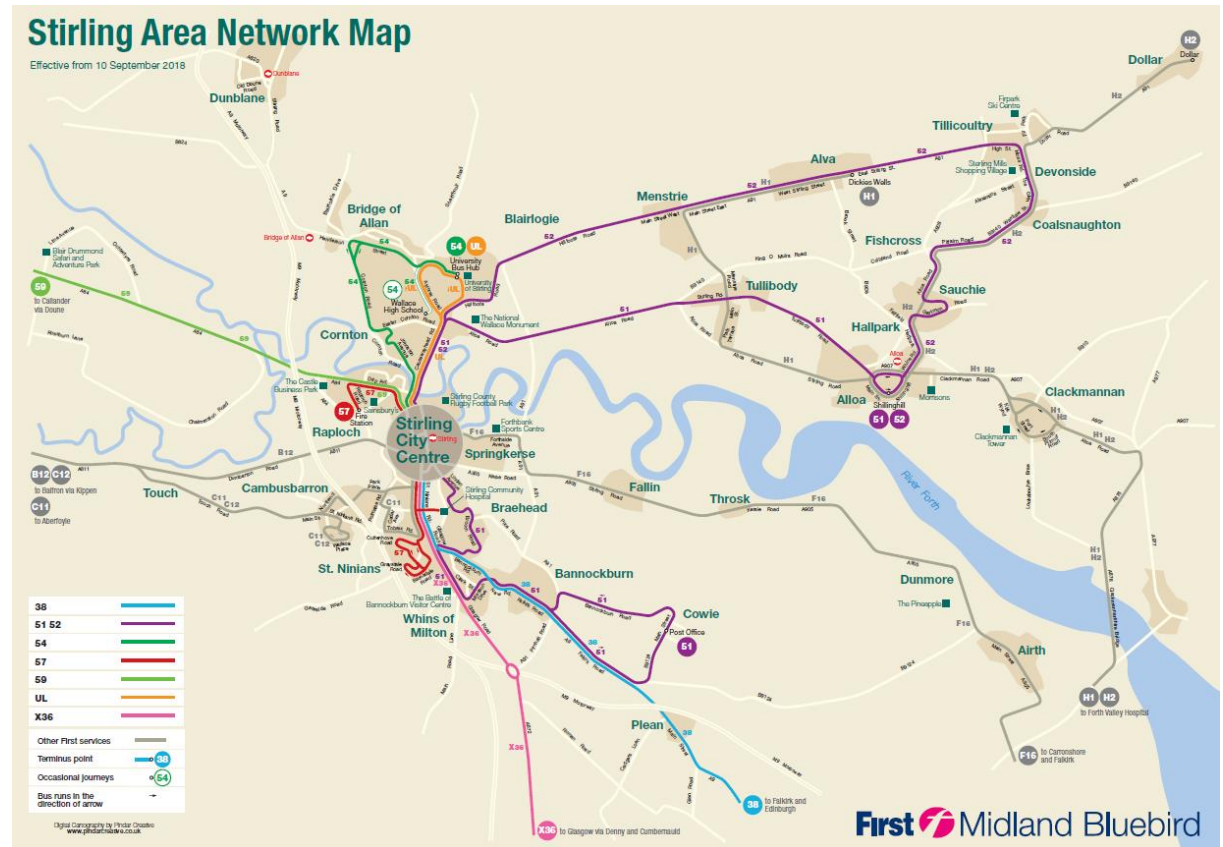
Model Data

- Approx. car 50% trips are internal to internal (48-56% AM and PM)
- Approx. 40% car trips are either internal to external or external to internal (38%-44%)



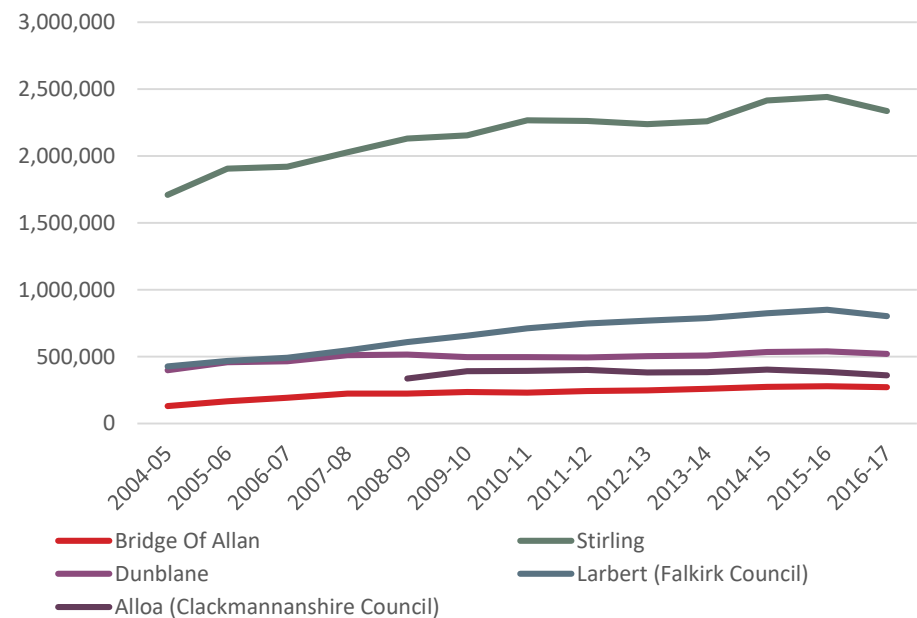
Baseline Review: Transport

- Significant reduction in First bus services in the Stirling Area.
- Cowie, Fallin and Plean have all seen a reduction in service
- Decline in the percentage of people who consider public transport (not exclusively bus) to be very or fairly convenient from 76.1% in 2011/12 to 68% in 2017. The Scottish average remains consistent at 84.1% and 82.4%. (SHS)



Baseline Review: Transport

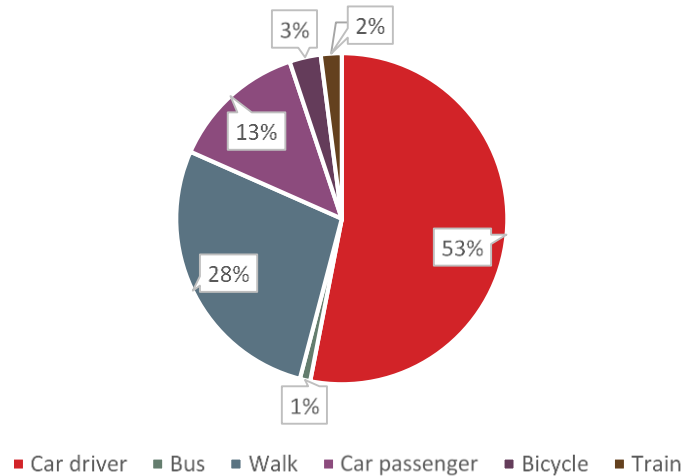
- Scottish Household Survey indicates that the uptake of rail services in the Stirling area is slightly higher than that of the Scottish average (7.3% v 4.3% use rail once a week)
- Rail is more competitive to/from Glasgow and Edinburgh than car/coach



Baseline Review: Transport: Rail Users Survey

BRIDGE OF ALLAN KEY STATISTICS

Mode split for travel to Bridge of Allan station



Journey time to station

83% <15 min

Top Origins

63% Bridge of Allan

24% Stirling North

2% Clackmannanshire

Top Destinations

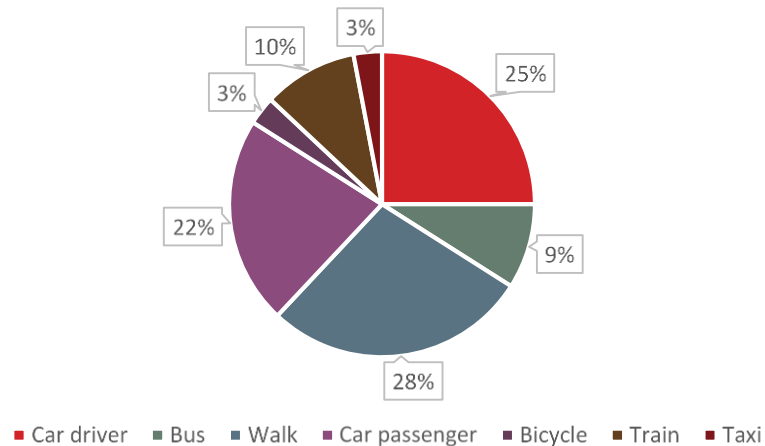
52% Edinburgh stations

31% Glasgow stations

Baseline Review: Transport: Rail Users Survey

STIRLING KEY STATISTICS

Mode split for travel to Stirling station



Journey time to station

70% <15 min

Top Origins

58% within Stirling City

15% Clackmannanshire

Top Destinations

32% Edinburgh stations

27% Glasgow stations

Baseline Review: Parking and Park & Ride

- In total, there are around 3,400 parking spaces in the city centre which are low cost and readily available
- The Springkerse P&R facility provides parking for around 215 cars while Castlevue offer parking for up to 200 cars
- The total number of vehicles parked at both sites in 2014 was 104,792, approximately 3% less than the figure in 2013
- Springkerse P&R opened in September 2006. After years of growth, usage of the Park & Ride has declined.
- Castlevue P&R opened September 2008. After years of growth, usage of the Park & Ride has levelled and declined.
- Stirling Council have reviewed their Parking Strategy

Baseline Review: Road

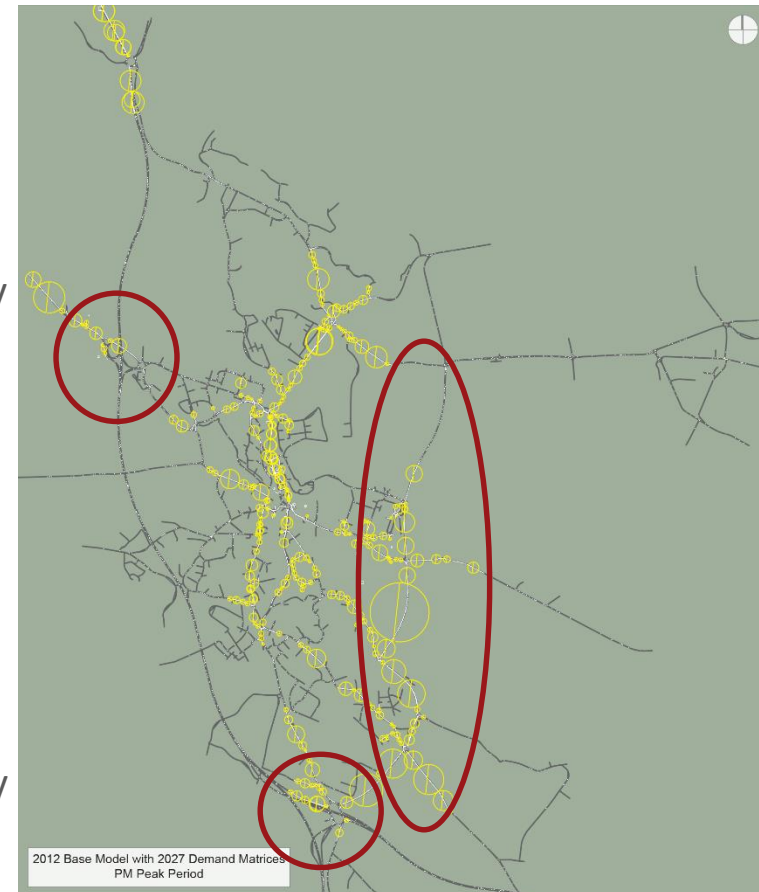
The DPMTAG highlighted that:

Currently

- The A91 experiences significant congestion during the peak periods, particularly the evening peak period with rolling queues often developing between most of the key connections.
- M9 Junction 9 Pirnhall regularly experiences significant congestion on the southbound approach out of Stirling and on the westbound off-ramp from the motorway.
- M9 Junction 11 Keir Roundabout experiences severe congestion during the peak periods, most notably southbound during the PM peak from the A9.

Forecast

- Forecast congestion at above locations in the PM Peak by 2027



Problems

Below average level of car ownership in some areas including Plean, Fallin, Cowie and Raploch.

Above average (and growing) over 65 population in rural areas

14 SIMD zones are within the 20% most deprived in Scotland

Travelling to Bridge of Allan station by car is high at Bridge of Allan (66%) compared to Dunblane (44%)

Congestion forecast as a result of LDP and City Deal developments

Above average unemployment in Raploch, Plean and Fallin.

Declining bus service

Increasing congestion on Stirling's roads

Dispersed nature of rural areas in Stirling makes it difficult to serve by public transport.

Poor links from areas of SIMD to jobs and services

Rail travel is increasing but there are capacity issues arising both on services and at station car parks.

Reliance on private car for journeys to work.

Declining use of park and ride sites.

Low cost and central parking in Stirling city centre reduces the competitiveness of sustainable modes

Parking at major employment destinations such as Prudential, University of Stirling and Forth Valley Royal Hospital

Incomplete cycle network, severance and safety issues for cycling and walking

40% of trips into Stirling

Rail brings trips into Stirling city centre

Stirling station car park at or near capacity

High cost of public transport.

Transport poverty

Inconvenience of public transport

Opportunities

Major development sites located on the strategic road network, including Plean, Cowie and Fallin

Strong community groups willing to be involved in exploring and delivering solutions

Strategically located to Scotland's cities by road and rail network

Gateway to Loch Lomond & Trossachs National Park

Stirling's central location within Scotland's strategic transport network

Compact city centre, attractive to sustainable travel options

Major development sites allow a range of transport solutions to be explored.

Benefits associated with the Stirling - Dunblane - Alloa Electrification (faster trains/reduced JT's)

Opportunity to link new park and ride sites with Stirling's tourism sites, major employers and health services

Being able to act as a strategic P&R site for events across Scotland

Sustainable expansion sites more easy to serve than disparate development

Existing long distance bus and coach services passing in close proximity to existing

Durieshill brings easily accessible opportunities for those in Plean to new jobs and services

The Stirling and Clackmannanshire City Region Deal provides the scope to improve infrastructure

Development related infrastructure improvements could resolve existing issues (University, Pru etc)

Rail competitive to all of Scotland's major cities. Maximise competitiveness.

Development of active travel networks help to support rural economic activity

Development of national cycle network offer opportunities to connect rural communities.

University of Stirling/FV Hospital/ Prudential located close to strategic network connections

Effectiveness of the parking strategy could discourage driving into the city centre

Low Emission Zones could make sustainable modes more attractive

Congestion on the A91 could encourage a shift to sustainable modes

Issues

Uncertainty over the rate of traffic growth as a consequence of:

- population growth
- how house prices will change
- whether there is the capacity within the construction industry to achieve the build out rates

Uncertainty of funding priorities for significant transport interventions

Forecast congestion impacts arising from LDP

Declining bus service impacted by congestion on the road network

Timetabling and long distance journey times – impact on existing users (bus and rail)

Significant population growth anticipated as a result of LDP and City Deal

Timing of infrastructure - encouraging/ supporting development or constraining development

Constraints

Any changes to existing services or new services need to be able to operate on a commercial basis.

Large legacy of built heritage within Stirling city and surrounding areas

Rail capacity at Glasgow Queen station dictates the length of trains on services north out of Glasgow.

Potential severance of developments by Pirnhall Roundabout, M9 and M80 (active modes) and A91

Flood risk may be a significant constraint impacting on development and transport interventions

Major development sites allow a range of transport solutions to be explored.

Majority of parking opportunities within the city are adjacent to one of the pinch points (Craigs Roundabout)

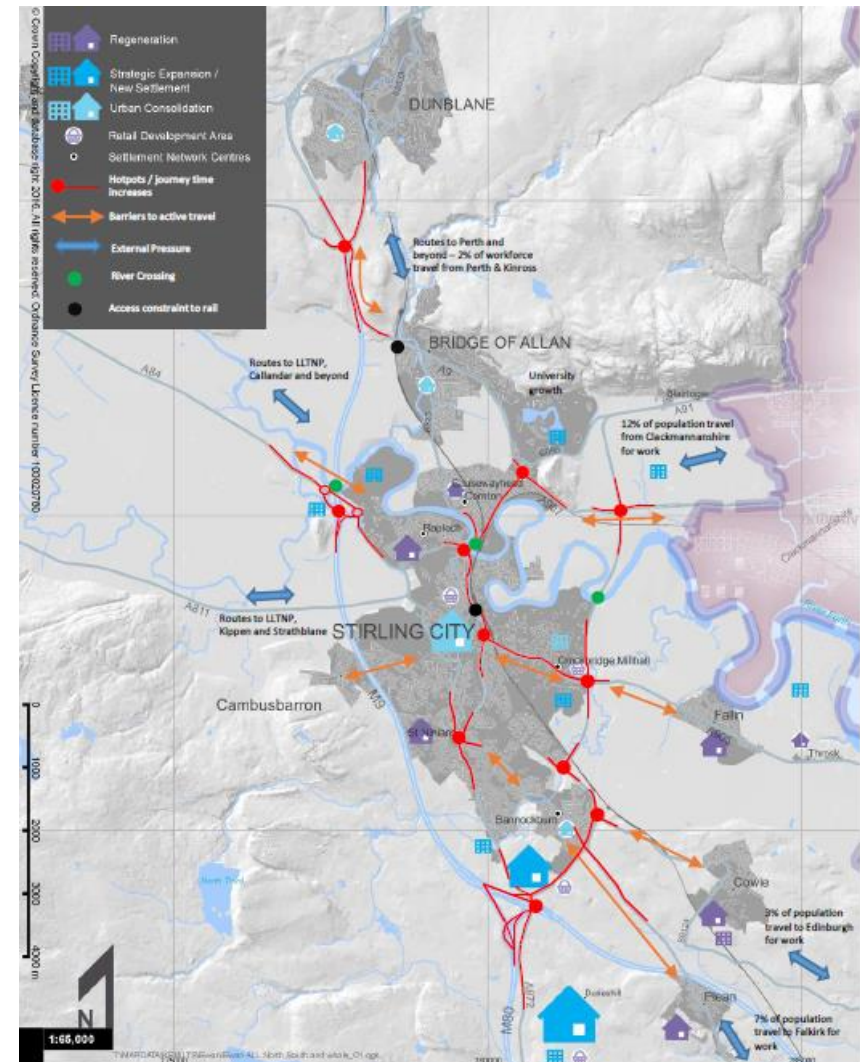
Expansion of rail infrastructure is constrained by bridges and other structures

Greenbelt / Landscape

Historical battlefield areas throughout Stirling Council

Baseline Review: Key points

- Forecast congestion on strategic and local. Need for modal shift and additional road capacity
- 40% of trips are internal-external/external-internal
- Trips from Clacks to Glasgow pass through Stirling (A91)
- Problems with existing generators (Prudential/University/Bridge of Allan and Stirling Station)
- Proposed growth (Durieshill/South Stirling Gateway/Plean/Cowie/Fallin/Forthside)
- Poor access for Plean/Cowie/Fallin
- Car is the main mode of transport for all destinations. Rail is more competitive to/from Glasgow and Edinburgh



Transport Planning Objectives



Transport Planning Objectives

Purpose of TPOs:

- ◉ Clarifies what the study aims to achieve
- ◉ Basis for directing and guiding the study process
- ◉ Provide basis for appraisal of alternative options
- ◉ Central to monitoring and evaluation
- ◉ Facilitate accountability of the decision maker
- ◉ Can evolve through the study
- ◉ Objectives should:
 - Reflect evidence base and established policy directives
 - Reflect multi-modal nature of study
 - Be SMART
(Specific, Measurable, Attainable, Relevant, Timed)
 - Be manageable in number

Transport Planning Objectives



Emerging TPOs for **discussion**:

- ◉ Reduce the volume of traffic entering, leaving or passing through the Stirling Core Area
- ◉ Improve the attractiveness and affordability of sustainable modes for local trips:
 - Bridge of Allan and North Stirling to Stirling City Centre
 - Stirling's Eastern Villages to Stirling City Centre
- ◉ Improve the attractiveness and affordability of sustainable modes for strategic trips:
 - To Scotland's Major Cities and the Forth Valley Royal Hospital

Option Generation



Option Generation

- To derive a range of options which should provide the solutions to meet the Transport Planning Objectives and alleviate the problems or address the opportunities identified.
- Derive options which fully reflect the range available.
- Option generation should not be constrained at this stage.
- Measures can be packaged if appropriate

Existing options have been collated from:

- previous studies; and
- the statutory planning process (transport and land use plans);

Option Generation - Workshop



Rail

- New Bannockburn/South Stirling Rail Station and service (DPMTAG/LTS/STPR). Potential location at Cowie.
- Relocated Bridge of Allan station (closure and reopening) (DPMTAG/LTS)
- Improve journey times, frequencies of rail services (frequency of Alloa to Edinburgh)
- Clackmannan P&R (rail halt)
- Dunfermline to Stirling rail connectivity
- Increased parking at Stirling station

Park and Ride

- A southern park and ride site for local and strategic trips (LTS)
- Low carbon transport and travel hubs at park and choose sites (LTS) at all potential sites
- Consider park and ride opportunities for traffic from Clackmannanshire, potentially NE Stirling (LTS/LDP)
- Increase park and ride capacity at Bridge of Allan station
- Investigate bus priority on key commercial and park and ride routes (LTS)
- Potential to mix P&R sites with other uses (eg. park and ride sites to be used by freight)
- Strategic coach serving existing P&R
- Park and ride opportunity at Alloa (currently 40-50 spaces)

Bus

- Improve journey times, frequencies and destinations of bus/coach (LTS)
- Bus gates in Stirling City Centre

Option Generation - Workshop

Integration

- Improve integration of Stirling Bus and Rail Stations (LTS)
- Bus and cycle integration at bus shelters (cycle parking at shelter etc)
- MaaS - Ticketing, car sharing, car hubs
- Opportunities to put bikes on buses

Parking

- Manage parking in the city centre (LTS) – review the charging mechanism for park and ride, for example, a standard charge for parking in place of bus fares. Depends on location (ie close to a retail park with spaces)
- Workplace parking levy
- Additional parking at Larbert
- Different roles for parking – loading bay during the day, available for parking during the day

Cycling

- Widen the NextBike cordon out of the city
- Community transport
- Improved sustainable access to big employers and large events

Option Generation - Workshop



Fares

- Reduced fares for bus and rail/integrated/flexible ticketing. Integrate car share, bike, bus, train
- Optimise ticket pricing structure to attract users

Technological improvements

- Electronic/Live LTS coming into Stirling. Direct visitors to P&R with space. Information on the way into the city and online
- Smart motorways/Smart towns – changing the speeds, closing the routes
- Traffic lights – change in prioritization of flows depending on congestion/air quality
- New technology and the negative impact it can have on driver behavior (eg. Reliance on satnav)

Initiatives

- Travel plans and promotions (LTS)
- Travel plans and promotions across council boundaries
- LEZ, car free zones/days, restricting car access to the city. Car free days working its way round the city.
- Encourage staff not to drive – reduced business rates as an incentive. Would be cross boundary issues

Report Appendix D – Stirling Parking Facilities

Table 1. Stirling Council Car Parks

STIRLING COUNCIL CAR PARKS	NUMBER OF SPACES	TIME	CHARGE	SEASON TICKETS
Dalglish Court Car Park	41	30 min	£0.80	Not Available
		1 hour	£1.50	
		2 hours	£2.00	
Wellgreen Car Park	38	1 hour	£1.50	Not Available
		2 hours	£1.80	
		4 hours	£2.60	
Forthside Car Park	529	All day	£1.40	4 weekly - £20
		Weekly	£5.00	12 weekly - £60
		-----		Annually - £230
Linden Avenue Car Park	185	All day	£1.40	4 weekly - £20
		Weekly	£5.00	12 weekly - £60
		-----		Annually - £230
Viewforth Car Park (Saturday Only)	117	All day	£2.00	Not Available

Source: (Stirling Parking Guide and Parkopedia)

Table 2. Car Parks Operated by Other Operators

CAR PARKS OPERATED BY OTHER OPERATORS	NUMBER OF SPACES	TIME	CHARGE
Stirling Railway Station Car Park	276	Day	£3.50
		Weekly	£20.00
Stirling Castle Car Park	250	Max stay 4 hours	£4.00
		Member 4 hours	£2.00
Wellgreen Multi Storey Car Park	530	All day	£2.20
The Thistles – Multi storey	1335	1 hour	£1.50
		2 hours	£2.50
		4 hours	£4.00
		8 hours and over	£9.00
		Weekly	£20.00
Stirling Smith Art Gallery and Museum	30	N/A	Free parking for visitors
Old Town Jail Car Park	35	N/A	Free parking for visitors
Goosecroft Road Car Park	80	1 hour	£1.00
		2 hours	£1.50
		4 hours	£2.00
		24 hours	£2.50
		Week	£12.00

Source: (Stirling Parking Guide and Parkopedia)

Report Appendix E – Option Sifting

Table 1. Option Generation and Sifting

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
1 - Accessibility	More disabled access taxis	+	0	+	Select - complementary option	As a component of a wider range of accessibility approaches this option would improve transport access to specific communities and potentially increase access to transport interchanges.
2 - Bus	Improve coach connectivity - increase in frequency and destinations	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
3 - Bus	Bus priority/gates on city centre approaches	0	+	+	Select - complementary option	Option would support TPO2 and 3 by encouraging modal shift from car to PT and improving the competitiveness of PT journey times.
4 - Bus	Improve bus connections at rail stations	+	+	+	Select - complementary option	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
5 - Bus	Measures to increase the attractiveness of public transport including sustained investment in new buses.	0	+	0	Select - complementary option	As a component of a wider range of measures to increase the attractiveness of public transport this option would support TPO2 by encouraging modal shift
6 - Bus/Coach	Bus/coach Park and Ride opportunities at the following sites: - Pirnhall/South Stirling - Relocated Springkerse site				Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
7 - Cycling	Segregated, designated walking and cycling routes to key destinations such as the City Centre, University and Park and Ride sites.	+	0	0	Select - complementary option	As a component of a wider range of accessibility approaches to improve access to interchanges this option would improve transport access for specific communities and potentially increase access to transport interchanges.
8 - Cycling	Widen the NextBike cordon out of the city and promote	+	0	0	Select - complementary option	As a component of a wider range of accessibility approaches to improve access to interchanges this option would improve transport access for specific communities and potentially increase access to transport interchanges.

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
9 - Initiatives	Improve car sharing offering in the study area by incentivising car sharing and encouraging more car clubs	0	+	+	Select - complementary option	Option would support TPOs 2 and 3 by improving access to services and encouraging modal shift by increasing more sustainable transport options available.
10 - Integration	Improve bus and cycle integration at bus shelters and on buses by allowing bikes on buses and installing cycle parking at shelters	+	0	0	Select - complementary option	As a component of a wider range of accessibility approaches to improve access to interchanges this option would improve transport access for specific communities and potentially increase access to transport interchanges.
11 - Integration	Create a multi-modal ticketing system and optimise pricing structure	0	+	+	Select - complementary option	As a component of a wider range of measures to increase the attractiveness of public transport this option would support TPO2 and TPO3 by encouraging modal shift and improving the competitiveness of public transport.
12 - Integration	Promote activities to encourage more sustainable travel including travel plans, Low Emission Zones, car-free days, incentives to leave the car at home and Workplace Parking Levy	0	+	+	Select - complementary option	As a component of a wider range of measures to increase the attractiveness of public transport this option would support TPO2 by encouraging modal shift.

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
13 - Land use planning	Change in land-use policy e.g. develop industry close to housing, relocate University to city centre campus.	0	0	0	Reject	Although a change in land use and location of trip attractors and generators would impact on travel in the study area it is outwith the scope of the study.
14 - Other	Community transport - target at interchange opportunities	+	0	+	Select - complementary option	As a component of a wider range of accessibility approaches this option would improve transport access to specific communities and potentially increase access to transport interchanges.
15 - Other	Consider changing school times to mitigate school traffic				Reject	Although a change in school times may mitigate transport problems in the study area it is outwith the scope of the study.
16 - Other	Light rail from Pirnhall/ Durieshill (into Stirling)	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
17 - Park and Ride/Choose	Potential for other trip attractors to use Prudential bus services (from city centre and around Central Scotland, e.g. Forth Valley College)	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
18 - Park and Ride/Choose	<p>Improvements to existing P&R including</p> <ul style="list-style-type: none"> - strategic coach/bus services; - improved frequency; - improved walking and cycling connections/facilities (including Nextbike); - tourism bus; - connections to employment and education destinations; - active travel hub with good connections; - shuttle buses connecting P&R sites - low carbon transport - mix P&R sites with other uses 	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
19 - Parking	Manage parking in the city centre – review the parking policy in the city; charging/fares for park and ride; and consider different roles for bays throughout the day/night	0	+	+	Select - complementary option	As a financial incentive to shift to public transport the rebalancing of parking charges in the study area would contribute towards TPO2 and 3 by supporting modal shift and making public transport more competitive.

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
20 - Parking	Increased parking at stations: - Stirling; - Dunblane; - Bridge of Allan; - Alloa; - Larbert	+	0	+	Select	Increased parking at stations increases the car accessibility to interchanges and journey time competitiveness of park and ride journeys (TPO1 and 3) however increased parking may result in an increase in driving trips to stations which may have previously been sustainable trips (neutral TPO2).
21 - Rail	Relocated Bridge of Allan station (closure and reopening)	+	+	+	Select	The relocation of Bridge of Allan station may result in an increased walk-in catchment and improved journey time competitiveness which would reduce the cars accessing the station supporting all three TPOs.
22 - Rail	Improve journey times, frequencies of rail services (frequency of Alloa to Edinburgh for example)	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.
23 - Rail	New rail stations: - Cornton (retaining Bridge of Allan); - Manor Powis; - Cambus;	+	+	+	Select	Option would support all three TPOs by improving access to services, encouraging modal shift and improving the competitiveness of public transport over car.

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
	<ul style="list-style-type: none"> - Causewayhead (Alloa line); - South Stirling/ Cowie/ Bannockburn; - Blackford or Greenloaning; - Clackmannanan. 					
24 - Road	Road improvements: <ul style="list-style-type: none"> - More access points from the M9; - Improve A91/A905 network; - Kildean to Cornton access 	0	0	0	Select - complementary	Road improvements to support the efficient working of park and ride services and accesses to rail stations may improve the competitiveness of bus/coach park and ride with better journey times, however, better road journey times may incentivise drivers to drive instead of using public transport.
25 - Technological Improvements	Technological improvements to improve flow of traffic: <ul style="list-style-type: none"> - Intelligent Transport Systems directing to P&R with spaces - Smart motorways/towns - Traffic light prioritisation for public transport 	0	+	+	Select - complementary option	As a component of a wider range of measures to increase the attractiveness of public transport this option would support TPO2 and TPO3 by encouraging modal shift and improving the competitiveness of public transport.

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
	- Bus real time information - Electric taxis and buses					
Accessibility	More disabled access taxis				Reject	Duplicate 1
Bus	Improve coach connectivity				Reject	Duplicate 2
Bus	Bus priority on city centre approaches				Reject	Duplicate 3
Bus	Bus services at rail stations				Reject	Duplicate 4
Bus	Growth of passengers on buses by sustained investment for new buses				Reject	Duplicate 5
Bus	Bus gates in Stirling City Centre				Reject	Duplicate 3
Bus	Bus Priority on A91 into the City Centre				Reject	Duplicate 3

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Bus	Bus lanes on the A91, A907 and Causewayhead Road				Reject	Duplicate 3
Bus	Give more priority to bus services				Reject	Duplicate 3
Cycling	Segregated, direct cycle routes from City Centre into University				Reject	Duplicate 7
Cycling	Designated cycle/walking routes connecting busy areas				Reject	Duplicate 7
Cycling	Encourage use of NextBike Scheme				Reject	Duplicate 8
Cycling	Widen the NextBike cordon out of the city and promote				Reject	Duplicate 8
Fares	Reduced fares for bus and rail/integrated/flexible ticketing. Integrate car share, bike, bus, train				Reject	Duplicate 11

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Fares	Optimise ticket pricing structure to attract users				Reject	Duplicate 11
Initiatives	Enhancing car sharing				Reject	Duplicate 9
Integration	Improve integration of Stirling Bus and Rail Stations (LTS)				Reject	Duplicate 4
Integration	Bus and cycle integration at bus shelters and on buses (cycle parking at shelter, bikes on buses etc)				Reject	Duplicate 10
Integration	MaaS - Ticketing, car sharing, car hubs				Reject	Duplicate 9/12
Integration	Create a multi-modal ticketing system and optimise pricing structure				Reject	Duplicate 11
Integration	Direct segregated cycle link from all existing and new park & rides to city centre				Reject	Duplicate 7/18

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Integration	Enhance the bus and rail interchange at Stirling				Reject	Duplicate 4
Integration	Opportunities to put bikes on buses				Reject	Duplicate 10
Integration	Integration of ticketing schemes				Reject	Duplicate 11
Initiatives	Travel plans and promotions (LTS)				Reject	Duplicate 12
Initiatives	LEZ, car free zones/days, restricting car access to the city. Car free days working its way round the city.				Reject	Duplicate 12
Initiatives	Encourage staff not to drive – reduced business rates as an incentive. Would be cross boundary issues				Reject	Duplicate 12

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Initiatives	Travel plans and promotions across council boundaries (car sharing)				Reject	Duplicate 12
Land use planning	City Centre campus for University				Reject	Duplicate 13
Land use planning	Develop industry close to housing-developer's contribution				Reject	Duplicate 13
Other	Community transport - target at interchange opportunities				Reject	Duplicate 14
Other	Improved sustainable access to big employers and large events				Reject	Duplicate 12
Other	Change school times like St. Modans to avoid school traffic on Causewayhead Road				Reject	Duplicate 15
Other	Provide easier access to/from Cumbernauld and Motherwell (coach/rail)				Reject	Duplicate 2

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Other	Lightrail from Pirnhall/Durieshill (into Stirling)				Reject	Duplicate 16
Other	Create a tram service				Reject	Duplicate 16
Other	Improve longer distance public transport links e.g. coach and rail				Reject	Duplicate 2/22
Park and Ride/Choose	Potential for other trip attractors to use prudential bus services (from city centre and around central scotland, eg Forth Valley College)				Reject	Duplicate 17
Park and Ride/Choose	A southern bus and coach park and ride site for local and strategic trips (LTS)				Reject	Duplicate 6
Park and Ride/Choose	Potential to mix P&R sites with other uses (eg. park and ride sites to be used by freight)				Reject	Duplicate 18

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Park and Ride/Choose	Park and ride opportunity at Alloa (currently 40-50 spaces)				Reject	Duplicate 20
Park and Ride/Choose	Improvements to existing P&R including strategic coach/bus services, improved frequency, improved walking and cycling connections/facilities (including Nextbike), tourism bus, connections to employment and education destinations, active travel hub with good connections, good facilities				Reject	Duplicate 18
Park and Ride/Choose	Shuttle buses connecting P&R hubs				Reject	Duplicate 18
Park and Ride/Choose	Relocated Springkerse with improved facilities				Reject	Duplicate 18
Park and Ride/Choose	Provide park & ride sites at Pirnhall				Reject	Duplicate 6

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Park and Ride/Choose	Tourist bus going to all sites from park & ride				Reject	Duplicate 18
Park and Ride/Choose	Higher frequency of park & ride				Reject	Duplicate 18
Park and Ride/Choose	Park and ride facilities - make use of existing long distance services, tourism bus, connections to employment and education destinations, active travel hub with good connections, good facilities				Reject	Duplicate 18
Park and Ride/Choose	Green Travel Hub at Springkerse, swap to other side of A91, EV charging, café/tourist draw on top floor to take advantage of the view, bridge to cycle/walking routes				Reject	Duplicate 18
Park and Ride/Choose	Low carbon transport and travel hubs at park and choose sites (LTS) at all potential sites				Reject	Duplicate 18

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Park and Ride/Choose	Investigate bus priority on key commercial and park and ride routes (LTS)				Reject	Duplicate 3
Park and Ride/Choose	Strategic coach services calling at existing P&R				Reject	Duplicate 2/18
Park and Ride/Choose	Tourism bus from park & ride site				Reject	Duplicate 18
Park and Ride/Choose	Park & choose with high quality walking/cycling routes to City Centre				Reject	Duplicate 7/18
Park and Ride/Choose	Increase park and ride capacity at Bridge of Allan station				Reject	Duplicate 20
Parking	Manage parking in the city centre (LTS) – review the charging mechanism for park and ride, for example, a standard charge for parking in place of bus fares. Depends on location (ie close to a retail park with spaces)				Reject	Duplicate 19

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Parking	Travel plans				Reject	Duplicate 12
Parking	Workplace parking levy				Reject	Duplicate 12
Parking	Different roles for parking – loading bay during the day, available for parking during the night				Reject	Duplicate 19
Parking	Increased parking at stations: a) Stirling, b) Dunblane, c) Bridge of Allan, d) Alloa, e) Larbert				Reject	Duplicate 20
Parking	Additional parking at Larbert				Reject	Duplicate 20
Rail	New Bannockburn/South Stirling Rail Station and service (DPMTAG/LTS/STPR)				Reject	Duplicate 23
Rail	Relocated Bridge of Allan station (closure and reopening) (DPMTAG/LTS)				Reject	Duplicate 21

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Rail	Improve journey times, frequencies of rail services (frequency of Alloa to Edinburgh)				Reject	Duplicate 22
Rail	Dunfermline to Stirling rail connectivity				Reject	Duplicate 22/23
Rail	Fare management to encourage rail trips within the travel to work area of the stirling/strathallan communities				Reject	Duplicate 11
Rail	Park & ride at Dunblane (increased parking provision)				Reject	Duplicate 20
Rail	New station at Cornton (retain Bridge of Allan Station)				Reject	Duplicate 23
Rail	Rail halt at Manor Powis (park and ride)				Reject	Duplicate 23
Rail	Link to WCML				Reject	Duplicate 22

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Rail	Station at Cambus				Reject	Duplicate 23
Rail	New station at Causewayhead (Alloa line)				Reject	Duplicate 23
Rail	Provide a station between Dunblane and Gleneagles at Blackford or Greenloaning to capture people from Crieff etc				Reject	Duplicate 23
Rail	New Cowie/South Stirling Rail Station and service (DPMTAG/LTS/STPR)				Reject	Duplicate 23
Rail	Railway halt at Cowie and Causewayhead				Reject	Duplicate 23
Rail	South Stirling Train Station				Reject	Duplicate 23
Rail	Rail park & ride on southside of Stirling (Plean/Cowie) with connection from M9				Reject	Duplicate 23

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Rail	Rail station at Cambus				Reject	Duplicate 23
Rail	Increase the number of trains to Alloa				Reject	Duplicate 22
Rail	Clackmannanshire P&R (rail halt)				Reject	Duplicate 23
Rail	Re-open the Alloa to Dunfermline Railway				Reject	Duplicate 23
Rail	Increased parking at Stirling railway station				Reject	Duplicate 20
Rail	Increase parking capacity at stations (and signage)				Reject	Duplicate 20
Rail	Decreased parking at Stirling railway station				Reject	Duplicate 20
Road	More access points from the M9 (addresses problems at Craigforth)				Reject	Duplicate 24

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Road	Work with SDC, LGV and bus operators to ensure bus routes are given priority by gritters when there is snow				Reject	Duplicate 24
Road	Kildean to Cornton - Access to Cornton station				Reject	Duplicate 24
Road	Improve A91/A905 network (P&R connections on A91)				Reject	Duplicate 24
Road	Junction alleviates traffic on Dumbarton Road				Reject	Duplicate 24
Technological improvements	Electronic/Live LTS coming into Stirling. Direct visitors to P&R with space. Information on the way into the city and online				Reject	Duplicate 25
Technological improvements	Smart motorways/Smart towns – changing the speeds, closing the routes				Reject	Duplicate 25

MODE	OPTION	TPO1 - IMPROVE TRANSPORT ACCESS	TPO2 - SUPPORT GROWTH ASPIRATIONS	TPO3 - IMPROVE COMPETITIVENESS OF PT	SELECT/ REJECT	RATIONALE
Technological improvements	Traffic lights – change in prioritization of flows depending on congestion/air quality				Reject	Duplicate 25
Technological improvements	Provide real time information - bus				Reject	Duplicate 25
Technological improvements	Electric taxis and buses				Reject	Duplicate 25

Report Appendix F Environmental

1. STIRLING - ENVIRONMENTAL PRE-APPRAISAL

1.1.1 In this pre-appraisal we have considered the following environmental sub-criteria:

- Noise;
- Global air quality - carbon dioxide (CO₂);
- Local air quality - particulates (PM₁₀) and nitrogen dioxide (NO₂);
- Hydrology, Hydrogeology and Flooding;
- Geology;
- Biodiversity and habitats;
- Landscape;
- Visual amenity;
- Agriculture and soils; and
- Cultural heritage.

1.2 Noise

1.2.1 Ten candidate noise management areas have been identified in Stirling by the Scottish Government for further study as these are in the top 1% of transport noise locations in Scotland. All are linked to road traffic noise. With the increases forecast in road traffic and population over the period of the Strategy it is likely that the number of people subject to noise impacts may increase. Major noise contributors within Stirling comprise predominately of road and railway traffic. Stirling City Council's website indicates that public noise complaints made are predominately for 'anti-social behaviour'.

1.3 Air Quality

1.3.1 There are no Air Quality Management Areas (AQMAs) within Stirling. Local monitoring data shows that annual mean NO₂ and annual mean PM₁₀ concentrations are well below their relevant objectives. This includes monitoring sites at locations close the A9 and A905 junction where high traffic volumes and queuing at the roundabout are likely to lead to elevated roadside pollutant concentrations.

1.4 Hydrology, Hydrogeology and Flooding

Hydrology

1.4.1 Stirling contains four surface water bodies recorded by SEPA, the River Forth, River Teith, Allan Water and Bannock Burn. To the north east the River Forth (Upper Estuary ID: 200437 and River ID: 4700) are both classified as having an overall status of Moderate (2017). Allan Water (ID:6832) which enters the River Forth to the north of the city is also classified by SEPA as having an overall status of Moderate (2017) as does the River Teith (ID: 6834) which enters the River Forth to the north west of the city. The Bannock Burn (ID: 6830) flows from south west to north east entering the Forth Estuary east of Stirling. The Pelstream Burn, Town Burn and Raploch Burn are not recorded by SEPA, however the latter flows in the north of Stirling whilst the other two are present in the east.

Hydrogeology

- 1.4.2 SEPA records two groundwater bodies below Stirling, the Stirling aquifer (ID:150571) classified as having an overall status of Poor (2017) and Teith and Forth Valleys aquifer (ID:150809) classified as having an overall status of Good (2017). Ochils North (ID:150499) and Carron and Touch (ID:150598) are also located in close proximity and have overall conditions of Good.
- 1.4.3 There are two dominant aquifers below the greater Stirling area. In the west a large igneous complex dominates the geology, this Permian intrusion is classed as a low productivity aquifer and contains small amounts of groundwater in near surface weathered zones and secondary fractures, with rare springs. The eastern section of Stirling is dominated by the Clackmannan group, this aquifer is regarded as being moderately productive, this is a multi-layered aquifer with low yields except where disturbed by mining. Passage Group sandstone has moderate yields up to 10l/s.
- 1.4.4 The DWQR website does not record any private water supplies however a number of Type B supplies are present in the much wider surrounds. Stirling is not within a Drinking Water Protected Area for surface water although one is present immediately west of Stirling beyond Cambusbarron. Stirling is within a Drinking Water Protected area for groundwater.

Flooding

- 1.4.5 Areas surrounding the above identified rivers are shown to be at high risk from fluvial flooding on the SEPA online flood mapping. Surface water flooding is shown in pockets throughout the region from low to high risk. Coastal flooding is isolated to areas immediately adjacent to the estuarine section of the River Forth in the north/east of Stirling and the Bannock Burn east of Stirling. The closest SEPA recorded flood defences are in Bridge of Allan and Alloa. North of Stirling an area where groundwater could influence the duration and extent of flooding from other sources is recorded but this is not recorded elsewhere.

1.5 Conservation Value

- 1.5.1 The River Teith is a Special Area of Conservation due to the presence of several species of lamprey and, to a lesser extent, salmon. Several kilometres downstream of Stirling the Firth of Forth is SSSI, Special Protection Area and Ramsar designated.

1.6 Geology

- 1.6.1 The majority of Stirling is covered by Late and Post-Glacial Raised Beach Deposits which includes marine and estuarine alluvium. Areas to the north and south of the city are dominated by Glacial Tills, with pockets of flood plain alluvium found along the channels of the watercourses in places.
- 1.6.2 Stirling is underlain by two main rock groups, separated by a dominant fault line. The Old Red Sandstone succession is found in the north of the city. These red sandstones are separated from the Carboniferous sedimentary succession, found in the centre and south of Stirling, by the Ochil Fault. Both of these successions have their own igneous complexes, with considerable extrusive and intrusive igneous rock recorded across the area. The Carboniferous succession is known to be coal bearing. Extensive mining throughout this succession is well documented, with the whole of Stirling within a Coal Authority Coal Mining Reporting area, however Development High Risk Areas are predominantly in the south and east.

- 1.6.3 As an urban area contamination can be anticipated due to previous industrial uses including along the line of the railway and sidings, as well as gasworks.
- 1.6.4 No special designations relating to geology and soils are located in Stirling. Within close proximity to Stirling Abbey Craig is a SSSI, recorded for beetles. Several Geological Conservation review sites are located west in the Touch Hills.

1.7 Biodiversity and habitats

- 1.7.1 Within 5 km of the Stirling area, a number of sites have been statutorily designated for their biodiversity and/or habitat interest (Table 1). These statutorily designated nature conservation sites must be considered when developments have the potential to impact on their qualifying features. The following designations are included:
- Special Protection Areas (SPA) are designated under the EU Birds Directive and provide protection to sites that support internationally important bird populations;
 - Special Areas of Conservation (SAC) are designated under EU Habitats Directive and safeguard populations of species listed in the directive and the best examples of habitats listed in the directive;
 - Ramsar sites are designated under the Convention on Wetlands of International Importance and are usually linked to the SPA and SAC network. All have an underpinning SSSI designation (see below);
 - Sites of Special Scientific Interest (SSSI) are designated under the Nature Conservation (Scotland) Act 2004 and safeguard nationally important species populations or habitats.
- 1.7.2 Within 5 km of the Stirling area, there are two SACs, one SPA and five SSSIs (Table 1). Depending on the location, nature and scale of any proposed development, the qualifying features of these sites are potentially vulnerable to adverse impacts due to direct damage/loss of habitats, habitat fragmentation, barriers to species movement, loss of connectivity between important sites/habitats and disturbance to or degradation of the qualifying feature. The principal potential impacts that may affect these sites are listed in Table 1. In addition to the SSSI designation, Balquhiderock Wood is also a Local Nature Reserve.
- 1.7.3 There are six areas listed on the Ancient Woodland Inventory (AWI) within the Stirling area, and sixty AWI compartments in a wider 2 km buffer (Map 2). Scottish Planning Policy identifies ancient woodland as '*an important and irreplaceable national resource that should be protected and enhanced*'. AWI sites within the Stirling area are vulnerable to direct loss and damage, fragmentation, loss of connectivity and degradation and should be considered at an early stage of any proposed development.
- 1.7.4 In line with Policy 1.3 of the Stirling Local Development Plan 2018, any new developments should take account of impacts on the Central Scotland Green Network (CSGN) plus local Green Network and Open Space strategies. Importantly, options to contribute to these initiatives or their objectives should be considered in any proposed development. The CSGN has mapped *integrated habitat networks* for a number of habitat types: neutral grassland, acid grassland, heathland, wetland and woodland. The Stirling area and areas within 5 km support part of the network for all these habitats.

Table 1. Statutory Designations

Protected Area	Designation	Qualifying features (biological)	Potential impacts associated with development
Firth of Forth	SPA and Ramsar	<u>On passage:</u> Sandwich tern <u>Over winter:</u> Bar-tailed godwit Golder plover Red-throated diver Slavonian grebe Knot Pink-footed goose Shelduck Redshank Turnstone <u>Assemblage:</u> Waterfowl assemblage	Disturbance
River Teith	SAC	River lamprey Brook lamprey Sea lamprey Atlantic salmon	Direct loss/damage Habitat fragmentation Loss of connectivity Barriers to species movement Disturbance/degradation
Kippenrait Glen	SAC	Mixed woodland on base-rich soils associated with rocky slopes	Loss of connectivity Degradation
Balquhiderock Wood	SSSI	Wet woodland	Direct loss/damage Habitat fragmentation Loss of connectivity Barriers to species movement Degradation
Wester Moss	SSSI	Raised bog	Loss of connectivity Degradation
Sauchie Craig Wood	SSSI	Upland mixed ash woodland	Loss of connectivity Degradation
Abbey Craig	SSSI	Upland mixed ash woodland Beetle assemblage	Direct loss/damage Habitat fragmentation Barriers to species movement Disturbance/degradation
Craig Leith and Myreton Hill SSSI	SSSI	Northern brown argus Sticky catchfly Upland mixed ash woodland Upland assemblage	Loss of connectivity Disturbance/degradation

1.8 Landscape and Visual Amenity

1.8.1 Stirling is a small city lying on the lower reaches of the River Forth in the Carse of Forth, a Flat Valley Floor landscape character type (LCT) running from west to east where the river widens into the Firth of Forth. The majority of the settlement lies to the south of the meandering river and to the east of the M9 motorway. The surroundings are predominantly flat agricultural land interspersed with other settlements including Bridge of Allan to the north; Fallin, Cowie and Plaean to the south. There are future strategic expansion areas for housing to the south and east.

- 1.8.2 The city has an extensive historic core, with scheduled monuments including Stirling Castle, extensive conservation areas and many listed buildings. There are also three extensive battlefield sites surrounding the city. There are many parks and greenspaces.
- 1.8.3 The wider setting of the city and Forth valley includes the Ochil Hills, a Lowland Hills LCT to the northeast and the East Touch Fringe, a Farmed Hill Fringe LCT to the southwest.
- 1.8.4 Stirling and its surrounding settlements do not lie within a designated landscape. However three local landscape designations bracket the river valley, bordering the main settlement: the Keir Local Landscape Area (LLA) to the northwest; the Western Ochils covering the Ochil Hills and their fringes to the north and northeast and the Southern Hills LLA covering the Touch, Gargunnoch and Fintry Hills to the west.
- 1.8.5 The Stirling greenbelt surrounds much of the main settlement, separating it from other nearby settlements including Bridge of Allan, Fallin and Cowie as well as areas between the M9 and western edges and the A91 and northeast Stirling.
- 1.8.6 There are four inventory Garden & Designed Landscapes either in or around Stirling: two close to the castle, the grounds of Airthrey Castle which host the University campus and the Keir estate north of Bridge of Allan.
- 1.8.7 Potential visual receptors include:
- Tourists visiting Stirling and surrounding attractions including Bannockburn and the Wallace monument
 - residents of/ visitors to Stirling and surrounding settlements
 - users of the A and B roads passing through and round the settlements
 - cyclists on Cycle Routes 76 and 765 passing through the area
 - drivers on the M9
 - users of the many core paths within and surrounding the settlements, including those overlooking the setting of Stirling and the Forth from the southern edge of the Ochils and the eastern Touch Hill fringes.

1.9 Agriculture and soils

- 1.9.1 Scotland Environment Web's 'National Scale Land Capability for Agriculture Map' shows the land within/surrounding Stirling comprises of land with the following classifications:
- Class 7 – Urban;
 - Class 3.1 - Land capable of producing consistently high yields of a narrow range of crops and/ or moderate yields of a wider range. Short grass leys are common; and
 - Class 4.1 - Land capable of producing a narrow range of crops, primarily grassland with short arable breaks of forage crops and cereal.
- 1.9.2 The Stirling area has a proud agricultural history and is an important area for livestock and crop farming in Scotland.

1.10 Cultural heritage

- 1.10.1 Little is known of the earliest settlement at Stirling, but the remains of an Iron Age vitrified hill fort are located on Gowanhill. The Roman road north to Ardoch Fort passed through the King's Park area before crossing the River Forth. Situated on a rocky crag, Stirling Castle dates from the twelfth century and the town was established as a Royal Burgh by David I (1124-53). The medieval town was concentrated on the sloping ridge below the fortified crag. Stirling occupies a strategic location at what was the lowest bridging point on the River Forth between the Highlands and Lowlands of Scotland. Many important battles in Scottish history took place in sight of the town within the surrounding land

including the Battle of Stirling Bridge (1297), the Battle of Bannockburn (1314) and the Battle of Sauchieburn (1488). Stirling contains 11 Scheduled Monuments, 12 Conservation Areas and many category A, B and C Listed Buildings. Conservation Areas and Scheduled Monuments are listed in Table 2.

Table 2. Conservation Areas & Scheduled Monuments

Conservation Areas	Scheduled Monuments
Stirling Town and Royal Park	Cambuskenneth Abbey, Cambuskenneth
King's Park	Remains of Former Stirling Old Bridge
Park Place/Randolphfield	Stirling Old Bridge
Randolph Road	Argyll Lodging
St Ninians	Stirling Castle
Bruce Street	Stirling Royal Gardens, including King's Knot
Bridgehaugh	Stirling Town Wall & Bastion
Cambuskenneth	Mar's Wark - Uncompleted Residence
Bannockburn	King's Park - Cup & Ring Mark
Cambusbarron	Abbey Craig Fort
Blairlogie	Airthrey Castle Standing Stone
Bridge of Allan	

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