

Perth & Kinross Council

Perth Cycle Network Masterplan

Identification and Approval

IDENTIFICATION TABLE

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1. Introduction

Objectives of the study

SYSTRA was appointed by Perth & Kinross Council (PKC) to develop a cycle network masterplan for Perth, in support of their ambition to make Perth an attractive city to cycle in.

The purpose of the masterplan is to coordinate current and future investment in cycling infrastructure in Perth, with the aim of creating a coherent and convenient cycle network, which will make cycling an attractive choice for everyday journeys, to work, to school, to the shop or for leisure.

The masterplan will serve as a reference:

- In the development of more detailed schemes by PKC, ensuring they are all coordinated,
- To support funding applications, such as Community Links and Community Links Plus, and
- To serve as the basis for discussion with partners, (e.g. developers) on how they can contribute and expected longer term benefits from the infrastructure.

The cycle network masterplan:

- Identifies major destinations and how well they are currently connected.
- Creates a schematic cycle network connecting those destinations, establishing what a complete cycle network in Perth would look like.
- Defines the functions and derived level of provision for the different types of connection.
- Along each core connection, identifies and assesses potential route alignments.
- Undertakes an initial assessment of the likely benefits and constraints of each corridor, for the purpose of informing short/medium term investment decisions.

This is an early step towards the implementation of a comprehensive cycle network in Perth, and is therefore expected to evolve as the design of specific schemes are progressed or new opportunities arise. It sets the expected reach and design principles of the cycle network, but does not prescribe specific route alignments and type of infrastructure at this stage. Extensive stakeholder engagement, options appraisal, benefit/cost analysis will need to take place to do so.

High quality cycling infrastructure alone, although necessary, is unlikely to be sufficient to achieve the ambitious scale of change and modal shift aimed for. Any cycling infrastructure development will rely for its success on complementary initiatives in favour of active travel. Travel behaviour change programmes, promotion, cycle training, travel planning, are all essential tools to make cycling attractive. Those are covered in more detail in the Active Travel Strategy for Perth and Kinross under development (planned for publication in Spring 2018).

Other policy areas relevant to creating an environment conducive to cycling include car parking strategies, development plans, or public transport especially interchanges.

Study Area

The study is focused on the City of Perth and its nearby towns and villages: Scone, Bridgend, Bridge of Earn, Almondbank, and Luncarty. The map alongside (figure 1) shows the extent of the area considered.

Although not considered in detail, connections to the wider region and beyond have been included in the review, to create a masterplan integrated with the regional and national cycle network.

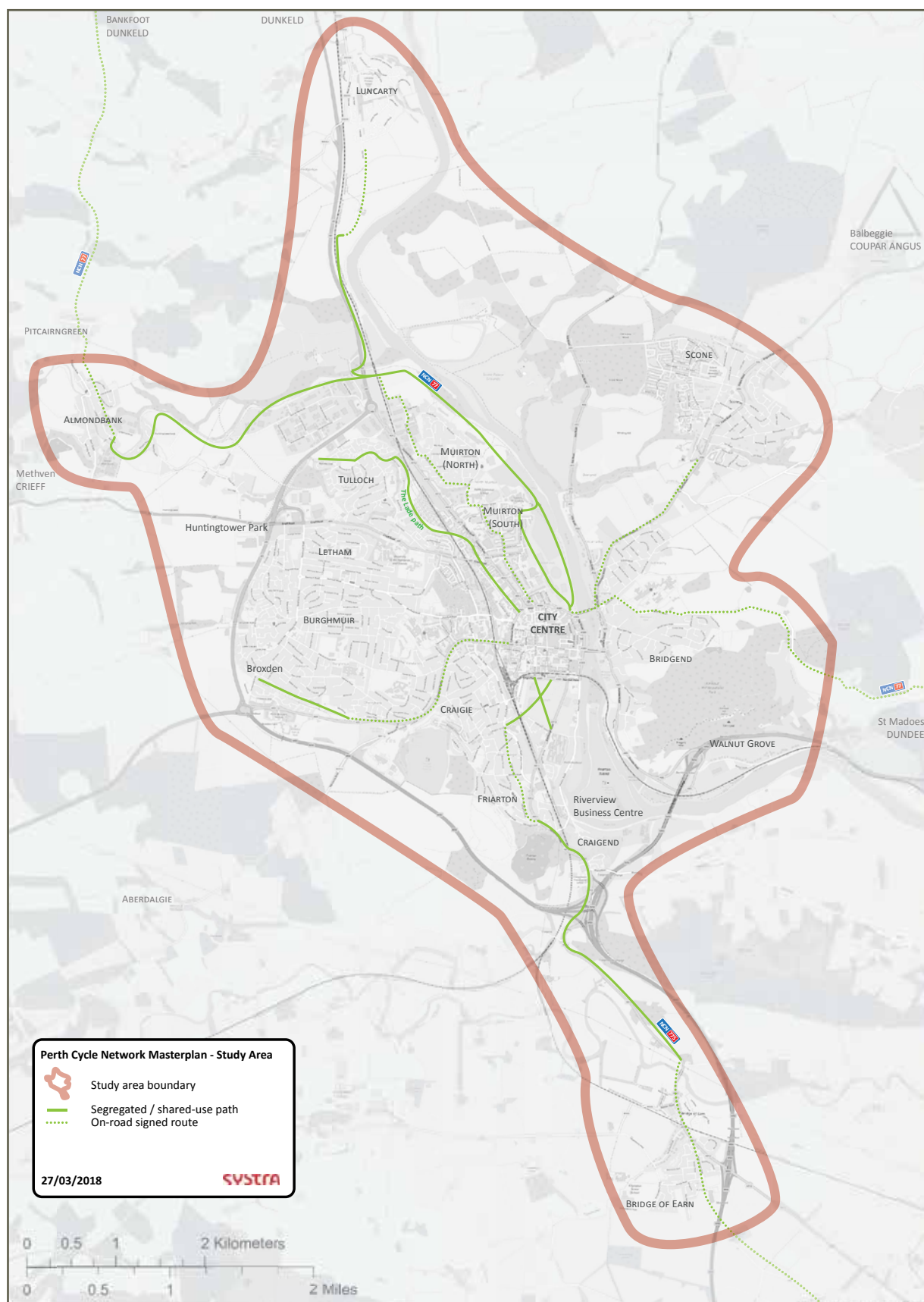


Figure 1 Map of study area

2. Methodology

Approach

The network masterplan was developed in line with guidance issued by Sustrans in "Design Manual Chapter 2 - Network Planning for Cyclists (draft)" December 2014.

The guidance describes a 5-stage development and implementation process of which this study covers the first two:

- Stage 1: Estimate cycling demand and define network function; and
- Stage 2: Define route alignments and concept design.

It also informs discussions on Stage 3 (Define implementation priorities, programme and budget) by providing an initial review of the benefits of selected corridors and alignment options.

The relevant extract from the process chart is shown on figure 2 below.

The methodology also draws inspiration from other guidance documents. In particular, the Dutch "Design Manual for Bicycle traffic" (2017) Chapter 4 "Design of the cycle network" was a direct reference for the development of the network hierarchy and the qualitative criteria used to assess the route options.

The masterplan was produced through the following steps:

- A desktop review of policy and planned changes at the local and regional level;
- Map and desktop-based identification of key origins and destinations, physical barriers, both existing and planned;
- A workshop with external stakeholders to gather views on future routes, identify opportunities and constraints;
- An workshop with stakeholders internal to Perth & Kinross Council to integrate constraints, opportunities, complementary initiatives and common objectives across council departments;
- A mapping exercise summarising findings from the previous stages, leading to the development of a schematic cycle network with a hierarchy of functions and general type of provision, including "core connections", "secondary connections", and "local access"/"basic structure".
- For the core connections, the identification of potential route alignments.
- And finally, a high-level assessment of the benefits and constraints of each core connection, to inform short or medium term investment plans.

Table 2.1 Cycle network planning and implementation stages

Project phase	Stage
Network planning	1. Estimate cycling demand (magnitude/ distribution and potential increases) and network function
	2. Define route alignment and concept design
	3. Define implementation priorities, programme and budget
Implementation	4. Detailed design, construct and publicise
Post-implementation	5. Monitor & evaluate, maintain and upgrade

Figure 2 - Extract from Sustrans' Network Planning for cycling process flow chart



Engagement

This network masterplan is ambitious in scope and level of provision for cyclists, and cannot be delivered without careful consideration of stakeholders' expectations and concerns, and building of support around its aims.

For this study, the start of the process, two workshops with external stakeholders and with Council Officers were organised. The list of organisations invited were: Sustrans, Cycling Scotland, The Perth Bike Station, Kinross Cycling Club, Coupar Angus Cycle Hub, Highland Perthshire Cycling, TRACKS, Ramblers Scotland, Live Active, ByCycle, and Muthill Village Trust. Within Perth & Kinross Council, the list of invitees was drawn up to cover as many departments as possible.

Each workshop had a different audience, thus different focus:

- The external workshop focused on locating

physical barriers to cycling, existing infrastructure of good quality to build the network around, but also areas which would benefit from upgrading, or have missing sections.

- For the Internal workshop, the focus was on reviewing ongoing projects and opportunities that cycling could benefit from, or support shared objectives.

The draft results and recommendations were issued to stakeholders for comment and integrated into the final masterplan.

This is the first step in a long process to develop a coherent, consistent, and attractive cycle network in and around Perth. As proposals emerge or the masterplan evolves, further and wider engagement with stakeholders is expected to take place, giving as many people and organisations as possible the opportunity to contribute.

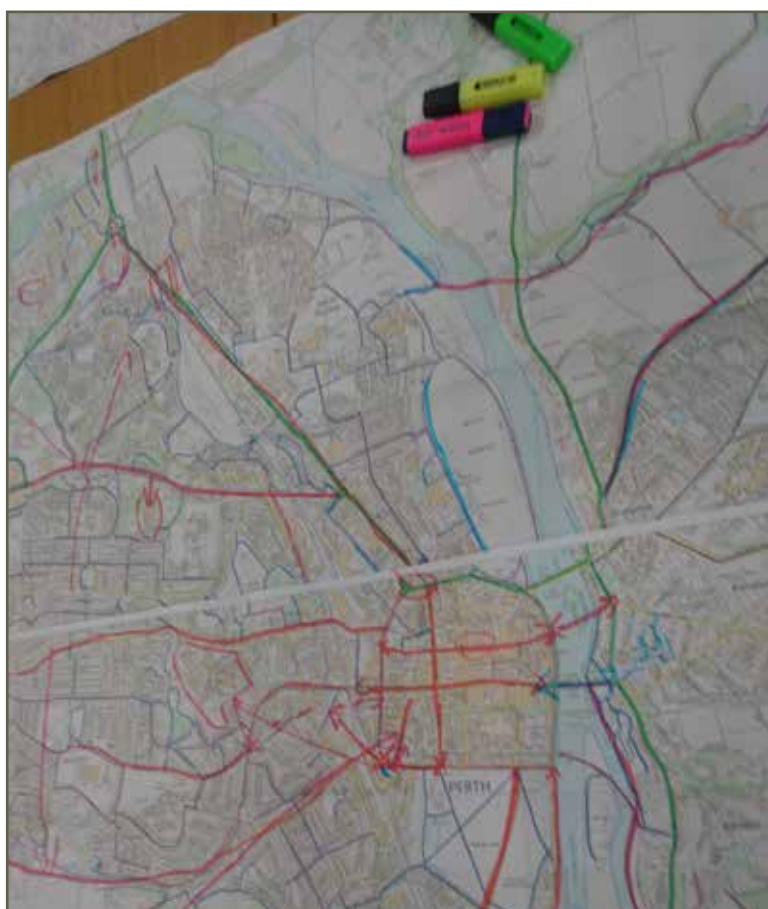


Figure 3 - Output from workshop with external stakeholders.

3. Policy framework and previous studies

Policy context

The policy context is provided with reference to Perth and Kinross Active Travel Strategy, complemented by relevant documents specific to the City of Perth.

National and supra-national context

In 2013, the Scottish Government published its Cycling Action Plan for Scotland. Its vision is that: “By 2020, 10% of everyday journeys taken in Scotland will be by bike.” It was last updated in 2017, maintaining the same vision.

It sets out 19 actions to achieve this, under priority headings of:

- “leadership and partnership;
- infrastructure, integration and road safety;
- promotion and behavioural change;
- resourcing; and
- monitoring and reporting.”

Regional Context

Promotion of active travel is a key output of Tactran’s Regional Transport Strategy (RTS). The recently refreshed RTS (2015-2036) has four key strands relating to active travel:

- “Strategic Integration;
 - High Quality Infrastructure
 - Making Better Use of the Transport System;
- and
- Influencing Travel Behaviour”.

The strategy also proposes a network of regional walking and cycling routes.

Perth and Kinross

The forthcoming Active Travel Strategy for Perth and Kinross includes the draft commitments to:

- Create good off-road networks, and improve the attractiveness of streets as places to walk and cycle ;
- Improve associated active travel friendly infrastructure;
- Improve information on walking and cycling routes and opportunities;
- Enable more people to walk and cycle;
- Encourage more people to walk and cycle; and
- Create a strong leadership and governance structure.

City of Perth

Perth’s Transport Future, published by PKC in 2012, notes that key transport problems include “Walking and Cycling: unattractive due to heavily trafficked roads in the city centre and on key routes leading to the centre, air quality problems and severance by the A9 to access to future growth areas”.

Its strategic objectives include “to increase the proportion of short trips by more sustainable modes”.

In the 2015-2035 Perth City Plan, PKC states its vision is to develop the City of Perth as “One of Europe’s Great Small Cities”, where (among other things) “The new River Tay Crossing, **investment in public transport, walking and cycling networks and infrastructure will create an accessible city that encourages active travel and reduces car dependency.**”

Extracts from the City Plan (figure 4 and 5) detail design principles and aspirations relevant to the cycle network.

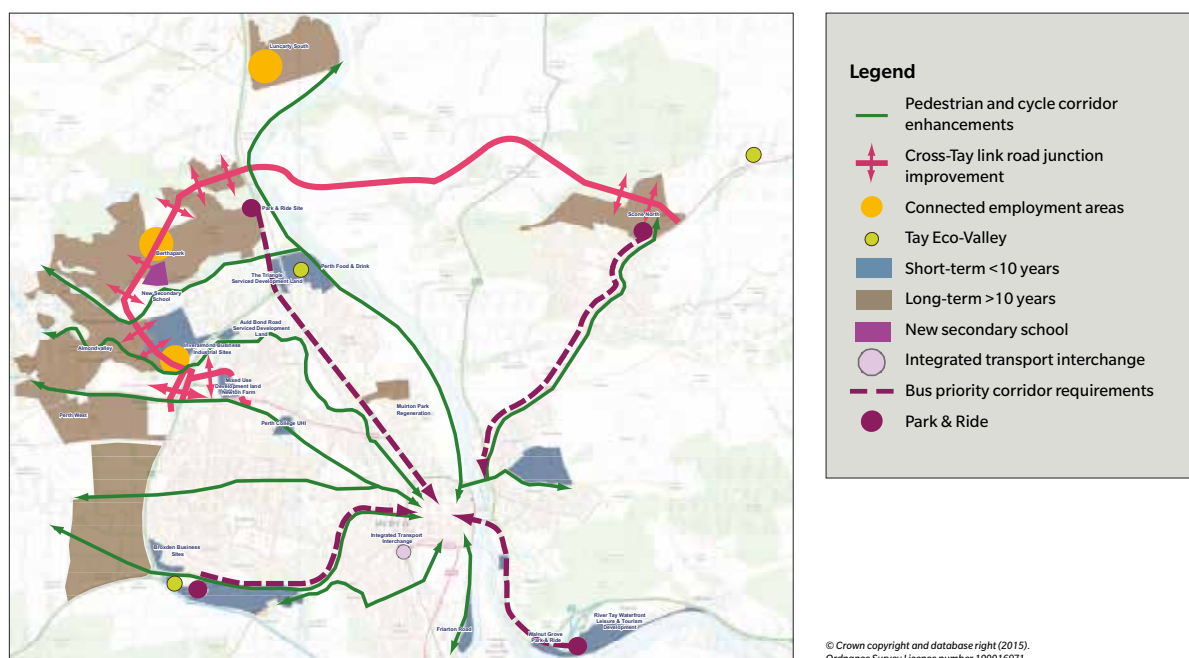


Figure 4 - Extract from Perth City Plan 2015-2035 - "City-wide design principles"

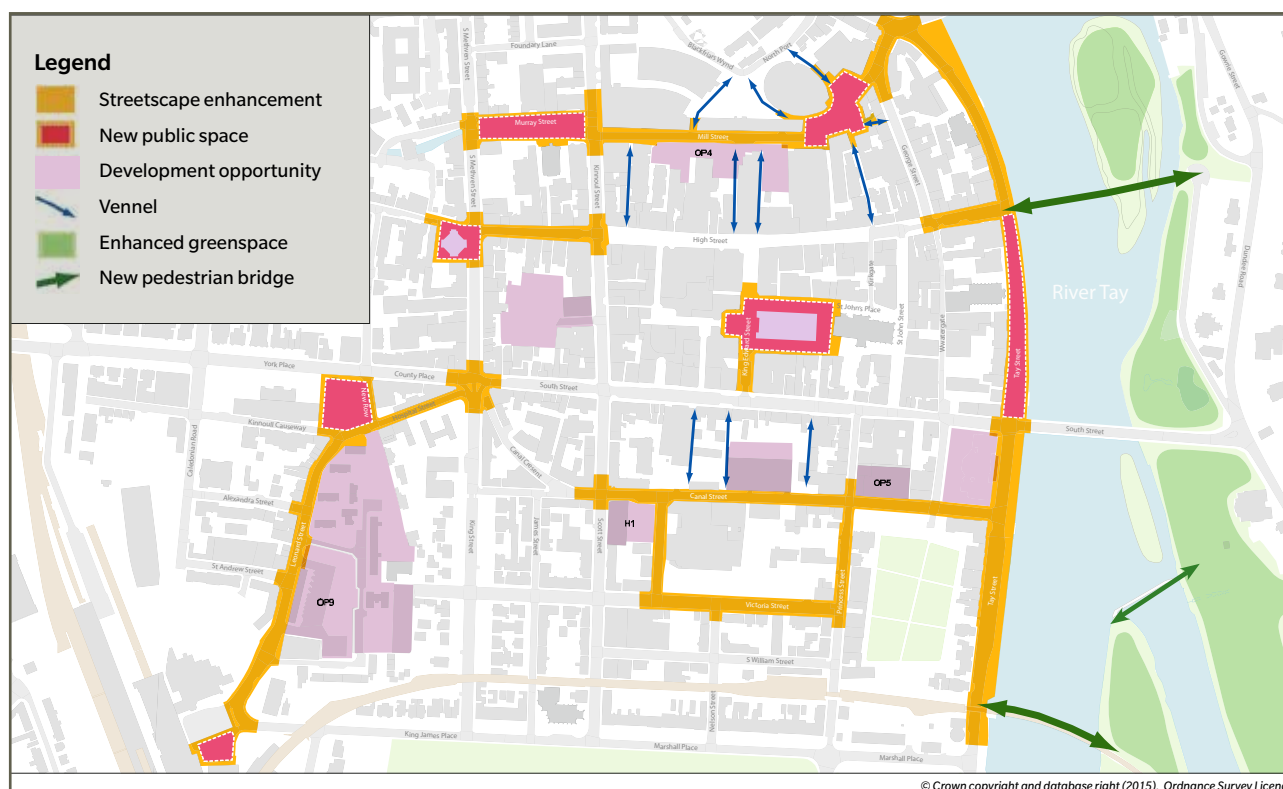


Figure 5 - Extract from Perth City Plan 2015-2035 - "Transforming the public realm"

Previous studies

Supplementing policy and strategy documents, two recent studies informed the cycling network plan.

Active travel audits for Scone/Bridgend area (2017)

Tactran commissioned an active travel audit for the Scone-Bridgend area, completed in 2017. The study reviewed and scored existing walking and cycling facilities and identified potential improvements. Proposed infrastructure included segregated cycleways, shared spaces, "cycle streets", or shared footways. Each proposal was assessed, scored, and ranked with the purpose of informing future scheme development.

The proposed network for Scone and bridgend is shown on Figure 6 below.

The full active travel audit report can be found on TACTRAN's website.

Bridgend Design Charette (2014)

The Design Charette was initiated by Perth & Kinross Council and Bridgend, Gannochy, and Kinnoull Community Council, and Perth Left Bank Community Trust, and took place on 20th March 2014.

The Charette lead to the creation of a vision for Bridgend, and the sharing of ideas and initiatives to realise that vision. Key aspirations included the re-design of Bridgend Main Street and surrounding areas into "People-friendly streets", with the re-balancing of the street layout in favour of walking, cycling and "spending time in" over motorised traffic.

Another key proposal was for a new foot (and cycle) crossing over the River Tay linking Bridgend to Perth High Street.

Initiatives from the Bridgend Charette Strategy are summarised on figure 7 alongside.

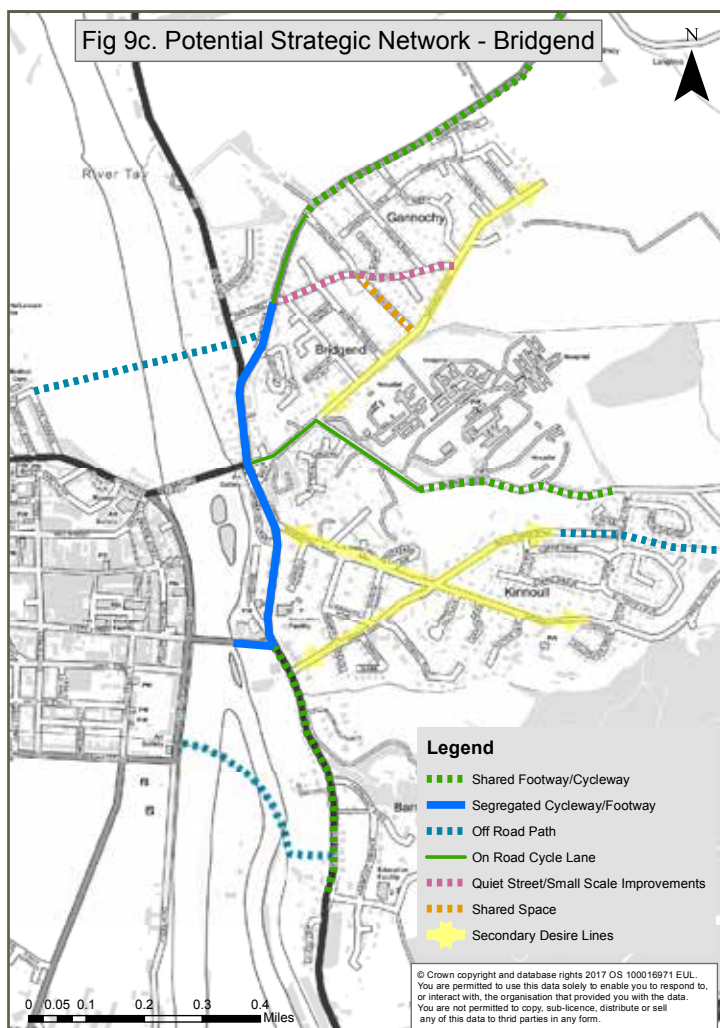


Figure 6 - Extract from Active Travel Audit for Scone and Bridgend (tactran, 2017).

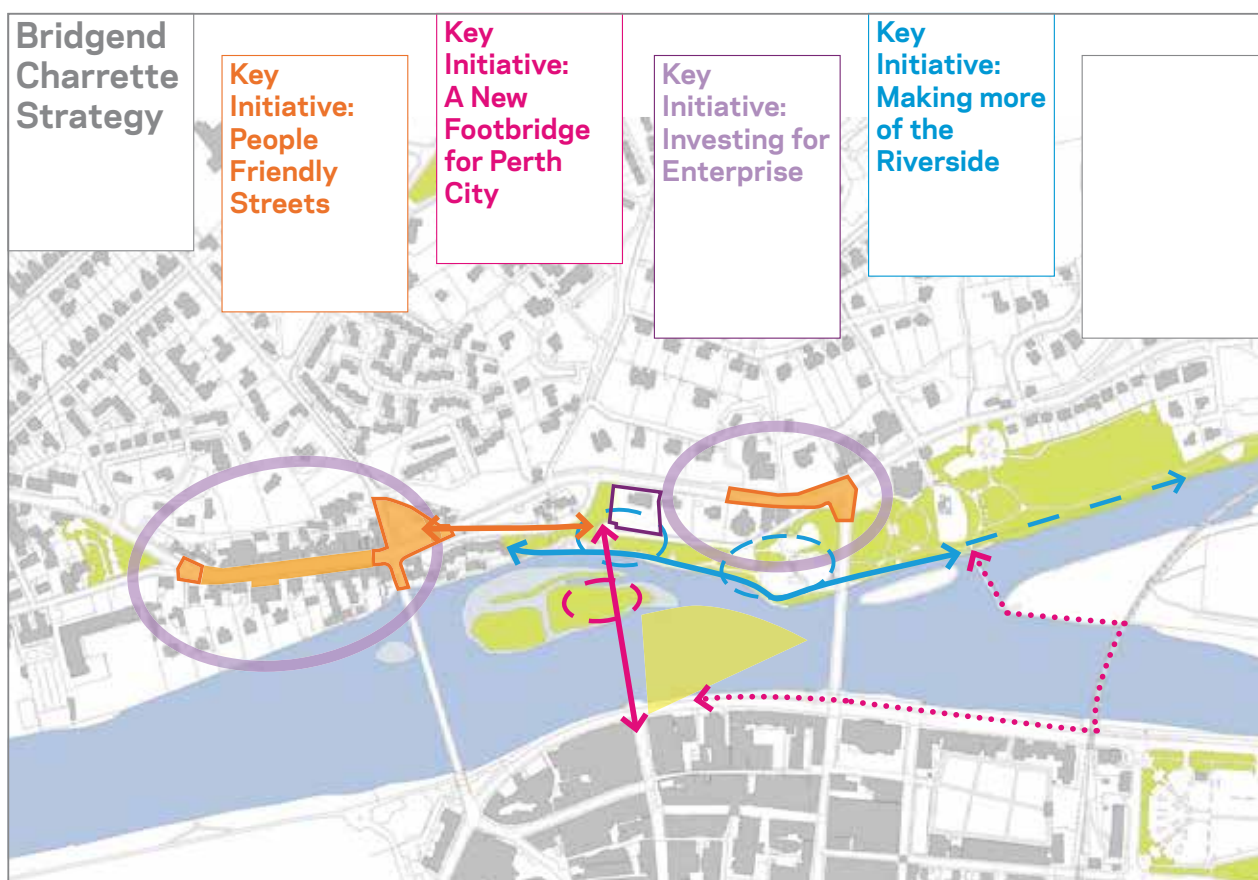


Figure 7 - Extract from the Bridgend Design Charette (PKC, 2014).

4. Cycling Demand and Network Functions

Current cycle use

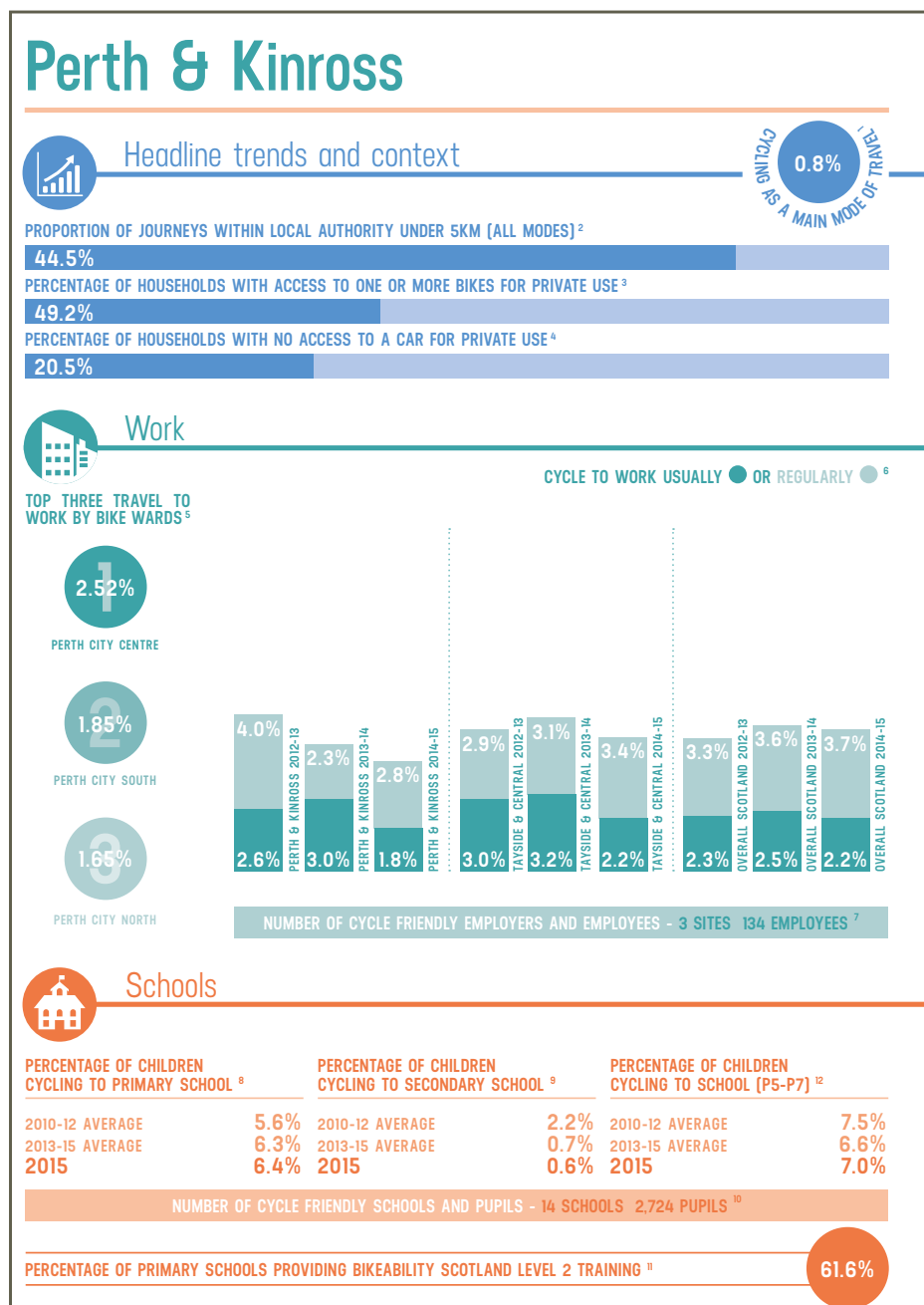
Cycling mode share remain low across most of Scotland, and even more so in Perth and Kinross.

The Annual Cycling Monitoring Report is produced every year by Cycling Scotland and summarises cycling trends at the national, regional and local level. The extract from the 2017 report covering Perth & Kinross Council is shown on Figure 8 below. Across the council area, it shows very low levels of cycling with cycling being the main mode of travel for 0.8% of journeys, compared to 1.2% across Scotland (Scottish Household Survey 2015). The percentage

cycling to work "usually" or "regularly" as actually reduced from 4% in 2012-13 to 2.8% in 2014-15 (SHS). Although as numbers are low, the significance of the change should not be overestimated.

The numbers quoted are for the Perth & Kinross Council area, which includes large rural areas. Although number for Perth are likely to be higher, 2011 Census data at the Ward level suggests they remain low across the city. Perth City Centre ward had the highest percentage travelling to work by bike in 2011, at 2.52% of the population.

Figure 8 - Extract from the 2017 Annual Cycling Monitoring Report, Cycling Scotland.





Current and future travel patterns - potential for cycling

Although current cycling levels remain low, current travel patterns in Perth suggest that large numbers of journey's could easily be cycled, given the right infrastructure and incentives.

Perth is compact, with surrounding settlements (Scone, Luncarty, Bridge of Earn, Walnut Grove and Almondbank) are within 3 to 7 km (approximately 2 to 5 miles) of the city centre, or a reasonable cycling distance.

44.5 % of journeys by any mode in Perth and Kinross are under 5km (SHS 2015), a distance which can be cycled in about 15 minutes. Not all of those journeys can be cycled for a range of reasons including trip-chaining, passengers or objects transported, certain disabilities, etc., however the potential remains important. In the three wards covering Perth, 66% of people live less than 5km from their place of work (Census 2011, excluding those mostly working from home).

Car ownership in Perth and Kinross (79.5%) is higher than the national average (74%), but figure 9 overleaf shows that areas in the City of Perth have much lower car ownership, mostly in the north and north-west of the city. Those areas also tend to have higher levels of deprivations and are therefore the ones most likely to benefit from improvement to cycling infrastructure.

The largest concentration of destinations is, predictably, the city centre. Beyond this, major trip generators include retail and employment sites at the Inveralmond retail park and industrial estate with the SSE headquarters also located nearby, Aviva offices along Glasgow Road and the Broxden business park further west. Other key retail destinations are St Catherine's retail park stretching between Glasgow Road and Dunkeld Road, and the junction of Creiff Road with the A9, near Huntingtower.

Sports and leisure destinations (Bell's Centre, Leisure Pool), education (University of the Highlands and Islands and secondary schools), health sites (Perth Royal Infirmary and Murray Royal Hospital), transport interchange (rail and bus stations and Broxden Park and Ride/coach hub), and residential neighbourhoods complete the list of the current major trip generators.

Significant growth in population and employment is planned, with the latest population estimate of 47,000 expected to reach 60,000 by 2035 (Perth City Plan). Significant developments are under construction, Bertha Park to the north of the city is expected to create 3,000 new homes with associated services and retail, as well as a high school. Further housing and mixed use development are planned to the west of the A9, near Broxden, south of Luncarty, and north/east of Scone.

The planned new Cross Tay Link Road (CTLR) is also expected to redirect car journeys away from the Scone Road - Atholl Street - Dunkeld Road corridor, enabling the re-allocation of the road capacity made available to other modes of transport. The two existing Park and Ride (P&R) sites (at Scone and Broxden) will be joined by two new ones, at the junction of Dunkeld Road with the CTLR, and at Walnut Grove.

At Broxden, the business park, P&R and coach hub will be complemented by a Low Carbon Hub Travel Hub.

The existing and future trip generators described above have been mapped (figure 10, page 16) to form the basis of the cycle network masterplan.

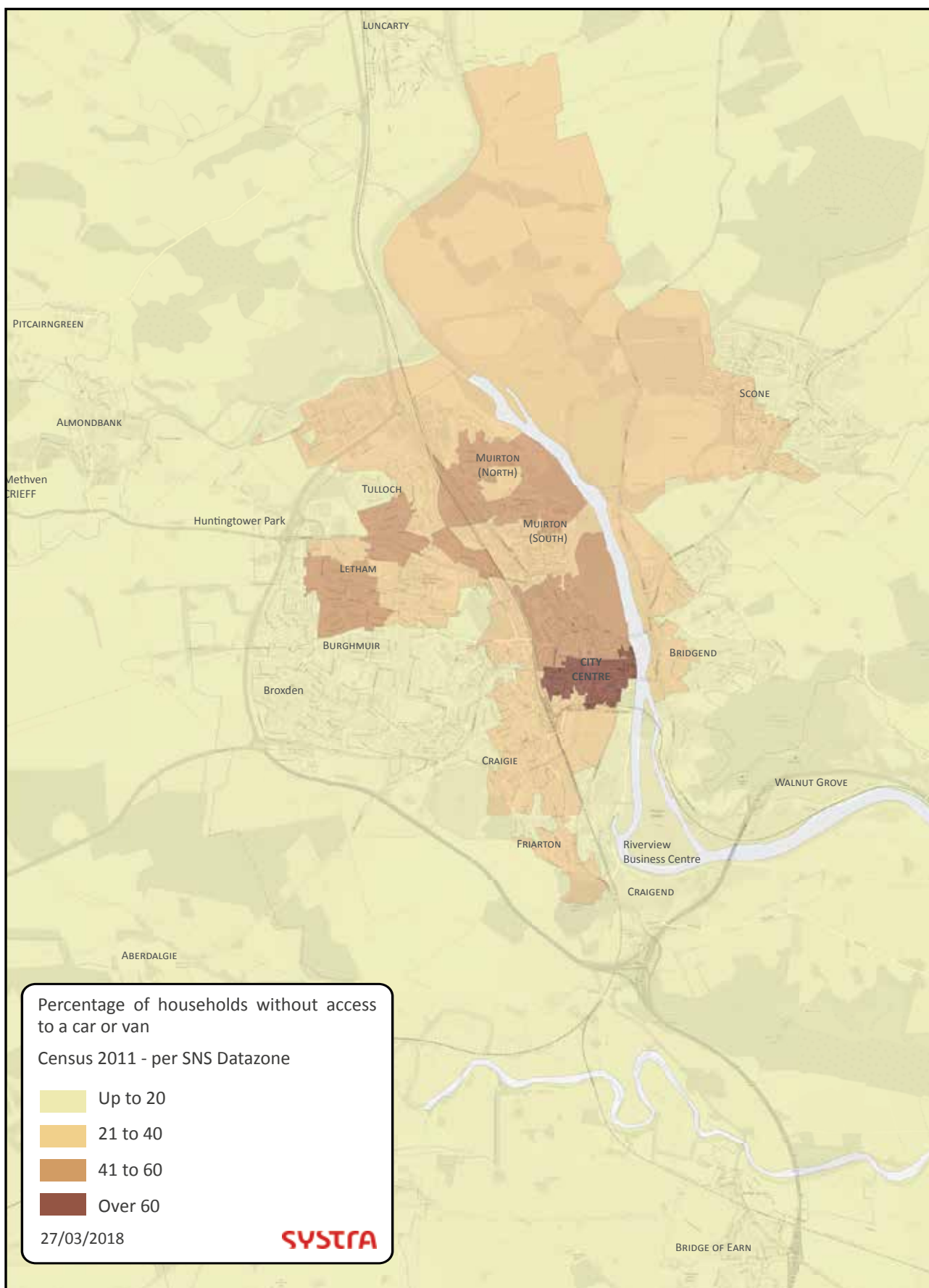


Figure 9 - Percentage of households with no access to a car or van (census 2011)



Cycle Network Functions

For the cycle network to be suitable for transport use, it needs to provide direct access to all destinations identified previously just as (or more) easily as one can drive there. And just as for the general road network, different types and levels of provision will be suitable for different routes.

The Dutch Design Manual for Bicycle Traffic (CROW, 2017) is key reference of design and network development guidance. It defines the main cycle network as: "in built-up areas, it pertains to the connections at district level which ensure that all districts and neighbourhoods, and important functions are connected[...]; outside of built up areas, it relates to the connections between centres, villages and towns and important functions" [...] "these routes must offer cyclists maximum quality and (in busy location and on busy stretches) the calculations need to factor in a high volume of cyclists" (p63).

The main cycle network is supported by the "basic structure" which is composed of "the residential connections at neighbourhood level, broadly corresponding in practice to each path and each street usable by cyclists." (CROW Manual p62) these routes typically do not require segregation between modes, but assumes a low level and speed of motorised traffic. Access to all modes is maintained, but no through routes are open to motorised traffic, through the use of filtered permeability tools, with for example, residential one-way systems or road closure at strategic points, both exempting cyclists.

Schematic Cycle Network Plan

Based on those principles and information gathered during the desktop review and workshops, the existing and future trip generators across Perth have been mapped and notional links drawn between them, creating a schematic cycle network.

Both destinations and links are shown on figure 10 alongside "Perth Schematic Cycle network".

In the Perth cycle network masterplan, the "main cycle network" is divided into two categories:

- "Core connections" linking neighbourhoods and key destinations. In Perth, the focus is on connections with the city centre. The type of infrastructure provided is dependant on the alignment selected and local context, but those core routes are often along busy transport corridors and most likely to require full segregation, from motorised vehicles, but also from pedestrians if the expected flow of either cyclists or pedestrians is significant.
- "Secondary connections" linking neighbourhoods to each other, typically without going to or through the city centre. The function and level of provision along secondary routes will vary and depend on local circumstances. Its definition as well as preferred alignment is outside the scope of this study. This may be investigated by area, through detailed active travel audits / optionneering.

The "basic structure" as defined by the CROW manual, is not represented on the map but can be described as all roads within the polygons created by the Core and Secondary connections in the built-up area (excluding motorways and dual-carriageways). In practice, the design of any core or secondary cycle route should include the review of the surrounding road network (or basic structure) to ensure it provides adequate access to the (usually) residential areas from the core/secondary route.

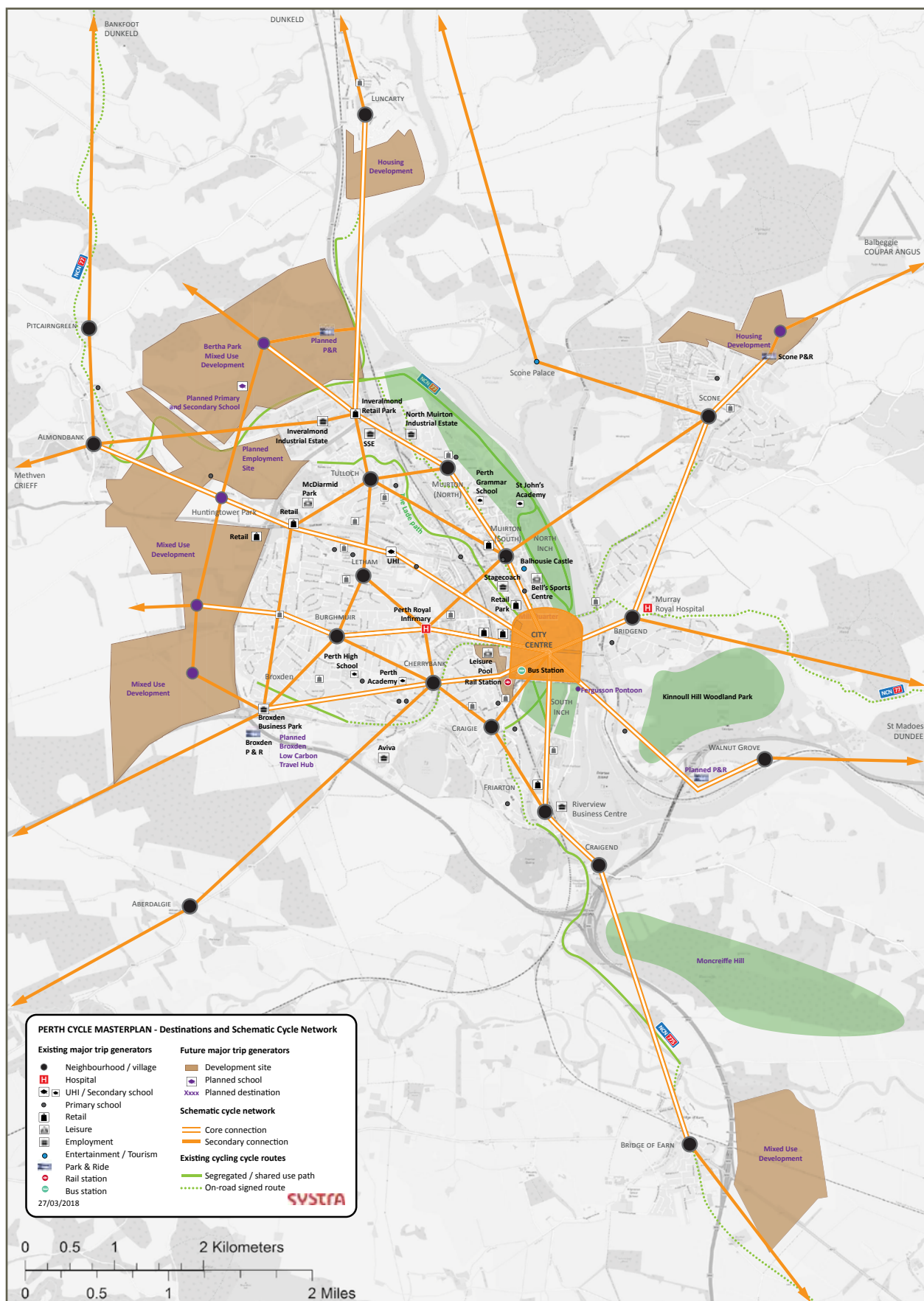


Figure 10 Map of trip generators and schematic cycle network (A larger version of this map is available in Appendix A)



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5. Core Route Alignment Options development

From schematic links to route alignments

The cycle network masterplan as shown on the schematic network map (figure 10) will be implemented over time as funding becomes available and opportunities arise. The detailed alignment of each of the notional link will therefore be determined when each scheme comes forward for development.

Within the scope of this study, the seven core links to the city centre (white/yellow on the map) have been taken one step further and alignment options have been identified and assessed. They are the focus of the remainder of this document.

This is in the context of current opportunities in terms of funding (e.g. Community Links and Community Links Plus), development (large housing and mixed use developments to the north and west of the city), and public realm improvements under development for the City Centre.

It is not suggesting that other connections (secondary routes or basic structure) should only be taken forward later or are less essential to the network. On the contrary, infrastructure investment in high quality and high capacity core routes can be best justified if it serves the largest number of destinations, at commuting times, throughout the day, and at weekends. Achieving that requires a fine grained network (or high density mesh).

The importance of secondary and basic connections is reflected in the corridors and alignment assessment in this chapter by the inclusion of a buffer from the routes themselves, established at 500m for the purposed of the study, when assessing its benefits. Each core route taken forward should include connections to nearby areas along the route as an integral part of the project and its budget, not only as an "end to end" route.

Identifying core route alignment options

Identification of alignment options was based on a review of:

- Existing infrastructure (current cycle routes shown on the Harvey's Perth Cycle map shown alongside, figure 11);
- Planned infrastructure and development areas identified through desktop research and at the workshops;
- Aspirations from policy and strategy documents, and previous studies; and
- Physical constraints, barriers and 'missing links' identified at the workshops and on site.

The review was supported by site visits and staff local knowledge.

Note that no detailed audit was undertaken or data collected as part of the study, the assessment is based on data available, general site observations, and feedback from stakeholders and PKC Officers.

Findings have been summarised on two maps shown on the next spread (figure 12 and figure 13).

For each corridor, between two and four potential alignments were identified. All options end at the same location in the city centre, for the purpose of the assessment of the review as there are many variations possible in the city centre.

The proposed routes alignments for each of the seven corridors is shown on figure 14, page 22.

A larger version of each of the maps is included in Appendix A.

Existing cycle routes

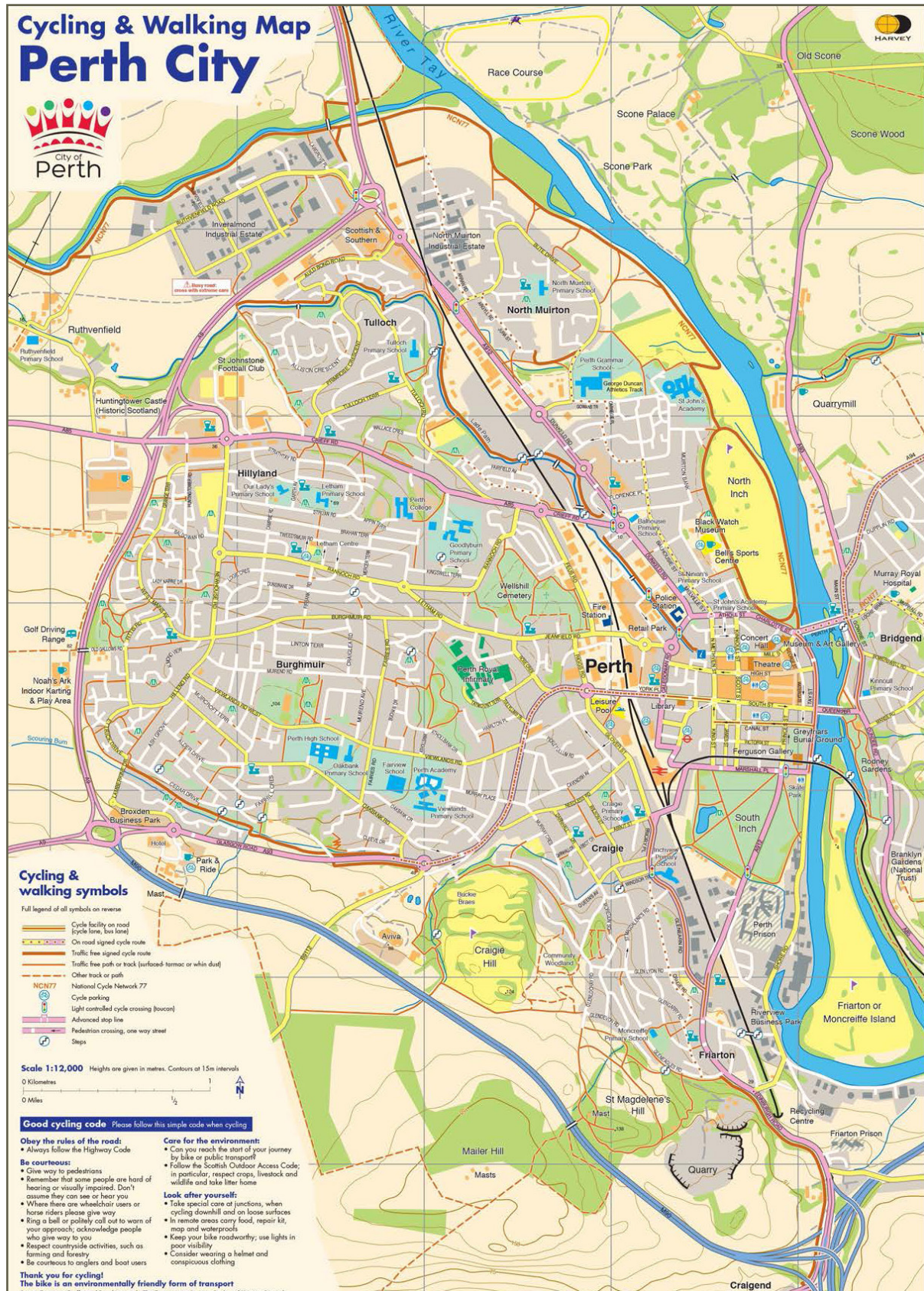


Figure 11 Extract from "Cycling and Walking Map - Perth City, Harvey, 2017 (A larger version of this map is available in Appendix A)



Physical barriers to cycling

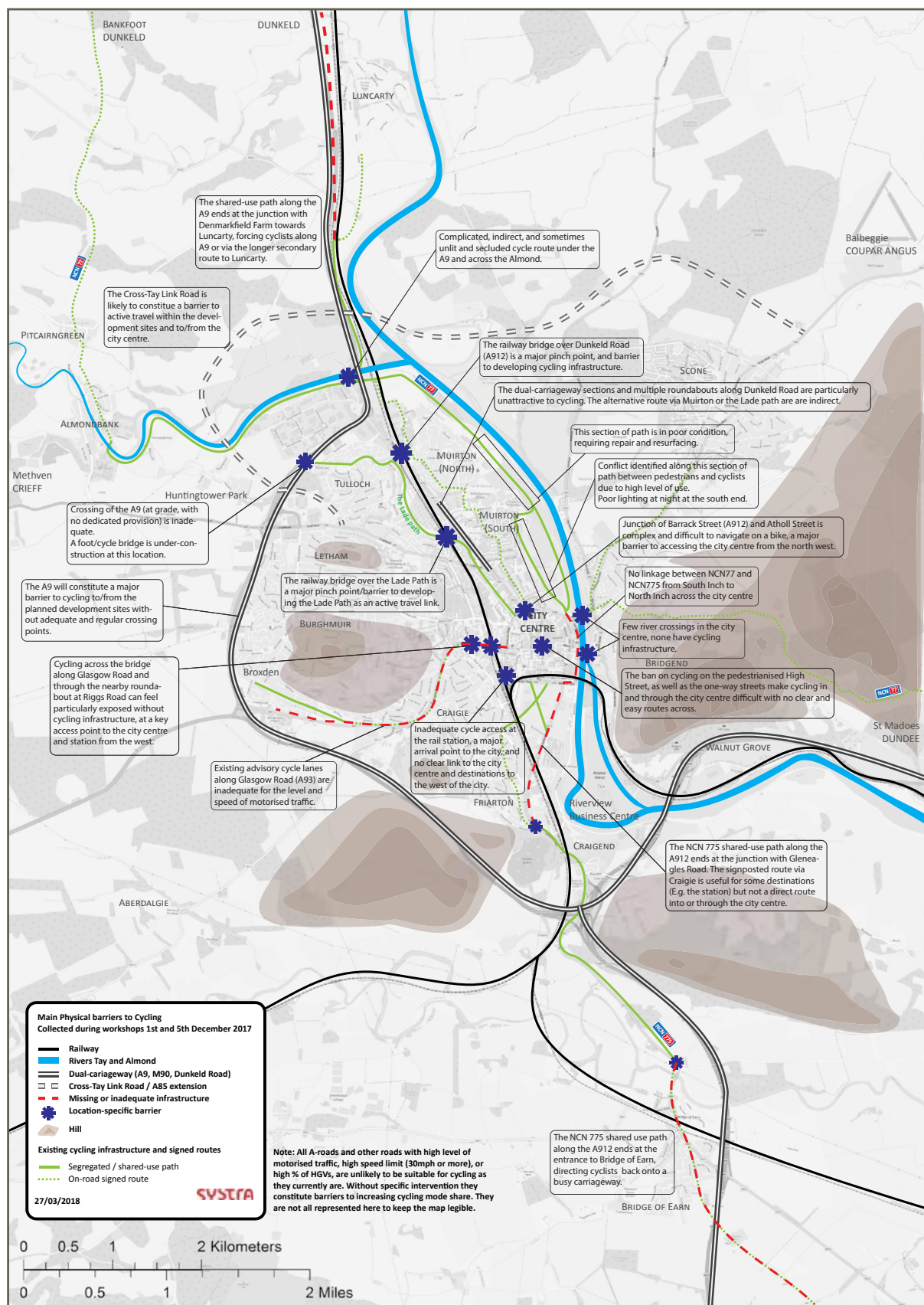


Figure 12 Map of physical barriers to cycling (larger version of this map is available in Appendix A)

Assets and opportunities

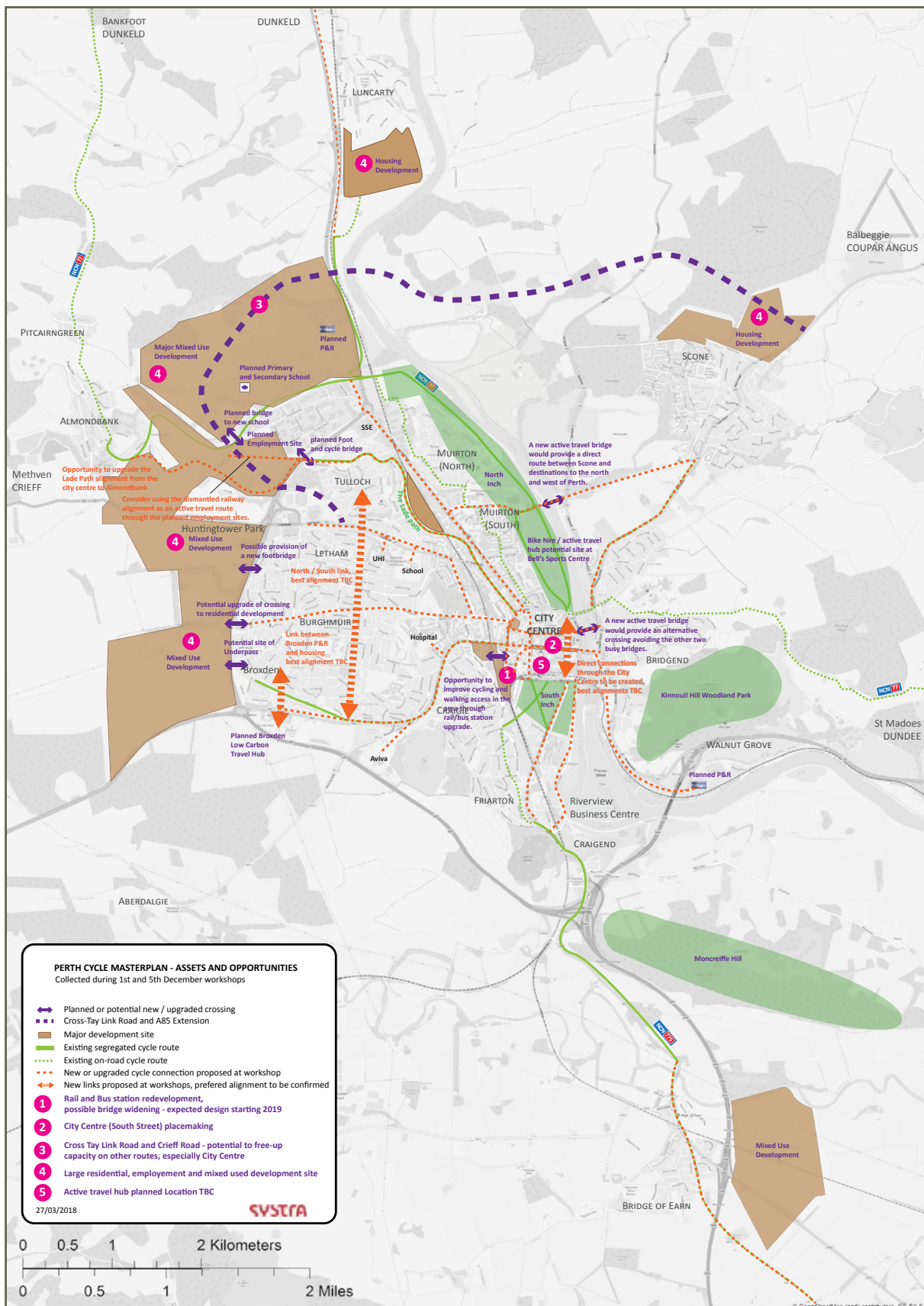


Figure 13 Map of Planned changes, assets and opportunities (larger version of this map is available in Appendix A)



Core route alignment options

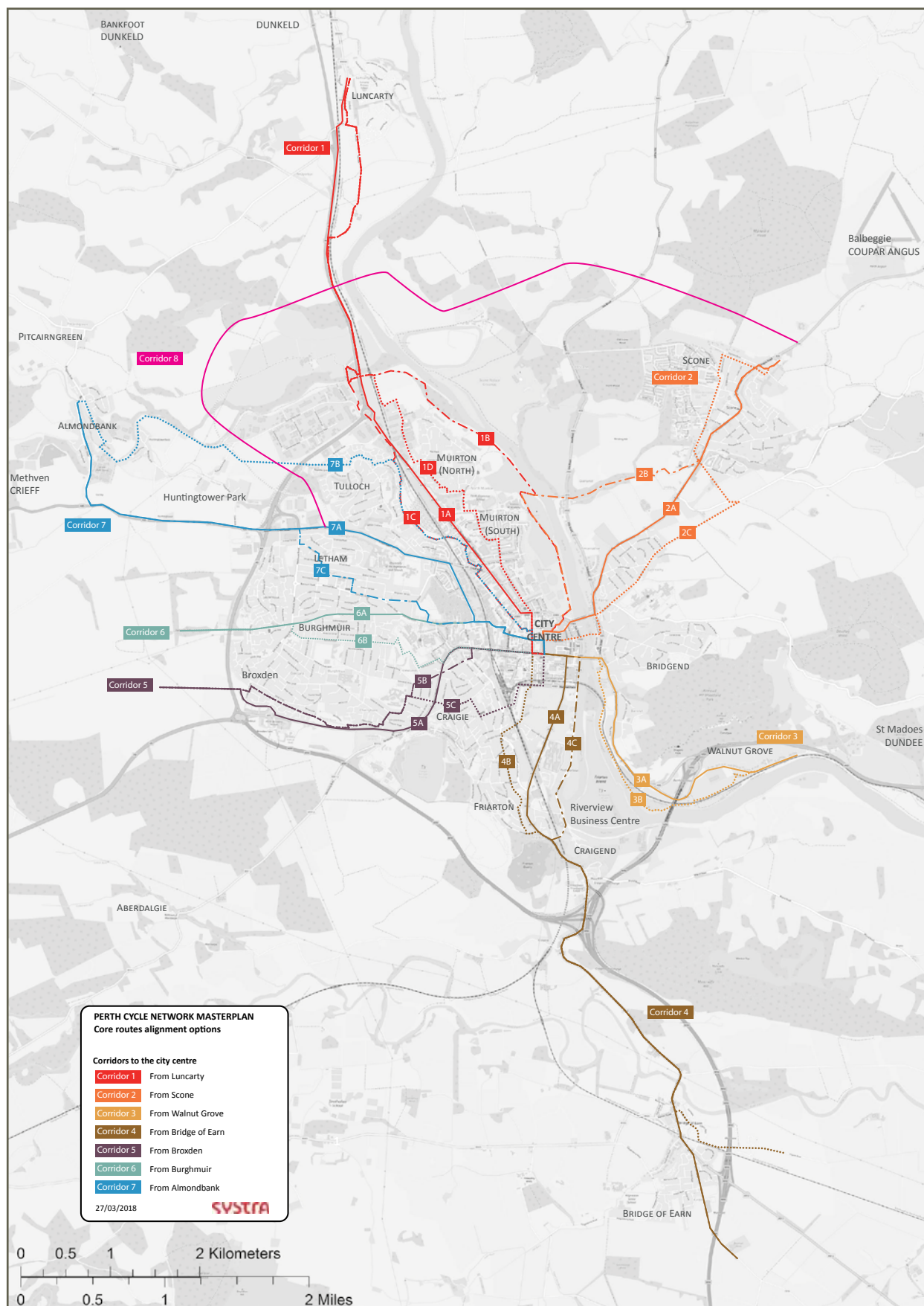


Figure 14 Map of Core Routes Alignment Options (larger version of this map is available in Appendix A)



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6. Core Route Assessment

Key corridors alignment options and assessment

All route options shown on the map on the previous page (figure 14) would have value in a cycle network and could be implemented in the longer term to create a coherent and comprehensive cycle network. This assessment is not about discarding routes, but about focusing on the identification of core routes, and the route options are assessed with that function in mind. The options not selected as core routes could still have, and indeed are likely to have, a function as a feeder or secondary routes to a core route.

The assessment is based on the assumption that the route infrastructure design will follow best practice and available/emerging guidance, building a network that is convenient and accessible to cyclists of all abilities. In practice, this means that where the route is along or crosses a main road in a built up environment, it is assumed the infrastructure required will be segregated from motorised vehicle and pedestrians, while on residential roads, the route will be mixed with general traffic (possibly requiring interventions such as filtered permeability to get motorised traffic to an suitable level).

This approach makes the routes comparable by assuming consistency of provision. It is also in line with the stated objective of the study to assess the schemes most likely to attract large funding sources such as Community Links Plus.

Alignment options assessment criteria

The criteria used to assess the route options are presented on Table 1 alongside. They were developed to cover all the elements of a good quality attractive cycle route, summarised in the following network design principles: Cohesion, directness, safety, comfort and attractiveness. These principles are widely recognised and described in detail in guidance documents such as Sustrans network development guide of the CROW Manual 2017.

An assessment exercise at this level is by nature qualitative and relies on professional judgement. To ensure consistency and limit subjectivity in the assessment, the table also includes for each criterion a description of what is considered a low, medium or high ranking option.

Table 1 Route alignment options - assessment criteria definition

Network Design Principle	Indicator	Criterion	Rank		
			Low (+)	Medium (++)	High (+++)
Cohesion	Interconnection	Does the route allows for easy and frequent junctions with other cycle routes ?	The route is isolated from the wider network (road and paths), with limited opportunities to access other destinations than directly along the route.	The route allows some connections to the wider network and other destinations.	The route allows many connections with the road and path network providing many opportunities to connect to other routes and destinations away from the route.
	Cohesion with other modes	Does the route serve transport interchanges? E.g.: Rail, bus station, P&R, pedestrian zones.	The route option does not serve any key transport interchange, and connecting them would be long, complex and/or onerous.	The route option serves an existng or planned key transport node (rail station, bus station, P&R, pedestrian zones), but indirectly, requiring additional links / spurs.	The route option directly serves one or more key transport nodes (rail station, bus station, P&R, pedestrian zones) for the most part directly, or requiring limited detours/spurs.
	Connection to the NCN/regional routes	Is the route options well connected to regional routes / NCN?	Not connected to the NCN.	Connected to the cycle network, but does not extend access to it significantly.	Connected to NCN or regional routes, and extend access to the network in several directions.
Directness	Time	Does the route have many traffic lights? Changes in direction? Give way? Side streets to cross?	The route option has significant delays which would be difficult to overcome (traffic lights, changes in direction, give-way).	The route option has some delays, along sections of the route, but this is balanced by faster sections, allowing a reasonable end to end journey time, while shorter journeys on some sections would be significantly delayed.	The route option has few traffic signs and turning movements or give-ways along the entire route.
	Distance	What is the detour factor? How does the route compare with the shortest path option?	High detour factor compared to the shortest path.	Medium detour factor compared to the shortest path.	Shortest path option.
Safety	Road safety	How likley is the route to have significant interaction with motorised traffic / or reducing interaction is likely to be complex? The assessment assumes segregated infrastructure if the route is on busy road, this criteria is looking at unavoidable interaction with motorised traffic, mainly at junctions.	High proximity and interaction with motorised vehicles, including major junction crossings (even if segregated), side streets and on-road sections.	Mixed routes, limited interaction, but some significant junctions to cross, and sections likely to be shared with motorised traffic.	Route mainly along paths with minimal crossing/ interactions with motorised vehicles.
	Health	How exposed is the route to noise and/or air pollution (from motorised traffic)?	High exposure	Medium exposure / along some sections only.	Route predominantly away from busiest roads, along paths or low traffic road.
comfort (nuisance other than already covered above)	Wayfinding	Would the route be easy to follow without signposting? How intuitive is the route?	Complicated route, does not follow an intuitive, already well known route, a lot of opportunities to get lost without extensive signposting.	Requires some signage at complex locations, but largely intuitive, in broadly the "right" direction of travel without many changes of direction.	The route follows an already well-known alignment, similar for all road users. Or route follows a well know landmark (e.g. along the river).
	Traffic nuisance (noise, air pollution)	Covered under "safety-health".			
	Delays, frequent stop-start	Covered under "Directness-time".			
	Gradient	How hilly is the route? Overall, and compared to alternative routes.	Route via significant hills. Not a major hill, but there is an alternative with lower gradient.	Not flat, but there is no alternative with lower gradient.	The route is largely flat.
	Road surface	Is the road surface even and smooth?	Assumed to be built to standard.		
Attractiveness (includes all the previous criteria plus:)	Varied, busy environment	How varied is the environment crossed by the route, is it likely to be busy with people and activity?	The route goes through long stretches of monotonous environment with limited activity.	A varied landscape and levels of activity, only during the day.	The route goes through varied setting, with activity, people and landmarks along most of the route and throughout the day and evening.
	Personal Safety	How safe does the route feel? During the day and at night. Considers visibility, dark/blind corners, shrubbery, etc.	The route is largely isolated with few "escape routes", little activity.	Little activity or activity during the day only.	The routes crosses busy areas, with a lot of people and activity at all times of the day, few secluded area.

Alignment options assessment result

Table two alongside summarises the results of the assessment, providing a ranking for each option against each criterion. Note that alignment options are best compared to each other within a corridor rather than between corridors (that assessment is presented in the next section).

No weighting was developed at this stage, this can be developed when a more detailed appraisal is undertaken, no final ranking is provided for that reason.

The assessment suggests that when looking at routes for their potential without considering current condition such as speed of traffic (this is assumed to be addressed through adapted design solutions, like segregation, bypass, filtering of traffic, etc.), the "main road" alignment was the one raking highest for largest number of criteria in most cases. The exception is corridor 3, where the route along the Tay has a slight advantage over the route along the main road, mainly because the main road does not offer significantly more interconnection opportunities and variety of destinations.

Finally, the individual ranking of options against each criterion shows no route scoring "high" against all criteria. This emphasises, if there was a need, that any route selected will require compromise on at least some aspects of what makes a cycle route an attractive choice for a journey.

Corridor				Indicators and scores										
				Cohesion			Directness		Safety		Comfort		Attractiveness	
				Interconnection	Cohesion with other modes	Connection to the NCN / Regional routes	Travel time	Travel distance	Road safety (Limited interaction with motorised traffic)	Health (Limited exposure to air pollution and noise)	Wayfinding ease	Gradient	presence of landmarks / varied environment	Personal safety
1	Luncarty to City Centre	1a	Dunkeld Road A9 A912	+++	++	+++	++	+++	+	+	+++	+++	+++	+++
		1b	North Inch	+	++	++	+++	++	+++	+++	+++	+++	++	+
		1c	Lade Path	+	++	+++	++	+	+++	+++	++	+++	++	+
		1d	Muirton	++	++	+++	+	+	+	++	+	+++	++	+++
2	Scone to City Centre	2a	Scone Road A94	+++	++	++	+++	+++	+	+	+++	++	++	++
		2b	Quarrymill Path	++	+	++	+	++	+++	+++	++	+++	+	+
		2c	Gannochy Abbey Roads	++	+	++	+	+	++	++	+	+	++	++
3	Walnut Grove to City Centre	3a	Dundee Road A85	+	++	+	+++	+++	+	+	+++	+++	++	++
		3b	River Tay Path	+	++	+	++	++	+++	+++	+++	++	++	+
4	Bridge of Earn to City Centre	4a	Edinburgh Road A912	+++	+	++	+++	+++	++	+	+++	++	++	++
		4b	Craigie Road	+++	++	++	++	+++	++	++	+	++	+++	+++
		4c	Friarton Road	++	+	++	+++	++	+	+	++	+	+	+
5	Broxden to City Centre	5a	Glasgow Road A83	+++	+++	+	+++	+++	+	+	+++	++	++	+++
		5b	Quietway Glasgow Road bridge	++	+++	+	+	++	+	++	+	+	+++	++
		5c	Quietway St Leonard bridge	++	+++	+	+	+	+	++	+	+	+++	++
6	Burghmuir to City Centre	6a	Burghmuir Jeanfield Road	+++	+	+	+++	+++	+	+	+++	+	+++	+++
		6b	Burghmuir Road Rose Crescent	++	++	+	+	+	+	++	+	+	+++	+++
7	Almondbank to City Cente	7a	Creiff Road A85	+++	+	+++	+++	+++	+	+	+++	+++	+++	+++
		7b	Lade Path	+	+	+++	+	+	+++	+++	++	+++	++	+
		7c	Letham	+++	+	+++	+	+	++	++	+	+	+++	+++

Table 2 Route alignment options - assessment results

Corridor assessment

The second step of the assessment was to compare the benefits of the seven corridors. The aim was to gain a high level understanding of the benefits and disadvantages of each corridor, and inform ongoing discussions on short and medium terms investment in cycling infrastructure.

As for the route alignment options, Table 3 alongside lists the criteria used for the corridor assessment, how they are assessed and for each, what constitutes a low, medium or high score.

The criteria are different from the previous alignment options assessment, as the focus is not to identify which ones serve as core route function, all of them do, but to assess which one is likely to deliver the most benefit if built in the short/medium term. This could be described as a "pre-appraisal", due to its high level and qualitative nature. The category covered include:

- Likely demand;
- Cycle network integration;
- Wider transport benefits;
- Policy integration; and
- Deliverability.

Category	Criterion		Source	Rank		
				Low	Medium	High
Demand	Likely demand	How well does the route serve key trip generators? Density of population within 400m buffer. Population with no access to car within 400m	Census data/GIS	The route alignment serves few key destinations, although it probably serves residential population and local destinations.	The route alignment serves the surrounding residential area and local destinations, as well as key destinations in the city, mainly directly along the route.	The route alignment serves multiple key destinations in addition to the surrounding residential area, as closely as possible.
Cycle network integration	Regional/national cycle connections	How well integrated is the route with the regional and national cycle network?	NCN cycle network and regional route map	No or limited benefit or connection to regional/national cycle routes.	Some connection to regional/national cycle routes, possibly indirect.	Good connection to the regional and national cycle network, possible improves on it / fills a gap.
	Contribution to Network extension	Does the route contribute to extending the cycle network in an area not previously covered?	GIS	The proposed corridor is already served by a cycling route of reasonable quality and level of service.	There is an existing cycle route along the corridor, but the infrastructure is inadequate.	The proposed route would create link where no cycling infrastructure at all exists.
Wider transport benefits	Interaction with public transport / P&R	Does the route serve another key mode of transport? serves rail, bus station, P&R, pedestrian zones.	Map of key destinations	The route option does not serve key transport interchange, and connecting them would be complex and/or onerous.	The route option serves key transport nodes (rail station, bus station, P&R, pedestrian zones), but indirectly, requiring additional links / spurs.	The route option directly serves key transport nodes (rail station, bus station, P&R, pedestrian zones).
	Benefits to pedestrian / wider public realm improvement	Does the implementation of this route deliver benefits to pedestrian facilities and wider public realm?	Professional judgement	The route would not provide improvements to other sustainable/active modes or public realm quality.	The route would provide limited benefits to other active and sustainable mode or public environment.	Delivering this route option would have benefits for pedestrians and the general quality of the public realm, and all those benefiting from an increase footfall.
	All modes road safety	Would the scheme bring the opportunity to address a collision black spot?	Collision resulting in cyclist casualty over past 5 years 2014-2017, based on Crashmap.co.uk	No serious cyclist casualty recorded.	Serious cyclists casualty, no fatalities.	Fatality and/or multiple serious cyclists casualties recorded along and near the corridor.
	Potential to alleviate congestion	Is there a significant congestion issue, that a switch to cycling could help address?	Professional judgement	There is no significant congestion.	There is congestion, but not considered a priority area	There is significant congestion problem along this corridor
Policy integration	Impact on areas with higher levels of deprivation	Could the cycle route increase transport connections between areas with higher levels of deprivation and key destinations, services and employment?	http://simd.scot	Limited impact - the route does not serve areas with higher levels of deprivation (neither 10% nor 20% most deprived deciles).	Some impact, connection to areas with higher levels of deprivation, 20% most deprived decile.	High impact-the route serves directly areas with higher levels of deprivation, most deprived decile.
Deliverability	Affordability	What level of investment is required?	Professional judgement	The route requires significant changes to the infrastructure to be of good standard.	Some infrastructure work required, but not major.	The alignment would require little additional work to be delivered.
	Physical constraints	Are there significant pinch points or barriers which will be difficult to overcome? Can include river crossing, rail bridge, narrow road, land ownership, etc. (the need for carriageway space reallocation is not considered a physical constraints at this stage).	Professional judgement / Site visit	Significant constraint along most of the length of the route, good standard infrastructure would be very difficult to deliver.	Localised physical constraints (pinch point, river crossing, etc.) which may require compromise in the design of the infrastructure, but not affecting the entire route.	No significant physical constraints identified.
	Integration with other projects	Will the route benefit, or benefit from, any committed, planned or aspirational projects?	Regional and PKC policy and strategy documents	No other significant scheme ongoing or planned along the route.	Long term aspirations, no specific scheme, or not directly relevant to cycling / transport.	Major scheme in which cycling could have an important function.
	Acceptability	How much support is there from stakeholders for the change required? Mention at workshop, email or previous consultation documents.	Stakeholder Workshops, discussions and review of previous studies and consultation events.	The need for new redesigned infrastructure was not identified during consultation or previous documents.	There is some support, but also concerns about the infrastructure changes required.	The need to provide this route alignment was mentioned during the workshop and widely supported.

Table 3 Corridor assessment - criteria

Key corridors assessment results

Table 4 alongside summaries the outcome of the corridor ranking exercise, while the detailed rationale for the ranking against each criteria is provided on the following three pages (Table 5, page 29 to 31).

Because the exercise is qualitative, aimed at informing discussions and further appraisal of the corridors, the final column of Table 4 provides only a visual indication of overall ranking. First, it shows that none of the corridors rank highest against all criteria, further, no single corridor is an outlier with a significantly higher overall rank.

Two broad groups of corridors can be identified. Four of the seven corridors present higher overall ranking, particularly in terms of integration with other projects and acceptability: From Broxden along Glasgow Road;

from Walnut Grove via the riverside path; from Luncarty via Dunkeld Road; and from Scone via the A93.

The other three corridors have benefits but are either facing significant physical barrier to their delivery: Burghmuir to City Centre, because of the topography, Almondbank to City Centre due to the limited width of Creiff Road. Or in the case of the route from Bridge of Earn, because of the lower number of destinations served and limited interaction with other modes of transport. These routes should still ultimately be developed and opportunities may arise to do so in the future.

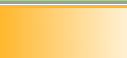






Corridor		DEMAND	CYCLE NETWORK INTEGRATION		WIDER TRANSPORT BENEFITS			POLICY INTEGRATION	DELIVERABILITY				Unweighted Rank
		Likely demand	Regional / national cycle connections	Contribution to extending the local network	Interaction with public transport / P&R	Benefits to pedestrian / wider public realm	Road safety	Impact on areas with higher levels of deprivation	Affordable	Physical constraints	Integration with other projects	Acceptable	
1	Luncarty to City Centre	HIGH +++	MEDIUM ++	LOW +	MEDIUM ++	MEDIUM ++	MEDIUM ++	HIGH +++	MEDIUM ++	MEDIUM ++	HIGH +++	MEDIUM ++	
2	Scone to City Centre	MEDIUM ++	MEDIUM ++	MEDIUM ++	MEDIUM ++	HIGH +++	LOW +	LOW +	MEDIUM ++	MEDIUM ++	HIGH +++	HIGH +++	
3	Walnut Grove to City Centre	MEDIUM ++	MEDIUM ++	HIGH +++	MEDIUM ++	HIGH +++	MEDIUM ++	LOW +	MEDIUM ++	MEDIUM ++	HIGH +++	HIGH +++	
4	Bridge of Earn to City Centre	LOW +	HIGH +++	LOW +	MEDIUM ++	LOW +	MEDIUM ++	LOW +	MEDIUM ++	MEDIUM ++	LOW +	MEDIUM ++	
5	Broxden to City Centre	HIGH +++	LOW +	MEDIUM ++	HIGH +++	MEDIUM ++	HIGH +++	LOW +	MEDIUM ++	MEDIUM ++	HIGH +++	HIGH +++	
6	Burghmuir to City Centre	MEDIUM ++	LOW +	HIGH +++	LOW +	HIGH +++	MEDIUM ++	MEDIUM ++	MEDIUM ++	MEDIUM ++	MEDIUM ++	LOW +	
7	Almondbank to City Centre	HIGH +++	MEDIUM ++	MEDIUM ++	LOW +	MEDIUM ++	LOW +	HIGH +++	MEDIUM ++	LOW +	MEDIUM ++	LOW +	

Table 4 Corridor assessment - summary results

INDICATORS AND RANK												
Corridor		DEMAND	CYCLE NETWORK INTEGRATION		WIDER TRANSPORT BENEFITS			POLICY INTEGRATION	DELIVERABILITY			
		Likely demand (key destinations served outside of city centre)	Regional / national cycle connections	Contribution to extending the local network	Interaction with public transport / P&R	Benefits to pedestrians and wider public realm improvement	Road safety	Impact on areas with higher levels of deprivation	Affordability	Physical constraints	Integration with other projects	Acceptability
1	Luncarty to City Centre	HIGH +++ - Large employment sites (SSE, Inveralmond Retail Park). - Large planned development (Bertha Park, Luncarty south). - Perth Grammar School, Bell's Sports Centre and Black Watch Museum, within 500m - St Catherine's Retail Park - Muirton well served, but access to Tulloch is limited by the railway tracks	MEDIUM ++ - The corridor intersects with NCR77 at the A9 bridge over the river Almond, extending its reach north towards Luncarty. - But, it would overlap or double the sections along the North Inch, bringing only limited contribution to extending the network.	LOW + - There are three signposted cycle routes along this corridor, NCN 7 along the River Almond and Tay, the route along the Lade Path and the on-road signposted route through Muirton. Although a new route would constitute an upgrade, it would not extend the network significantly.	MEDIUM ++ - Limited interaction with current transport interchange - The route would serve the planned P&R along the A9 north of Inveralmond Retail Park. - An extension of the route through the City Centre is needed to serve the bus and rail station	MEDIUM ++ - Improvements to the Barrack Street / Atholl Street junction would address a major barrier to non motorised movements to/from the city centre. - More limited potential for improvement if the route follows the residential or North Inch alignment	MEDIUM ++ - 1 fatality along Dunkeld Road (on A9 at Inverlamond bridge, 2013), - 2 slights and 1 serious along Dunkeld Road. - Atholl Street / North Methven Street also has a particularly high number of pedestrian casualties over the period.	HIGH +++ The route would serve an area among the 10% most deprived in Scotland (South Muirton)	Several major junction re-design required and major physical constraint at rail bridge	MEDIUM ++ -The railway bridge is a major pinch point along Dunkeld Road	HIGH +++ - Cross Tay Link Road work at interchange with A9. - Bertha Park and Luncarty housing development.	MEDIUM ++ - Current design of the Barrack Street / Atholl Street listed at workshop by Officer a 'in need of review'. - Large employers along Dunkeld Road said to be keen to support mode shift away from the car. Concern about pinch point at the rail bridge, and provision of infrastructure along a corridor already served by other routes.
2	Scone to City Centre	MEDIUM ++ - Existing P&R at Scone - Large residential areas, with extension planned to the north of Scone. -but no large employment site existing or planned	MEDIUM ++ - Intersects NCR 77 to Dundee - Improvements to Tay crossing and junctions either sides would benefit the national cycle route.	MEDIUM ++ There is a signposted route however, it is an on-road advisory cycle lane along most its length and would be unsuitable to generate the mainstream, everyday cycling usage aimed for.	MEDIUM ++ - Serves Scone P&R.	HIGH +++ - Need to improve Bridgend public realm has been raised at a previous design charette event	LOW + 1 slight (on Gannochy Rd)	LOW + The route does not serve any are among the 20% most deprived.	Potential new bridge across the Tay if capacity cannot be tranfered to Cycling from one of the existing bridges.	MEDIUM ++ - Pinch point at the crossing of the Tay, with limited width on either of the two bridges.	HIGH +++ - In line with Bridgend urban design charette, including new bridge across the Tay. - New bridge also included in the City Plan	HIGH +++ - In line with Bridgend urban design charette, including new bridge across the Tay. - New bridge also include in Perth City Plan - Concern raised about capacity on the existing bridges.
3	Walnut Grove to City Centre	MEDIUM ++ - Small residential area at Walnut Grove and Bridgend - No significant employment sites - Serves the planned P&R - Leisure potential	MEDIUM ++ - Intersects NCR 77 to Dundee - Improvements to Tay crossing and junctions either sides would benefit NCR 77 - Potential for NCR 77 to be re-routed along the river, a less hilly route.	HIGH +++ There is not existing cycling route along this corridor.	MEDIUM ++ - Would serve planned P&R at Walnut Grove	HIGH +++ - Need to improve Bridgend public realm has been raised at a previous design charette event	MEDIUM ++ 1 serious, 1 slight	LOW + The route does not serve any are among the 20% most deprived.	Potential new bridge across the Tay if capacity cannot be tranfered to Cycling from one of the existing bridges.	MEDIUM ++ - Pinch point at the crossing of the Tay, with limited width on either of the two bridges.	HIGH +++ - Planned P&R at Walnut Grove - Urban realm improvements along South Street.	HIGH +++ - In line with Bridgend urban realm design charette, including new bridge across the Tay. Concern raised about capacity on the two existing bridges.

Table 5 Corridor assessment - detailed results



Corridor		DEMAND	CYCLE NETWORK INTEGRATION		WIDER TRANSPORT BENEFITS			POLICY INTEGRATION	DELIVERABILITY			
		Likely demand (key destinations served outside of city centre)	Regional / national cycle connections	Contribution to extending the local network	Interaction with public transport / P&R	Benefits to pedestrians and wider public realm improvement	Road safety	Impact on areas with higher levels of deprivation	Affordability	Physical constraints	Integration with other projects	Acceptability
4	Bridge of Earn to City Centre	LOW + - Small settlement at Bridge of Earn - Limited employment sites - Planned housing development to the west (Oudenarde)	HIGH ++ - Along NCR 775, up to South Inch - Connecting the route to NCR 77 would be a major benefit to the national cycle network	LOW + NCR 756, a shared use footway along most of the route. Some sections are inadequate or missing, a new route would be an upgrade rather than an extension.	MEDIUM ++ - Closest route to the rail and bus station.	LOW + - No major oppportunity to improve public realm identified at this stage.	MEDIUM ++ 2 serious and 1 slight (all in Bridge of Earn)	LOW + The route does not serve any are among the 20% most deprived.	Width on the railway bridge to be confirmed	MEDIUM ++ Bridge over the railway may be too narrow to accommodate segregated cycling infrastructure	LOW + - No short or medium term project directly along the route.	MEDIUM ++ - Missing section of cycle path (largely shared used path) at either end of the route, mentioned at stakeholder workshop
5	Broxden to City Centre	HIGH +++ - Residential area to the north - Large housing developements ongoing and planned on the south side and north west. - Existing and planned employment sites (Aviva, Broxden Business Park). - P&R and coach hub - Perth High School, Perth Academy and Royal Informary within 500m - Leisure and Dewars Centres - St Catherine's Retail Park - Rail station northern entrance	LOW + Does not intersect with the National Cycle Network.	MEDIUM ++ There is a signposted route however, it is an on-road advisory cycle lane along most its length and would be unsuitable to generate the mainstream, everyday cycling usage aimed for.	HIGH +++ - Route serves north access to the rail station (off Glasgow Road) - Southern option (via St Leonard's Bridge) serves the rail station main entrance. - Provides direct access to Broxden P&R and local buses and long distance coaches hub - Will serve the Low Carbon Transport Hub planned at Broxden	MEDIUM ++ - Oppportunity to improve public realm at western gateway to the city centre, along County Place and South Street and to the station. - increased or improved crossing opportunity of the A9 to the west.	HIGH +++ 7 collisions (4 serious, 3 slights) involving cyclists. All were along Glasgow road between Viewlands Road and the railway bridge. This sections stands out as a cycling collision blackspot.	LOW + The route would not serve any area among the 10% or 20% most deprived in Scotland Although, note the south area to the north west of the rail station at the city centre end of the route is among the 10% most deprived.	Significant junction and railway crossing re-design at eastern end.	MEDIUM ++ - The bridges over the rail tracks (at Crieff Road or Long Causeway) are will be pinch points, my require bridge widening or new cycle bridge.	HIGH +++ - Possible new underpass for pedestrians and cyclists under the A9 north of Boxden roundabout, associated with the housing development. - Sustainable travel hub planned at Broxden - Rail Station redevelopment masterplan may extend to the Glasgow Road bridge/station access.	HIGH +++ - Glasgow Road highlighted during both PKC officers and stakeholders workshops as having inadequate cycling infrastructure, and serving the planned sustainable travel hub.



Corridor		DEMAND	CYCLE NETWORK INTEGRATION		WIDER TRANSPORT BENEFITS			POLICY INTEGRATION	DELIVERABILITY			
		Likely demand (key destinations served outside of city centre)	Regional / national cycle connections	Contribution to extending the local network	Interaction with public transport / P&R	Benefits to pedestrians and wider public realm improvement	Road safety	Impact on areas with higher levels of deprivation	Affordability	Physical constraints	Integration with other projects	Acceptability
6	Burghmuir to City Centre	MEDIUM ++ - Large future housing development to the north west of Broxden Roundabout. - Serves directly Perth Royal Infirmary - Well connected to residential north and south. - Retail park along Long Causeway (St Catherine's Retail Park) But non-residential destinations concentrated near the city centre. - The significant gradient is likely to limit the attractivity of cycling along this corridor.	LOW + Does not intersect with the National Cycle Network	HIGH +++ There is not existing cycling route along this corridor.	LOW + - limited interchange with other modes, can serve rail station if using option B alignment (via Glasgow Road)	HIGH +++ - Oppportunity to improve public realm at a western gateway to the city centre on Long Causeway, where a narrow bridge and rounabout layout constitute barriers to pedestrian movements, linking to the High Street. - increased or improved crossing opportunity of the A9 to the west.	MEDIUM ++ 1 serious (Caledonia Rd junction), 2 slight)	MEDIUM ++ The route would serve areas among the 20% most deprived in Scotland in Letham.	- potential railway widening at Long causeway	MEDIUM ++ - The bridges over the rail tracks (at Long Causeway) will be a pinch point	MEDIUM ++ - Potential for upgrade / new pedestrian and cycle crossing of the A9 associated with planned housing / mixed use development to the west. - Mill Street development in the city centre	LOW + No specific mention during consultation or other available documents
7	Almondbank to City Centre	HIGH +++ - Serves Huntingtower retail park and football stadium - Residential areas to north and south along most of the way - Serves UHI campus - Serves St Catherine's Retail Park - Planned housing and employment developments west of the A9	MEDIUM ++ - Connects to NCR 77 at Almondbank	MEDIUM ++ NCN 77 along the Almond River and the Lade path serve the corridor, however they serve only part of the area and there is not or limited infrastructure along the Crieff Road.	LOW + - Limited interchange with other modes.	MEDIUM ++ - As for Route 6 and 7, opportunities to improve north west gateway into the city centre. - increased or improved crossing opportunity of the A9 to the west.	LOW + 1 slight on Crieff Road. (1 fatality away from Crieff Road, on W Mains Avenue in Letham)	HIGH +++ The route would serve areas among the 10% or 20% most deprived in Scotland (the south east of the Tulloch area),	Potential railway widening at Long causeway or Crieff Road	LOW + - The narrow width of Crieff Road limits possibilities - - Bridges over the rail tracks (at Crieff Road or Long Causeway) are also pinch points. - Alternative routes are longer or have significant slopes.	MEDIUM ++ - Creiff Road extension and junction with Cross Tay Link Road - Employment and housing development sites west of the A9 bringing potential contribution/opp ortunities	LOW + - Concerned raised about the limited width of Crieff Road, with any segregated infrastructure affecting other modes, especially PT, less likely to gather sufficient support. - the Lade Path option would have more support, as part of wider efforts to improve the path, but less benefits in terms of transport.

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7. Conclusion and Next Steps



Summary of findings

This study achieved three main objectives:

First, it has identified what an attractive cycle network in Perth would look like. To do this, it started from where people want to go on their everyday journeys, and what type of infrastructure and network is most likely to be attractive to them. It was informed by the best available guidance, desktop and on-site review and by consultation events with stakeholders. It led to the creation of a schematic cycle network map, supplemented by summary maps of the main barriers its implementation will face, as well as assets and opportunities to build it on.

Second, it went one step further by taking the core network links from the schematic network map and identifying and assessing potential alignments on the ground. The assessment of the alignment options for each core route suggests that for most of the corridors, the main road alignment is the most likely to deliver the highest level of service to users. The link from Walnut Grove to the city centre is the exception to this, with the route along the river most likely to serve cyclists best. The other alignment options should still be considered for delivery, although not recommended as core routes, they would be suited as feeder or distributor routes between the core routes and final destinations.

Finally, the potential of each corridor was assessed against a set of criteria covering likely demand, cycle network integration, wider transport benefits, policy integration and deliverability. Findings should be considered carefully as the exercise was qualitative and the results un-weighted. It suggested however that four of the seven corridors present higher level of benefits and deliverability: from Broxden along Glasgow Road; from Walnut Grove probably via the riverside; from Luncarty via Dunkeld Road; and from Scone via the A93.

The other three corridors (Corridor 4 from Bridge of Earn, corridor 6 from Burghmuir, and corridor 7 from Almondbank) may not become the highest priority, but should still ultimately be developed, and opportunities may arise to do so in the future.

Next steps

This study can be described as a "pre-appraisal", in which the baseline situation and broad objectives (schematic cycle network and route functions) were established, high level options were identified, and a first sifting of those options was carried out against the objectives. The next step will be to undertake an appraisal of any short-listed options, establishing scope, benefits and costs in more detail. This would include developing a range of options for each corridor or section and model their impact on other modes, particularly public transport; and create concept designs which could then be open consulted on with a wide range of stakeholders.

Anticipating significant changes to the current road layout, meaningful engagement with a wide range of stakeholders will be essential. It will help maximise benefits, addressing concerns, and building up widespread support for any scheme taken forward. Setting up a stakeholder engagement strategy or plan early in the process will maximise chances of success.

SYSTRA

March 2018