Tactran RTS Targets: baseline and options

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Tactran RTS Targets
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1. Introduction

Tactran's emerging new Regional Transport Strategy (RTS)[i] sets out key outcomes for change in the region's transport system, and draft targets to define the scale of ambition.

Those draft targets, as set out in Table 2.2 of the consultation draft RTS are:

Key RTS Outcomes	Proposed Regional Target	Scale of the challenge	What needs to be done
Reduce estimated CO_2 emissions from transport in the region	Reduce emissions from transport in line with the national target of a reduction of 56% by 2030 (compared to 1990)	Angus, Perth & Kinross and Stirling all have higher transport CO_2 emissions per head than the Scottish average If current trends are maintained, it is likely that a reduction of only 11% may be likely.	Decarbonisation of vehicle transmissions Reduce mileage driven
Increase the share of EV and low emission vehicle use	Promote Ultra Low Emission Vehicle (ULEV) adoption to achieve 72.7%[ii] of the 56% reduction in CO_2 by 2030	Approximately 2.2 % of vehicles registered in the region were hybrid, electric or ULEV in 2021	Rapid introduction and adoption of low and zero-emission technologies
Reduce car kilometres driven	Reduce car kilometres driven in line with the national target of reducing car km driven by 20% by 2030 (compared to 2019 levels)	National target means reversing 29+ yrs of growth in car km in 6 years 82% car mileage is generated to or from our rural areas and towns Over ¾ of personal mileage is generated by trips over 10km	Improve alternatives for longer trips Facilitate shorter trips through more services being delivered locally Discourage car trips where there are reasonable alternatives and facilitate shorter trips Improve access to public transport
Reduce fatalities and injuries	Meet the targets set out in Scotland's Road Safety Framework to 2030[iii]	Any number of fatalities or casualties are too many. While good progress has been, and continues to be, made across most of the region in the last 10years, close attention needs to continue to be paid to longer term trends	Reduce traffic speeds and consider engineering solutions to address identified safety concerns Provide road safety education and campaigns

Key RTS Outcomes	Proposed Regional Target	Scale of the challenge	What needs to be done
Increase the levels of walking and cycling in the least affluent SIMD data zones	For the least affluent SIMD data zones achieve the Transport Scotland's[iv] forecasts for average proportion of journeys walked and cycled by 2030[v] Large urban areas: 30% walk / 24% cycle Other urban areas: 24% walk /19% cycle Accessible small towns: 26% walk 13% cycle	The current average proportion of journeys walked / cycled are: Large urban areas: 24% walk / 1.5% cycle Other urban areas: 19% walk / 0.4% cycle Accessible small towns: 20% walk / 0.5% cycle Within existing parameters, walking can be expected to increase in the least affluent communities by an additional 1% point, and cycling by 2-4% points	Improve the proportion of facilities that are within walking/cycling distance of communities. Improve walking and cycling opportunities to local facilities
Reduce transport emissions in declared air quality management areas	National Emission Ceiling Directive[vi] thresholds are reflected in Crieff, Dundee City and Perth City Air Quality Management Plans and Dundee Low Emission Zone. Including. NO_2 annual mean (not to exceed 40µg m-3) number of NO_2 exceedances (200µg m-3 not to be exceeded more than 18 times a year)	Our towns & cities serve large rural hinterlands. 60% of trips made by those living in the region are by car (2019)	Support the introduction and adoption of low and zero emission technologies Reduce the number of car journeys in our towns through promoting walking, cycling and public transport
Improve ability of all in the least affluent SIMD data zones targeted by the respective Council to access jobs, education and services	% of employed adults who could use public transport for work in least affluent areas to be equal to or better than the average for the Council area[vii]	Access to affordable transport is identified as a key driver of Child Poverty. Limited public transport services in many localities and limited ability to influence commercial fares	Improve the proportion of facilities that are within walking/cycling distance of communities. Improve public and shared transport opportunities Improve ability to access and use public and shared transport opportunities

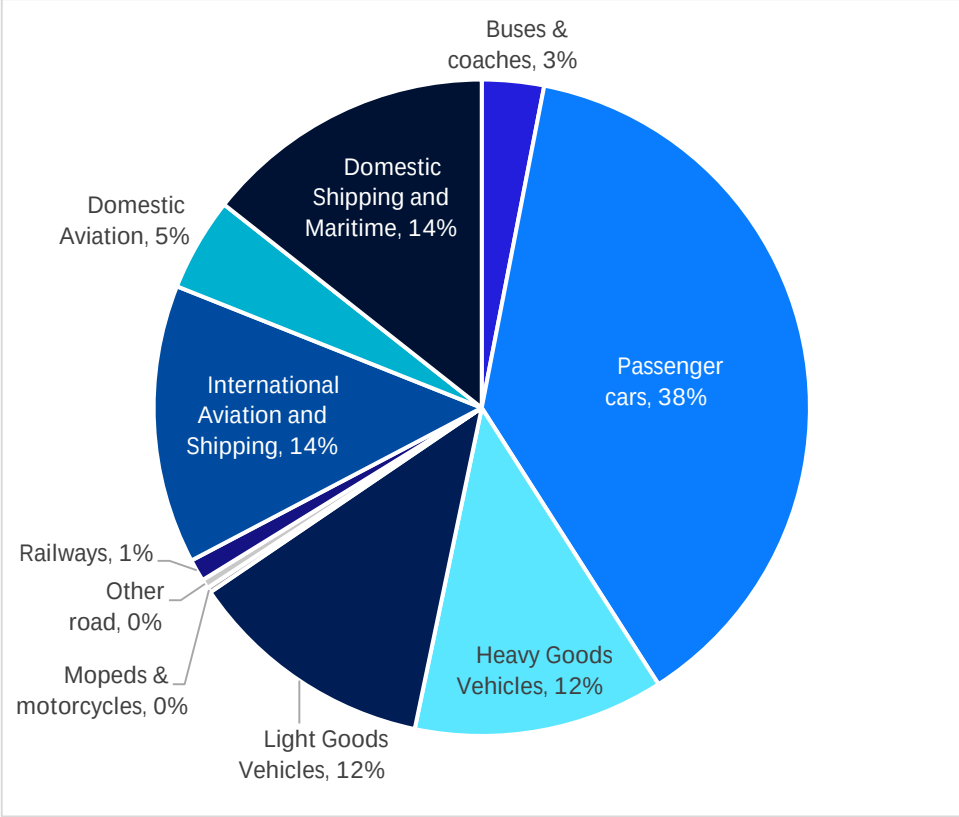
Key RTS Outcomes	Proposed Regional Target	Scale of the challenge	What needs to be done
Improve journey times and journey time reliability on strategic road and rail routes to key destinations for (a) public transport (b) freight	Improve public transport journey time and journey time reliability on key bus corridors in accord with the Bus Partnership Fund bids Ensure journey time reliability to key freight origins/destinations remains with 95% of average journey time	The region is both peripheral to the central belt, as well as accommodating almost all surface trips to North-East Scotland and the Highlands and Islands	Reduce the number of trips passing through the pinch points on our strategic routes

This report provides an evidence base for some of these targets, and a commentary on their implementability.

Note that targets relating to three of the key outcomes are excluded from this report. They, and the rationale for their exclusion, are:

- Reduce car kilometres driven: this has been thoroughly investigated by Jacobs for Tactran and reported separately;
- Reduce fatalities and injuries: progress and actions in relation to this are established by Scotland's Road Safety Framework to 2030 and by local authorities in the region;
- Reduce transport emissions in declared air quality management areas: action by the region's local authorities is understood to be on track for air quality standards to be met.

2. Reduce carbon emissions/increase share of low emission vehicles

Draft target	Reduce emissions from transport in line with the national target of a reduction of 56% by 2030 (compared to 1990) Promote Ultra Low Emission Vehicle (ULEV) adoption to achieve 72.7% of the 56% reduction in CO2 by 2030
Baseline data	It is estimated that transport is responsible for 35.6% of carbon emissions in Scotland[viii]. Net emissions of greenhouse gases by transport allocated to Scotland were 13.9 $MtCO_2e$ in 2019, of which 66% was from road transport, and 14% from international aviation/shipping[ix]. The sources of transport emissions are as shown in the graph:  According to Scottish Government data[x], carbon emissions from transport has fallen by only 6.7% in the period from 1990 to 2019 (total emissions from all sectors fell by 43.8%). Moreover, transport emissions were no lower in 2019 than 2015:

Year	Carbon emissions from transport (MtCO2e)	Annual emissions as proportion of 1990 total
1990	*14.9*	*100%*
2015	13.8	93%
2016	14.2	95%
2017	14.5	97%
2018	14.3	96%
2019	13.9	93%

The average age of the car/van fleet in Scotland in 2020 was 7.6 years[xi], hence there is the expectation that nearly half of the current vehicle fleet will be replaced by 2030.

In the year to July 2023, 17.7% of the new cars sold in Scotland were fully electric[xii]; this is a substantial increase on historic proportions (for example, the equivalent level in 2020 was 6%), but ULEVs currently still make up only around 2.5% of all cars in the UK[xiii].

External targets

The Climate Change Plan Update[xiv] requires the transport sector to reduce emissions by 56% by 2030 on the 1990 baseline, to 6.5 $MtCO_2e$ – but this includes aviation and maritime, modes largely outwith the influence of the RTS.

A summary of the emissions reduction effort across transport sectors (relative to 2018) is set out as Policy Scenario 3 in research into Decarbonising the Scottish Transport Sector, undertaken for Transport Scotland[xv], and is shown below:

Sector	Emissions saving by 2030 (%)	Emissions saving by 2040 (%)	Emissions saving by 2045 (%)
Car	78%	98%	100%
Bus and Coach	79%	96%	100%
Rail	42%	100%	100%
Vans	47%	95%	100%
Trucks	52%	89%	100%

Local Authorities' Carbon Aspirations

Angus Council (AC)

- AC declared a climate emergency in September 2019
- AC do not have their own specific carbon reduction targets, but are working towards the Scottish Government's targets
- AC's Sustainable Energy and Climate Action Plan was approved in November 2021. The plan comprises seven key sectors: Buildings, Energy, Transport, Land Use & Forestry, Agriculture & Food, Waste, and Governance & Process, but does not contain any specific targets

Dundee City Council (DCC)

- DCC declared a Climate Emergency in June 2019
- A partnership Climate Action Plan was published in 2019 which commits to surpass the Covenant of Mayors target of 40% reduction in greenhouse gas emissions by 2030 and achieve net-zero greenhouse gas emissions by 2045 or sooner, in line with the proposed targets of the Scottish Climate Change Bill
- Two performance indicators will be used to measure emissions reduction progress against the target: total carbon dioxide equivalent (CO2e) emissions (total and by end-use) in Dundee, and per capita (person) CO2e emissions in Dundee
- The plan comprises four key themes, each of which contains a number of actions and targets: Energy, Transport, Waste and Resilience
- Transport accounted for 25% of total CO2 emissions in Dundee in 2015
- The key objective for transport is to "encourage active travel through walking, cycling and public transport and deploy sustainable alternatives to decarbonise transport"

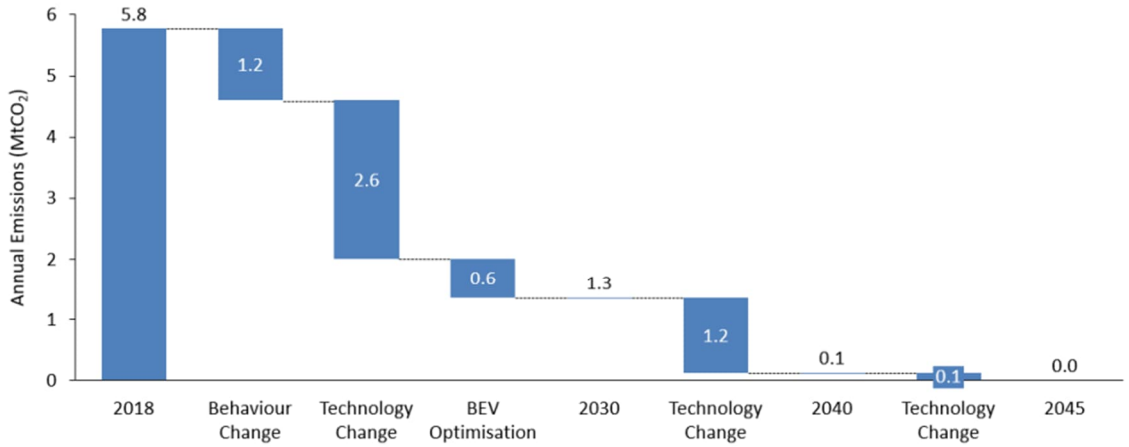
Stirling Council (SC)

- SC declared a climate emergency in October 2019
- SC's Climate and Nature Emergency Plan (2021-2045) has two targets: Stirling Council will be carbon neutral in its own operations by 2035, and the Stirling Council area will achieve 'net zero' carbon by 2045
- The plan comprises five sectors, each with its own main objective: Energy Use & Generation, Transport, Resource Efficiency, Nature & Biodiversity, and Climate Adaption
- The main transport objective is to "develop a modern transport system that minimises carbon emissions, improves affordability, and provides choice for all"
- There are four priorities that sit within the transport objective:
    - Make every trip in the Stirling area net-zero carbon
    - Make walking and cycling easy, safe, and attractive travel options
    - Help enable an effective, affordable public transport network
    - Maximise sustainable choices for all
- The plan sets out the following transport performance indicators and interim and 2045 targets (^ indicates NTS2 targets and * indicates targets from the Climate Change Act)

Indicator (against a 2019 baseline)	Interim target	2045 target
Area-wide targets		
% reduction in carbon emissions from road traffic in the city area (1,608 tCO2 a year across monitored AADT routes)	More than 40% by 2032^	75%^
% of city centre journeys by active travel (against modal cordon count of 15.4%)	At least 20% by 2030^	Increase of 30%^
% of Ultra Low Emission Vehicles (2.2% of all vehicles registered in Stirling in 2019)	45% by 2032	100%
% patronage increase in public transport (2.3m boarding 2019-20)	25% by 2030	50%
% reduction in carbon emissions from public transport (3,842 tCO2 in 2019-20)	25% in 2030	75%
Council targets		
% of Stirling licensed taxis which are EVs (0% in 2019)	100% of new licenses by 2032	100% of all taxis operating in the area to be EV
% Council vehicle fleet running on 'clean' energy (3.1% in 2019)	Phase out new petrol and diesel light commercial vehicles by 2025*	100% of all fleet clean by 2030*
% reduction in carbon emissions from Council business travel (4,450 tCO2 in 2006/07 baseline year)	45% by 2030	90%

Perth and Kinross Council (PKC)

- PKC declared their support for the Scottish Government and UK Parliaments' climate emergency statements in 2019
- Climate Change Strategy and Action Plan was adopted by P&KC in December 2021 and commits to achieving Net Zero in line with the Paris Agreement and the Scottish Government Targets by 2045, with the ambition of achieving them sooner
- Transport emissions account for 52% of total CO2 emissions across Perth and Kinross, with cars providing 45% of these emissions, LGVs and HGVs providing 23% each, and trains providing the remaining 9%
- The plan comprises eight key areas: Transport, Buildings & Energy, Business & Industry, Waste & Circular Economy, Land Use, Climate Resilience, Education & Engagement, and Governance, but does not contain any specific targets:

What could be achieved by 2030	It can be assumed that the Scottish Government consider that their targets for carbon reduction from transport (as set out under 'Extant Targets' above) are achievable. The Tactran region displays broadly similar characteristics in terms of overall population density and settlement patterns to the Scottish average, hence it could be assumed that the national targets are achievable in the region. Emissions reductions from rail in the region may be able to exceed the national targets, as the Rail Decarbonisation Action Plan suggests that all rail lines in the Tactran region are to be electrified by 2030[xvi].
Potential business-as-usual outcome by 2030	Emissions from cars are anticipated to be reduced in part by the 20% reduction in car-km, but to a greater extent by technological changes, as indicated in the Decarbonising the Scottish Transport Sector report[xvii]:  **Figure 8: Car emission reduction due to technology and behaviour change in 2030, 2040 and 2045.** However, as work for Tactran to investigate the 20% car-km target has demonstrated, that target to reduce car use is achievable by 2030 but only with significant increases in both political will and funding. The research concluded that, without these changes, car-km in the region would be 10-15% greater in 2030 than 2019, and that business-as-usual action might reduce this by only around 1.5% (resulting in a business-as-usual net increase in car-km between 2019 and 2030 in the range of 8.5-13.5%). The availability and affordability of technological changes also cannot be guaranteed. The achievement of the carbon target assumes that 73% of cars operating in Scotland in 2030 will be ULEV, up from the 0.5% of 2020, despite the current average age of the fleet being longer than the period to achievement of the target.

17.7% of cars sold in the UK in the year to July 2023 were electric[xviii]. Even if this proportion doubled to one third of all cars by 2024 and was sustained for the rest of the decade, then only around 23% of the total fleet would be ULEV by 2030 (assuming the average age of the vehicle fleet remained unchanged). If the current 17.7% proportion of new cars being electric was sustained throughout the decade, then only around 13% of all cars would be ULEV by 2030.

Some reductions in emissions per km from the non-ULEV fleet would also be expected (with new cars emitting less than older ones), but net reductions of emissions per car-km are not expected to exceed around 30%.

Even if all the cars sold from 2024 were electric then the proportion of the fleet that would be electric by 2030, assuming the average age of the car fleet remained the same, is around 65%.

Summarising the above, the expectations of business-as-usual outcomes are:

- For net car-km in the region to increase in the range of 8.5% to 13.5%;
- For emissions per car-km to fall by 30% or less.

This results in a maximum reduction in emissions from car use of 24% (= (1+8.5%) x (1-30%) - 1); a lesser reduction would result if the number of car-km was greater than the level suggested or the emissions per km greater.

Total net carbon emissions from car, therefore, are expected to fall in a business-as-usual scenario, but not by more than around 35% (~ 1.085% to 1.135% x 30%), and potentially less if the take up of ULEVs is lower than assumed here.

If the 24% reduction in emissions from car was achieved, rail in the region was fully decarbonised and bus and commercial vehicle fleets met their national targets for reduction in line with the Decarbonising the Scottish Transport Sector report, then net potential emissions reductions by 2030 could be:

Sector	1990 emissions (MtCO2e)	2019 emissions (MtCO2e)	Potential reduction by 2030	2030 emissions (MtCO2e)
Car	5.79	5.28	24% (from calculations above)	4.02
Bus and Coach	0.60	0.43	79% (assuming national target achieved)	0.09
Rail	0.12	0.15	100% (assuming rail is decarbonised as planned)	0.00
Vans	0.96	1.71	47% (assuming national target achieved)	0.90
Trucks	1.79	1.72	52% (assuming national target achieved)	0.83
Totals	*9.25*	*9.29*		*5.84*

This is considered to be a ‘best case’ scenario (as achieving all the targeted reductions from public and freight transport will be challenging).

	If it were achieved, then emissions from surface transport in 2030 will be 63% of those in 2019 (and 63% of the 1990 baseline emissions level from the same modes). This equates to a reduction of 37%; significantly less than the 56% national target which has been adopted for the RTS (noting that the analysis above excludes consideration of maritime and aviation modes).
Commentary on achievability of proposed target	Achievement of the draft RTS target relies on both reductions in emissions per car-km and in the number of car-km that are greater than are anticipated under a current 'best case' scenario in the Tactran region, and also the achievement of challenging reductions from other surface transport modes.

3. Physical activity in more deprived communities

Draft target	For the least affluent SIMD data zones to achieve the Transport Scotland's forecasts for average proportion of journeys walked and cycled by 2030 • Large urban areas: 30% walk / 24% cycle • Other urban areas: 24% walk /19% cycle • Accessible small towns: 26% walk 13% cycle
Baseline data	The extant baseline of walking, wheeling and cycling in more deprived communities is not detailed/robust, and datasets are sometimes conflicting. Active travel comprises around 20% of all minutes of physical activity[xix]. Extrapolation of Scottish Household Survey Travel Diary Survey data[xx] and market research on travel patterns recently undertaken by Tactran suggests the following modal shares, and that people living in more deprived communities do walk and cycle proportionately at least as much as the regional average (though the average number of journeys made by them is lower):

	Regional average	SIMD 1&2 – Most deprived	SIMD 3&4	SIMD 5&6	SIMD 7&8	SIMD 9&10 – Least deprived
Walking	22%	25%	25%	24%	20%	17%
Driver car/van	53%	41%	46%	51%	56%	65%
Passenger car/van	12%	13%	13%	12%	12%	10%
Bicycle	1%	2%	1%	1%	1%	1%
Bus	7%	12%	10%	7%	6%	3%
Taxi/ minicab	1%	2%	1%	1%	1%	1%
Rail	2%	4%	3%	2%	3%	2%
Other	1%	1%	1%	1%	1%	1%
Relative number of journeys made	*100*	*81*	*91*	*102*	*107*	*111*

	However, almost all of the most health deprived communities in the region are in urban areas, where rates of active travel are higher than average because of the typically shorter journey distance in towns and cities. When this is accounted for, there does appear therefore to be some correlation between deprivation and lower levels of walking and cycling. Anecdotal evidence collected by Jacobs staff during extensive engagement in communities in the region suggests that, in more deprived communities: • Low levels of income and typically short journeys distances force or enable many people that live in more deprived communities to undertake a high proportion of their journeys by active modes, especially on foot; but • In these more deprived communities, a higher proportion of people are unable to walk or cycle because of mobility impairments and poor health, so may be dependent on motorised modes if they are able to travel at all.
External targets	Chief Medical Officers' physical activity targets, which are complex and different for different age groups, include for adults (19 to 64 years): "*For good physical and mental health, adults should aim to be physically active every day. Each week, adults should accumulate at least 150 minutes (2 ½ hours) of moderate intensity activity (such as brisk walking or cycling); or 75 minutes of vigorous intensity activity (such as running); or even shorter durations of very vigorous intensity activity (such as sprinting or stair climbing); or a combination of moderate, vigorous and very vigorous intensity activity*"[xxi]. Scotland's Physical Activity Delivery Plan sets out a "*target of achieving a 15% relative reduction in the global prevalence of physical inactivity in adults and in adolescents by 2030*"[xxii]. Local authority active travel targets: • Stirling LTS[xxiii] [xxiv]: Proportion of people accessing Stirling City Centre on foot: 10% increase compared to 2017 levels; % increase of annual average daily total of cyclists on monitored routes: 50% increase compared to 2017 levels; • Angus ATS[xxv]: For the proportion of Angus residents walking for utility journeys weekly or more often to be at least equal to the Scottish average by 2034; For the proportion of Angus residents cycling for utility journeys weekly or more often to be greater than 10% by 2034; • Perth's Transport Future: One of the strategic objectives is to Increase the proportion of short trips by more sustainable modes setting out targets to achieve a: 5% increase in cycling; 20% increase in walking; • PKC ATS[xxvi]: Perth & Kinross Council and its partners will seek to: Increase the number of journeys made on foot across Perth and Kinross as recorded in the 2011 Census for Scotland; Increase the number of journeys made by bike in Perth and Kinross as recorded in 2011 Census for Scotland; Increase the proportion of residents of Perth and Kinross walking more than 30 minutes in one go per month by 5% by 2028 in comparison with a 2018 baseline; Increase the proportion of residents cycling monthly or more often in Perth and Kinross by 50% by 2028 in comparison with a 2018 baseline; • Dundee Cycling Strategy : Dundee City Council and its partners will aim: To increase the number of journeys made by bike annually in Dundee by 200% by 2026 in comparison with the 2016 baseline, with an interim target of 100% by 2021; To increase the number of

Dundee residents cycling monthly or more often by 100% by 2026 in comparison with the 2016 baseline, with an interim target of 50% by 2021; For the number of cyclist casualties in road crashes in Dundee, as reported by Police Scotland data, to be no higher in any year than the 2010-14 average; and To increase the number of children who cycle to school by 100% by 2021 in comparison with the 2014 baseline data.

In summary, there is an extensive range of extant targets to increase levels of physical activity and rates of active travel, but few if any focus specifically on achieving improvements in deprived communities.

What could be achieved by 2030

Transport Scotland's recent Scottish Transport Projects Review (STPR2) made forecasts[xxvii] (by local authority and urban/rural classification, not specifically by health or community deprivation level) of what could be achieved by long-term, comprehensive investment in high-quality active travel facilities. These are listed below, but are valid only if "*all the active travel and behaviour change interventions were fully implemented in every relevant location in the region*" (quoting STPR2). Evidence from other countries that have greater experience in designing for active travel suggests that achieving these outcome comprehensively across regions takes many decades of effort and investment, hence these forecasts are considered to be deliverable only the long term.

Local Authority	Average proportion of all journeys walked		Average proportion of all journeys cycled	
	Baseline	Forecast following comprehensive delivery of high quality active travel investment	Baseline	Forecast following comprehensive delivery of high quality active travel investment
Angus	17%	22%	0.7%	19%
Dundee City	24%	30%	0.7%	23%
Perth and Kinross	17%	20%	0.5%	15%
Stirling	17%	21%	0.5%	18%
Regional average	*19%*	*23%*	*0.6%*	*19%*

Urban-rural 6-fold classification	Average proportion of all journeys walked		Average proportion of all journeys cycled	
	Baseline	Forecast following comprehensive delivery of high quality active travel investment	Baseline	Forecast following comprehensive delivery of high quality active travel investment
Large Urban Areas	24%	30%	1.5%	24%

	Other Urban Areas	19%	24%	0.4%	19%
	Accessible Small Towns	20%	26%	0.5%	13%
	Remote Small Towns	24%	31%	0.7%	11%
	Accessible Rural	12%	14%	0.4%	7%
	Remote Rural	15%	16%	1.0%	7%
	Scotland total	*19.9%*	*24.9%*	*1.4%*	*19.1%*

Impacts on more deprived communities would depend on local and regional decisions about where investment in the region is targeted, but it is reasonable to assume that, in the long term, the proportional rates of increase in walking and cycling indicated in the tables above could be achieved; i.e. that investment could increase the amount of walking by around 25% (= (24.9% / 19.9%) – 1) and cycling by 1300% (= (19.1% / 1.4%) – 1).

Active travel improvement measures are largely feasible and typically enjoy public support. Almost all are within the control of local and regional partners. However, the high cost of measures in comparison with currently available funding, the long implementation timescales that are typically observed for active travel infrastructure delivery in Scotland and the lack of capacity for large-scale delivery in the region significantly hamper what is likely to be achievable in terms of increasing active travel by 2030. The STPR2 forecasts presented above depend on comprehensive delivery of high quality active travel infrastructure in all relevant locations within and between all communities in the region; an outcome which is anticipated to take a number of decades to deliver.

Potential business-as-usual outcome by 2030

The investment required to achieve the active travel outcomes forecast by STPR2 across all of Scotland is in the range of £7-14bn.

Tactran's regional population = 511k, 9% of Scotland total. Tactran's region = 9,900 sqkm, 12.5% of Scotland total.

Hence if Tactran warrants ~10% of national total spend on active travel (based on a proportional allocation in line with population and area), then there is a budget requirement of £700-1,400M required to deliver the high quality infrastructure throughout the region on which the forecasts above are based.

The Scottish Government has committed to invest £320M per annum on active travel. If 10% of this came to the Tactran region, then potential investment of around £30M per annum may be possible in the region. If this came fully on stream by 2027 (reflecting the requirement for Local Authorities and other partners to build capacity for implementation and currently-observed challenges in scheme development

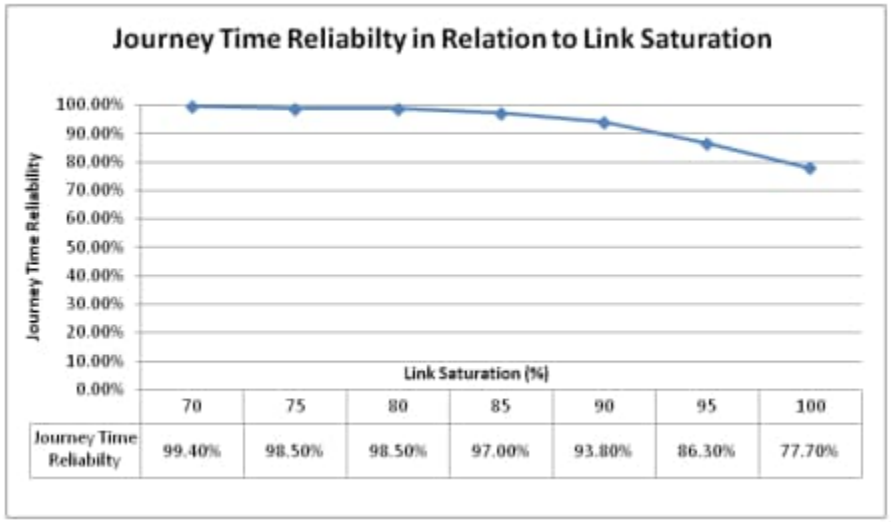
	nationally) with investment at a lower level until then, then it might be reasonable to assume that a total of around £140M could be invested by 2030, around one tenth to one fifth of the potential long-term region-wide investment requirement of £700-1,400M. At present there is no clear indication that the region's Local Authorities are specifically targeting active travel investment at deprived communities, so it is assumed that likely business-as-usual increases in active travel rates in deprived communities by 2030 would be in the range of one tenth to one fifth of the increases shown in the tables in the section above (i.e. the same as the regional average). It could therefore be expected to increase the mode share of walking in the most deprived communities by approximately one percentage point by 2030 (with the number of walking journeys increasing by 3-6%), and the mode share of cycling in the range of 2 to 4 percentage points (with the number of cycling journeys increasing between one- and three-fold). Given that the baseline level of walking is relatively high but that for cycling low, this suggests only modest increases in the amount of walking in more deprived communities are to be anticipated, but significant proportional growth in cycling could be achieved (from its low base). However, the change achieved will be highly dependent on the types and locations of the schemes to be implemented.
Commentary on achievability of proposed target	The proposed regional target of delivering significant increases in walking and cycling rates in the region by 2030 is considered to be unachievable. The modal share targets for walk and cycle as presented should be considered to be challenging long-term targets, based on the delivery of significant improvements to active travel infrastructure within and between all communities in the region. It is not currently foreseen that sufficient budget will be available to deliver the improvements by 2030 and, even if it was, there is insufficient capacity to design and deliver the required changes, and probably a lack political support to deliver such widespread change within that period. It is suggested that an ambitious but achievable target to increase the levels of walking and cycling in the least affluent SIMD data zones would follow the analysis provided in the 'potential business-as-usual outcome by 2030' analysis above.

4. Improve accessibility in more deprived communities

Draft target	Improve ability of all in the least affluent SIMD data zones targeted by the respective Council to access jobs, education and services
Baseline data	Baseline data is presented in Appendix A. This shows the areas from which access to a variety of key destinations and services is possible using public transport or active modes. It is noted that many people are unable to make use of these transport choices, for a variety of reasons including affordability, personal security concerns, social norms and limited travel horizons[xxviii]. Note also that in their 2016 report into Transport Poverty in Scotland, Sustrans stated that their view was that factors which affect people's poor access to transport are correlated to household income, car availability and access to the public transport network[xxix]. As no specific target is given in the draft LTS for the scale of improvement, no commentary on the deliverability of this target is provided.

5. Journey time reliability

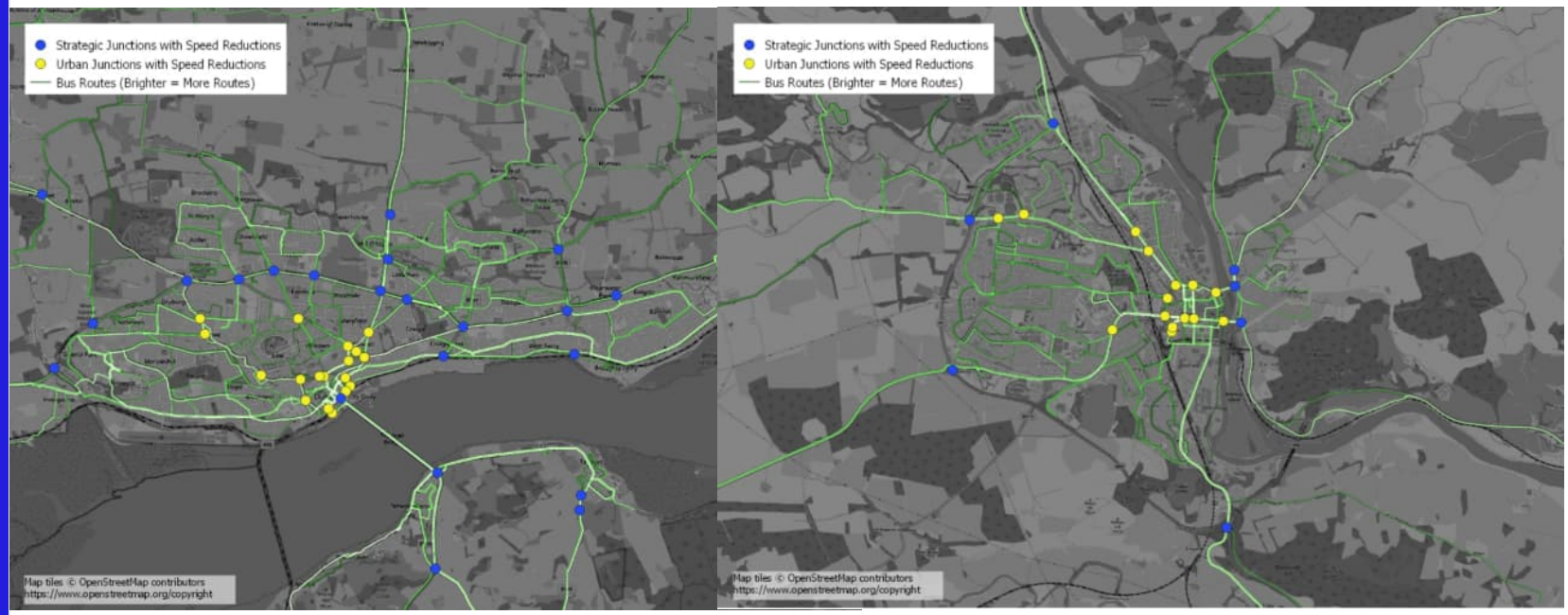
Draft target	Improve public transport journey time and journey time reliability on key bus corridors in accord with the Bus Partnership Fund bids Ensure journey time reliability to key freight origins/destinations remains with 95% of average journey time
Baseline data	The primary concerns for journey time unreliability in the Tactran region are: • for lorry and interurban coach services in the Tactran region at key nodes on the Trunk Road network; • for lorry journeys to key freight origins/destinations away from Trunk Roads; • for buses and coaches on congested urban roads. Note that rail journey time reliability is considered to be entirely within the remit of Network Rail and train operators, and is not considered within this note. Road journey time unreliability is, setting aside the effects of incidents (crashes, roadworks, poor weather, etc) which Tactran have confirmed are outwith the scope of the target, typically a function of network capacity and usage. Road journey time reliability tends to start to become uncertain when traffic flow is more than around 80% of capacity, with more significant effects at more than 90%[xxx] (see figure). This suggests that, assuming that lorries/buses/coaches are mixed with general traffic, then link saturation of less than around 88% of capacity is required at all points on the transport network for the 95% journey time reliability to be achieved. Modelled capacity and flow plots for key nodes at peak periods are provided in Appendix B for 2017 and 2032 forecast years (these are taken from the Tay Cities Regional Transport Model which does not include the Stirling area). They show that there are many locations on main routes at which traffic flow is already greater than 88%[xxxi], and that there is forecast to be many more by 2032. Therefore, without action, delays and journey time unreliability are anticipated to get worse.



Key sites of concern for freight and interurban coach services are primarily at key nodes on the Trunk Road network (including Keir, Broxden and Inveralmond junctions, and on the Kingsway and Forfar Road in Dundee), which in turn affect traffic flows on other links as some traffic may route away from these locations on secondary routes.

As well as the trunk routes and industrial/transhipment sites adjacent to them, key freight origins/destinations in the region include Montrose Port, the Stirling Industrial Estate (accessed from the A91), Arbroath (A92) and many largely agricultural sites accessed from the A94 between Scone and Forfar.

Work for the Tayside Bus Alliance has identified the locations around Perth and Dundee at which delays to buses are most prevalent[xxxii]:



Modelling undertaken for the Alliance suggests that measures to improve bus priority on the corridors most affected by delays could reduce the standard deviation of the journey time of buses by an average of 14% in Dundee and 30% in Perth.

Equivalent data for Stirling or other locations in the region is not available.

External targets

There are no known relevant targets specifically relating to road journey time reliability, beyond those for scheduled bus services, which state that 95% of services should operate not more than one minute early or five minutes late in comparison with published timetables.

What could be achieved by 2030	Achieving more reliable road journey times such that the targets would be met requires: • If interventions are to be focussed on all traffic, for capacity increases and/or demand restraints to be effective such that flow would be less than around 88% of capacity throughout the network; and/or. • If interventions are to be focussed on specifically freight and bus journey time reliability, then the capacity increases and demand restraints for general traffic may be effective, or work to be focussed on giving these modes priority over general traffic, for example through bus/lorry lanes. To deliver flows of less than around 88% of capacity his would require capacity increases and/or demand restraint measures at all congestion hotspots. Significant road network capacity increases for general traffic are contrary to national and regional policy and are not anticipated to be implementable or fundable by 2030. If demand restraint measures were to be effective, they would need to largely target peak-time journeys passing through the congestion hotspots on the Trunk Roads and in the region's cities. If they are unsuccessful at reducing traffic demand at these specific locations then little impact on journey time reliability would be anticipated, even if they affected traffic flows elsewhere. If the Scottish Government is to lead the implementation of effective measures that would achieve its target for a 20% reduction in car-km (in comparison with a 2019 baseline) by 2030, then this could make a significant contribution to reducing traffic volumes, and hence towards the journey time reliability target. However, as indicated in Appendix C, it is likely that there would be some key nodes (including Broxden, Inveralmond and Swallow roundabouts) could retain traffic flows in excess of 90% of capacity even with 20% fewer car-km. The figures shown in Appendix C also demonstrate that the manner in which the new 20% target is achieved would have a bearing on flow on these main congested links (as some options to achieve the 20% reduction are more likely to influence longer-distance trips – shown as scenario 1 in Appendix C – and some on a larger number of shorter-distance trips – scenario 2). There are some locations within the region's cities where bus/lorry priority measures may be implementable. The work undertaken to consider bus priority within the region's cities has identified some sites for which positive improvements can be made, but has not identified solutions for every congested location (and there has not been, as far as we are aware, any consideration of these being for lorries as well as buses). The implementability of the proposals is understood to be dependent on the availability of Bus Partnership Funding. Implementing bus/lorry priority on the approaches to the congested Trunk Road hotspots would, in most instances, require either carriageway widening or the reallocation of existing space on dual carriageways in a manner which has not previously been undertaken in Scotland (hard shoulder running to provide bus priority is in operation in some locations in Scotland, but the opportunities to deliver this within the Tactran region are effectively limited to only the northbound approaches to Keir and Broxden roundabouts). Traffic restraint or bus/lorry priority measures on Trunk Roads are implementable only with Transport Scotland consent. Experience of motorway bus priority measures in Scotland suggests that an extended period of consideration and design should be anticipated for any new proposals, which may push

	implementation beyond 2030. There are no locations in Scotland at which lorry priority roadspace reallocation measures are currently provided, including no locations in which commercial vehicles are given access to bus lanes. It may be challenging to gain acceptance of change to regulations to enable lorry priority.
Commentary on achievability of proposed target	The first part of the target (Improve public transport journey time and journey time reliability on key bus corridors in accord with the Bus Partnership Fund bids) appears to be achievable subject to a successful BPF funding application. Achieving the second part of the target (Ensure journey time reliability to key freight origins/destinations remains with 95% of average journey time) will depend on a package of measures which: • Reduce general traffic flow at congestion hotspots; and/or • Increase capacity for general traffic at congestion hotspots; and/or • Enable separation of traffic heading to/from key freight origins/destinations from general traffic at congestion hotspots. It is difficult to identify mechanisms by which will deliver the outcomes at all or even many of the hotspot locations by 2030 unless there is a significant reduction in traffic flow across the network. This would occur if the Scottish Government's 20% car-km reduction target by 2030 was to be achieved, but it is forecast that it is likely that some congestion hotspots would remain even in this case, so it would be unlikely that the target would be achieved in every location in the region without further intervention.

Appendix A. Accessibility Data Summary

The tables below show a baseline of the resident population's accessibility to key services, firstly for the entire region and then separately for each of the four local authorities.

The maps then show the spatial variation of accessibility.

Accessibility is calculated in Jacobs' NaPTAT tool and is defined according to scheduled public transport (based on timetables in spring 2023) or on foot if the relevant walk time is less than an estimated 10 minutes. The data assumes use of the weekday morning (0630-0930) public transport network.

Tactran RTS Targets: baseline and options

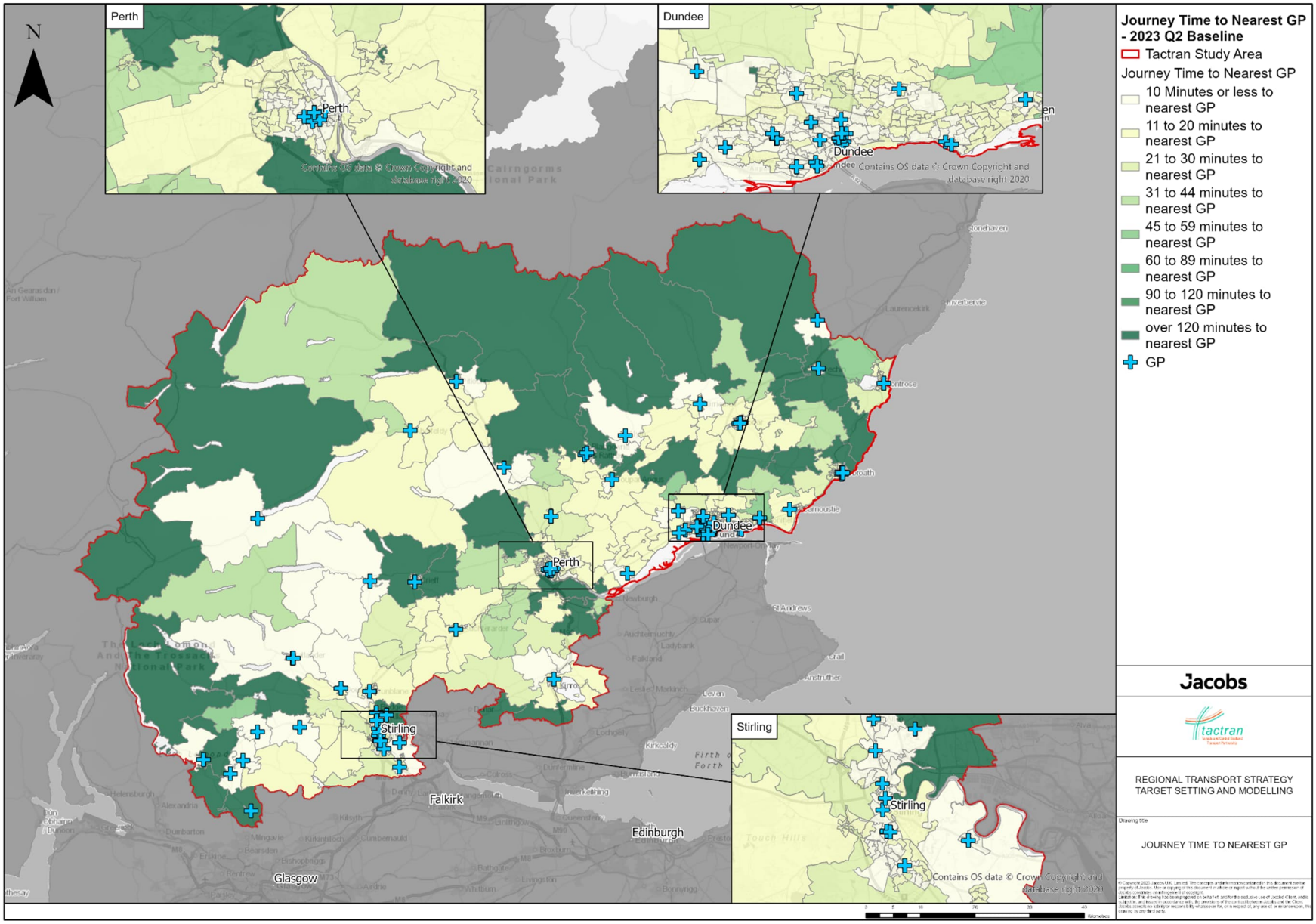
Tactran Accessibility Summary	Tactran Region												
	Population	Households	Households with at least one car	Households with at least two cars	Non-car owning households	5% SIMD	10% SIMD	20% SIMD	16-24	Working age population (16-66)	66+	Urban areas	Rural areas
Proportion within 30mins of a GP by public transport	91.9%	93.2%	91.1%	87.3%	98.3%	100.0%	100.0%	100.0%	92.9%	91.9%	91.8%	99.2%	70.6%
Proportion within 60mins of a GP by public transport	94.7%	95.7%	94.4%	91.9%	99.0%	100.0%	100.0%	100.0%	95.1%	94.7%	94.7%	99.2%	81.8%
Proportion within 30mins of a hospital by public transport	47.8%	50.0%	46.6%	40.7%	58.4%	37.5%	49.1%	50.0%	55.5%	48.9%	46.1%	55.4%	23.5%
Proportion within 60mins of a hospital by public transport	85.6%	87.4%	84.4%	79.4%	95.1%	100.0%	100.0%	100.0%	87.7%	85.9%	84.3%	94.0%	62.9%
Proportion within 30mins of further education by public transport	55.6%	58.2%	51.9%	44.0%	74.3%	100.0%	94.7%	87.0%	62.4%	57.2%	50.6%	69.6%	17.1%
Proportion within 60mins of further education by public transport	86.1%	87.7%	84.8%	79.9%	95.3%	100.0%	100.0%	100.0%	88.8%	86.5%	84.5%	96.0%	59.4%
Proportion within 30mins of a post office by public transport	93.3%	94.7%	93.1%	89.9%	98.7%	100.0%	100.0%	100.0%	94.0%	93.3%	93.4%	99.2%	77.6%
Proportion within 60mins of a post office by public transport	94.3%	95.5%	94.2%	91.5%	98.9%	100.0%	100.0%	100.0%	94.8%	94.3%	94.5%	99.2%	81.2%
Proportion within 30mins of a large food store by public transport	79.6%	81.8%	77.8%	71.1%	92.0%	100.0%	100.0%	97.2%	83.4%	80.3%	77.3%	93.3%	42.4%
Proportion within 60mins of a large food store by public transport	90.6%	91.9%	89.7%	86.1%	97.2%	100.0%	100.0%	100.0%	92.3%	90.7%	89.7%	99.2%	67.1%
Proportion within 30mins of a city by public transport	57.7%	59.6%	54.4%	47.7%	72.7%	95.8%	94.7%	84.3%	64.9%	59.2%	53.2%	70.0%	22.9%
Proportion within 60mins of a city by public transport	86.3%	87.6%	84.9%	80.5%	94.4%	100.0%	100.0%	98.1%	88.9%	86.7%	84.5%	95.8%	58.8%
Proportion within 30mins of Dundee (city centre) by public transport	30.4%	33.0%	27.3%	20.8%	47.4%	87.5%	78.9%	64.8%	36.3%	31.6%	27.1%	40.4%	2.9%
Proportion within 60mins of Dundee (city centre) by public transport	55.8%	58.6%	54.0%	47.0%	70.1%	91.7%	86.0%	79.6%	57.9%	56.1%	54.5%	68.5%	21.2%
Proportion within 30mins of Perth by public transport	14.0%	14.2%	14.3%	13.4%	14.1%	0.0%	3.5%	8.3%	12.1%	13.8%	14.4%	14.8%	11.8%
Proportion within 60mins of Perth by public transport	39.5%	40.0%	38.7%	36.6%	43.1%	41.7%	43.9%	38.0%	43.2%	39.8%	39.0%	41.9%	28.8%
Proportion within 30mins of Stirling by public transport	13.3%	12.4%	12.8%	13.5%	11.2%	8.3%	12.3%	11.1%	16.5%	13.8%	11.8%	14.8%	8.2%
Proportion within 60mins of Stirling by public transport	17.4%	16.3%	17.3%	18.6%	13.7%	8.3%	12.3%	13.9%	20.0%	17.8%	16.3%	17.7%	16.5%
Proportion within 30mins of Dundee Airport by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Dundee Airport by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 30mins of a recreation or leisure facility by public transport	83.4%	85.2%	81.7%	76.0%	94.0%	100.0%	100.0%	97.2%	85.9%	83.6%	82.5%	95.8%	47.1%
Proportion within 60mins of a recreation or leisure facility by public transport	92.1%	93.3%	91.4%	87.9%	98.1%	100.0%	100.0%	100.0%	93.1%	92.2%	91.6%	99.2%	71.8%

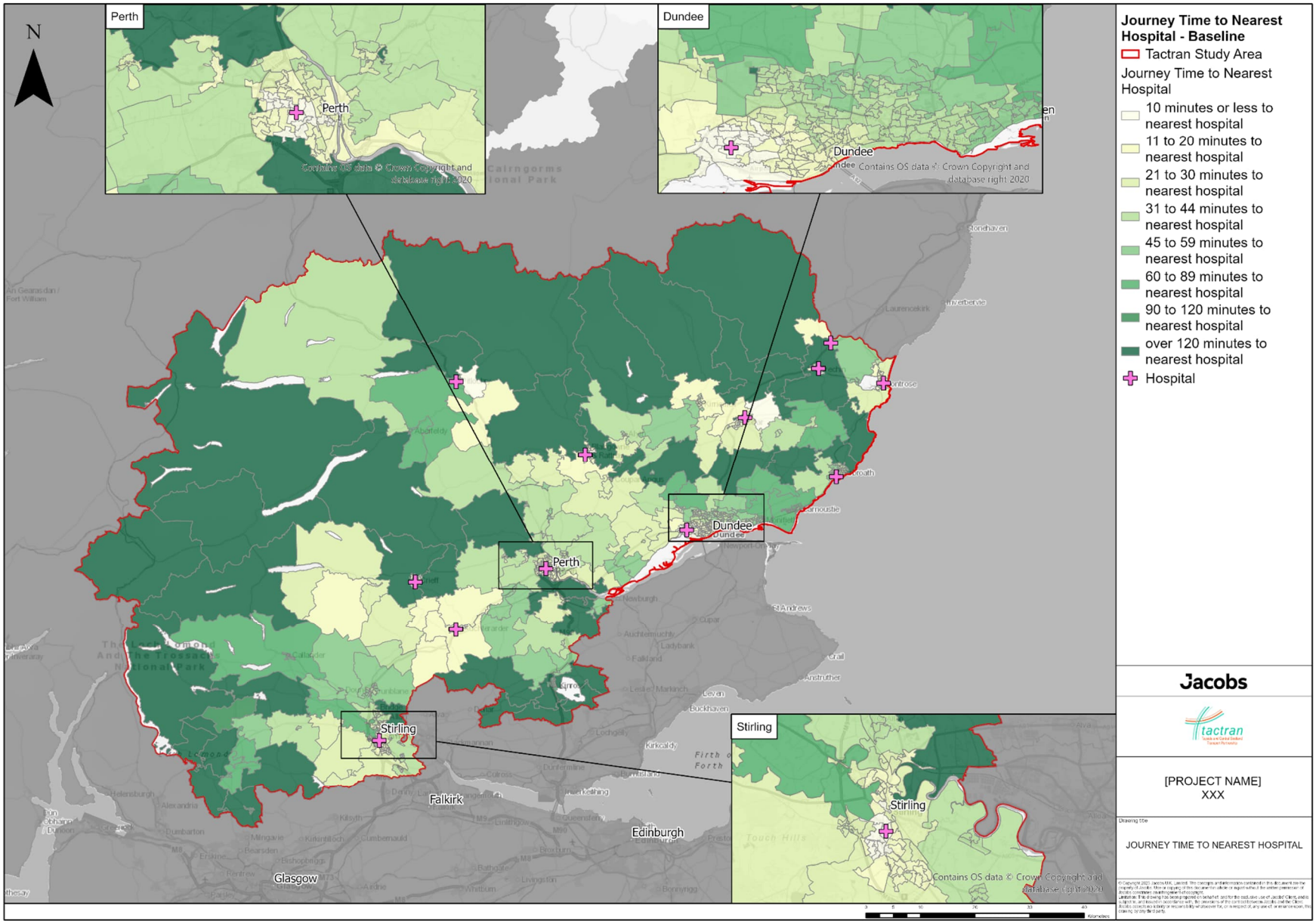
Local Authority Accessibility Summary	Dundee City												
	Population	Households	Households with at least one car	Households with at least two cars	Non-car owning households	5% SIMD	10% SIMD	20% SIMD	16-24	Working age population (16-66)	66+	Urban areas	Rural areas
Proportion within 30mins of a GP by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%
Proportion within 60mins of a GP by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%
Proportion within 30mins of a hospital by public transport	40.9%	41.6%	36.8%	29.5%	48.4%	33.3%	40.0%	38.6%	61.7%	43.9%	33.2%	38.5%	100.0%
Proportion within 60mins of a hospital by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%
Proportion within 30mins of further education by public transport	96.6%	97.5%	96.5%	94.2%	99.0%	100.0%	95.6%	97.1%	97.7%	96.6%	98.1%	96.3%	100.0%
Proportion within 60mins of further education by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%
Proportion within 30mins of a post office by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%
Proportion within 60mins of a post office by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%
Proportion within 30mins of a large food store by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%
Proportion within 60mins of a large food store by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%
Proportion within 30mins of a city by public transport	93.2%	94.7%	93.0%	89.6%	97.1%	95.2%	97.8%	97.1%	95.6%	93.2%	94.5%	93.6%	0.0%
Proportion within 60mins of a city by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%
Proportion within 30mins of Dundee (city centre) by public transport	93.2%	94.7%	93.0%	89.6%	97.1%	95.2%	97.8%	97.1%	95.6%	93.2%	94.5%	93.6%	0.0%
Proportion within 60mins of Dundee (city centre) by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%
Proportion within 30mins of Perth by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Perth by public transport	42.4%	43.6%	40.5%	34.3%	47.9%	47.6%	46.7%	41.4%	53.1%	43.7%	39.5%	42.8%	0.0%
Proportion within 30mins of Stirling by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Stirling by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 30mins of Dundee Airport by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Dundee Airport by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 30mins of a recreation or leisure facility by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%
Proportion within 60mins of a recreation or leisure facility by public transport	99.6%	99.7%	99.5%	99.2%	100.0%	100.0%	100.0%	100.0%	99.7%	99.6%	99.8%	99.5%	100.0%

Local Authority Accessibility Summary	Angus												
	Population	Households	Households with at least one car	Households with at least two cars	Non-car owning households	5% SIMD	10% SIMD	20% SIMD	16-24	Working age population (16-66)	66+	Urban areas	Rural areas
Proportion within 30mins of a GP by public transport	88.0%	89.7%	87.2%	82.1%	97.6%	100.0%	100.0%	100.0%	88.8%	87.7%	89.0%	99.1%	60.5%
Proportion within 60mins of a GP by public transport	93.1%	93.8%	92.3%	89.4%	98.5%	100.0%	100.0%	100.0%	94.1%	92.9%	93.3%	99.1%	76.7%
Proportion within 30mins of a hospital by public transport	41.4%	44.1%	41.2%	36.1%	53.2%	0.0%	0.0%	41.7%	41.7%	41.5%	41.5%	47.3%	23.3%
Proportion within 60mins of a hospital by public transport	76.7%	79.1%	75.8%	70.5%	89.6%	100.0%	100.0%	100.0%	76.9%	76.6%	76.6%	84.8%	58.1%
Proportion within 30mins of further education by public transport	36.2%	36.8%	35.3%	33.8%	41.7%	100.0%	100.0%	66.7%	37.4%	36.0%	37.2%	40.2%	25.6%
Proportion within 60mins of further education by public transport	86.0%	86.8%	84.4%	79.9%	94.7%	100.0%	100.0%	100.0%	87.6%	86.0%	85.7%	93.8%	62.8%
Proportion within 30mins of a post office by public transport	90.8%	92.1%	90.2%	86.3%	98.1%	100.0%	100.0%	100.0%	91.5%	90.6%	91.4%	99.1%	69.8%
Proportion within 60mins of a post office by public transport	93.1%	93.8%	92.3%	89.4%	98.5%	100.0%	100.0%	100.0%	94.1%	92.9%	93.3%	99.1%	76.7%
Proportion within 30mins of a large food store by public transport	84.8%	86.1%	83.4%	78.2%	94.7%	100.0%	100.0%	100.0%	85.7%	84.7%	85.1%	95.5%	55.8%
Proportion within 60mins of a large food store by public transport	92.4%	93.1%	91.4%	88.1%	98.4%	100.0%	100.0%	100.0%	93.2%	92.1%	92.7%	99.1%	74.4%
Proportion within 30mins of a city by public transport	12.9%	13.3%	13.1%	13.0%	13.8%	100.0%	50.0%	16.7%	12.3%	12.1%	15.7%	15.2%	9.3%
Proportion within 60mins of a city by public transport	75.5%	76.4%	74.0%	69.6%	84.3%	100.0%	100.0%	83.3%	77.5%	75.4%	75.5%	84.8%	48.8%
Proportion within 30mins of Dundee (city centre) by public transport	12.9%	13.3%	13.1%	13.0%	13.8%	100.0%	50.0%	16.7%	12.3%	12.1%	15.7%	15.2%	9.3%
Proportion within 60mins of Dundee (city centre) by public transport	75.5%	76.4%	74.0%	69.6%	84.3%	100.0%	100.0%	83.3%	77.5%	75.4%	75.5%	84.8%	48.8%
Proportion within 30mins of Perth by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Perth by public transport	1.3%	1.3%	1.4%	1.8%	0.8%	0.0%	0.0%	0.0%	1.3%	1.3%	1.6%	0.9%	2.3%
Proportion within 30mins of Stirling by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Stirling by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 30mins of Dundee Airport by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Dundee Airport by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 30mins of a recreation or leisure facility by public transport	79.6%	82.0%	79.2%	74.3%	91.1%	100.0%	100.0%	100.0%	80.3%	79.0%	81.8%	92.0%	48.8%
Proportion within 60mins of a recreation or leisure facility by public transport	92.3%	93.1%	91.4%	88.2%	98.4%	100.0%	100.0%	100.0%	93.5%	92.1%	92.8%	99.1%	74.4%

Local Authority Accessibility Summary	Perth and Kinross												
	Population	Households	Households with at least one car	Households with at least two cars	Non-car owning households	5% SIMD	10% SIMD	20% SIMD	16-24	Working age population (16-66)	66+	Urban areas	Rural areas
Proportion within 30mins of a GP by public transport	86.2%	88.6%	86.6%	82.6%	96.1%	N/A	100.0%	100.0%	84.1%	85.7%	87.7%	98.1%	72.3%
Proportion within 60mins of a GP by public transport	90.5%	92.8%	91.5%	89.0%	97.6%	N/A	100.0%	100.0%	88.0%	90.2%	92.0%	98.1%	83.1%
Proportion within 30mins of a hospital by public transport	59.8%	63.5%	59.4%	51.8%	79.0%	N/A	100.0%	100.0%	60.6%	59.9%	60.3%	85.4%	30.1%
Proportion within 60mins of a hospital by public transport	83.1%	85.9%	84.0%	80.4%	93.1%	N/A	100.0%	100.0%	81.6%	82.8%	84.3%	94.2%	73.5%
Proportion within 30mins of further education by public transport	35.0%	38.4%	33.4%	26.8%	57.4%	N/A	66.7%	81.8%	38.0%	36.5%	29.6%	56.3%	15.7%
Proportion within 60mins of further education by public transport	74.3%	77.5%	74.8%	70.7%	87.2%	N/A	100.0%	100.0%	74.3%	74.2%	74.2%	89.3%	61.4%
Proportion within 30mins of a post office by public transport	87.9%	91.0%	89.3%	85.6%	97.2%	N/A	100.0%	100.0%	85.8%	87.5%	89.7%	98.1%	78.3%
Proportion within 60mins of a post office by public transport	89.0%	91.9%	90.4%	87.3%	97.4%	N/A	100.0%	100.0%	86.7%	88.5%	90.8%	98.1%	80.7%
Proportion within 30mins of a large food store by public transport	62.4%	65.5%	62.1%	56.7%	78.3%	N/A	100.0%	100.0%	63.0%	62.6%	61.3%	83.5%	41.0%
Proportion within 60mins of a large food store by public transport	82.7%	85.1%	83.4%	80.5%	91.7%	N/A	100.0%	100.0%	81.8%	82.4%	82.9%	98.1%	67.5%
Proportion within 30mins of a city by public transport	48.4%	51.0%	47.0%	41.1%	66.3%	N/A	66.7%	81.8%	49.9%	49.4%	44.9%	70.9%	25.3%
Proportion within 60mins of a city by public transport	81.0%	83.6%	81.6%	78.1%	91.3%	N/A	100.0%	100.0%	80.5%	80.8%	80.9%	98.1%	63.9%
Proportion within 30mins of Dundee (city centre) by public transport	1.9%	2.0%	2.1%	2.1%	1.4%	N/A	0.0%	0.0%	1.6%	1.9%	2.0%	1.9%	1.2%
Proportion within 60mins of Dundee (city centre) by public transport	32.8%	34.4%	33.6%	30.1%	37.5%	N/A	66.7%	54.5%	31.9%	32.3%	33.9%	46.6%	16.9%
Proportion within 30mins of Perth by public transport	46.5%	49.1%	44.8%	38.9%	64.9%	N/A	66.7%	81.8%	48.4%	47.4%	42.9%	68.9%	24.1%
Proportion within 60mins of Perth by public transport	78.2%	80.5%	78.3%	74.6%	88.8%	N/A	100.0%	100.0%	78.1%	78.1%	77.5%	98.1%	56.6%
Proportion within 30mins of Stirling by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	N/A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Stirling by public transport	5.0%	5.4%	5.5%	4.9%	4.9%	N/A	0.0%	0.0%	4.7%	4.8%	5.9%	6.8%	3.6%
Proportion within 30mins of Dundee Airport by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	N/A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Dundee Airport by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	N/A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 30mins of a recreation or leisure facility by public transport	75.3%	77.7%	74.6%	69.7%	88.9%	N/A	100.0%	100.0%	74.0%	75.2%	75.5%	93.2%	54.2%
Proportion within 60mins of a recreation or leisure facility by public transport	88.9%	91.0%	89.5%	87.0%	96.4%	N/A	100.0%	100.0%	86.7%	88.7%	89.6%	98.1%	79.5%

Local Authority Accessibility Summary	Stirling												
	Population	Households	Households with at least one car	Households with at least two cars	Non-car owning households	5% SIMD	10% SIMD	20% SIMD	16-24	Working age population (16-66)	66+	Urban areas	Rural areas
Proportion within 30mins of a GP by public transport	93.8%	93.9%	92.9%	90.8%	97.2%	100.0%	100.0%	100.0%	95.7%	93.7%	92.9%	100.0%	76.7%
Proportion within 60mins of a GP by public transport	95.7%	96.0%	95.3%	93.5%	98.4%	100.0%	100.0%	100.0%	96.7%	95.6%	95.2%	100.0%	83.7%
Proportion within 30mins of a hospital by public transport	47.0%	50.1%	45.3%	38.0%	66.7%	100.0%	100.0%	73.3%	51.7%	48.3%	43.3%	67.9%	9.3%
Proportion within 60mins of a hospital by public transport	78.5%	78.9%	75.9%	71.3%	89.3%	100.0%	100.0%	100.0%	84.7%	79.4%	74.5%	93.6%	46.5%
Proportion within 30mins of further education by public transport	48.9%	49.5%	45.4%	40.3%	63.9%	100.0%	100.0%	60.0%	55.1%	49.8%	46.6%	65.4%	9.3%
Proportion within 60mins of further education by public transport	84.3%	84.7%	82.2%	77.7%	93.3%	100.0%	100.0%	100.0%	88.8%	84.9%	81.4%	100.0%	51.2%
Proportion within 30mins of a post office by public transport	95.2%	95.4%	94.7%	93.3%	97.9%	100.0%	100.0%	100.0%	96.5%	95.1%	94.7%	100.0%	83.7%
Proportion within 60mins of a post office by public transport	96.3%	96.6%	96.0%	94.5%	98.6%	100.0%	100.0%	100.0%	97.1%	96.2%	96.0%	100.0%	86.0%
Proportion within 30mins of a large food store by public transport	69.9%	71.0%	67.5%	61.1%	83.0%	100.0%	100.0%	80.0%	78.3%	71.3%	65.5%	88.5%	30.2%
Proportion within 60mins of a large food store by public transport	87.2%	87.3%	85.1%	81.1%	95.0%	100.0%	100.0%	100.0%	91.5%	87.7%	84.3%	100.0%	58.1%
Proportion within 30mins of a city by public transport	72.8%	73.4%	70.3%	64.8%	84.3%	100.0%	100.0%	80.0%	80.0%	73.9%	69.3%	91.0%	32.6%
Proportion within 60mins of a city by public transport	87.2%	87.3%	85.1%	81.1%	95.0%	100.0%	100.0%	100.0%	91.5%	87.7%	84.3%	100.0%	58.1%
Proportion within 30mins of Dundee (city centre) by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Dundee (city centre) by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 30mins of Perth by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Perth by public transport	18.5%	16.4%	17.5%	19.2%	12.8%	0.0%	14.3%	6.7%	23.3%	18.4%	19.1%	24.4%	2.3%
Proportion within 30mins of Stirling by public transport	72.8%	73.4%	70.3%	64.8%	84.3%	100.0%	100.0%	80.0%	80.0%	73.9%	69.3%	91.0%	32.6%
Proportion within 60mins of Stirling by public transport	87.2%	87.3%	85.1%	81.1%	95.0%	100.0%	100.0%	100.0%	91.5%	87.7%	84.3%	100.0%	58.1%
Proportion within 30mins of Dundee Airport by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 60mins of Dundee Airport by public transport	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Proportion within 30mins of a recreation or leisure facility by public transport	75.6%	76.0%	73.0%	67.8%	86.3%	100.0%	100.0%	80.0%	81.9%	76.3%	73.5%	96.2%	30.2%
Proportion within 60mins of a recreation or leisure facility by public transport	85.1%	85.6%	83.2%	78.9%	93.9%	100.0%	100.0%	100.0%	89.4%	85.7%	82.5%	100.0%	53.5%


N
Perth
Dundee
Stirling
Journey Time to Nearest GP - 2023 Q2 Baseline
Tactran Study Area
Journey Time to Nearest GP
10 Minutes or less to nearest GP
11 to 20 minutes to nearest GP
21 to 30 minutes to nearest GP
31 to 44 minutes to nearest GP
45 to 59 minutes to nearest GP
60 to 89 minutes to nearest GP
90 to 120 minutes to nearest GP
over 120 minutes to nearest GP
GP
Jacobs
tactran
REGIONAL TRANSPORT STRATEGY TARGET SETTING AND MODELLING
JOURNEY TIME TO NEAREST GP
Contains OS data © Crown Copyright and database right 2020
Falkirk
Edinburgh
Glasgow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Dundee
Stirling
Falkirk
Edinburgh
Glasgow
Journey Time to Nearest Hospital - Baseline
Tactran Study Area
Journey Time to Nearest Hospital
10 minutes or less to nearest hospital
11 to 20 minutes to nearest hospital
21 to 30 minutes to nearest hospital
31 to 44 minutes to nearest hospital
45 to 59 minutes to nearest hospital
60 to 89 minutes to nearest hospital
90 to 120 minutes to nearest hospital
over 120 minutes to nearest hospital
Hospital
Jacobs
tactran
[PROJECT NAME]
XXX
JOURNEY TIME TO NEAREST HOSPITAL
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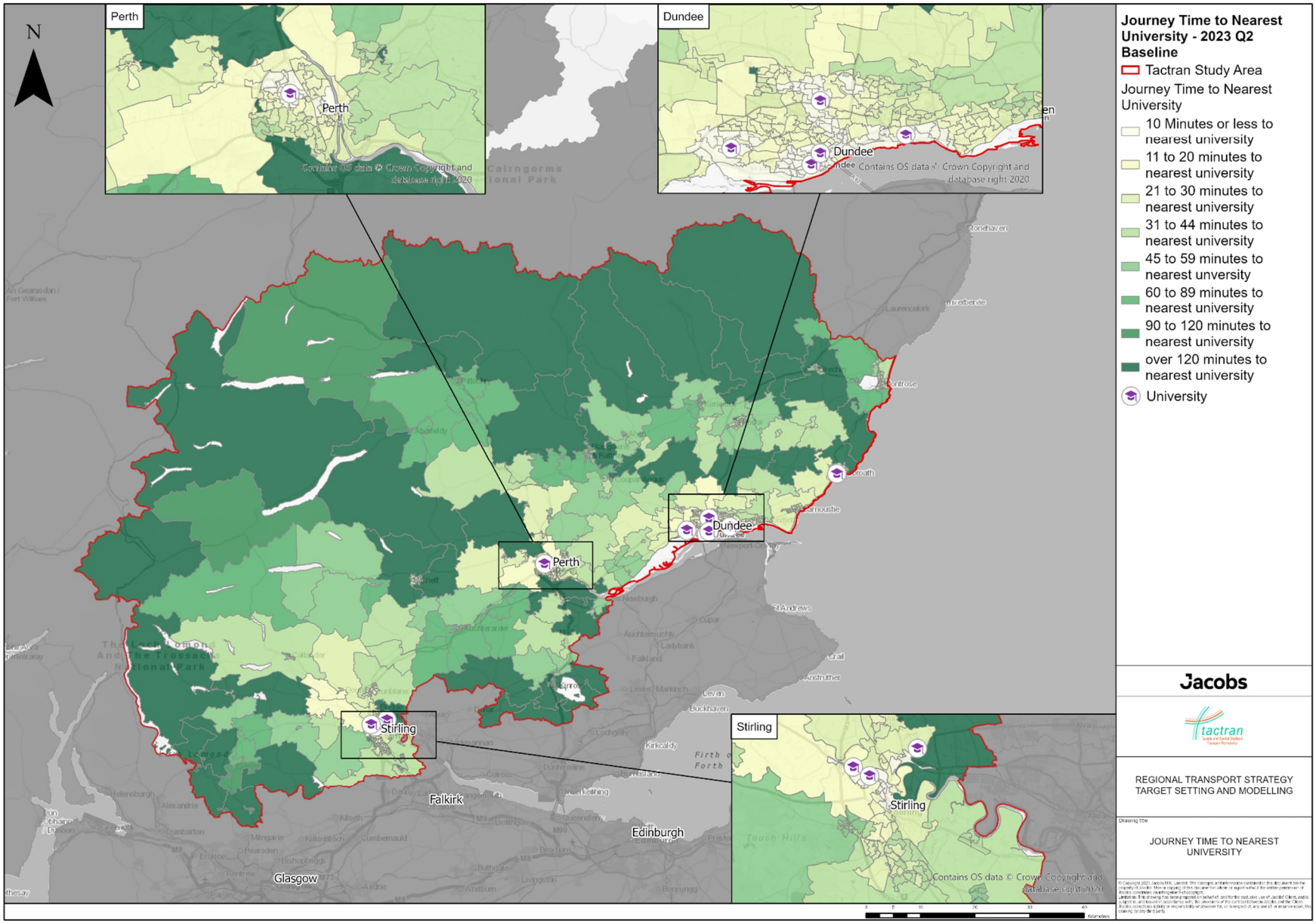
N
Perth
Dundee
Stirling
Falkirk
Edinburgh
Glasgow
Journey Time to Nearest University - 2023 Q2 Baseline
Tactran Study Area
Journey Time to Nearest University
10 Minutes or less to nearest university
11 to 20 minutes to nearest university
21 to 30 minutes to nearest university
31 to 44 minutes to nearest university
45 to 59 minutes to nearest unversity
60 to 89 minutes to nearest university
90 to 120 minutes to nearest university
over 120 minutes to nearest university
University
Jacobs
tactran
REGIONAL TRANSPORT STRATEGY TARGET SETTING AND MODELLING
JOURNEY TIME TO NEAREST UNIVERSITY
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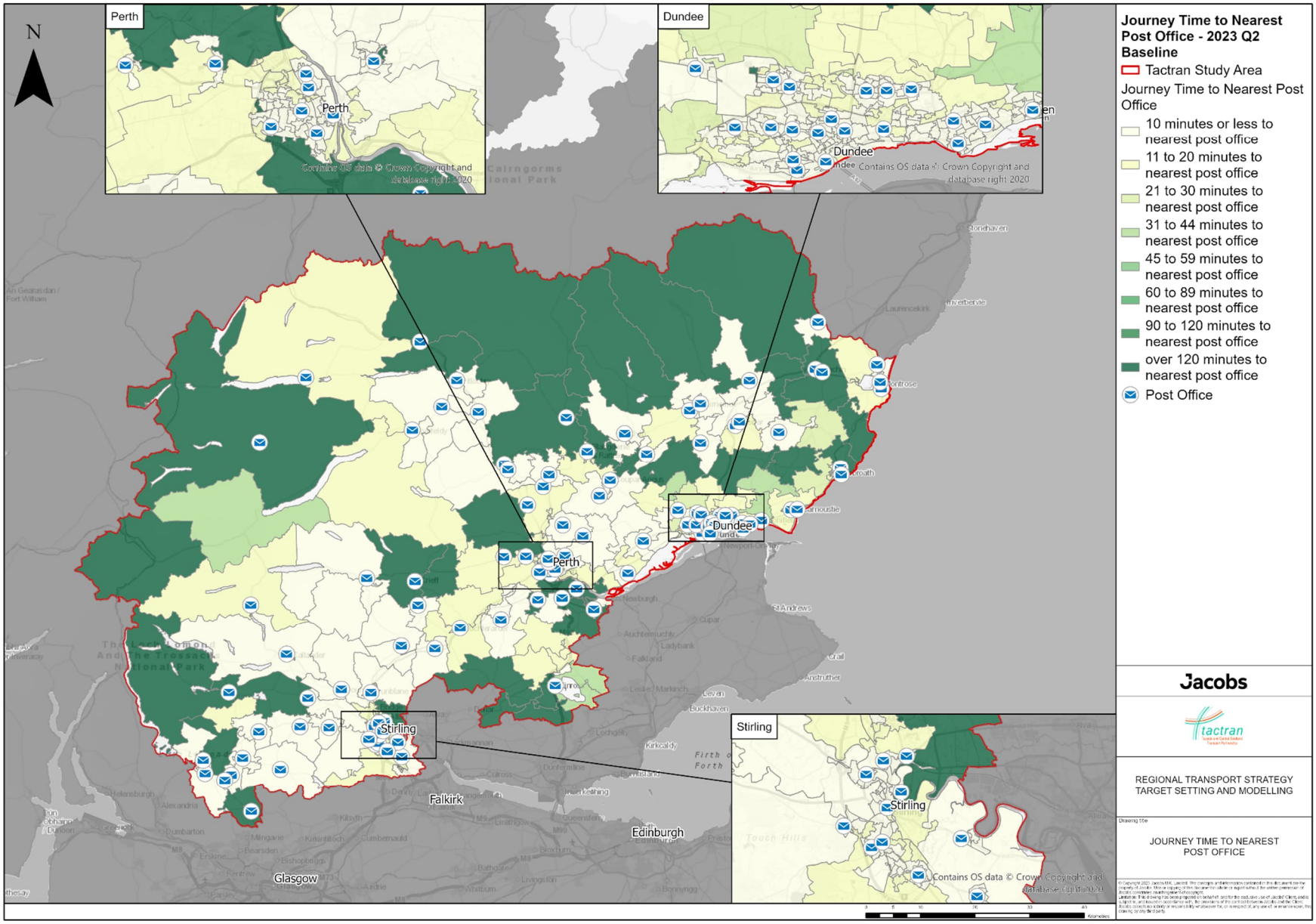
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Perth
Dundee
Stirling
Falkirk
Edinburgh
Glasgow
Journey Time to Nearest Post Office - 2023 Q2 Baseline
Tactran Study Area
Journey Time to Nearest Post Office
10 minutes or less to nearest post office
11 to 20 minutes to nearest post office
21 to 30 minutes to nearest post office
31 to 44 minutes to nearest post office
45 to 59 minutes to nearest post office
60 to 89 minutes to nearest post office
90 to 120 minutes to nearest post office
over 120 minutes to nearest post office
Post Office
Jacobs
tactran
REGIONAL TRANSPORT STRATEGY TARGET SETTING AND MODELLING
JOURNEY TIME TO NEAREST POST OFFICE
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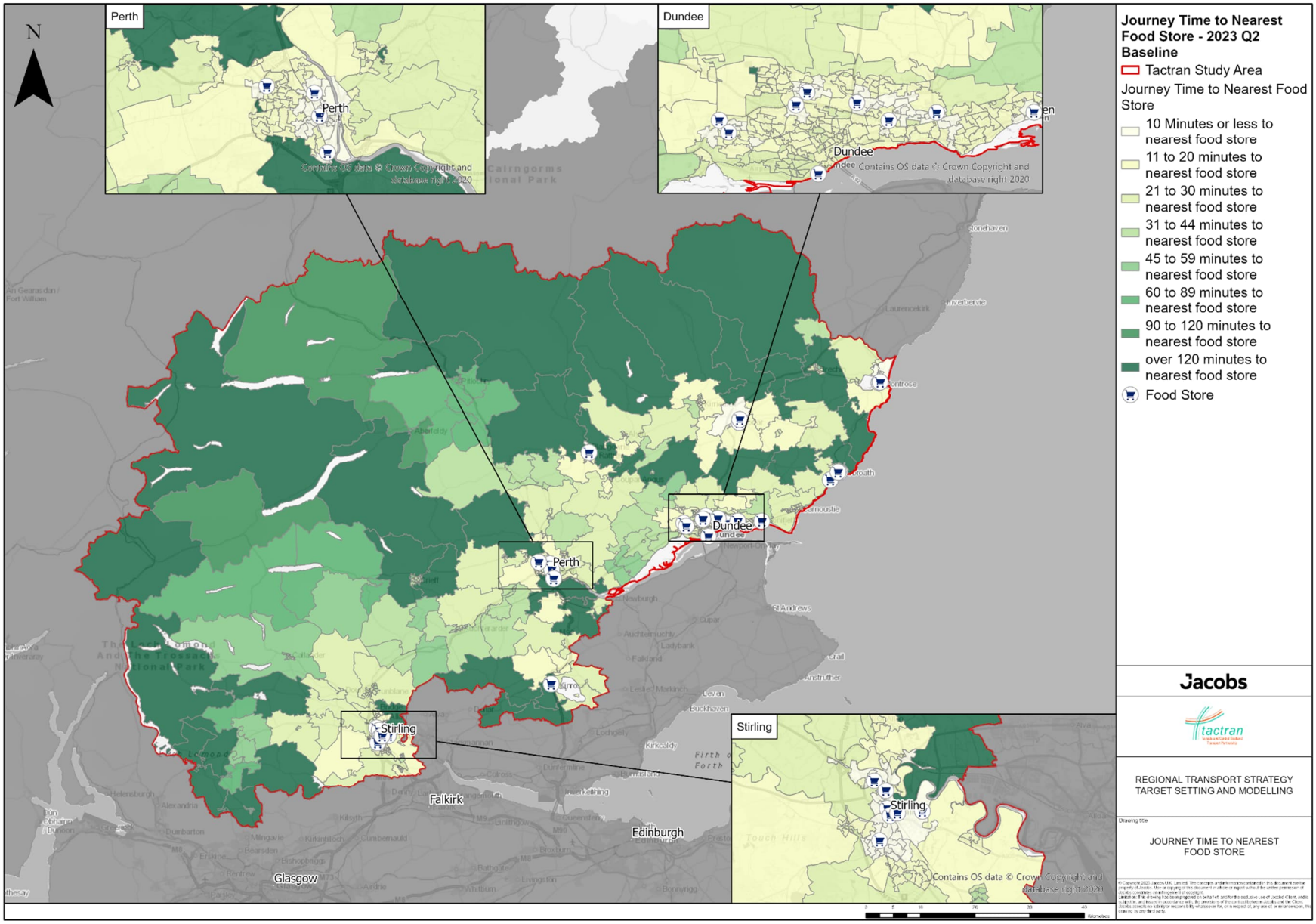
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Dundee
Stirling
Falkirk
Edinburgh
Glasgow
Journey Time to Nearest Food Store - 2023 Q2 Baseline
Tactran Study Area
Journey Time to Nearest Food Store
10 Minutes or less to nearest food store
11 to 20 minutes to nearest food store
21 to 30 minutes to nearest food store
31 to 44 minutes to nearest food store
45 to 59 minutes to nearest food store
60 to 89 minutes to nearest food store
90 to 120 minutes to nearest food store
over 120 minutes to nearest food store
Food Store
Jacobs
tactran
REGIONAL TRANSPORT STRATEGY TARGET SETTING AND MODELLING
JOURNEY TIME TO NEAREST FOOD STORE
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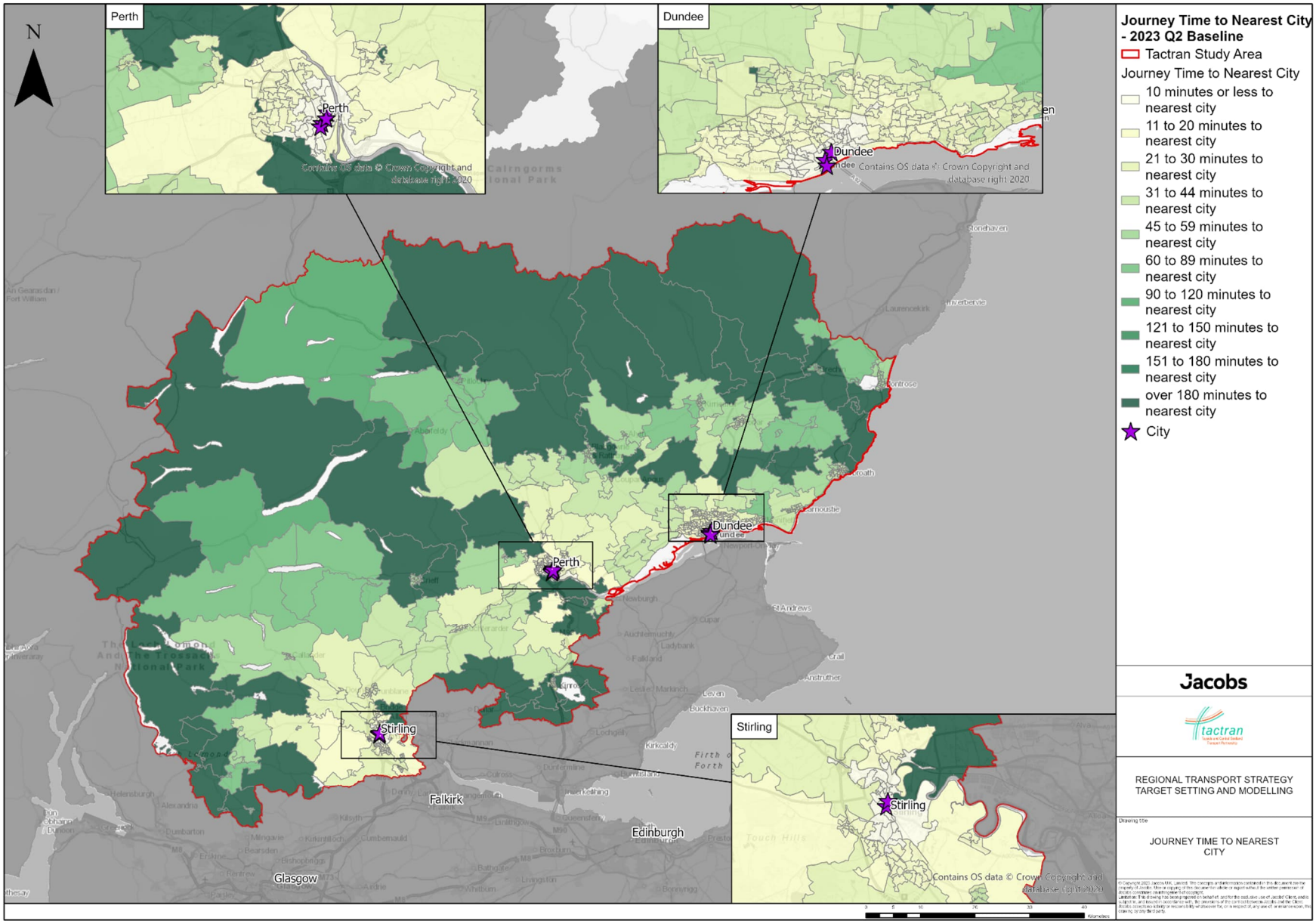
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Dundee
Stirling
Falkirk
Edinburgh
Glasgow
Journey Time to Nearest City - 2023 Q2 Baseline
Tactran Study Area
Journey Time to Nearest City
10 minutes or less to nearest city
11 to 20 minutes to nearest city
21 to 30 minutes to nearest city
31 to 44 minutes to nearest city
45 to 59 minutes to nearest city
60 to 89 minutes to nearest city
90 to 120 minutes to nearest city
121 to 150 minutes to nearest city
151 to 180 minutes to nearest city
over 180 minutes to nearest city
City
Jacobs
tactran
REGIONAL TRANSPORT STRATEGY TARGET SETTING AND MODELLING
JOURNEY TIME TO NEAREST CITY
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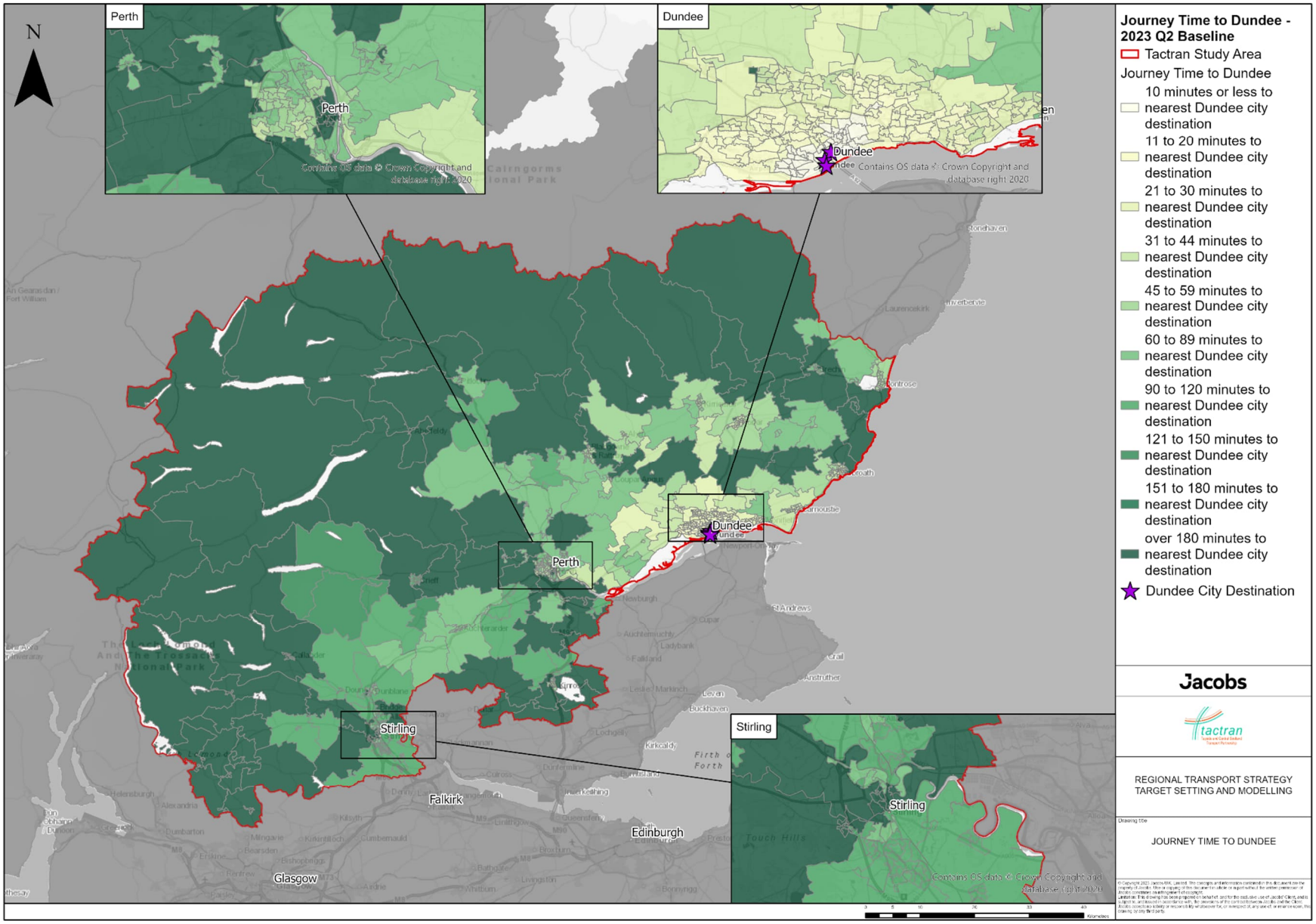
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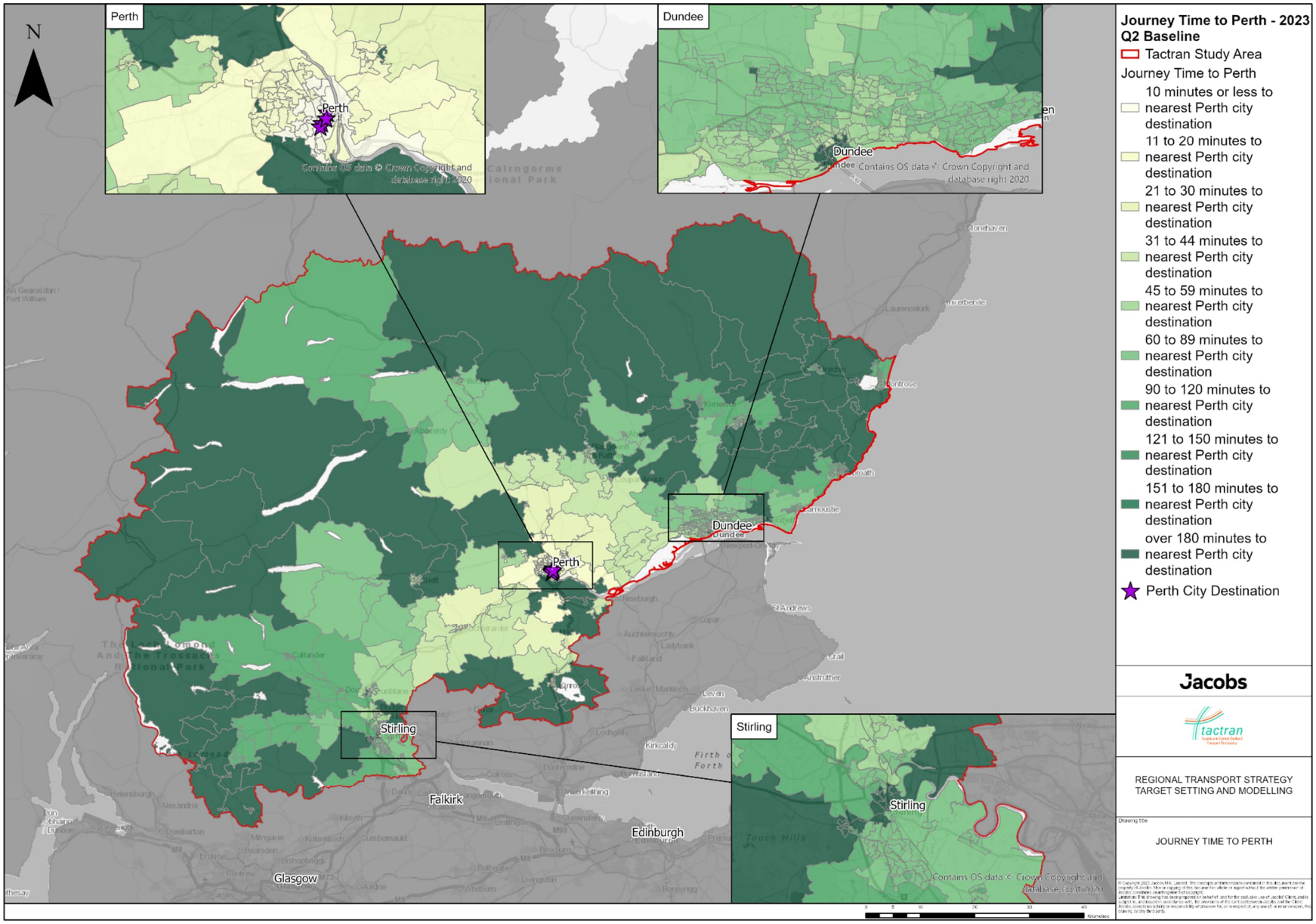
Falkirk
Edinburgh
Glasgow
Journey Time to Dundee - 2023 Q2 Baseline
Tactran Study Area
Journey Time to Dundee
10 minutes or less to nearest Dundee city destination
11 to 20 minutes to nearest Dundee city destination
21 to 30 minutes to nearest Dundee city destination
31 to 44 minutes to nearest Dundee city destination
45 to 59 minutes to nearest Dundee city destination
60 to 89 minutes to nearest Dundee city destination
90 to 120 minutes to nearest Dundee city destination
121 to 150 minutes to nearest Dundee city destination
151 to 180 minutes to nearest Dundee city destination
over 180 minutes to nearest Dundee city destination
Dundee City Destination
Jacobs
tactran
REGIONAL TRANSPORT STRATEGY TARGET SETTING AND MODELLING
JOURNEY TIME TO DUNDEE


N
Perth
Dundee
Stirling
Falkirk
Edinburgh
Glasgow
Journey Time to Perth - 2023 Q2 Baseline
Tactran Study Area
Journey Time to Perth
10 minutes or less to nearest Perth city destination
11 to 20 minutes to nearest Perth city destination
21 to 30 minutes to nearest Perth city destination
31 to 44 minutes to nearest Perth city destination
45 to 59 minutes to nearest Perth city destination
60 to 89 minutes to nearest Perth city destination
90 to 120 minutes to nearest Perth city destination
121 to 150 minutes to nearest Perth city destination
151 to 180 minutes to nearest Perth city destination
over 180 minutes to nearest Perth city destination
Perth City Destination
Jacobs
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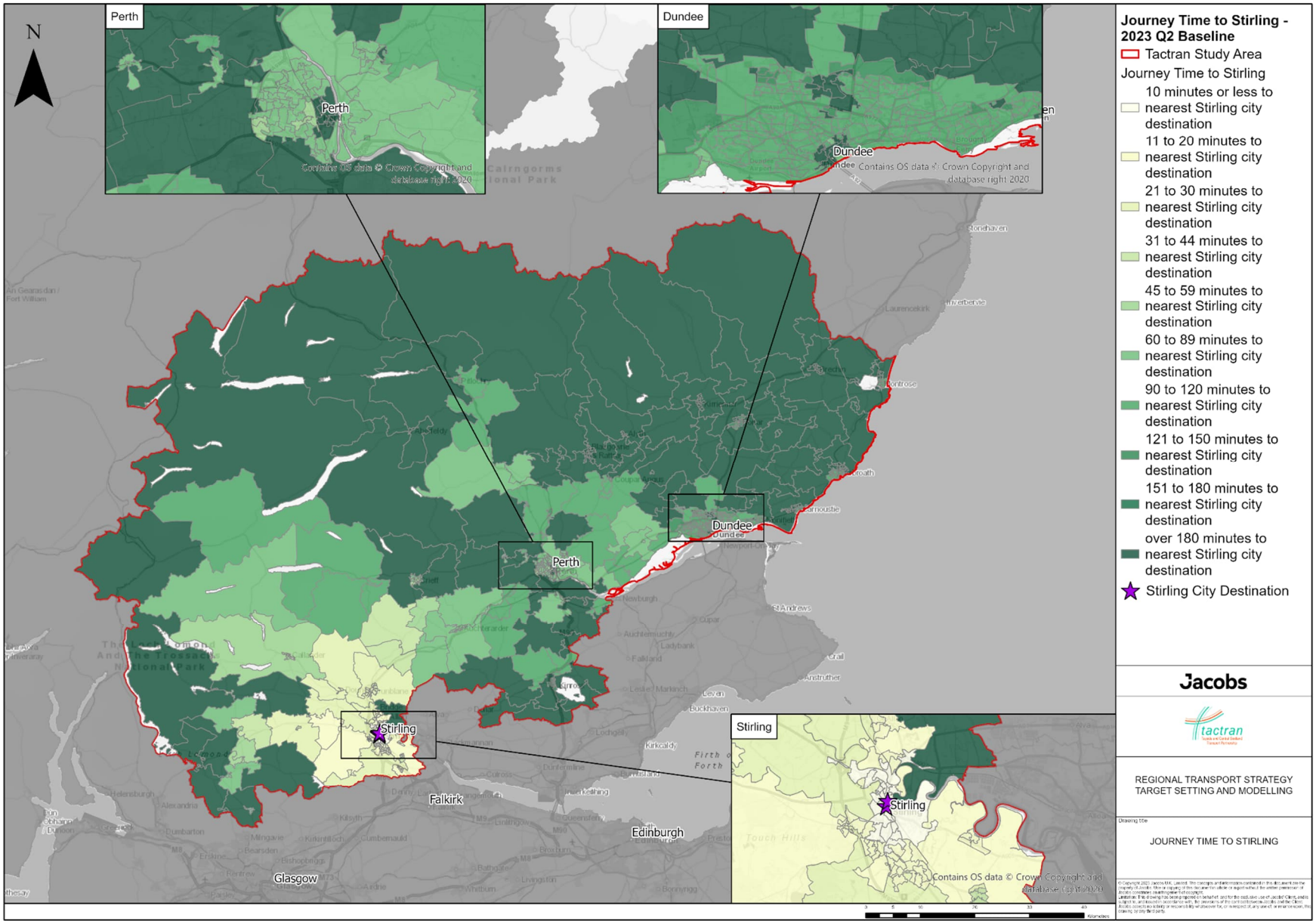
REGIONAL TRANSPORT STRATEGY TARGET SETTING AND MODELLING
JOURNEY TIME TO PERTH


N
Perth
Dundee
Stirling
Falkirk
Edinburgh
Glasgow
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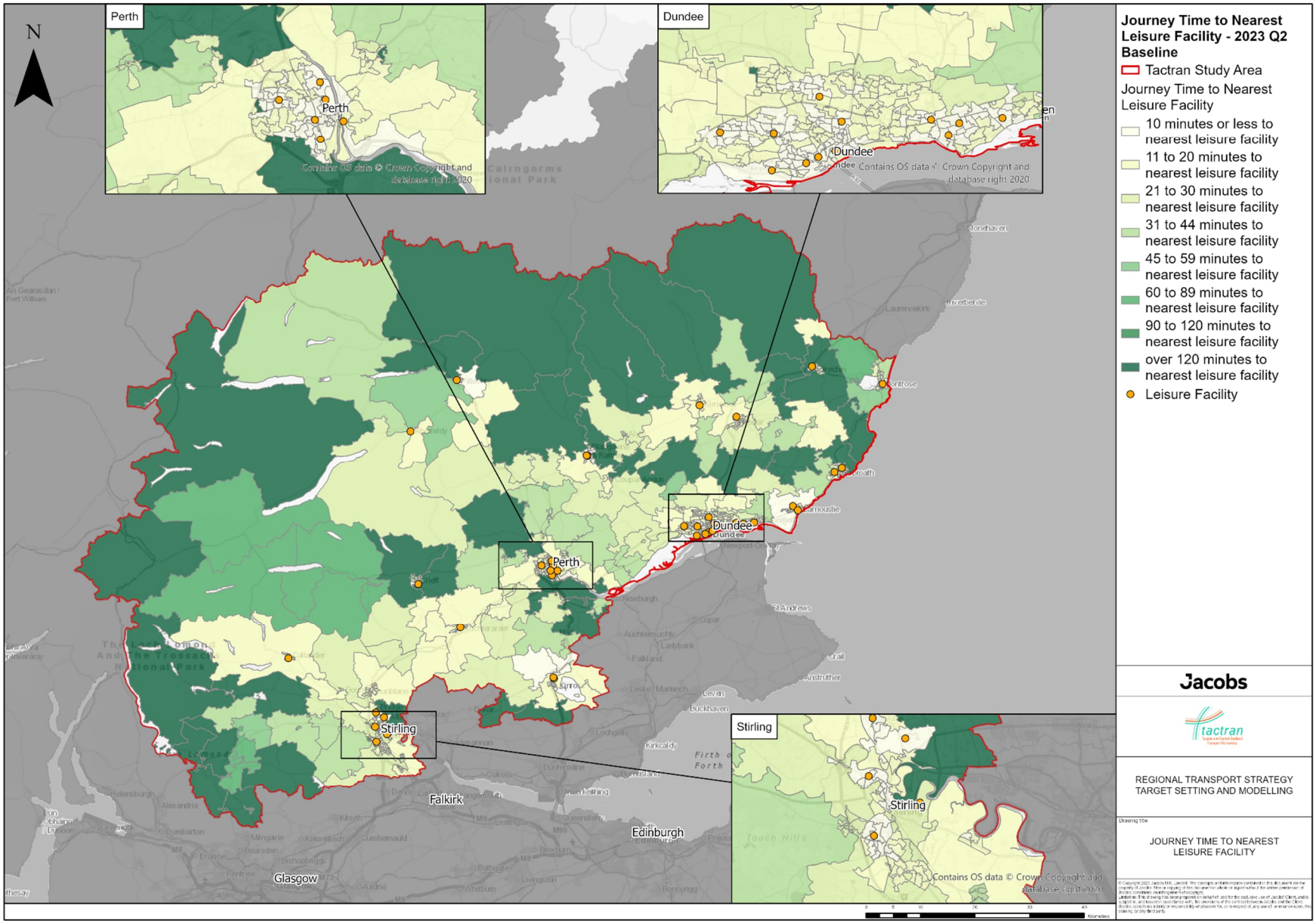
Journey Time to Stirling - 2023 Q2 Baseline
Tactran Study Area
Journey Time to Stirling
10 minutes or less to nearest Stirling city destination
11 to 20 minutes to nearest Stirling city destination
21 to 30 minutes to nearest Stirling city destination
31 to 44 minutes to nearest Stirling city destination
45 to 59 minutes to nearest Stirling city destination
60 to 89 minutes to nearest Stirling city destination
90 to 120 minutes to nearest Stirling city destination
121 to 150 minutes to nearest Stirling city destination
151 to 180 minutes to nearest Stirling city destination
over 180 minutes to nearest Stirling city destination
Stirling City Destination
Jacobs
tactran
REGIONAL TRANSPORT STRATEGY TARGET SETTING AND MODELLING
JOURNEY TIME TO STIRLING


N
Perth
Dundee
Stirling
Falkirk
Edinburgh
Glasgow
Journey Time to Dundee Airport - 2023 Q2 Baseline
Tactran Study Area
Journey Time to Airport
10 minutes or less to Dundee Airport
11 to 20 minutes to Dundee Airport
21 to 30 minutes to Dundee Airport
31 to 44 minutes to Dundee Airport
45 to 59 minutes to Dundee Airport
60 to 89 minutes to Dundee Airport
90 to 120 minutes to Dundee Airport
121 to 150 minutes to Dundee Airport
151 to 180 minutes to Dundee Airport
over 180 minutes to Dundee Airport
Dundee Airport
Jacobs
tactran
REGIONAL TRANSPORT STRATEGY TARGET SETTING AND MODELLING
JOURNEY TIME TO DUNDEE AIRPORT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Dundee
Stirling
Falkirk
Edinburgh
Glasgow
Journey Time to Nearest Leisure Facility - 2023 Q2 Baseline
Tactran Study Area
Journey Time to Nearest Leisure Facility
10 minutes or less to nearest leisure facility
11 to 20 minutes to nearest leisure facility
21 to 30 minutes to nearest leisure facility
31 to 44 minutes to nearest leisure facility
45 to 59 minutes to nearest leisure facility
60 to 89 minutes to nearest leisure facility
90 to 120 minutes to nearest leisure facility
over 120 minutes to nearest leisure facility
Leisure Facility
Jacobs
tactran
REGIONAL TRANSPORT STRATEGY TARGET SETTING AND MODELLING
JOURNEY TIME TO NEAREST LEISURE FACILITY
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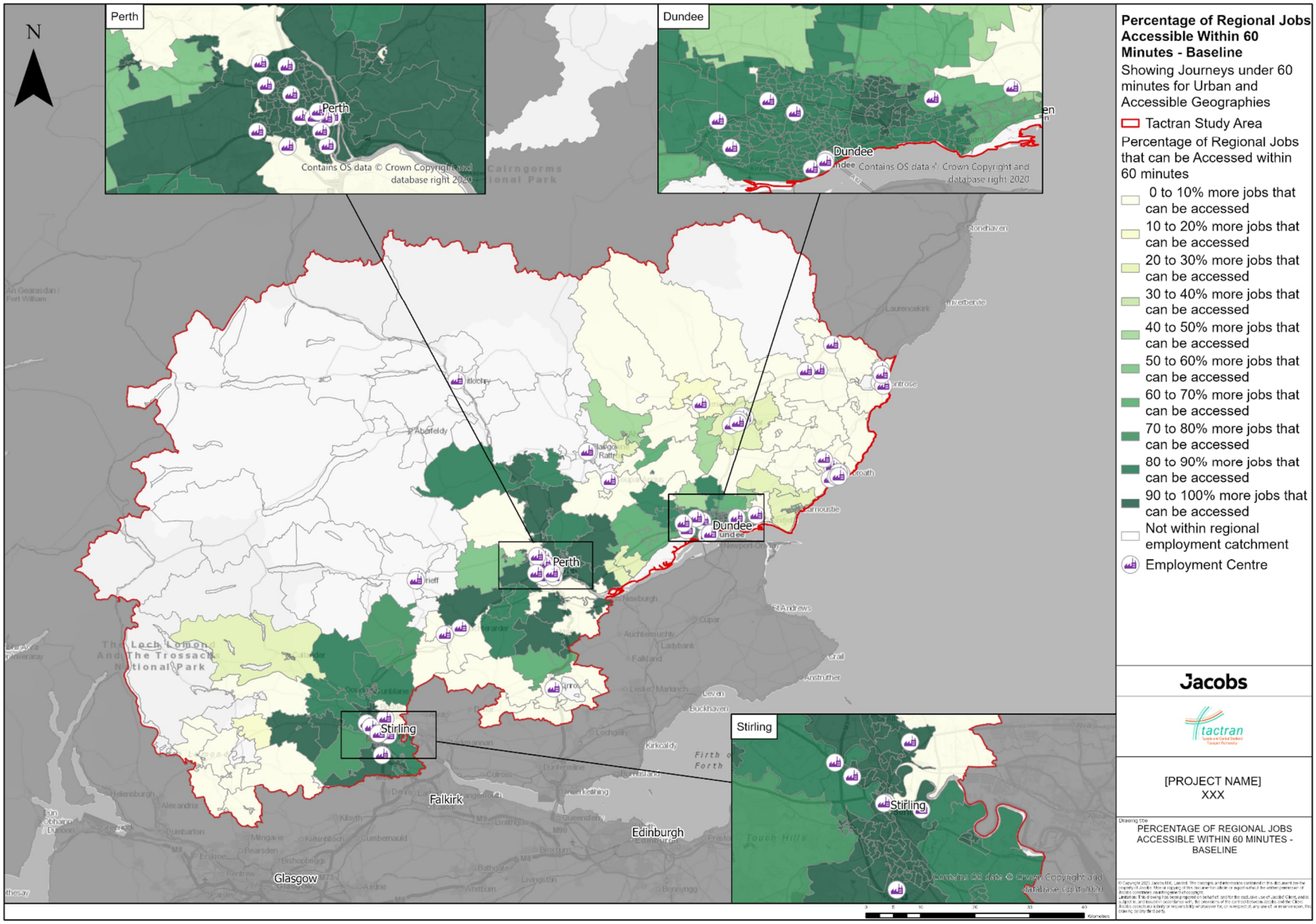
N
Perth
Perth
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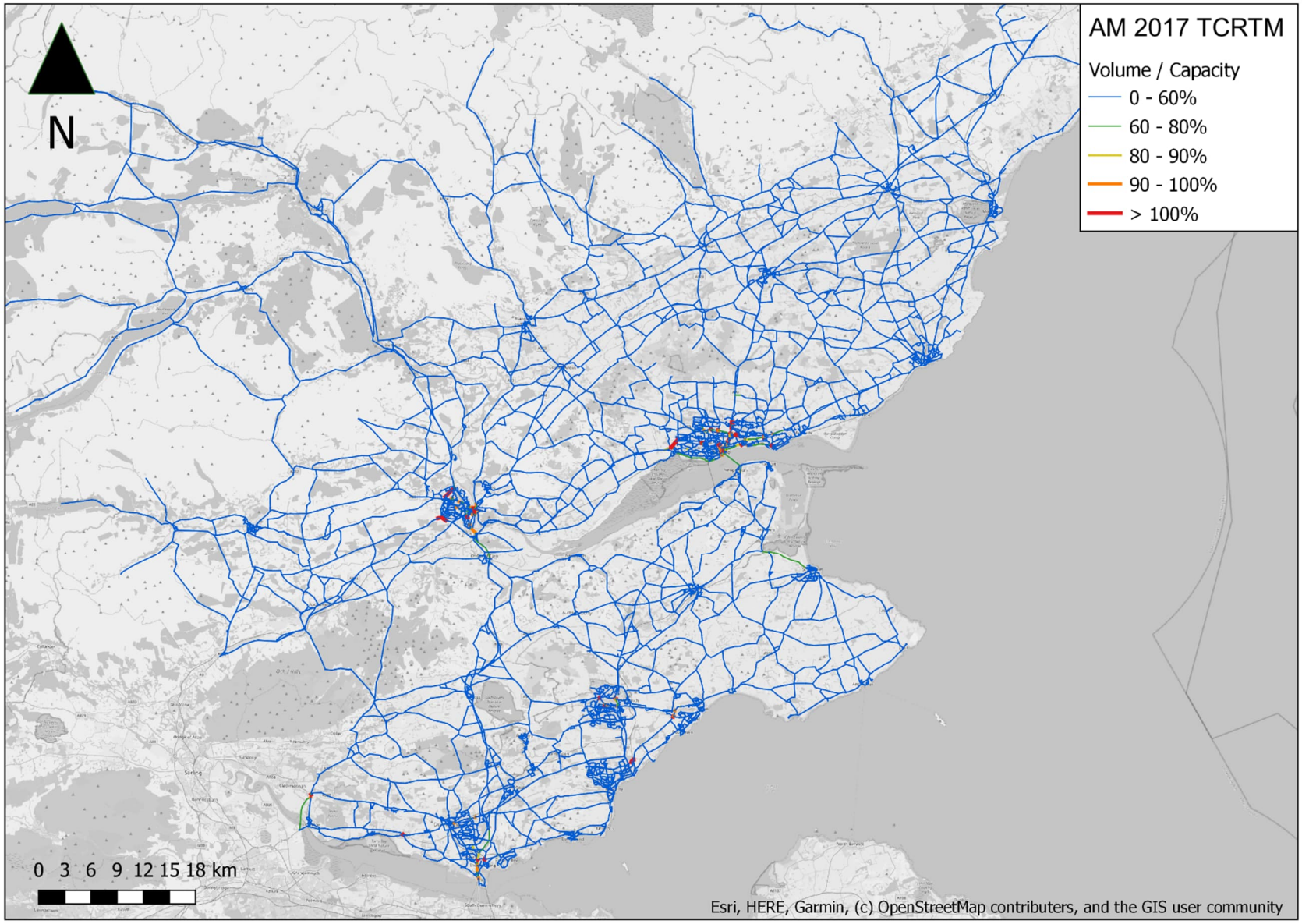
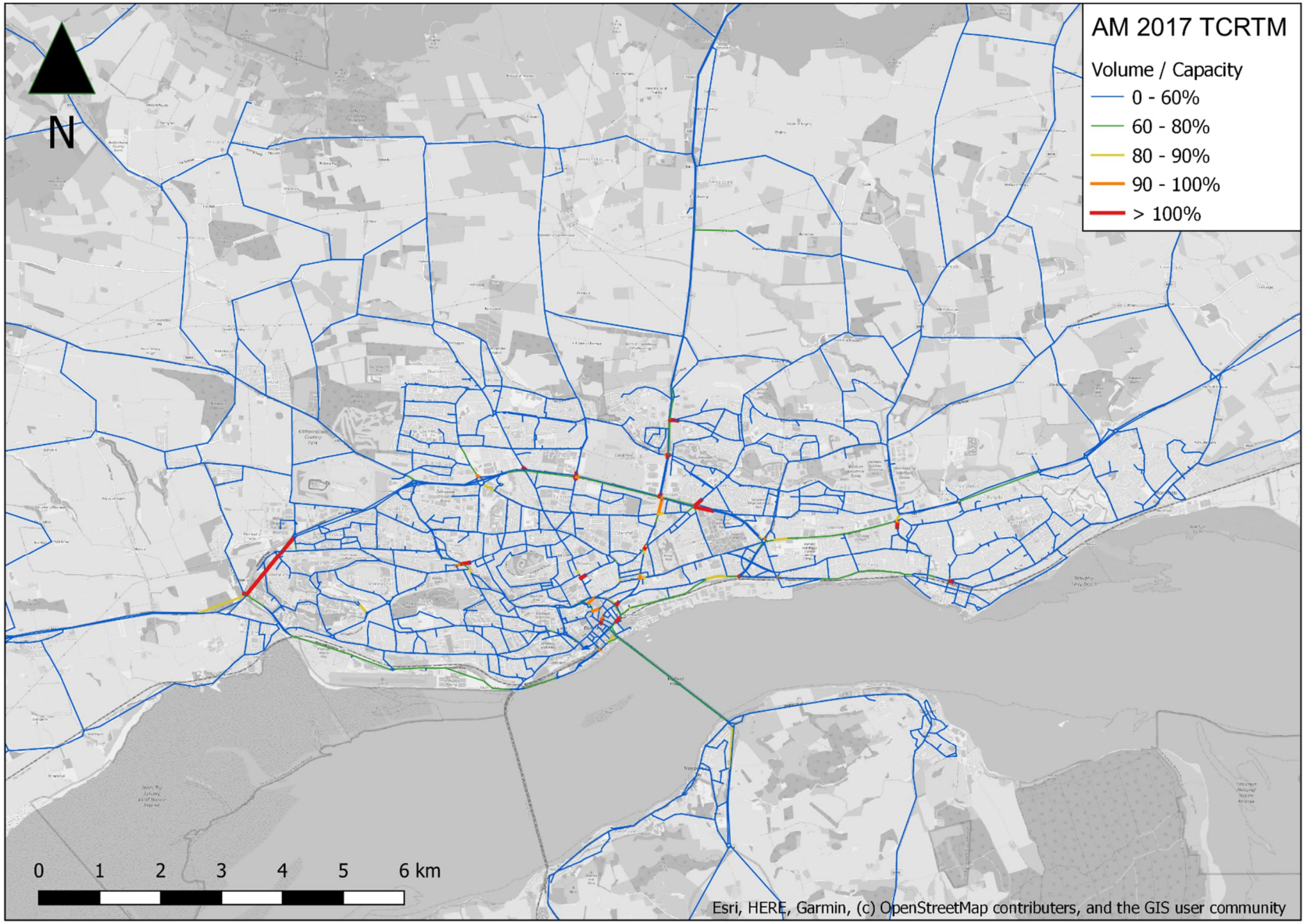
Dundee
Dundee
Contains OS data © Crown Copyright and database right 2020
Stirling
Stirling
Contains OS data © Crown Copyright and database right 2020
Percentage of Regional Jobs Accessible Within 60 Minutes - Baseline
Showing Journeys under 60 minutes for Urban and Accessible Geographies
Tactran Study Area
Percentage of Regional Jobs that can be Accessed within 60 minutes
0 to 10% more jobs that can be accessed
10 to 20% more jobs that can be accessed
20 to 30% more jobs that can be accessed
30 to 40% more jobs that can be accessed
40 to 50% more jobs that can be accessed
50 to 60% more jobs that can be accessed
60 to 70% more jobs that can be accessed
70 to 80% more jobs that can be accessed
80 to 90% more jobs that can be accessed
90 to 100% more jobs that can be accessed
Not within regional employment catchment
Employment Centre
Jacobs
tactran
[PROJECT NAME]
XXX
PERCENTAGE OF REGIONAL JOBS ACCESSIBLE WITHIN 60 MINUTES - BASELINE
Falkirk
Edinburgh
Glasgow

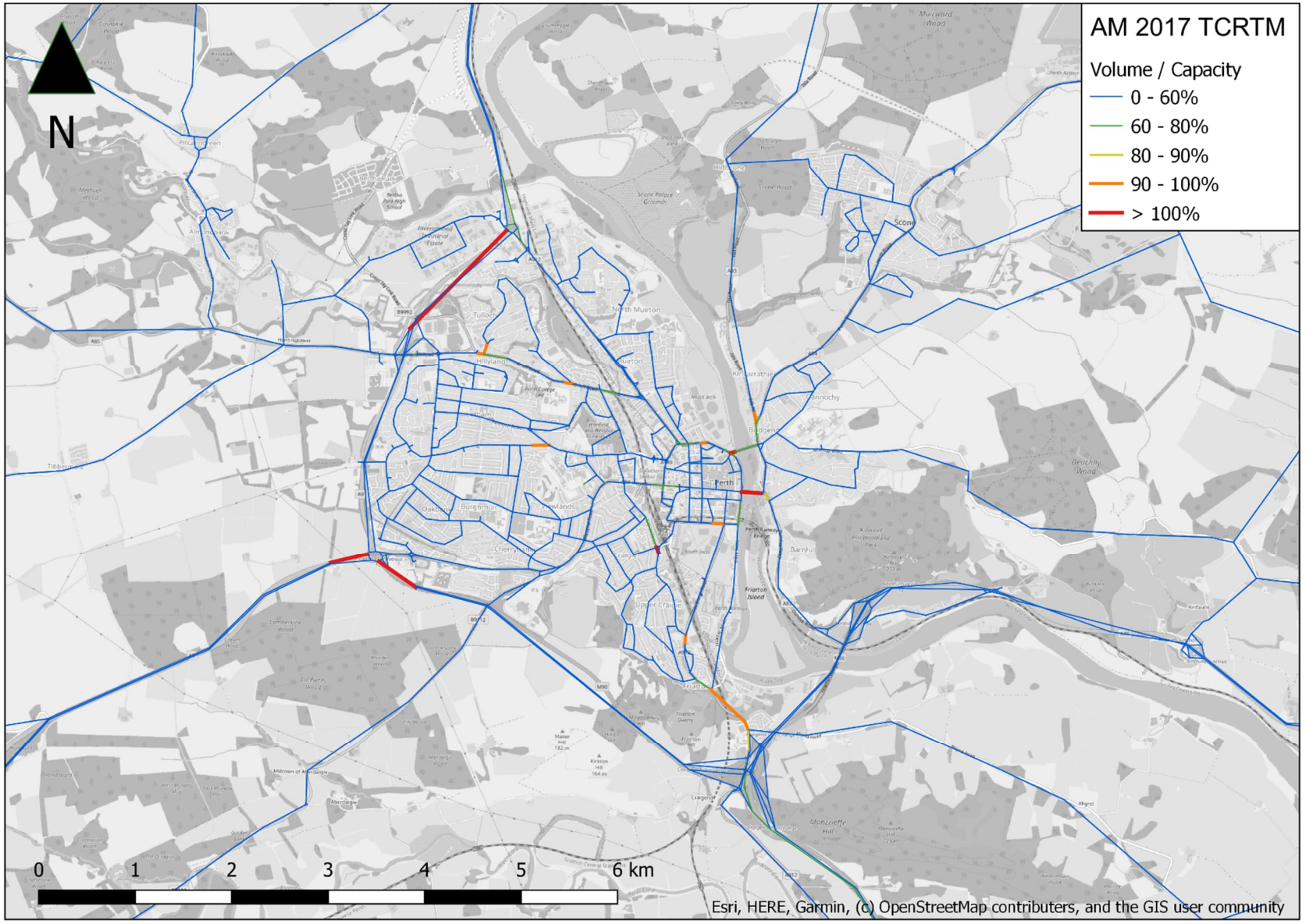
Appendix B. Forecast traffic flow as proportion of capacity: base and forecast years

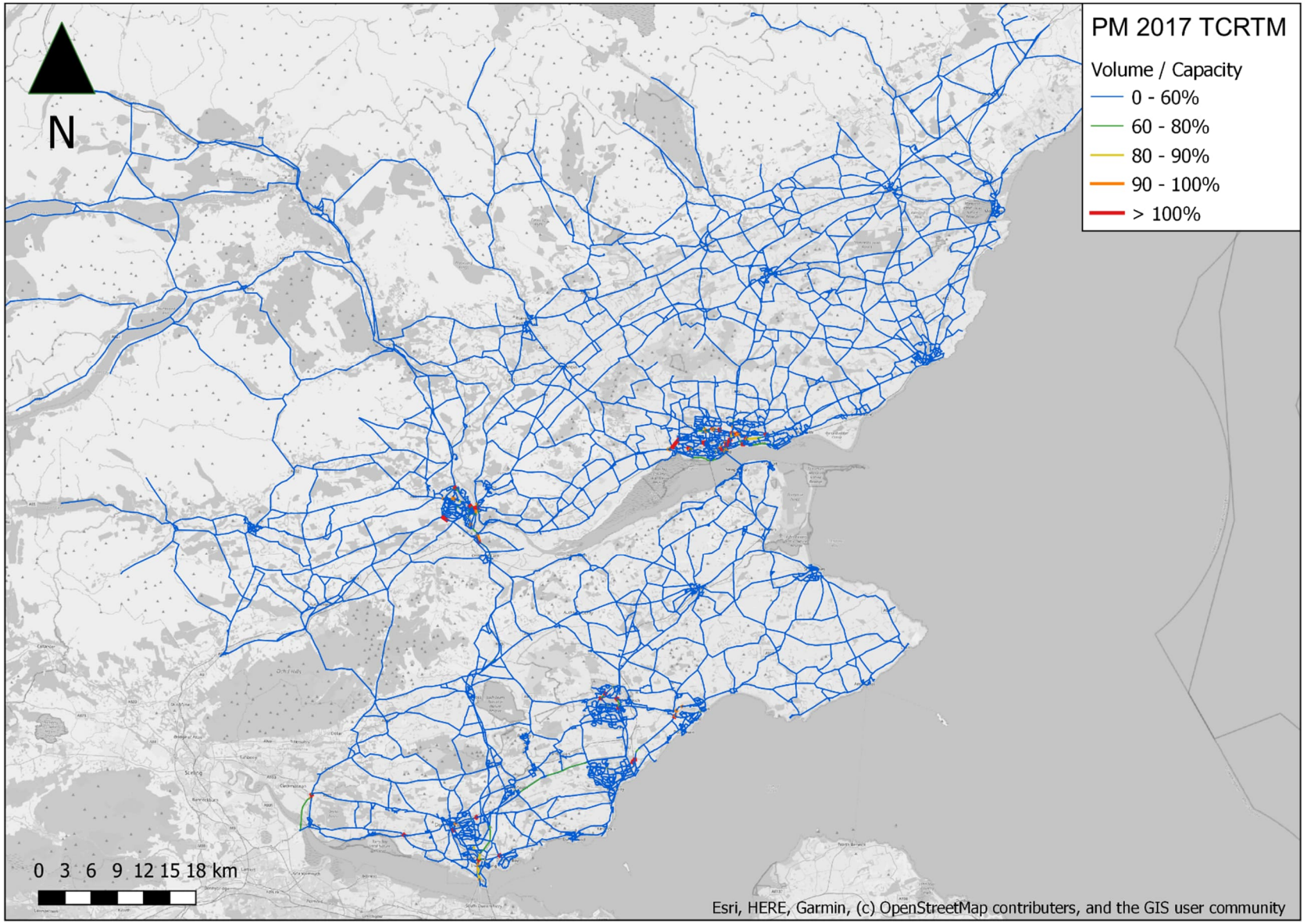
The maps below show the forecast traffic volume as a proportion of capacity on each link in the TCRTM model, for AM and PM peaks in both the 2017 base and 2032 forecast years.

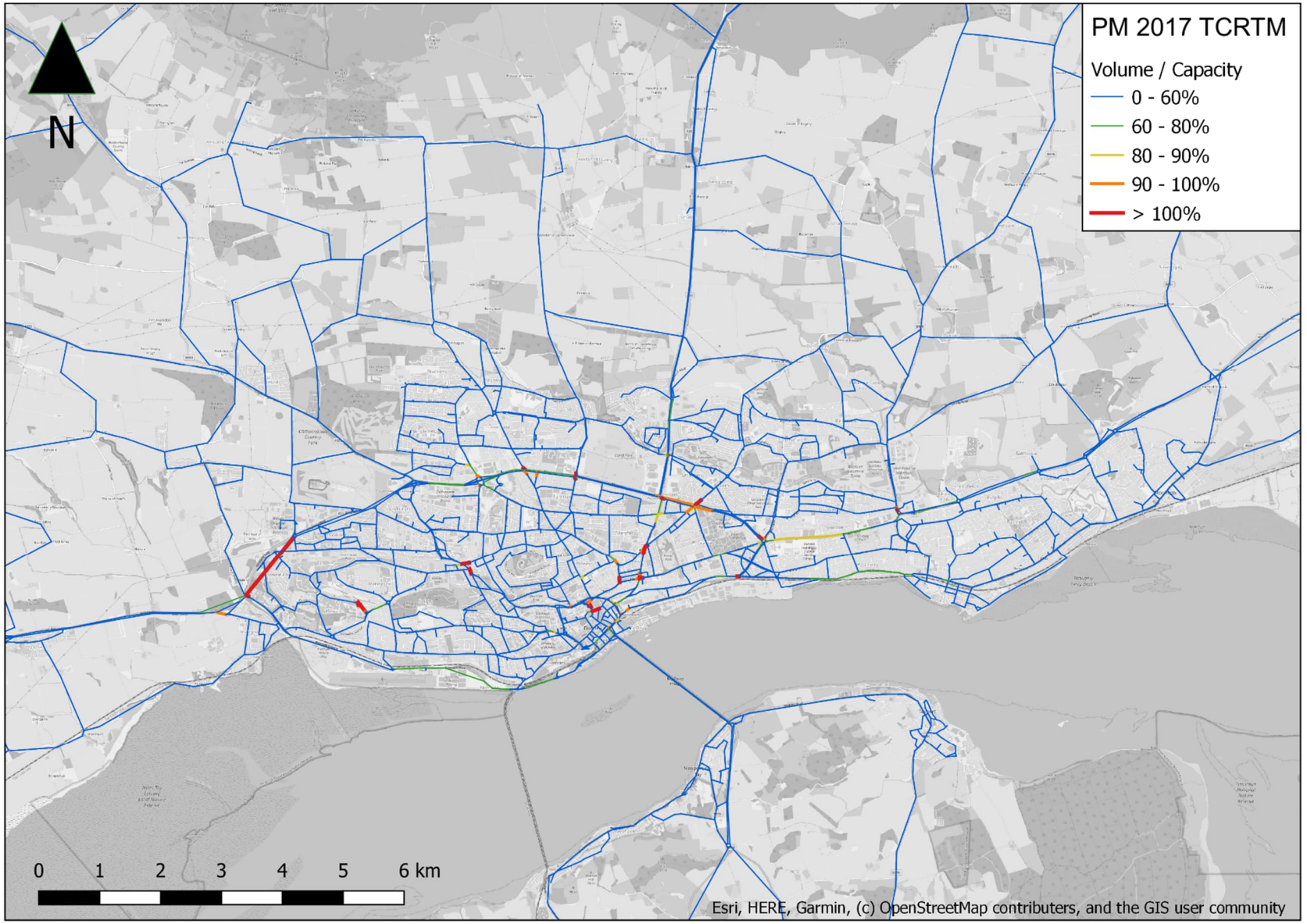
There are three maps for each case, showing the same information at different scales (one the whole network area, then larger-scale maps for the areas around Dundee and Perth.

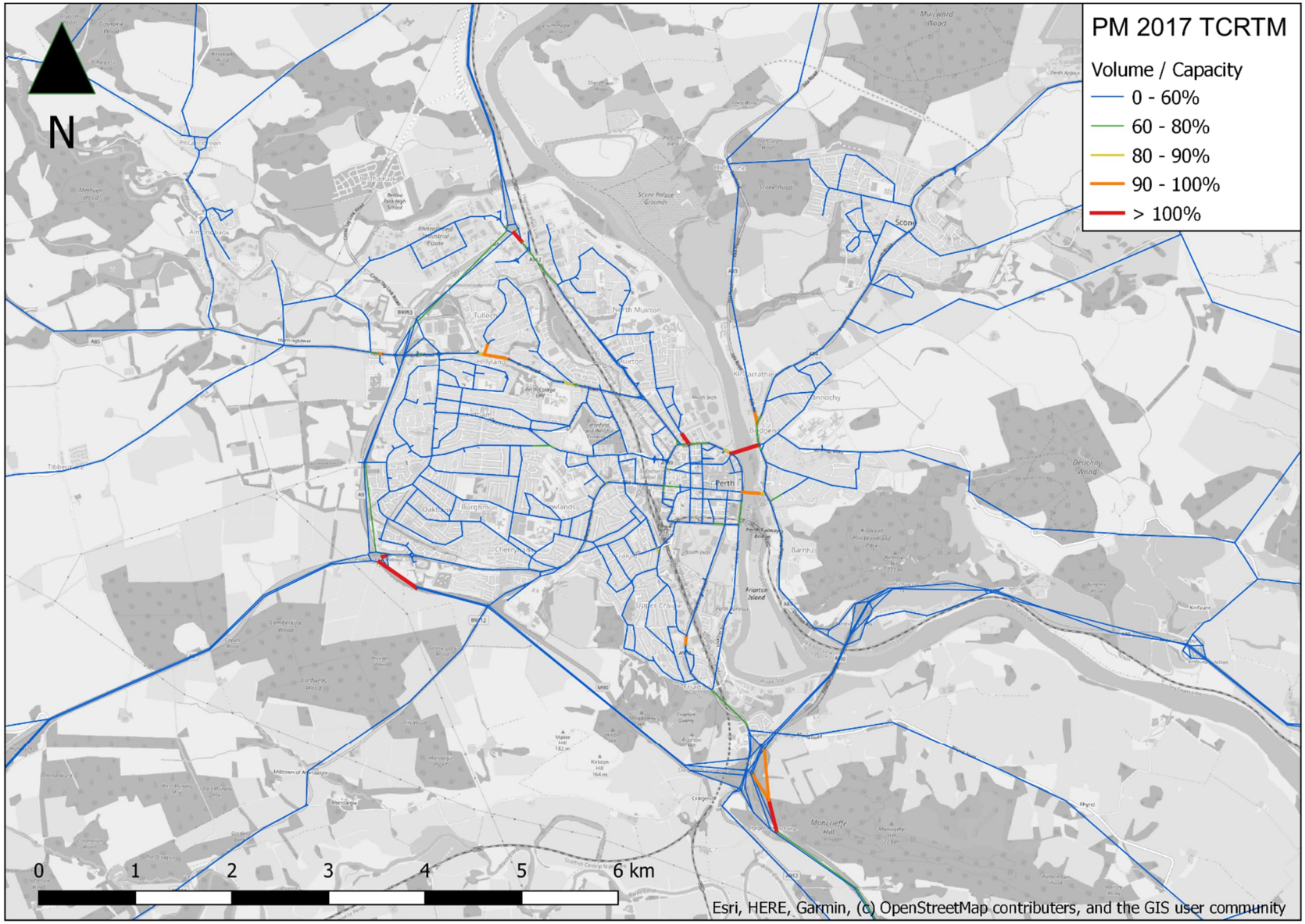

N
AM 2017 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
0 3 6 9 12 15 18 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community

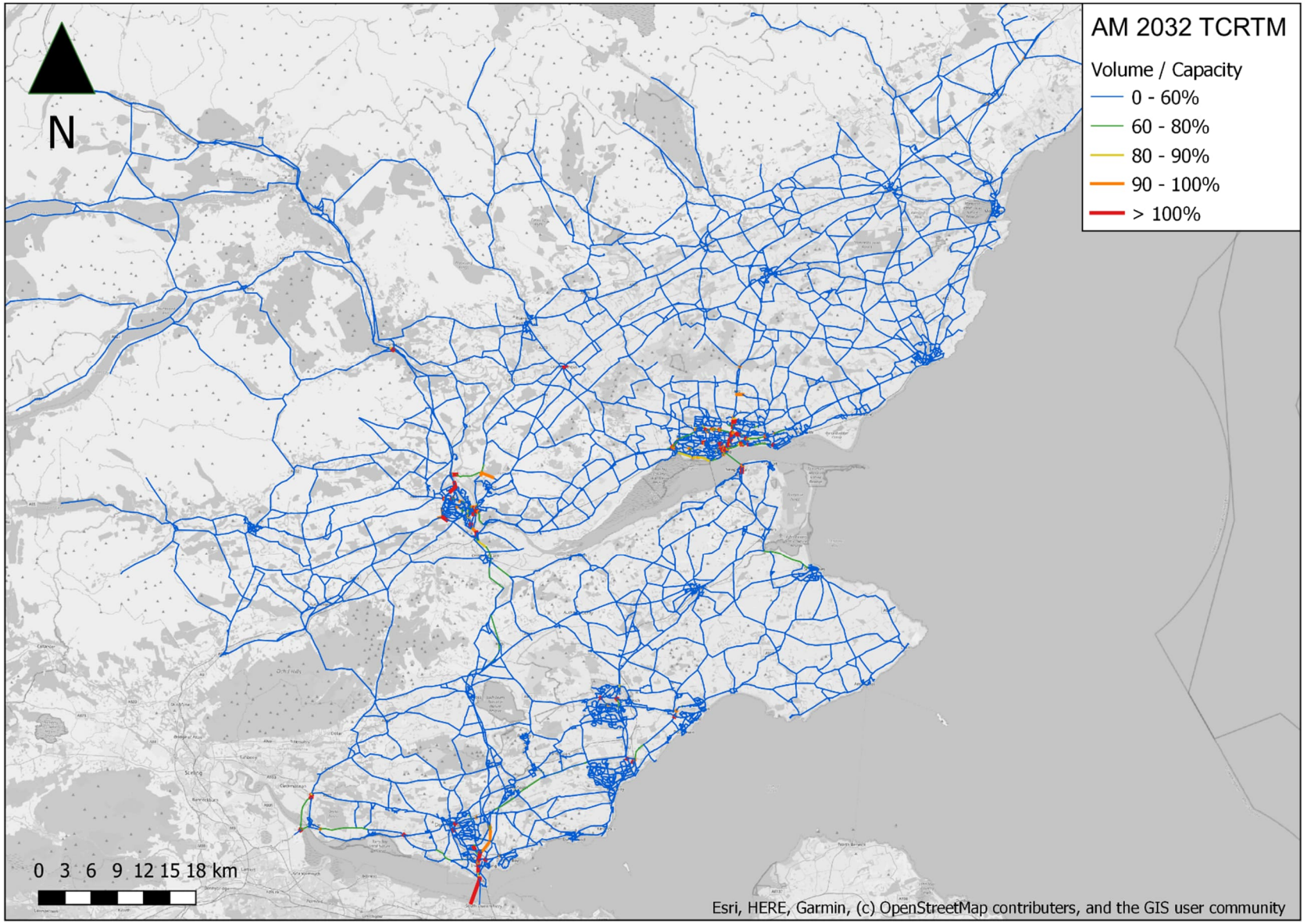

AM 2017 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0 1 2 3 4 5 6 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community

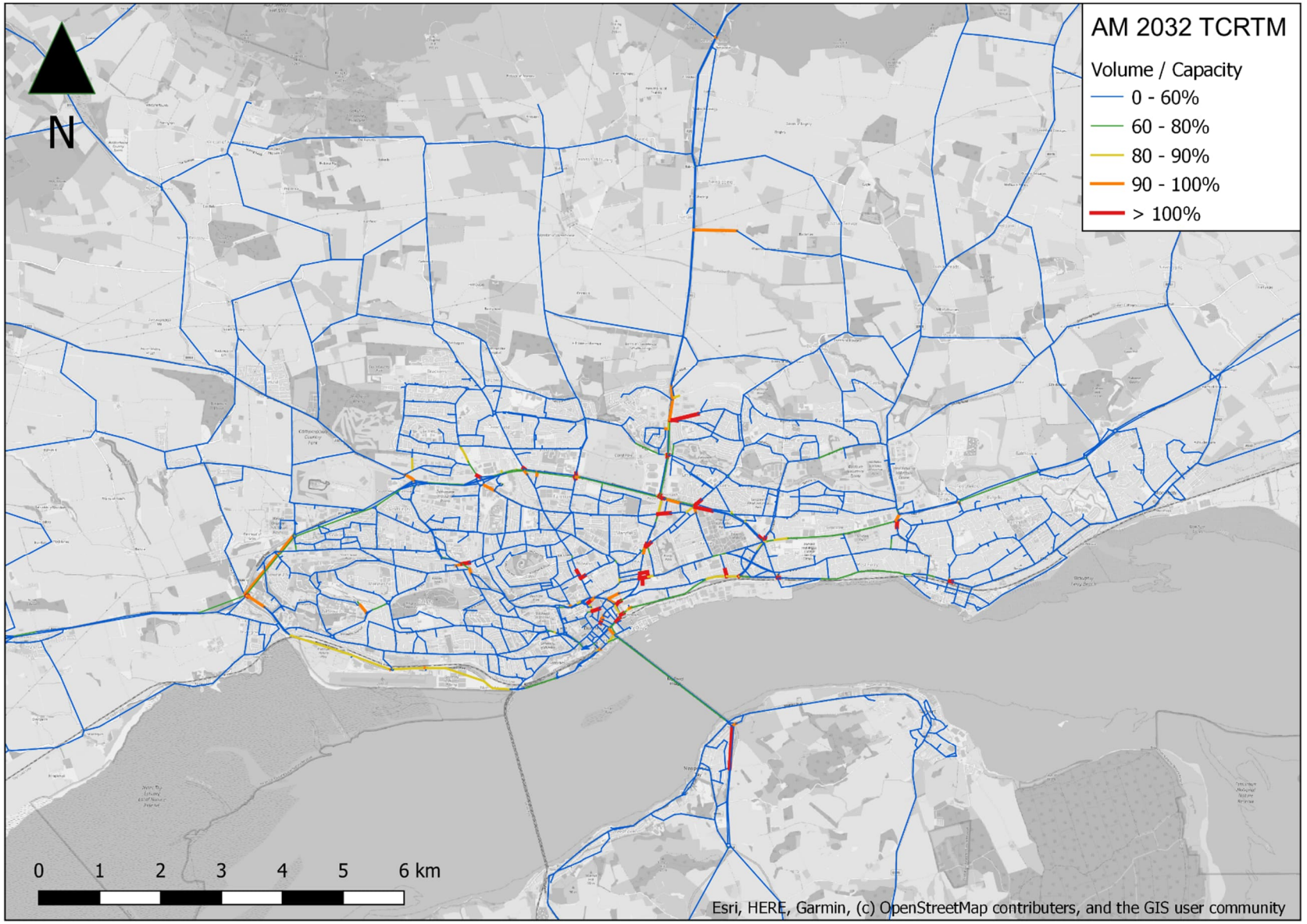

AM 2017 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0
1
2
3
4
5
6 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community

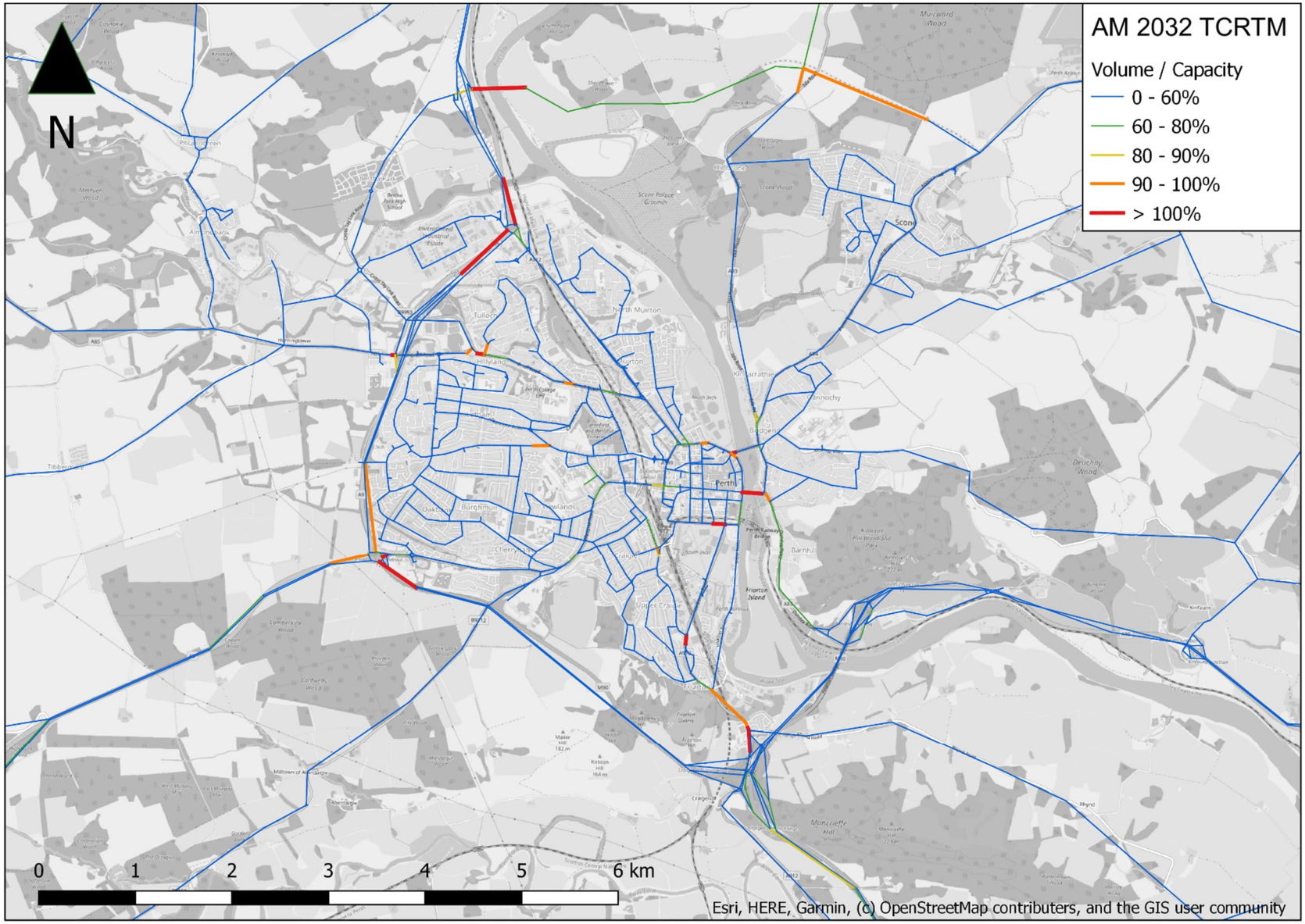

PM 2017 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0 3 6 9 12 15 18 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community

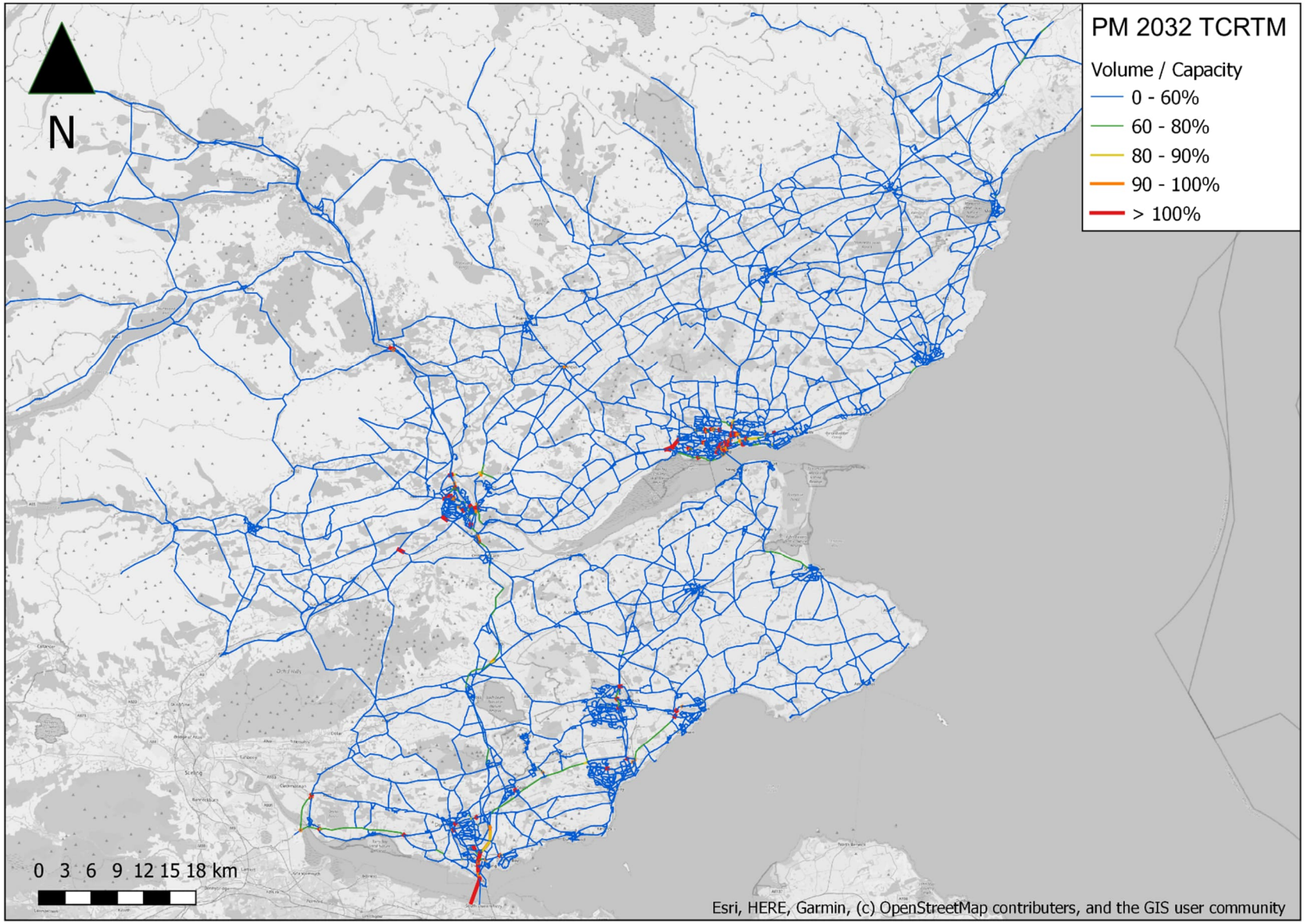

PM 2017 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0 1 2 3 4 5 6 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community

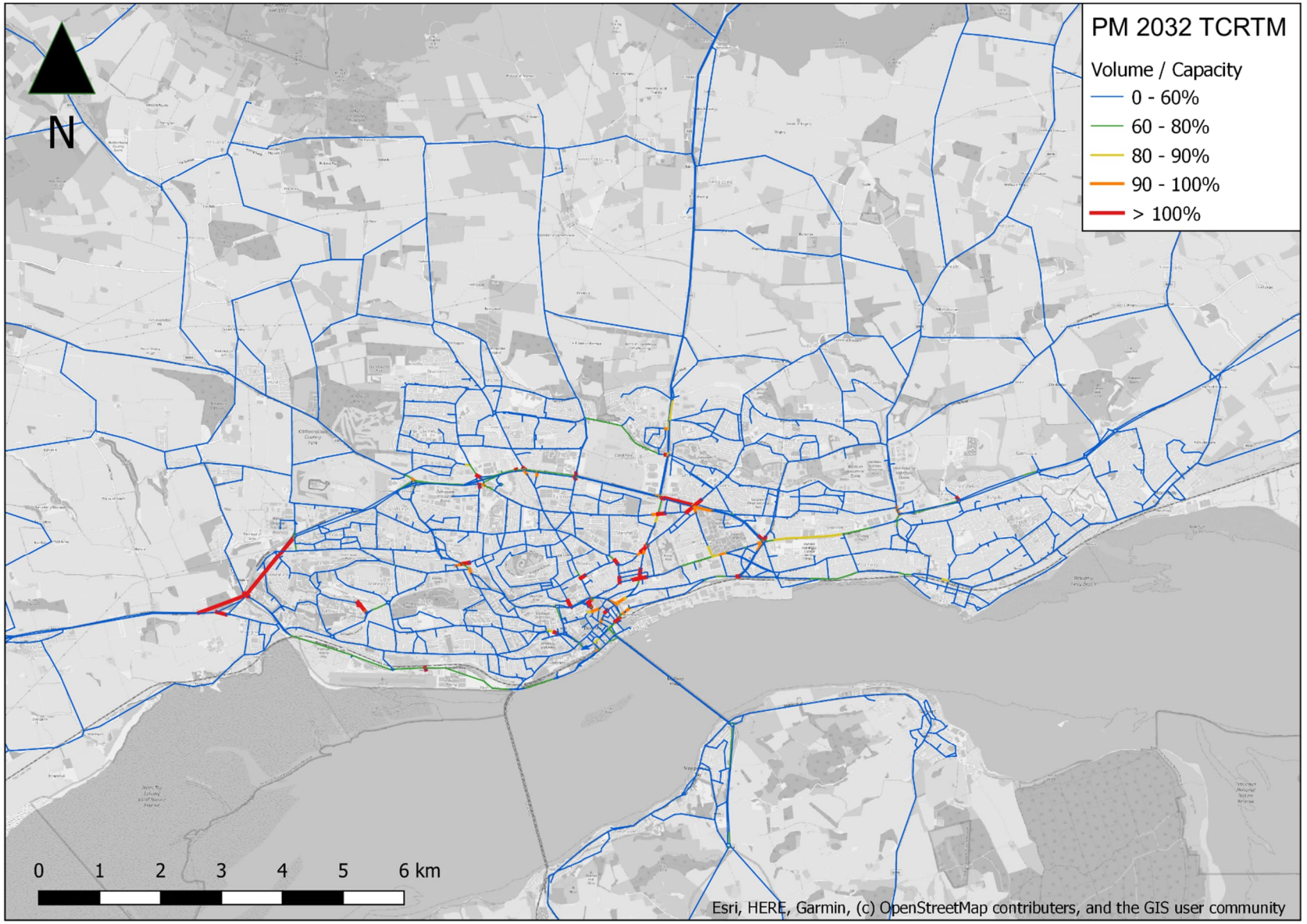

PM 2017 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0
1
2
3
4
5
6 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community

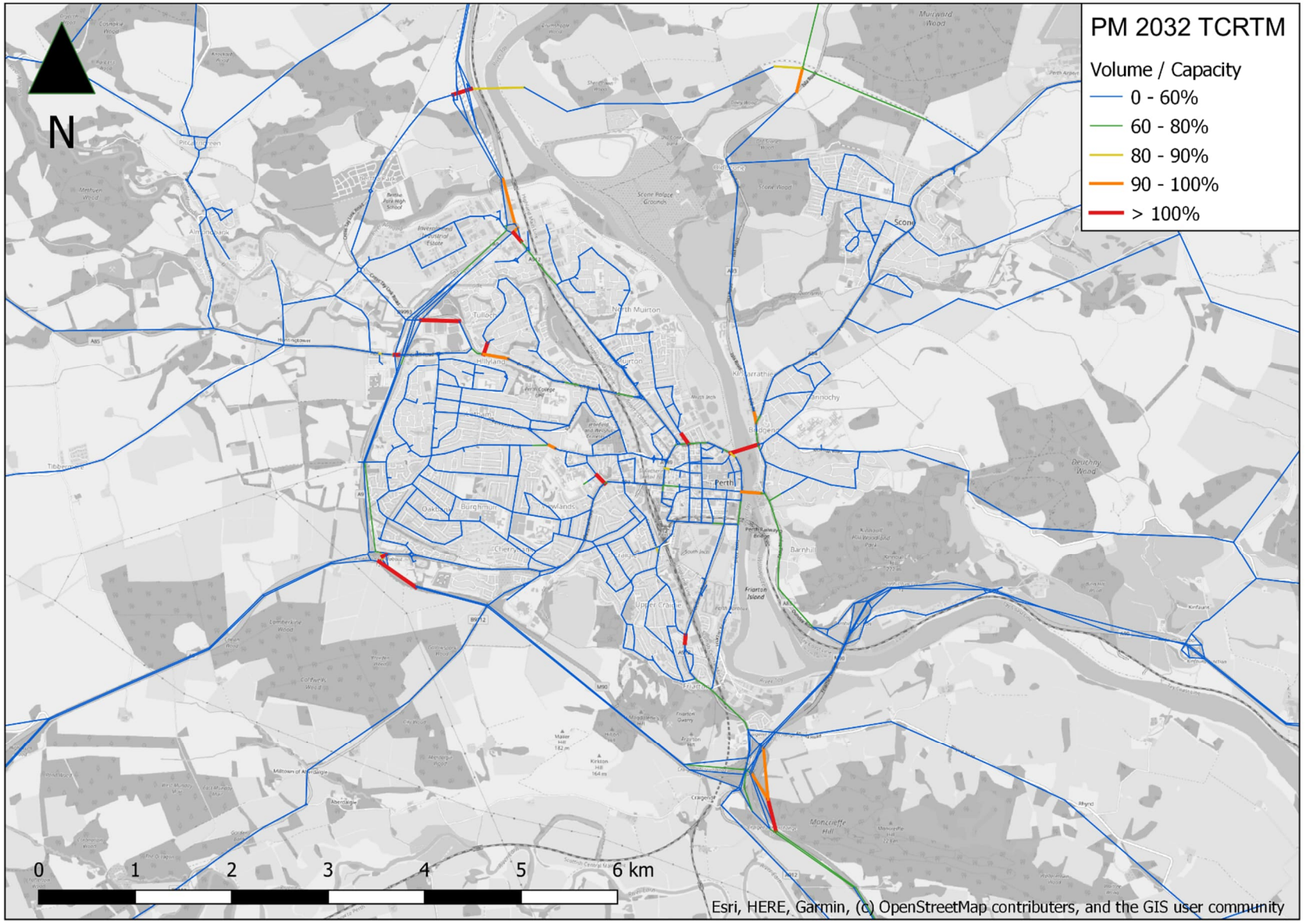

AM 2032 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0 3 6 9 12 15 18 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community


AM 2032 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0 1 2 3 4 5 6 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community


AM 2032 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0
1
2
3
4
5
6 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community


PM 2032 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0 3 6 9 12 15 18 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community


PM 2032 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0 1 2 3 4 5 6 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community


PM 2032 TCRTM
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0
1
2
3
4
5
6 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community

Appendix C. Forecast traffic flow as proportion of capacity: incorporating 20% car-km reduction

The maps below show the forecast traffic volume as a proportion of capacity on each link in the TCRTM model for the AM peak assuming that the 20% car-km reduction target has been achieved.

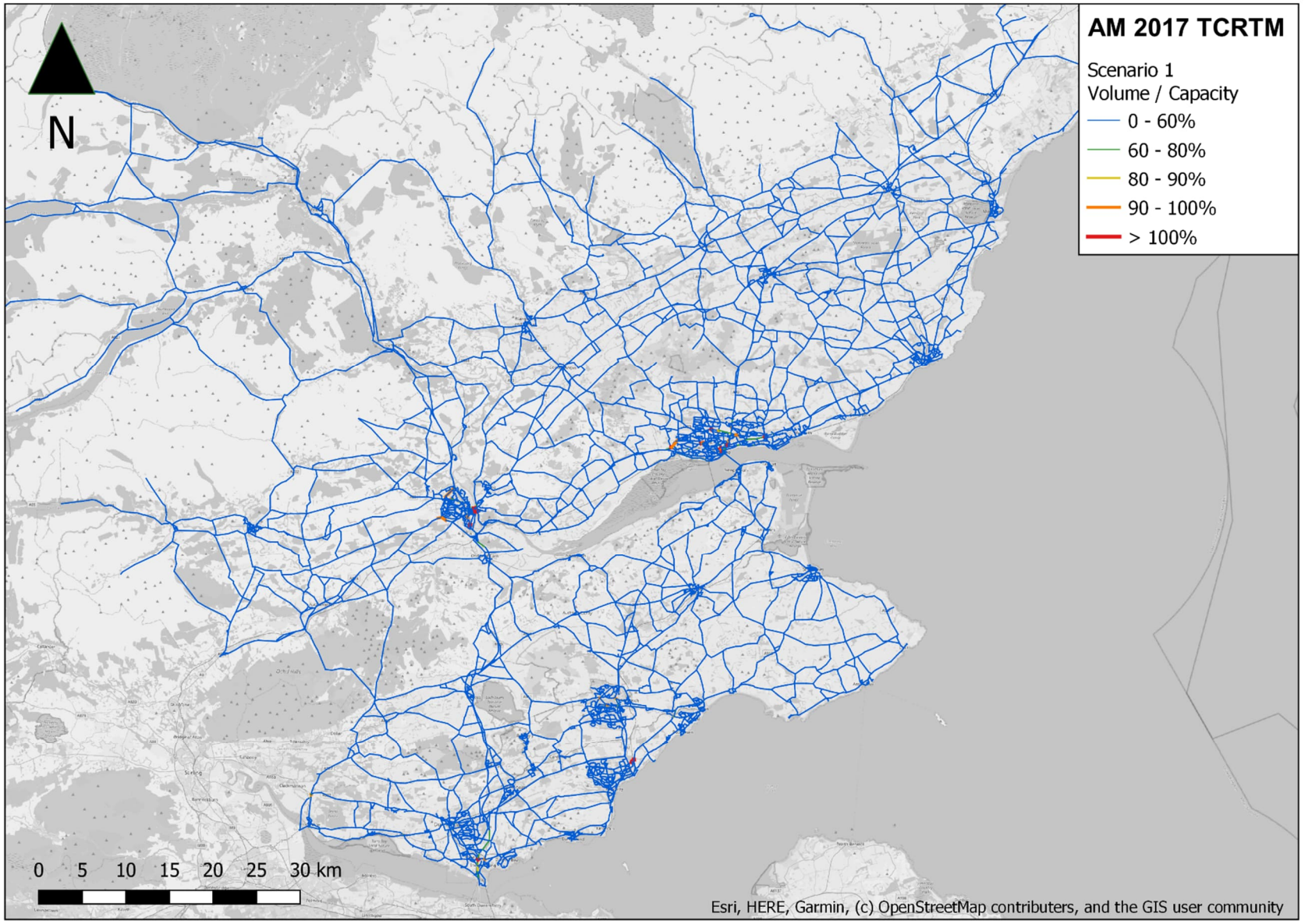
There are three maps for each case, showing the same information at different scales (one the whole network area, then larger-scale maps for the areas around Dundee and Perth.

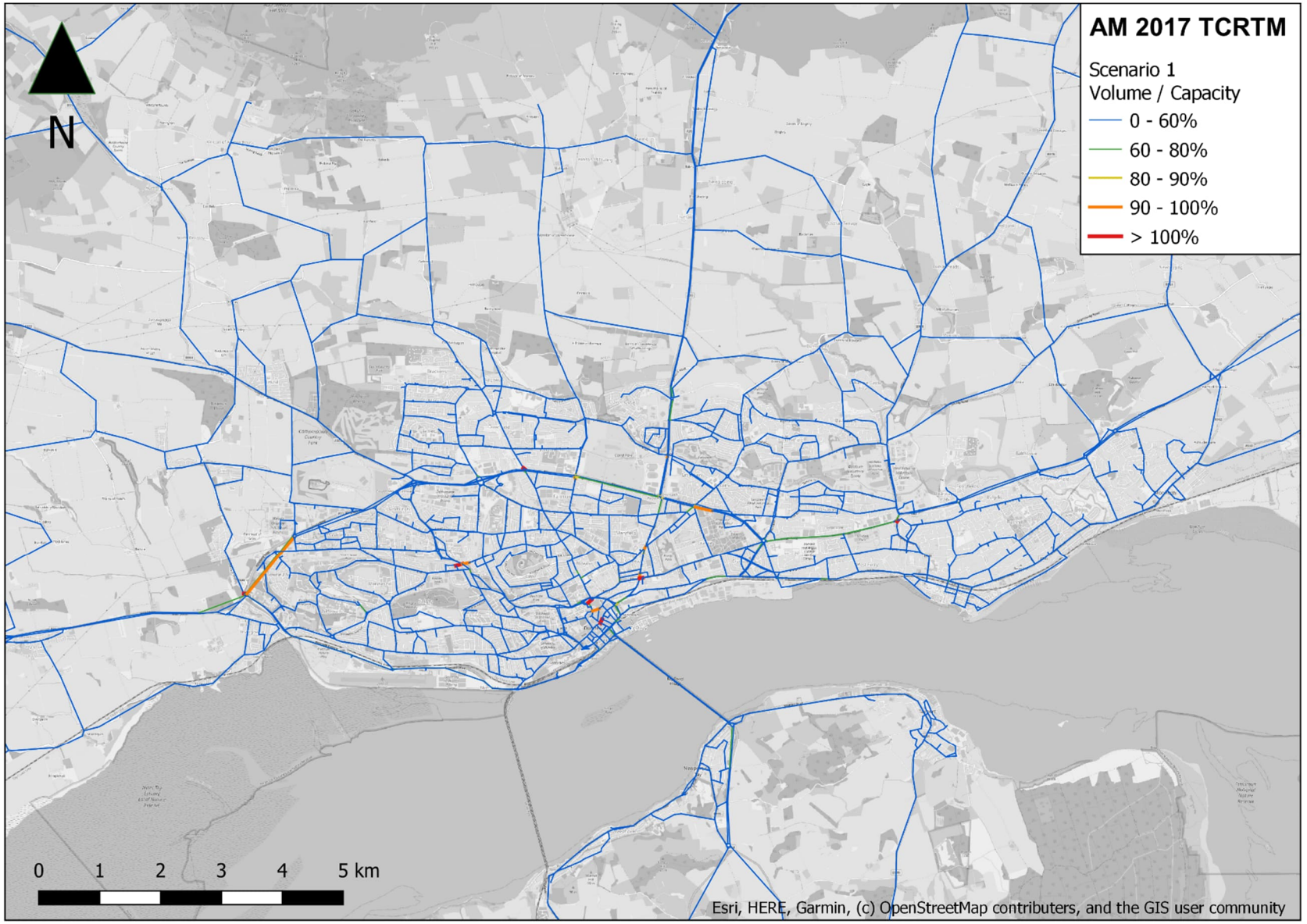
Different scenarios are shown, reflecting the fact that different mechanisms to achieve the overall 20% reduction would have different impacts on travel demand, so affect traffic flows differently.

In scenario 1, the full traffic reduction effect is achieved through the introduction of a distance-based road user charge (without any complementary investment).

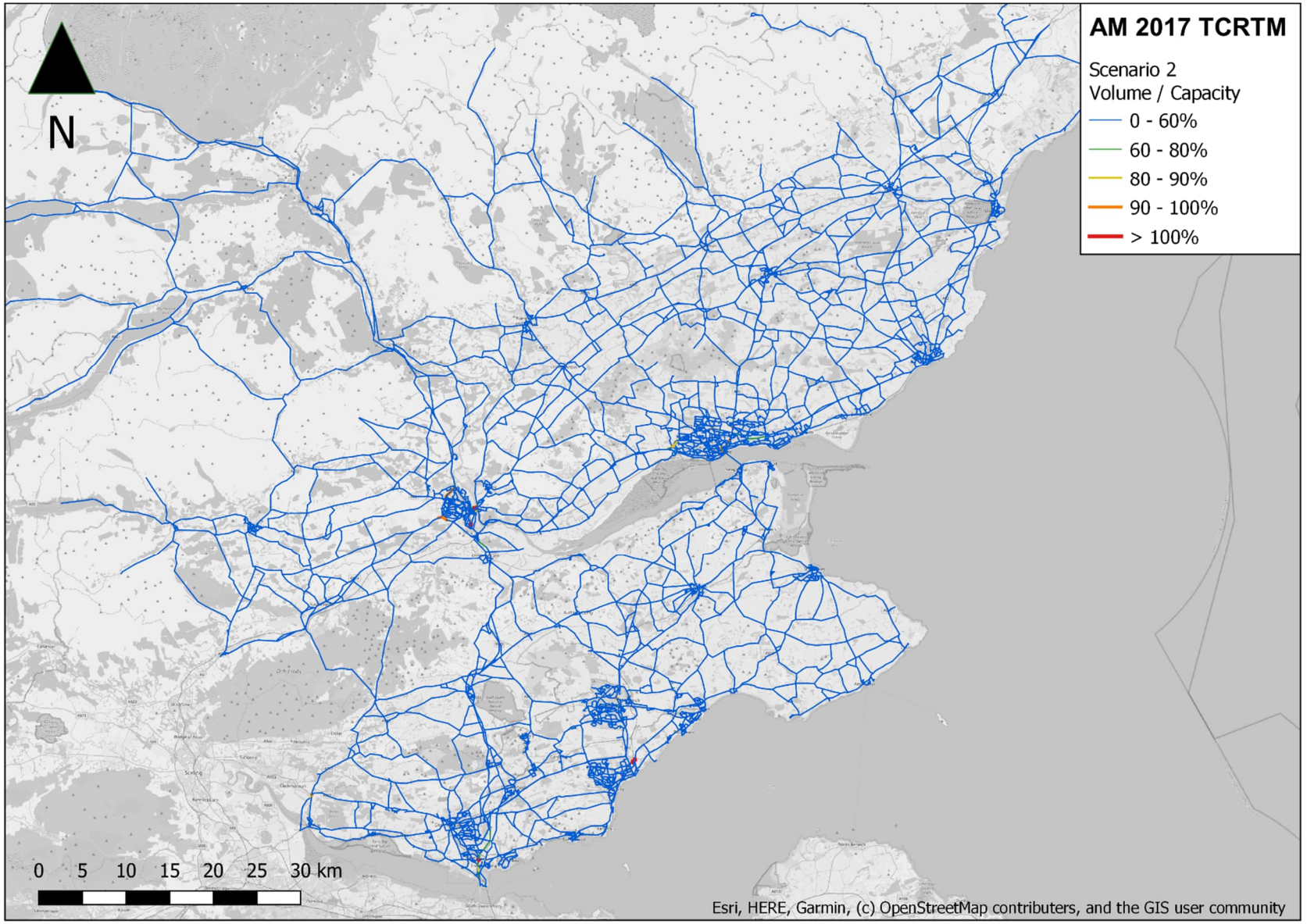
In scenario 2, a more balanced package is implemented, with the traffic reduction achieved by a combination of investment in public transport and active travel, encouragements to drive less, local traffic restraint measures (through stricter parking controls), and with the remaining traffic reduction requirement achieved through road user charging.

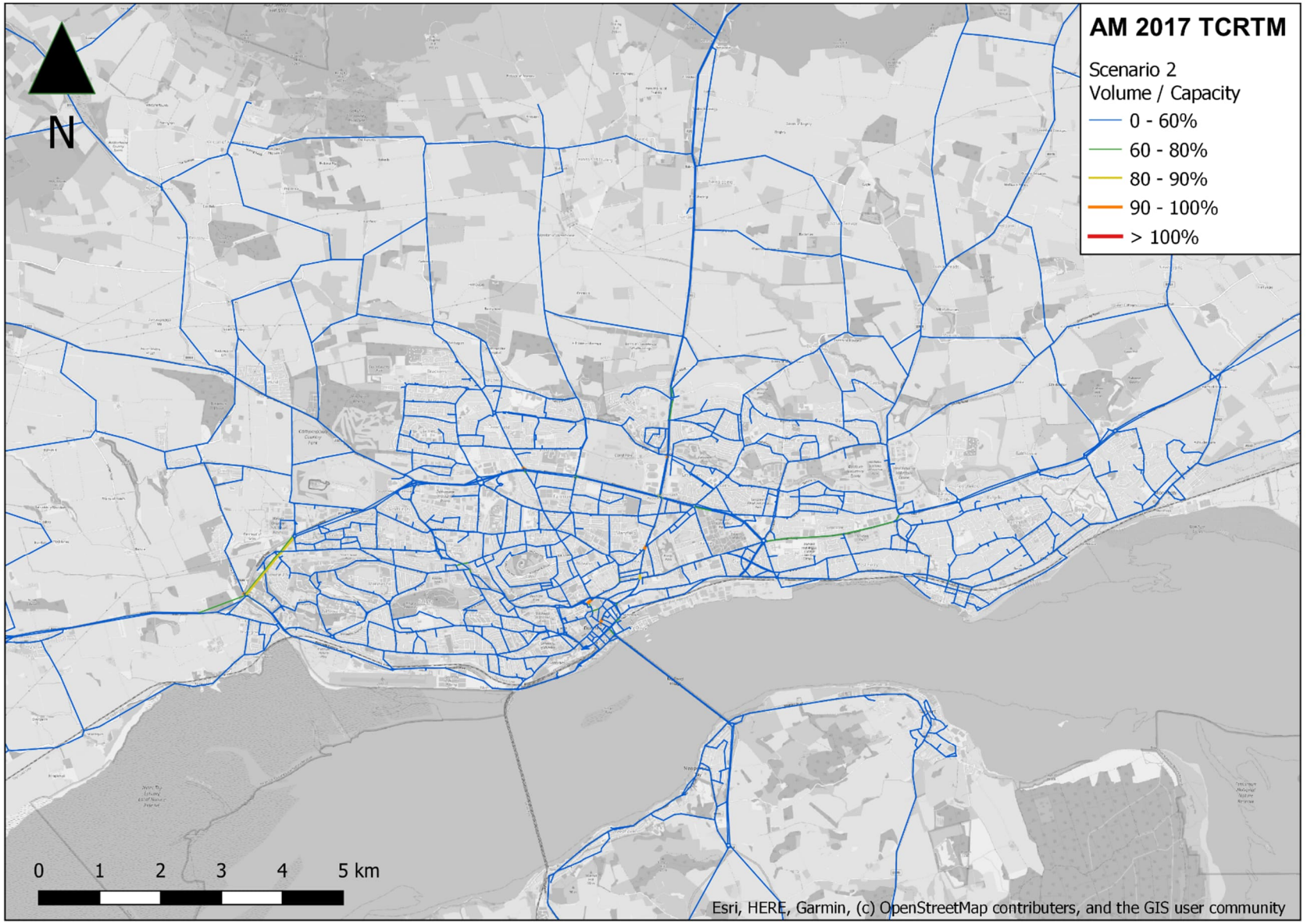
Scenario 1 tends to have a greater impact on longer-distance trips, whilst scenario 2 has a greater impact on (a larger number of) shorter trips.


AM 2017 TCRTM
Scenario 1
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0 5 10 15 20 25 30 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community


AM 2017 TCRTM
Scenario 1
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0 1 2 3 4 5 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community


AM 2017 TCRTM
Scenario 1
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0
1
2
3
4
5 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community


AM 2017 TCRTM
Scenario 2
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0 5 10 15 20 25 30 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community


AM 2017 TCRTM
Scenario 2
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0 1 2 3 4 5 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community


AM 2017 TCRTM
Scenario 2
Volume / Capacity
0 - 60%
60 - 80%
80 - 90%
90 - 100%
> 100%
N
0
1
2
3
4
5 km
Esri, HERE, Garmin, (c) OpenStreetMap contributers, and the GIS user community

[i] A consultation draft of which is available at https://tactran.gov.uk/projects/regional-transport-strategy/
[ii] Research commissioned by the Scottish Government suggests Scottish Government's Climate Change Action Plan identifies changing technology as achieving 72.7% of 2030 target and behaviour change as 27.3% of target (Element Energy 'Decarbonising the Scottish transport sector' 2021)
[iii] Scotland's Road Safety Framework to 2030 indicators
[iv] Transport Scotland's Second Strategic Transport Projects Review (STPR2)
[v] To reduce inequalities, the goal would be to increase the levels of walking and cycling in the least affluent SIMD data zones to the same level as that in the most affluent areas. However, it is difficult to pick out differences at a local level, not least as most of the less affluent communities are in urban areas where active travel is higher than the average. It is possible however to seek to achieve the target levels of walking and cycling in the least affluent areas first (i.e. by 203), the STPR2 forecasts are to 2033.
[vi] National Emission Ceilings Directive
[vii] To monitor this outcome, a survey repeating the SHS question '% of employed adults who could use public transport for work' would need to be undertaken in the regions' least affluent areas
[viii] https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/
[ix] Scottish Transport Statistics 2021 https://www.transport.gov.scot/media/51312/chapter-13-environment-reference-tables-scottish-transport-statistics-2021.xlsx
[x] https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/pages/8/
[xi] https://www.transport.gov.scot/publication/scottish-transport-statistics-2021/chapter-01-road-transport-vehicles/
[xii] SMMT, quoted at https://www.zap-map.com/ev-stats/ev-market
[xiii] SMMT, ibid and https://www.racfoundation.org/motoring-faqs/mobility#:~:text=In%20the%20United%20Kingdom%2C%20there,the%20end%20of%20September%202022.
[xiv] https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/
[xv] https://www.transport.gov.scot/media/50354/decarbonising-the-scottish-transport-sector-summary-report-september-2021.pdf
[xvi] https://www.transport.gov.scot/media/47906/rail-services-decarbonisation-action-plan.pdf
[xvii] https://www.transport.gov.scot/media/50354/decarbonising-the-scottish-transport-sector-summary-report-september-2021.pdf
[xviii] SMMT, quoted at https://www.zap-map.com/ev-stats/ev-market
[xix] https://www.gov.uk/government/news/active-travel-now-accounts-for-20-of-all-minutes-of-activity-taken-by-adults-in-england#:~:text=Cycling%20and%20walking-,Active%20travel%20now%20accounts%20for%2020%25%20of%20all%20minutes%20of,in%20the%20cost%20of%20living.
[xx] Scottish Household Survey Travel Diary Table 16: Main mode of travel: 2019
[xxi] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/832868/uk-chief-medical-officers-physical-activity-guidelines.pdf
[xxii] https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2018/07/active-scotland-delivery-plan/documents/00537494-pdf/00537494-pdf/govscot%3Adocument/00537494.pdf
[xxiii] Local Transport Strategy
[xxiv] https://www.stirling.gov.uk/media/0jhnsaaz/local-transport-strategy-2017-2027.pdf
[xxv] Active Travel Strategy
[xxvi] https://perth-and-kinross.cmis.uk.com/Perth-and-Kinross/Document.ashx?czJKcaeAi5tUFL1DTL2UE4zNRBcoShgo=mZcCnujHqiTukOtjNVyedggYITs7XU2kYZGUKY9TX0HwyoLS84Z%2B1g%3D%3D&rUzwRPf%2BZ3zd4E7Ikn8Lyw%3D%3D=pwRE6AGJFLDNlh225F5Q

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[xxvii] https://www.transport.gov.scot/media/50944/detailed-appraisal-summary-table-tay-cities-draft-technical-report-stpr2.pdf and https://www.transport.gov.scot/media/50936/detailed-appraisal-summary-table-forth-valley-draft-technical-report-stpr2.pdf

[xxviii] See, for example, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/953951/Transport_and_inequality_report_document.pdf

[xxix] https://www.sustrans.org.uk/media/2880/transport_poverty_in_scotland_2016.pdf

[xxx] https://content.tfl.gov.uk/technical-note-11-to-what-extent-is-congestion-and-unreliability-on-the-road-network.pdf

[xxxi] Detailed data on variability of journey times at these (and other) locations is available from the Inrix dataset, to which Transport Scotland has licenced access. Tactran is encouraged to work in partnership with Transport Scotland in order to use that data to provide a detailed baseline of journey times.

[xxxii] Tayside Bus Strategy Initial Appraisal: Case for Change