

ROADS TO RUIN

TIME FOR
CLIMATE-RESPONSIBLE
TRANSPORT INVESTMENT
IN SCOTLAND

August 2021



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INTRODUCTION



WHY TRANSPORT SPENDING MATTERS

Recent years have seen politicians of all colours recognise the severity of the climate crisis and proclaim their determination to take action. Scotland recently revised its climate targets to be net zero by 2045, with a 75% emissions reduction by 2030.¹ In transport specifically, the Scottish Government has now committed to a target of 20% traffic reduction by 2030.² Yet in this key policy area where Scotland has consistently failed to make progress on emissions, most mainstream politicians still appear wedded to the further subsidy of road use through the construction of new roads and additional road capacity.

It is indefensible, especially in light of significant progress in other sectors, that there has been nearly no progress in emissions reduction in the transport sector over the past 30 years. The result is that transport is now the largest overall source, accounting for 36% of all Scottish emissions, having overtaken the energy sector in 2015.^{3,4} Other sectors have had to bear a greater burden in reducing emissions as a direct consequence of the failure to decarbonise the transport sector. Looking to the future, there is no chance of reducing emissions fast enough, or in a just way, if current transport trends are allowed to continue. The speed at which we cut our carbon emissions is vital – the next ten years are crucial if we are to meet our commitments under the Paris Climate Agreement and limit global temperature increases.

Road transport specifically accounts for a massive 68% of transport emissions. This means road transport works out as 24% of all Scottish emissions, meaning that this one part of the transport sector is a larger emitter than any full sector of the economy –

the closest being business and manufacturing, which accounts for 20% of emissions. TransportScotland reports that “motorway emissions have increased substantially since 1990, with the 2018 level 81% above that of the 1990 baseline. This increase in motorway emissions since 1990 has coincided with a substantial increase in the length of Scotland’s motorway network. Between 1990 and 2017, Scotland’s motorway network increased in length from 312km to 645km. Motorway vehicle kilometres rose from 3242 million in 1990 to 8518 million in 2018.”^{5,6}

The link between the provision of additional road capacity and increased road traffic levels is long established, and widely acknowledged by governments and experts. This phenomenon of “induced traffic” was reaffirmed in a recent evidence review carried out by WSP and Rand Europe for the UK Department for Transport. Despite road traffic being our biggest problem in transport, and climate change emissions, TransportScotland’s priority for new capital expenditure remains overwhelmingly directed to the provision of increased road capacity. This will inevitably further increase road traffic levels, and consequently worsen Scotland’s prospects of meeting its climate change obligations. As a December 2020 briefing from the Scottish Parliamentary Information Centre (SPICe) noted when considering how sustainable transport investment was dwarfed by new road-building, “new road building also generates significant greenhouse gas emissions during construction and locks in higher emission travel choices for years to come.”⁸

FOCUS OF THIS REPORT

Despite the many deleterious impacts and significant opportunity costs of the Scottish Government's huge road-building programme, there are no published figures providing the total cost of the planned investment. Neither is there comprehensive information on how much has been spent in previous years. While costs are available for many (but far from all) road schemes, in the main they are imprecise and often inaccurate. Particularly for larger road schemes, the official outturn costs take years to finalise, and in the case of those delivered through a public-private partnership (PPP) model this can be decades. Often the costs quoted at the point when schemes are given ministerial approval are significantly lower than actual costs once construction gets underway. Furthermore, the Scottish Government does not provide a total figure for how much it is spending on increasing road capacity for a given year, or even over a five- or ten-year period.

Not only does the road-building programme have a massive impact on the government's near term budgets, but it creates significant financial commitments over many decades

due to paying private consortiums in PPP-delivered schemes and the additional maintenance burden in other schemes. Given the large amounts of financing involved, it is vital that the government, parliament, and the public have accurate and timely costings for the road-building programme. We must be able to understand the scale of the financial commitment being put into new roads, and the magnitude of the opportunity cost. If we are to see transport play its part in building a sustainable, healthy, and fair Scotland, the Scottish Government's expenditure priorities must be aligned with its stated policy objectives.

This report provides an analysis of the Scottish road-building programme to determine its scale and calculate how much of the Scottish budget is being spent on new road capacity. Because of the timescales of large road projects we look at spend in ten-year periods: looking back to 2011-2020 and forward to the current plans for 2021-2030. As well as considering the sheer cost, we additionally discuss the impact of the road-building programme on the environment and society.

SCOPE OF THIS REPORT

This report considers Scottish Government-funded road schemes, which are managed by TransportScotland. Whilst there are also road-building projects being promoted and paid for by local authorities, it is even more challenging to come up with comprehensive figures for these, and they are at least an order of magnitude smaller than Scottish Government spending in any case. So to ensure that the figures are fair and robust, local authority road-building is outside the scope of this report, except in cases where TransportScotland is also involved and spending central government funds.

Only schemes which will provide new road capacity are considered, so all projects that are road maintenance or replacing like-for-like are excluded. For example, the report does not include A830 bridge replacements

that provide new bridges to a modern standard, but with the same capacity as the old bridges. Maintaining existing roads is clearly important and should be properly funded. It is increasing road capacity, not maintenance, which imposes the environmental and social costs discussed in this report.

Over recent years, the Scottish and UK Governments have agreed a series of Regional Growth Deals which involve the two governments, local authorities, educational institutions, and regional partners working together, "to bring about long-term strategic approaches to improving regional economies."⁹ The partners contribute funding towards an overall package of measures for the region.

Some of these City–Region Deals are being used to build new road capacity. In cases where the Scottish Government is directing some of its Deal funding to road–building, that spend is included in this report. It is most notable in the Inverness and Highland City–Region Deal, where 81% of the Scottish Government’s total contribution is going towards building new roads. In cases where the funding for road projects comes from the other partners, the projects and spend are not included here (consistent with the approach taken to local authority spending, outlined above).

One type of Scottish Government–funded road–building that is not included in this report is where new road capacity has been built as part of rail projects. There are cases where ‘railway’ money has been spent to build new roads, such as with the Borders Railway and Gleneagles station upgrade.

In the case of the former, significant enhancements were made to the adjacent road network, and in the Gleneagles station upgrade project more than half – £3.9 million out of £7 million – of the spend went towards building a new road. Some of this provided or improved road safety for station access, but some of the funding was used to enhance road capacity. It is impossible for us to disentangle how much of the spending went to enhanced access, but it is worth noting that Scottish Government spending on road capacity is even higher than what is reported here, as the figures do not include road spending from other budgets.

Finally, when summarising and making comparisons involving a project cost given as a range by the Scottish Government, we have followed their practice of using the upper range figure.¹⁰

ROAD SPENDING DATASOURCES

As noted above, the overall cost of the Scottish Government’s road–building programme is not published, and costs for individual projects are inconsistently, and often inaccurately, provided. The costs for large projects are often wildly underestimated initially, or not revised when it is clear they have increased (see the discussions below of the M74 Completion and Aberdeen Western Peripheral Route projects for examples). Furthermore, even the costings provided for smaller projects cannot be relied upon.

A small but illustrative example of the lack of basic accurate information is the A75 Dunragit Bypass. The project page lists it as a “£17.1million project”, but a Freedom of Information response from Transport Scotland states the final outturn construction costs for the project were £18million.^{11,12} And there is no reference at all to the fact that the project was initially estimated to cost £15.9million.¹³ This is for a project completed in March 2014 where accurate costs should be finalised and published by now.

The following list gives a sense of how difficult it can be to find costs for road–building projects, especially what the original cost estimates were at the time of ministerial approval. These are the range of data sources and Freedom of Information requests that were necessary to get a simple list of the costs of the Scottish Government’s road–building programme from 2011 through to the present. Note that some of the Scottish Government documents are not available on their website, and it is necessary to go through web archives to find these official publications:

1. Audit Scotland: [Report: Forth Replacement Crossing](#)
2. [Infrastructure Investment Plan 2008](#)
3. [Infrastructure Investment Plan 2011](#)
4. [Infrastructure Investment Plan 2011: Progress Report for 2014](#)
5. [Infrastructure Investment Plan 2011: Updated Programme Pipeline \(January 2015\)](#)

6. [Infrastructure Investment Plan 2015](#)
7. [Infrastructure Investment Plan 2015: major capital projects update March 2018](#)
8. [Infrastructure Investment Plan 2015: major capital projects update September 2020](#)
9. [Infrastructure Investment Plan 2015: programme pipeline update September 2020](#)
10. [Infrastructure Investment Plan 2021](#)
11. [Inverness and Highland City-Region Deal Signatory Document](#)
12. JAM74: David Spaven precognition to M74 Public Local Inquiry
13. [M74 completion scheme – 1YA evaluation report](#)
14. Scotland Construction News: [A75 Dunragit by-pass moves forward](#)
15. Scottish Government: [Swinney outlines further shovel-ready projects](#)
16. Scottish Parliament Rural Economy and Connectivity Committee: [Official Report 5 December 2018](#)
17. [Scottish Trunk Road Infrastructure Project Evaluation – 1YAEvaluation Report for A77\(T\)Park End to Bennane](#)
18. [Strategic Transport Projects Review Report 3: Generation, Sifting and Appraisal of Interventions](#)
19. [Strategic Transport Projects Review: Final Report](#)
20. The Moray Council: [Areas for Transport Investment in Moray \(Moray Transport Interventions Study\)](#)
21. TransportScotland: [Contract for A82 Crianlarich Bypass Awarded](#)
22. TransportScotland: [Contract for further A737improvement awarded](#)
23. TransportScotland: [Fol Response 202000102801](#)
24. TransportScotland: [Fol Response 202000124498](#)
25. TransportScotland: [Fol Response 202000124500](#)
26. TransportScotland: [M80 Stepps to Haggs Project Details as at 7 Oct 2006](#)
27. TransportScotland: [New A9 improvement at Berriedale opens today](#)

An aerial photograph showing a multi-lane road construction project. A bridge spans over a road, with construction equipment and barriers visible on the road surface. The surrounding area includes residential houses, trees, and a body of water.

1

THE SCOTTISH ROAD-BUILDING PROGRAMME

1.1.THE PAST TEN YEARS (2011–2021)

OVERVIEW

Over the past ten years, we calculate that TransportScotland has spent £4 billion building new roads. However, of the 17 projects completed in this time, finalised outturn costs are only available for five of them. Moreover, for the major schemes (those costing more than £50 million), only one has finalised outturn costs, despite two of them having been completed almost ten years ago. While there are estimates available for the other schemes, it is difficult to have confidence in their accuracy, as it is clear that they may be significantly off. For instance, while the official estimate for the Aberdeen Western Peripheral Route is still given by TransformScotland as £745 million, in evidence to the Scottish Parliament, the contractors who built the road stated that its actual cost was “over £1 billion.”¹⁴

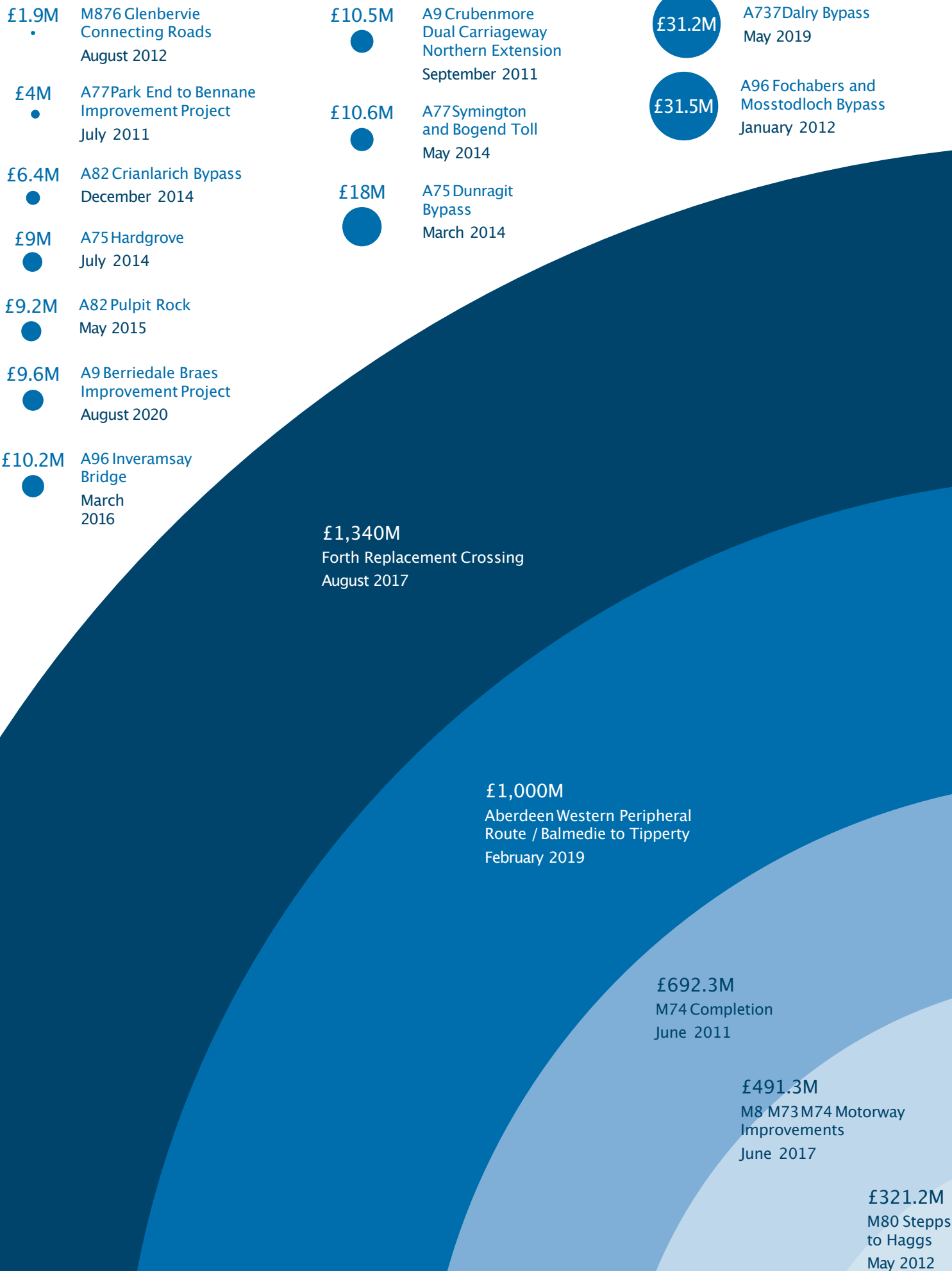
The full list of projects that delivered new road capacity in the last ten years, with the best available cost information, is shown below (graphic overleaf for illustrative purposes).

SCOTTISH GOVERNMENT ROAD PROJECTS 2011–2020

Project	Cost (final cost, estimate)	Project Completion
M74 Completion	£692.3 million	June 2011
A77 Park End to Bennane Improvement Project	£4 million	July 2011
A9 Crubenmore Dual Carriageway Northern Extension	£10.5 million	September 2011
A96 Fochabers and Mosstodloch Bypass	£31.5 million	January 2012
M80 Stepps to Haggs	£321.2 million	May 2012
M876 Glenbervie Connecting Roads	£1.9 million	August 2012
A75 Dunragit Bypass	£18 million	March 2014
A77 Symington and Bogend Toll	£10.6 million	May 2014
A75 Hardgrove	£9 million	July 2014
A82 Crianlarich Bypass	£6.4 million	December 2014
A82 Pulpit Rock	£9.2 million	May 2015
A96 Inveramsay Bridge	£10.2 million	March 2016
M8 M73 M74 Motorway Improvements	£491.3 million	June 2017
Forth Replacement Crossing	£1,340 million	August 2017
Aberdeen Western Peripheral Route / Balmedie to Tipperty	£1,000 million	February 2019
A737 Dalry Bypass	£31.2 million	May 2019
A9 Berriedale Braes Improvement Project	£9.6 million	August 2020
Total:	£3,996.8 million	

SCOTTISH GOVERNMENT ROAD PROJECTS (2011-2020)

(Final cost, estimate)



MAJOR PROJECTS (COSTING MORE THAN £50 MILLION)

Of the 17 projects in the past ten years, the five that cost over £50 million accounted for 96%, or £3.85 billion, of the £4 billion spent on new roads. It is therefore worth considering these schemes in more detail, including what their cost estimates were at the point of ministerial approval, and how those differ from finalised actual costs or best available current estimates.

M74 COMPLETION (COMPLETED JUNE 2011): £692.3 MILLION

Considered by the government as “the completion of a vital missing link in the west of Scotland’s motorway network,” this project led to the construction of a new 6-lane elevated urban motorway through the south side of Glasgow. The new motorway linked the erstwhile northwestern end of the M74 at Fullarton to the M8 southwest of the Kingston Bridge. Two intermediate junctions were constructed at Cambuslang Road and Polmadie Road. The five miles of motorway were built due to Scottish Ministers overriding the outcome of the Public Local Inquiry which found that the road should not be built. It found that the case for the road was fatally flawed and concluded that, “the proposal would be very likely to have very serious undesirable results; and that [...] the economic and traffic benefits of the project would be much more limited, more uncertain, and (in the case of the congestion benefits) probably ephemeral.”¹⁵

Initially estimated at [£177 million](#) in 1995, by 2001 when the Scottish Government approved the scheme, the cost had already risen to [£245 million](#).¹⁶ By the time the Public Local Inquiry commenced in 2003, this had increased further to [£375–£500 million](#).¹⁷ The latest estimate (note, no finalised outturn figures have yet been published) published in the 2015 “1 Year After Evaluation Report” is that these five miles of motorway cost [£692.3 million](#).¹⁸

M80 STEPPS TO HAGGS (COMPLETED MAY 2012): £321.2 MILLION

The Stepps to Haggs road scheme involved creating 18km of motorway by building 8km of new dual two-lane carriageway between Stepps and Mollinsburn, and upgrading the remaining 10km of the existing A80. The M80 already existed on either side of this scheme, and at its northeastern end connected to the M9, so this project created a continuous motorway from Glasgow, past Stirling, to just south of Dunblane. At the time the scheme was approved by the Scottish Ministers in 2006, it was estimated to cost between [£130–£150 million](#).¹⁹ However, the latest estimate of the road’s final cost is [£321.2 million](#), more than double the high end of the initial estimate.²⁰ As with the previous scheme, it is notable that almost nine years after the motorway opened, finalised outturn costs are still not available.

M8 M73 M74 MOTORWAY IMPROVEMENTS (COMPLETED JUNE 2017): £491.3 MILLION

This project involved both building new roads and upgrading existing ones in east Glasgow and North Lanarkshire. According to Transport Scotland, these works will accrue benefits to the economy by “improving connections between the commercial centres of Glasgow and Edinburgh and beyond.”²¹ The centrepiece of the scheme was converting a section of the A8 to the M8, creating a continuous motorway between Glasgow and Edinburgh, and building a new A8 parallel to this section. ‘Upgrades’ to various other junctions and sections of the nearby M73 and M74 motorways were also carried out.

M8 M73 M74 MOTORWAY IMPROVEMENTS

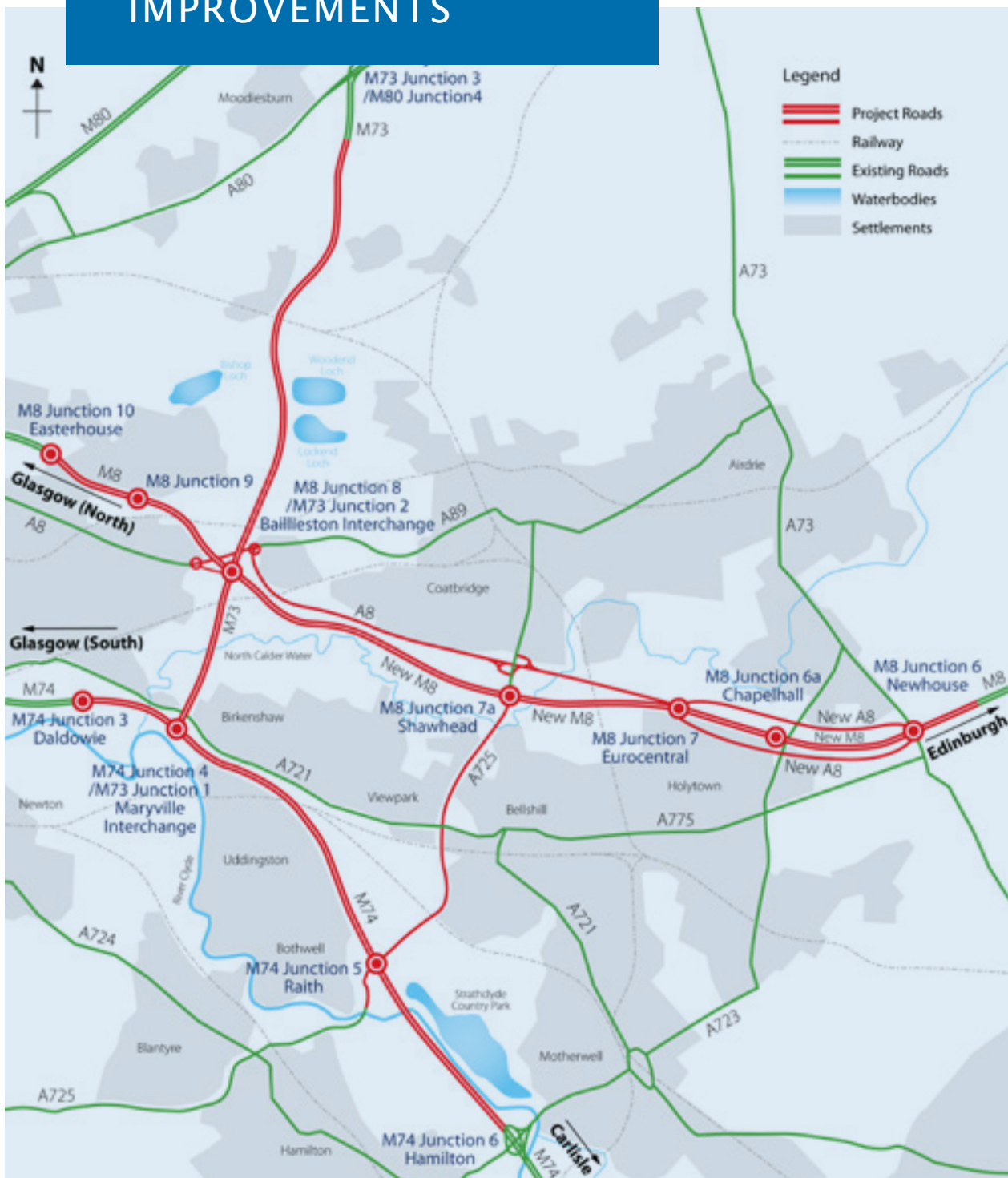


Image from TransportScotland website

Originally estimated as costing **£335 million** in the outline business case in December 2011, by March 2012, this had already risen to **£415 million**.²² The last published estimate for this project was in the March 2018 Infrastructure Investment Plan 2015: major capital projects update where it was **£452 million**.²³

However, the cost appears to have risen further since then, as in a January 2021 response to a Freedom of Information request, TransportScotland stated that the scheme was now estimated to have cost **£491.3 million**, though final outturn costs are still not available nearly four years after completion.²⁴

FORTH REPLACEMENT CROSSING (COMPLETED AUGUST 2017): £1.34BILLION

In 2004, maintenance work on the Forth Road Bridge (built in 1964) identified corrosion in the main cables supporting the bridge. Further investigations showed that the problem was progressing with breaks in the individual wires making up the main cables, and “fatigue in the viaducts, bridge deck and road surfacing” largely caused by the increased weight and number of HGVs using the bridge over the years (allowed HGV weight increased from 24 to 44 tonnes between the 1960s and 2000s).²⁵ Due to uncertainties over the ability to repair the Forth Road Bridge, and the potential economic impact of disruption during repair, in 2007 Scottish Ministers decided to build a new crossing. Through an appraisal process starting with 65 options (including bridges, tunnels, rail, ferry, and hovercraft) it was decided that the crossing would be a second road bridge near the existing one. The Queensferry Crossing, as it came to be known, was built between 2011–2017. The Forth Road Bridge continues to operate exclusively for public transport, taxis, motorcycles, cycling, and walking.²⁶

While the initial estimate for the project was £3.2–£4.2 billion, in 2008 it became clear that remedial works on the existing Forth Road Bridge were having success and would allow it to continue to be used to a limited extent. The decision was therefore made to narrow the Queensferry Crossing by removing public transport, cycling, and walking lanes, and instead use the Forth

Road Bridge as a dedicated sustainable transport corridor. This revision was announced in December 2008 when the Scottish Government approved the scheme at a lowered cost of £1.72–£2.34 billion. Through further investigations and improved modelling, the budget was revised further downwards to £1.45–£1.6 billion by the start of construction in June 2011. This is one of the few projects where a finalised outturn cost is available, and it came in at £1.34 billion, 8%–16% lower than the estimate at the start of construction. Jillian Matthew, one of the authors of Audit Scotland’s report, stated that “Transport Scotland managed the project really effectively...it’s one of the most positive reports I’ve worked on at Audit Scotland.”²⁷

Transport Scotland is to be commended for good project management and coming in under budget, but it is disheartening that this project is the singular exception in this regard. However, the cost control does not negate the fact that vast amounts of money were still spent on building new road capacity, even though the goal was to maintain road access across the Forth, not to increase traffic capacity. The business case specifically stated that increased travel demand across the Forth is to be met by public transport. In 2008, the Forth Road Bridge authority estimated that extensive repairs to the existing bridge to bring it back to a fully operational level would have only cost £91–£126 million. This would have represented a savings of £1.21 billion compared with the final cost of the second bridge.²⁸ This option was ruled out due to the extensive disruption it would have caused over nearly a decade, though the ‘increased costs’ to travellers and value of reduced economic activity are speculative.

ABERDEEN WESTERN
PERIPHERAL ROUTE
(COMPLETED
FEBRUARY 2019):
> £1BILLION

The Aberdeen Western Peripheral Route / Balmedie to Tipperty project involved building 58.3km of new mostly dual-carriageway road with grade separated junctions, as well as 40km of new side roads and 30km of access tracks. This provided a bypass around the west of Aberdeen, as well as 12km link roads to the north and south of the bypass.²⁹ This massive road capacity increase was justified on the basis that it would improve the economy of the North East through increased 'accessibility' and reduced journey times, improve air quality in Aberdeen city centre, and increase safety on minor roads used as 'unofficial bypasses' amongst other purported benefits.³⁰

The Balmerie to Tippierty (B-T) section was costed at £35-£45 million in 2006 when the Scottish Government approved it, and the rest of the Aberdeen Western Peripheral Route (AWPR) was approved in 2009 at an estimate of £295-£395 million.^{31,32} So the total estimate for this project when the two sections were approved was **£330-£440 million**. By December 2011, when the Infrastructure Investment Plan (IIP 2011) was published, the B-T section had increased to £53-£63 million, for a total of **£348-£458 million**.³³ Then, in the 2013 progress report on the IIP 2011, the estimated project cost for the combined schemes had shot up to **£745 million**.³⁴ Transport Scotland still maintains that the cost of the AWPR/B-T is £745 million, even though significant cost overruns have been documented, and in December 2018 one of the principle contractors testified to parliament that the project cost “will be **over £1 billion**.”³⁵ No further detail on who will pay for these cost overruns has been released since, and the Scottish Government will pay the private consortium Aberdeen Roads Limited for the road over a period of 30 years.



Image from TransportScotland website

COST INCREASES OF MAJOR PROJECTS

As described in the last section, four of the five major road projects over the past ten years experienced significant cost increases. The “Forth Replacement Crossing” (FRC) is the one exception, which not only didn’t experience an increase, but resulted in considerable cost savings over the original budget. An overview of the cost changes is shown below. Three projects saw costs more than double, with the M74 Completion nearly tripling its costs. Even with the £1 billion cost savings on the FRC, the average cost increases across all five projects was 86%, or nearly a doubling of costs, totalling £335 million.

COST INCREASES IN MAJOR SCOTTISH ROAD PROJECTS 2011–2020

Project	Cost at approval	Cost at completion (final cost, estimate)	Change (£)	Change (%)
M74 Completion	£245 million	£692.3 million	£447.3 million	183%
M80 Steps to Haggs	£150 million	£321.2 million	£171.2 million	114%
M8 M73 M74 Motorway Improvements	£335 million	£491.3 million	£156.3 million	47%
Forth Replacement Crossing	£2,340 million	£1,340 million	–£1,000 million	–43%
Aberdeen Western Peripheral Route / Balmedie to Tipperty	£440 million	£1,000 million	£560 million	127%

The fact that the Scottish Government effectively managed and controlled the cost of the Forth Replacement Crossing should not be ignored, but it is also atypical. Aside from the major projects shown here, all of the smaller road projects where initial costs are easily available show cost increases between approval and completion. Given that the FRC is both an outlier in terms of cost control and almost six times as expensive as the next largest project at approval, it is instructive to consider the numbers without the FRC. This is likely to give a more accurate guide as to what can be expected for future projects. (And as discussed later, many projects for the next ten years have already seen cost increases.) Table overleaf therefore looks at the cost increases with the FRC excluded.

£3,510M

Total cost at approval

£3,844.8M

Total cost at completion

↑ £334.8M

Total increase

↑ 86%

Average increase

COST INCREASES IN MAJOR SCOTTISH ROAD PROJECTS 2011–2020

(excluding “Forth Replacement Crossing”)

Project	Cost at approval	Cost at completion (final cost, estimate)	Change (£)	Change (%)
M74 Completion	£245 million	£692.3 million	£447.3 million	183%
M80 Stepps to Haggs	£150 million	£321.2 million	£171.2 million	114%
M8 M73 M74 Motorway Improvements	£335 million	£491.3 million	£156.3 million	47%
Aberdeen Western Peripheral Route / Balmedie to Tipperty	£440 million	£1,000 million	£560 million	127%

It's clear that the Government significantly underestimates the cost of road schemes when they approve them. Both the average and total show costs more than double between approval and completion. These four schemes saw a massive £1.3 billion of extra spending – more than the total of their initial estimates.

£1,188M

Total cost at approval



111%

£1,316.8M

Total increase

£2,504.8M

Total cost at completion



115%

£329.2M

Average increase

1.2.THE NEXT TEN YEARS (2021–2031)

OVERVIEW

Looking forward, TransportScotland currently has 16 ongoing or planned road-building projects that have cost estimates. They represent a total spend of nearly £7 billion – close to double what has been spent in the last ten years. Given that the past ten years included massive projects such as a new bridge across the Forth, and the imperative to make significant cuts to carbon emissions in the near term, it is hard to see how nearly doubling spend on new high carbon road infrastructure can be justified. This total is based on current cost estimates, but as discussed in the previous section, all bar one of the completed road projects have experienced cost increases, and several of the current projects have already seen their initial estimates increase. The scale of potential increases will be explored in more detail below.

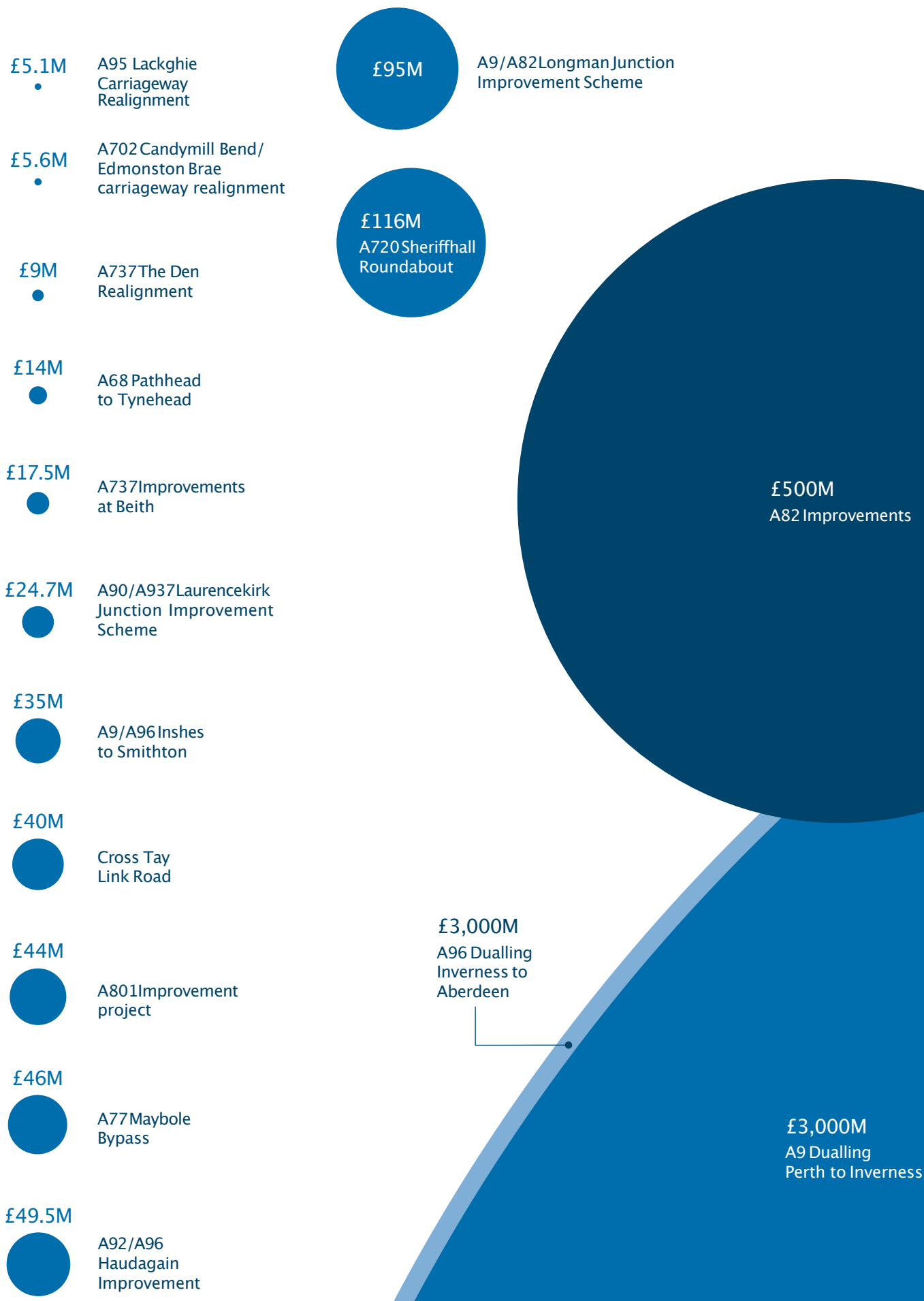
The full list of current TransportScotland road-building projects that have been costed is shown below (graphic overleaf for illustrative purposes).

SCOTTISH GOVERNMENT CURRENT ROAD PROJECTS

Project	Latest Cost Estimate
A9 Dualling Perth to Inverness	£3,000 million
A9/A82 Longman Junction Improvement Scheme	£95 million
A9/A96 Inshes to Smithton	£35 million
A68 Pathhead to Tynehead	£14 million
A77 Maybole Bypass	£46 million
A82 Improvements	£500 million
A90/A937 Laurencekirk Junction Improvement Scheme	£24.7 million
A92/A96 Haudagain Improvement	£49.5 million
A95 Lackghe Carriageway Relignment	£5.1 million
A96 Dualling Inverness to Aberdeen	£3,000 million
A702 Candymill Bend/Edmonston Brae carriageway realignment	£5.6 million
A720 Sheriffhall Roundabout	£116 million
A737 Improvements at Beith	£17.5 million
A737 The Den Realignment	£9 million
A801 Improvement project	£44 million
Cross Tay Link Road	£40 million
Total:	£7,001.4 million

SCOTTISH GOVERNMENT CURRENT ROAD PROJECTS

(Latest cost estimate) 



ONGOING MAJOR PROJECTS (COSTING MORE THAN £50 MILLION)

Out of the total set of 16 current road-building projects, the five that cost over £50 million again account for 96%, or £6.7 billion, of the £7 billion planned spend on new roads. This is the same proportion as in the projects from the last ten years. Due to the vast amounts of money involved, these five projects are considered in more detail.

A9 DUALLING PERTH TO INVERNESS: £3 BILLION (OR MORE)

In the December 2011 Infrastructure Investment Plan (IIP), the Scottish Government made the commitment that, “by 2025, we will have dualled the A9 between Perth and Inverness.”³⁶ There were some existing dual carriageway sections of the A9, and the commitment was to progressively dual the stretches of single carriageway. However, when the 2011 IIP was published, there had not been any proper assessments of the scale of dualling costs for each section, and so an extremely rough overall estimate of the total dualling programme was given as £3 billion. Due to the lack of appraisal at the time of commitment, no analysis could be presented showing whether this massive cost was worthwhile or not, and so the scheme was promoted on the basis of a potential average journey time reduction by 22 minutes, and undefined safety benefits, notions of maintaining access to employment, and encouraging investment. Further details of how this scheme was then retroactively justified through transport appraisal can be found in the A9 Dualling case study in this report.

Despite the fact that one section has been completed, work is underway on another, and the design work has progressed on the others, a more accurate costing is still not available. Given some of the complications that have arisen and some options under consideration for certain sections, it is also likely that the full A9 dualling between Perth and Inverness will cost significantly more than £3 billion. The safety improvement case for dualling the A9 has also been fundamentally

undermined since it was approved, as in 2014 two inexpensive and extremely effective safety interventions were made: installation of average speed cameras and an increase of the HGV speed limit from 40mph to 50mph.³⁷

A9/A82 LONGMAN JUNCTION IMPROVEMENT SCHEME: £85–£95 MILLION

Longman Junction is a key interchange where the A82 comes out of Inverness, through Longman Industrial Estate, and joins the A9 just before the Kessock Bridge. All traffic heading north from Inverness, the A9, and the A96 (from Aberdeen) must pass through Longman Junction. The process leading to the development of this project started with the 2008 Strategic Transport Projects Review (STPR) which included a goal of improving the operation of the A9 around Inverness. An initial study and consultation led to the A9/A96 Connections Study which in 2016 “recommended the grade separation of Longman Roundabout to relieve congestion at this strategic junction.”³⁸ This project involves replacing the Longman roundabout with a flyover for the A9 and some combination of access ramps and roundabouts along with associated local road reconfiguration.

As part of the Inverness and Highland City–Region Deal, the Scottish Government has agreed to contribute £135 million of the package of £315 million funding. The vast majority of this (81%) is going to fund the Longman Junction improvement, and a related project nearby to build a new road between the A9 and A96 (A9/A96 Inshes to

Smithton). The City–Region Deal signatory document put the estimated cost of these two schemes at £109million. Based on the current breakdown of the two projects, the A9/A82 Longman Junction project was estimated to cost **£84.2 million** in 2017.³⁹ Although no further cost estimates have been published, Transport Scotland's response to a Freedom of Information request in November 2020 shows that the upper end of the cost range for the project has already risen to **£95 million** (and £130million for the combined schemes).⁴⁰

A82 IMPROVEMENTS: £250–£500 MILLION

The A82 is a key route linking the western Highlands and Western Isles with Glasgow and Central Scotland. In February 2006, Transport Scotland published the A82 Tarbet to Fort William Route Action Plan Study which made several recommendations to remove congestion and improve traffic in a number of sections along the road. Two of the recommended projects were completed in the past ten years (A82 Crianlarich Bypass and A82 Pulpit Rock), and the current programme is focused on “improvements to the 17km route between Tarbet and Inverarnan adjacent to the west bank of Loch Lomond.” Detailed development and assessment of a preferred route is currently underway.

The A82 Improvements scheme was included in the 2011 Infrastructure Investment Plan (IIP), though at that point the scope also included “improved overtaking opportunities Tyndrum to Glen Coe and speed management measures between Ballahulish and Fort William.” The estimated cost was given as **£200–£250 million**.⁴¹ By the 2015 IIP, the cost of the project had risen to **£250–£500 million**, and the programme pipeline updates to the IIP indicate that this is now solely for the 17km between Tarbet and Inverarnan.^{42,43}

A96 DUALLING INVERNESS TO ABERDEEN: £3 BILLION (OR MORE)

The A96 is the trunk route connecting Inverness to Aberdeen, 99 miles in length, with approximately 13 miles dual carriageway (the remainder being single carriageway).⁴⁴ The 2008 Strategic Transport Projects Review (STPR) identified upgrading the A96 between Inverness and Nairn to dual carriageway, building a bypass around Nairn, and strategic congestion-reducing enhancements along the rest of the A96 as priorities.⁴⁵ The IIP 2011 included “A96 dualling Nairn to Inverness” in its projected project pipeline, but also a commitment “to completing the dualled road network between all our cities by 2030.”⁴⁶ By 2013, this had been confirmed as a commitment to “the full dualling between Inverness and Aberdeen by 2030.”⁴⁷ For the A96 between Hardmuir and Fochabers, although Transport Scotland describes the project as “dualling the 29-mile western section,” they are in fact proposing to build a completely new dual carriageway road through the countryside and maintain the existing road.

When the STPR and IIP 2011 were published, the estimate for dualling the A96 between Inverness and Nairn and building the Nairn bypass was **£250–£500 million**. After the commitment was made for fully dualling the A96, the project was estimated to be “in range of **£3 billion**.”⁴⁸ However, at the time of this estimate, no route option design had taken place on the route west of Nairn – only “preliminary development work” had been carried out. So the **£3 billion** estimate is extremely inaccurate, and has not been updated as further design work and option appraisals have been carried out. Given that the preferred route between Hardmuir and Fochabers now involves building an entirely new road through land that is currently used for other purposes, it is highly likely that the **£3 billion** estimate is too low.

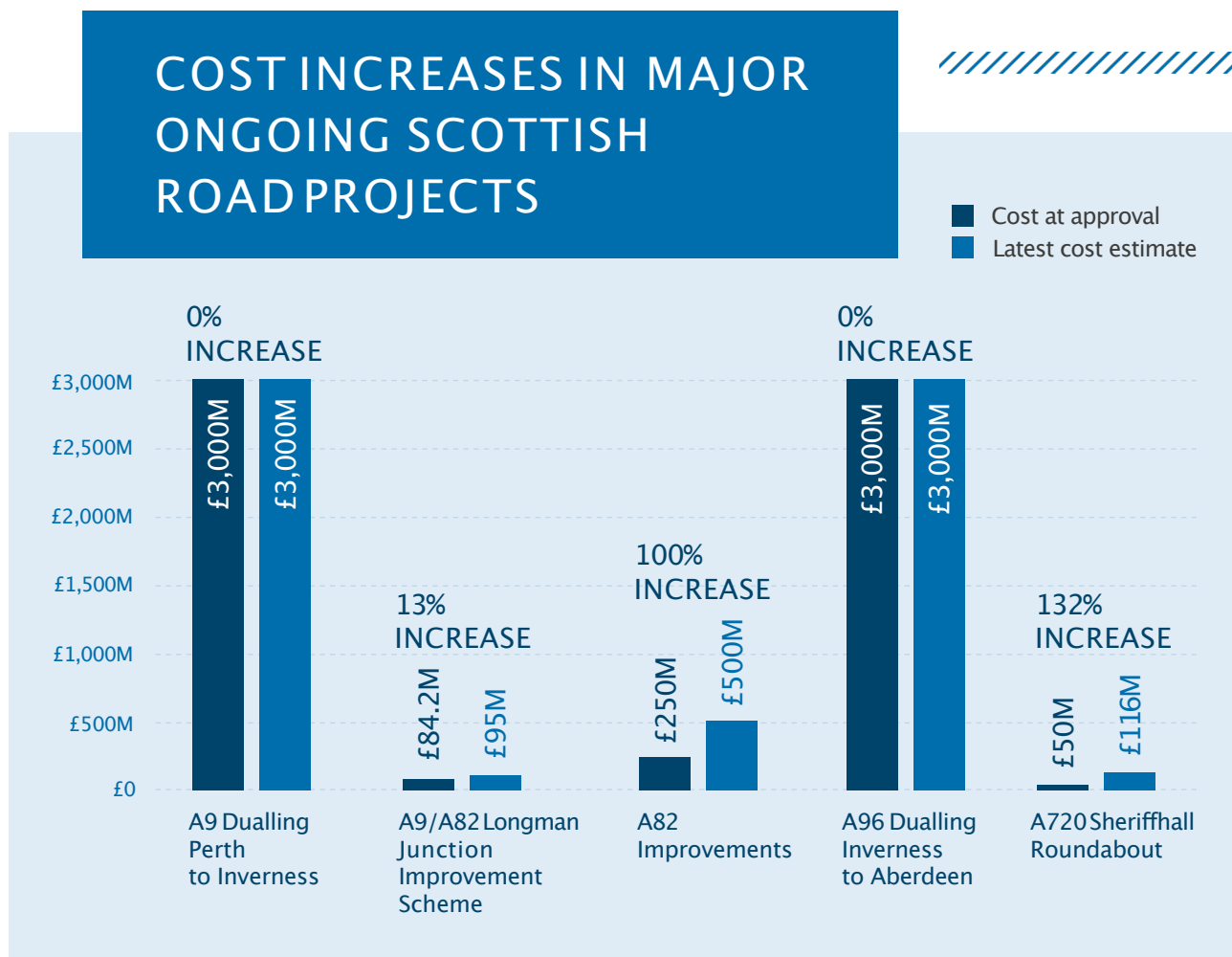
A720 SHERIFFHALL ROUNABOUT: £116MILLION

The Sheriffhall Roundabout on the Edinburgh City Bypass (A720) is the only at-grade junction on the bypass. The STPR identified building a grade-separated junction as a priority in 2008.⁴⁹ A preferred option was developed and selected by 2017, and in 2018 the Scottish Government committed to funding the project as part of the Edinburgh & South East Scotland City Region Deal.⁵⁰

When it was identified in 2008, building a grade separated junction at Sheriffhall Roundabout was estimated to cost **£10-£50 million**.⁵¹ Development of the project showed that it was going to cost more than double the high end of the estimate, and in the 2018 City Region Deal, the Scottish Government pledged to fund the project up to £120 million.⁵² The latest estimate for the project is **£116million**.⁵³

COST INCREASES OF ONGOING MAJOR PROJECTS

Although none of these projects have been completed, three of them have already seen officially acknowledged cost increases, as shown below.



The two projects that have not had any change in their published estimates are A9 and A96 dualling projects. The estimates in both cases have always been extremely rough, and haven't been updated as design work and options appraisal has been carried out. It is highly improbable that the £6 billion combined cost is accurate if both projects are to be completed. Neither of these match the characteristics of the Forth Replacement Crossing, which came in under budget because it was focused, tightly specified, extremely well managed, and had clearly-agreed timescales.⁵⁴ Therefore, to get a more accurate understanding of the cost escalation for the ongoing major projects, chart overleaf shows the changes without the two dualling schemes.

£6,384.2M

Total cost at approval

£6,711M

Total cost at completion

↑ £326.8M

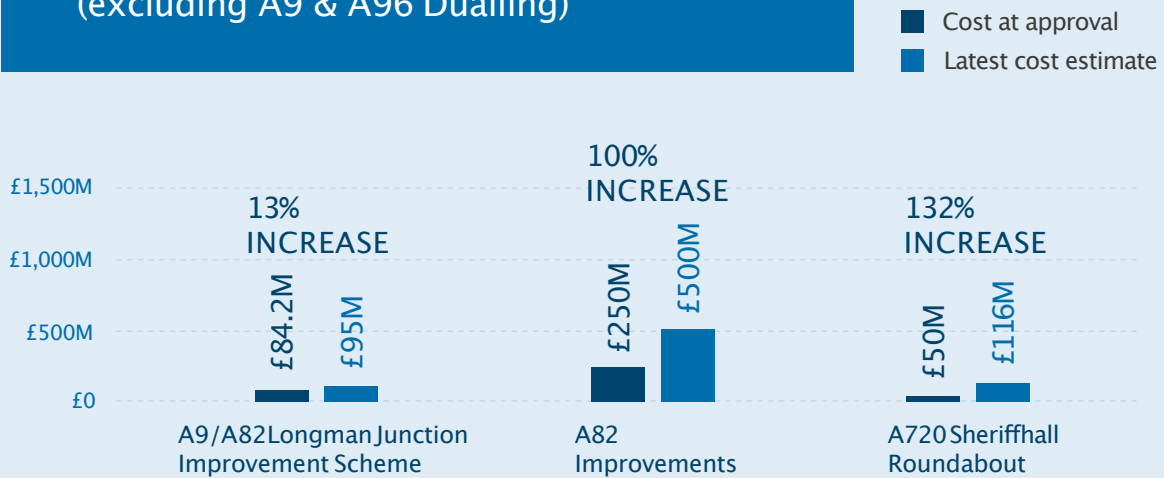
Total increase

↑ 49%

Average increase

COST INCREASES IN MAJOR ONGOING SCOTTISH ROAD PROJECTS

(excluding A9 & A96 Dualling)



It's clear that even at the pre-completion state, the cost escalation in ongoing major projects is of a similar scale to that which happened with the major projects completed in the last ten years: a near doubling of costs. The average cost increase of major projects completed in the last ten years – including the significant savings on the Forth Replacement Crossing project – was 86%, similar to the 82% already seen on the three ongoing projects with updated estimates. That implies the final outturn costs are likely to be around **£12 billion for just the five major projects**. (Note that without the savings on the Forth Replacement Crossing, cost increases over the last ten years averaged 115%. If overspend on current major projects end up closer to this that would lead to final outturn costs of around £14 billion.) Even taking the lowest cost increase on a major project over the last ten years – 47% – gives a total for the five major ongoing projects of £9.4 billion. If we then generously assume no cost increases on the remaining ten projects, **the total of the current Scottish Government road-building programme will be £9.6 billion**. This is before including the unknown costs of motorway expansions and bypasses being considered as part of STPR2 and the A83 upgrade, discussed in the next section.

£384.2M

Total cost at approval

£711M

Total latest cost estimate

85%
£326.8M
Total increase

82%
£108.9M
Average increase

UNCOSTED PROJECTS

As well as the costed projects on page 17, there are uncosted road-building projects which the Scottish Government is proposing as part of the second Strategic Transport Projects Review (STPR2). The list of projects has yet to be finalised, but there are many road-building projects being considered as part of the appraisal, including extending the M8, expanding a section of the M74, building new roads, many dualling and capacity expansion projects across the A-roads comprising the trunk road network, and several bypasses including a major one around Dundee.⁵⁵ It is unclear how many of these projects will make it through the appraisal stage, but it is concerning that such a significant road capacity increase is even being considered. Without course correction from the Scottish Government, total spend on the high carbon infrastructure of new roads in the next decade could easily reach or exceed £10 billion.

One uncosted project which the Scottish Government has already committed to is building a new road as an alternative to the A83 “Rest And Be Thankful”. This primary route to Argyll from central Scotland has seen increasingly frequent closures due to severe weather events leading to landslides. A programme of hillside stabilisation and catch pit installation is ongoing, but in 2020 the Scottish Government committed to “deliver an alternative infrastructure solution to the existing A83” which is described in the STPR2 as a “new off-line alternative route improving resilience for strategic A83 traffic.”⁵⁶

While action is needed to maintain the primary route to Argyll and ensure reliable access, the approach taken to date to solving this issue has been poor and raises concerns. The consultation undertaken in September–October 2020 essentially presented 11 options to build a new road.⁵⁷ The most glaring omission from the consultation was the lack of an online improvement option – upgrading existing roads instead of building new ones. Some of the proposed projects would have been very costly, including non-trivial tunnels and bridges. No costs (indicative or otherwise) were associated with any of the projects, so in addition to not being able to assess the absolute impact on public spending, there were no Benefit-to-Cost Ratios to aid in assessing the options presented. Given that some of the options might have been unaffordable or of poor value, it was difficult to respond meaningfully to the consultation. Fortunately, the minister did not choose the more outlandish projects, and instead recommended the corridor option most likely to reduce costs and the amount of new road that must be built. However some of the specific route options being considered within the recommended corridor still involve significant tunnelling. No cost has yet been associated with any of the five route options now being considered, though the consultation materials note that tunnels represent “a considerable cost element.”⁵⁸ Taken as a whole, the current A83 Access to Argyll and Bute project has the potential to lead to a significant but unknown increase in the roads budget, and the lack of rough costings during the consultation periods is a cause for concern.

PROBLEMS WITH PROJECT APPRAISAL

The A83 is not the only example of poor project appraisal practice. Even when followed as intended, the Scottish Transport Appraisal Guidance (STAG) over emphasises the benefit of journey time savings, with many road projects being justified on this metric. It ignores the fact that productive and enjoyable time can be spent when travelling via certain forms of transport (e.g. train and bus), or the health benefits from others (e.g. walking and cycling). Furthermore, it does not incorporate Scotland's climate change commitments, and so projects are not assessed with regard to their compatibility with emissions reduction targets.

To make matters worse, STAG is also not always used as intended. It should be a process whereby a transport issue is identified and then travel mode-agnostic solutions to the issue are evaluated. However, in projects involving major investment, such as the A9 Dualling Programme which is estimated to cost at least £3 billion, STAG has been brought in to justify a commitment that was made without any robust appraisal. The political commitment to dual the A9 was made before any assessment was made, let alone identification of an issue and an agnostic appraisal as to how it could best be addressed. The case of the A9 is particularly egregious, because when an appraisal was finally carried out, the benefit-to-cost ratio could not be brought above 0.89, even when including some nebulous Wider Economic Benefits. So Transport Scotland created an entirely new metric that assigned a monetary value to "removing driver frustration." This metric has not been used in any other transport appraisal, and was responsible for raising the A9 dualling to a barely justifiable BCR of 1.12. This is discussed further in the A9 Dualling case study in this report.

The current transport appraisal system is simply not credible. It does not include the right metrics when used as designed, and it is inconsistently applied. STAG is frequently used as a justification of road-building projects that the Government wants to proceed with. Instead of considering a range and combination of transport solutions to an issue, it becomes a way of selecting which road to build.



2

THE IMPACT OF THE SCOTTISH ROAD-BUILDING PROGRAMME

2.1. INDUCED TRAFFIC

It is now widely accepted that building new roads, or expanding capacity on existing ones, results in people making trips they otherwise would not have made. Instead of reducing congestion, the net result is to increase the number of vehicles travelling. This 'induced traffic' was comprehensively studied in 1994 by the UK Government's Standing Advisory Committee on Trunk Road Assessment (SACTRA), and their conclusions that induced traffic was real and resulted in a 10%–20% increase in traffic over base forecasts was accepted by the UK Department for Transport (DfT) at the time.⁵⁹

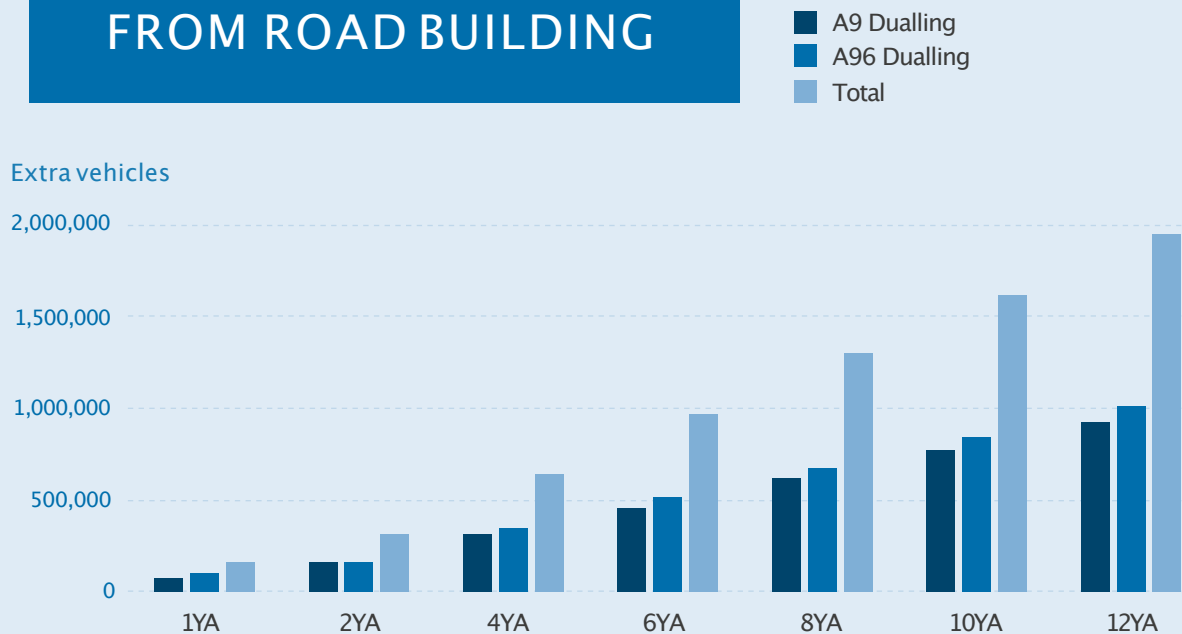
A 2017 study carried out by Transport for Quality of Life found induced traffic effects consistent with SACTRA's findings, and found induced traffic increased on average by 2% per year. After 8–20 years in the schemes studied, traffic had increased by an average of 47% over the background traffic growth in the region.⁶⁰ The DfT again studied the issue of induced traffic in 2018 which also confirmed the SACTRA findings. This new study also found there was a bias in traffic forecasts produced for road-building schemes, where the 'do-nothing' approaches had a systematic bias to over-estimating the future amount of traffic.⁶¹ This bias has the effect of masking the full scale of induced traffic when levels are assessed after road schemes open.

Transport for Quality of Life recently published a report looking into the carbon impact of the English road-building programme. As part of their work, they looked at the evidence on induced traffic, and used it as the basis for the following method for calculating its effect:

“ We made the assumption that induced traffic would be zero in the year the scheme was completed; 2% of opening year traffic in the year after the scheme was completed; and rising by 2% per year to 24% of opening year traffic 12 years after scheme completion. ”⁶²

Using these evidence-based assumptions, the chart overleaf shows estimates of the extra traffic that could be generated by the A9 and A96 dualling projects – on top of any 'background' growth in traffic that may occur. Note that pre-Covid-19 traffic levels are taken from the most recent Scottish Transport Statistics, and so this assessment was only possible for the projects where traffic figures are available along the scheme's route.⁶³

ESTIMATE OF 'INDUCED TRAFFIC' FROM ROAD BUILDING



As can be seen, these two projects will likely result in at least **2 million extra vehicles** on the roads 12 years after they open, on top of any general traffic increase forecasts. Aside from the incompatibility with Scotland's climate change targets, this increased traffic creates congestion in the surrounding area, as the vehicles need to get to and from the trunk roads they are travelling on. Although it was not possible to calculate induced traffic estimates for the other schemes currently under construction, or being assessed as part of STPR2, all will create induced traffic. It is vital that Transport Scotland recognise the effect of induced traffic and include it and its impacts in calculations when assessing schemes.

2.2. INEQUALITIES AND HEALTH

Building new roads, particularly motorways and dual carriageways, is an inherently regressive policy as it is the wealthier members of society (and men in particular) who are more likely to have the ability to use them. Over half of Scottish households earning £15,000/year have no access to a car, and the number with no access rises to 60% for an income of £10,000 or less. Even where income is £15,000–£30,000 for the household, 20%–37% have no access to a car. This contrasts strongly with households that have an income above £40,000, where only 3%–6% have no access to a car.⁶⁴ The net result is that spending billions to build new motorways and dual carriageways results in the poorest in society paying for the wealthiest to save a few minutes of journey time. The billions of pounds being spent on Scotland's road-building programme inevitably come at the expense of investing transport more likely to benefit the less well off: walking, cycling, bus, and rail.

Aside from the cost, too much traffic divides communities and degrades the environment, in rural as well as urban areas. More roads mean more air pollution deaths and more congestion in the medium- and long-term due to the impacts of induced traffic. The type of roads that form the vast bulk of the Scottish Government's road-building programme (dual carriageways and motorways) are also unjust, as the benefits accrue to those from outside the area who are passing through, while the communities along the routes of these limited-access roads must deal with the negative impacts. This was demonstrated by a comprehensive academic health study carried out along the route of the M74 Completion project. The new motorway led to poorer mental wellbeing and increased noise pollution for people living near it, who for the most part did not use the road.⁶⁵

2.3. CLIMATE

As discussed in the [Introduction](#), transport is the one sector that has not been contributing towards Scotland's 2030 75% reduction and 2045 net zero targets – transport emissions have remained essentially constant, down only 0.5% on the 1990 baseline. The Scottish Government has belatedly acknowledged the need for significant traffic reduction in the December 2020 climate change plan update which includes the commitment to reduce car kilometres by 20% by 2030.⁶⁶ The effect of this would be to reduce car travel to a level last seen in 1994.⁶⁷

This commitment is to be welcomed, and is necessary, but will not be met without action to restrict car use. Since the publication of the first Climate Change Plan in 2011, distance travelled by car has increased by 8.4%, and TransportScotland's modelling in 2018 predicted a 37% increase in distance driven by 2037.^{68,69} To realise a reduction in kilometres driven, it is necessary to do far more than improve the alternative options. As Professor Tom Rye said in evidence to the Scottish Parliament's Rural Economy and Connectivity Committee in February 2017:

“ If we want to focus on and bring about mode shift, we need to improve the alternatives, but I am afraid that all the evidence suggests that we also need to make car use a bit more difficult. [...] What has to be borne in mind is that, if we only improve public transport without making car use a bit more inconvenient, the new passengers on public transport will primarily be people who have been attracted to it from walking or cycling.”⁷⁰

Put simply, the current road-building plans are incompatible with the need to reduce car travel and emissions by 2030. Research shows that cost and travel time are the two most important factors for people when deciding how to travel.⁷¹ As pointed out by the Scottish Parliamentary Information Centre,

“ investment which reduces car journey times, relative to travel by rail or bus, on key strategic routes may result in travellers switching from public transport to car, as public transport journey times become less competitive.”⁷²

Even before the latest Climate Change Plan update was published, two commissions set up by the Scottish Government stressed the need to reduce spending on building new roads. The Just Transition Commission was set up by the Scottish Government to advise Ministers on how to transition to a net zero economy in a way that is fair and inclusive. Their report published in July 2020 urged the Government to re-prioritise existing transport budgets to redirect money that would be spent on increasing road capacity to investments in “low-carbon transport initiatives.”⁷³ The Scottish Government also set up the Infrastructure Commission for Scotland, whose purpose is to provide independent, expert advice on creating a 30-year infrastructure strategy. In their January 2020 “key findings” report, they recommended that the Strategic Transport Projects Review 2 (STPR2) should consider infrastructure as part of a holistic system that must deliver a net zero carbon economy. Specifically, they call for any road investment included in the National Transport Strategy and STPR2 to prioritise improving the safety, reliability, and resilience of existing roads over building new road capacity.⁷⁴ In spite of this, the new Infrastructure Investment Plan (IIP) published in February 2021 does the opposite.

It confirms a £6.8 billion commitment to the high carbon road-building programme, which dwarfs the £1.5 billion pledged to road and bridge maintenance or the £1.3 billion for decarbonising transport and investing in sustainable travel.⁷⁵

It should also be noted that building new roads has a climate change impact beyond increases in traffic. The materials used to build the roads have significant embodied carbon (particularly concrete, steel, and asphalt) and the construction machinery emits carbon. Destruction of woodland and soil ecosystems can destroy a carbon sink. And even without an increase in traffic, higher speeds lead to higher carbon emissions: when average speeds go from 60mph to 70mph, carbon emissions increase by about 13%.⁷⁶

Assessing the precise carbon impact of the current Scottish road-building programme is outwith the scope of this report. However, Transport for Quality of Life carried out such an assessment for the current English road-building programme, and as part of this calculated the expected carbon emissions from the additional induced traffic per million pounds spent on new roads. This can not be directly applied to the road plans in Scotland, but using their conversion factor can give an indication of the scale of emissions. In any case, the amount of emissions will vary depending on when the schemes are built and the level of electric vehicle uptake. With those caveats, the scale of emissions just from extra induced traffic due to the Scottish Government's current £7 billion road-building plans could be in the region of 2–5 MtCO₂ by 2032.

2.4. LANDSCAPES AND ECOSYSTEMS

The large road projects considered in this report often have significant impacts on Scotland's natural heritage. Schemes to widen existing roads involve the destruction of habitats and woodland along the route of the road. Where the roads are being built along new alignments, the impact is often greater, as formerly cohesive areas are sliced up, severing wildlife corridors and eroding the interconnected ecosystem.

In 1996, research by the Scottish Wildlife Trust (SWT) found that the transport appraisal process failed to consider the cumulative impact of road schemes on natural and semi-natural habitats. By considering road-building projects individually, it was possible to present the ecosystem impact as relatively small, even though the cumulative impact was large and hugely damaging. Hundreds of kilometres of habitat were under threat, including over one hundred designated sites, many of national and international importance.⁷⁷

As the SWT predicted, because the impact of individual schemes could be 'justified', over the years there has been a steady erosion of Scotland's natural heritage. A few sites damaged here and there with each project, and over the decades this has resulted in the destruction of a large number of sites. Furthermore, transport appraisal only considers designated sites, but the greatest threat is likely to be to natural habitats that are not designated. Scotland's proportion of high value non-designated habitats is higher than in most other regions of the UK due to lower levels of urban development. Irrespective of designation, where the ecological functioning of the landscape is not largely disrupted by human activity, the area can have a high natural capital value, being important to wildlife, as well as nearby residents and tourists. Road-building represents a considerable threat to these areas, especially roads outwith urban areas, such as along the A9 and A96.

The transport appraisal process does not provide sufficient weight and consideration to the value of natural capital and the irreparable damage road-building inflicts.

It is important to note that at the time of the SWT report, there were no proposed road projects even approaching the scale of the current A9 and A96 dualling projects, which will have significant impacts even when considered individually. For instance, dualling the A9 will see the destruction of 6,000 hectares of ancient woodland – and irreplaceable (on human timescales) ecosystem important both to wildlife and as the highest value woodland for reducing carbon emissions.⁷⁸ And the A96 dualling project will destroy, reduce, or sever the habitats of 27 protected species listed on the Scottish Biodiversity List, as well as many unlisted species and migratory birds.^{79,80}



3

CONCLUSIONS

It is clear from looking at current road-building plans that vast amounts of money are being spent to build high carbon infrastructure, with no reference to Scotland's climate commitments and abysmal cost control. Notably, in both the past ten years and in current plans, the five largest projects dwarf the rest, accounting for 96% of all spending on increasing road capacity. Looking at the previous decade of road-building also reveals two disturbing facts: the Scottish Government has nearly doubled the amount it intends to spend on new roads, and project costs will further increase as they are implemented. Given the scale of public money involved it is not acceptable that the focus of Scottish Government spending is on projects that directly undermine the action Scotland must take to address the climate crisis. The current levels of spending are in clear opposition to the Scottish Government's priorities and the expert advice of its relevant commissions.

1. TRANSPORT PRIORITIES SET IN A VACUUM

Whilst Scottish Government policies are being aligned with its climate change commitments, transport spending is seemingly set in a world where all that matters is appeasing motorists. There are many good transport policies and targets, but the vast majority of actual spending is going towards increasing road capacity.⁸¹ Transport spending is not being set as part of a holistic approach to creating an equitable and prosperous net zero emissions economy. The continued clamour for new road-building demonstrates just how shallow the political commitment is to genuine action to reduce climate change emissions.

2. LACK OF AVAILABILITY AND TRANSPARENCY ON COSTS

Simply determining the costs of road-building projects, and how they have changed over time, has been challenging as there is no consistent and accurate source for these figures. Many projects do not have cost information readily available. Even where costs are available, the information is poor. Larger projects are often "design, build, finance and operate" contracts. These have expiry dates decades into the future, so costs are even more opaque, as finalised outturn costs cannot be calculated until many years

after the project is complete. The impact of this could be seen in the section looking at projects completed in the last ten years. Finalised outturn costs were only available for five of the 17 projects, including only one major project (>£50million). The lack of consistent, accurate, and clear information on the amount being spent on road-building makes parliamentary and public scrutiny of these projects virtually impossible. This deficit of democratic oversight is particularly troubling in an area which has such a large impact on climate change and communities.

3. COSTS INCREASE BY NEARLY DOUBLE ON AVERAGE

Where it was possible to establish project cost estimates at the time of ministerial approval, the data show that road-building projects almost always experience cost increases – many of them significant. Only one project in the past ten years did not experience a cost increase. The average cost increase of major projects in the last ten years was 86%, and for the ongoing major projects that have had updated estimates, they have already increased by an average of 82%. For the past decade, if the large savings on the Forth Replacement Bridge are excluded, costs on the other four major projects actually increased by an average of 115% – more than doubling.

4. PROJECT APPRAISAL NOT FIT FOR PURPOSE

The current appraisal system for transport projects is heavily biased towards the value of time saved. The fixation on this metric is often the only way to justify road schemes, and it is out of step with reality. Time savings values are based on the assumption that travel time is non-productive, and so decreasing it increases productivity. This model based on a business executive driving between locations ignores the fact that people can be 'productive' when travelling in certain ways (for instance, working on the train), and that productivity is not the main concern for many types of travel.⁸² Even in its flawed state, the appraisal system is often not fully implemented, as the first stage should consider a range of options and travel modes to address a transport issue. However, the system is often used to justify a decision that has already been made to build a road.

Furthermore, in cases where the Government is determined to build a road and time savings are not sufficient justification, such as the A9 dualling, additional factors are added. Yet the existential climate threat is not sufficiently considered if it is considered at all. Whilst the phenomenon of induced traffic is widely accepted, its impacts both on reducing the journey time benefits and increasing carbon emissions is not included in appraisal. Transport Scotland is using an appraisal system that over-emphasises a narrow and outdated metric, whilst ignoring the ways that transport projects interact with and impact climate, quality of life, inclusivity, and human behaviour.

5. SOCIAL AND GENERATIONAL INJUSTICE

Given that 28% of Scottish households do not have access to a car, rising to 60% for those earning £10,000 or less, spending on motorways and dual carriageways also compounds inequalities and undermines the call to shift to active and sustainable options.⁸³ This leads to adverse health and societal impacts for the country as a whole. At a time when the government should be providing transport infrastructure that improves people's health and widens access to facilities and services, it is spending billions to reduce average journey times for the wealthiest by a few minutes.

With a finite amount of funding available, the vast amount of money being spent on building new roads precludes investment in building a more sustainable, resilient, and healthy Scotland. In particular, as Covid-19 has fundamentally impacted the economy and society, we need to take the opportunity to rebuild in a way that looks forward instead of replicating the mistakes of the past. Scotland should take advantage of new ways of working and societal shifts to create a fairer, greener and more robust transport system. These topics were explored in the TransformScotland's Corona Recovery Series.⁸⁴ But for this to happen, investment is needed in infrastructure that enables better and more flexible ways of travelling – instead of locking us into decades of high-carbon travel.

4

RECOMMENDATIONS

1. RESPONSIBLE PRIORITIES



Advice from a range of expert advisory groups has consistently identified changes to infrastructure investment priorities as a crucial issue for the Scottish Government to address in order to reduce transport emissions and societal inequalities. For example, the UK Committee on Climate Change called in May 2020 for governments to “avoid locking-in higher emissions or increased vulnerability to climate change in the longer-term”.⁸⁵ The Scottish Parliament’s Environment, Climate Change and Land Reform Committee recommended in November 2020 that “transport budgets and fiscal incentives are targeted at reducing demand for travel by car and encouraging the use of active and sustainable modes, e.g. prioritising investment in active and sustainable travel infrastructure rather than additional road capacity.”⁸⁶ Urgent action is needed:

1.1. Cancel the dualling of the A9 between Perth and Inverness and of the A96.

These projects are incompatible with Scotland’s climate change targets, place a massive burden on all other sectors and the country as a whole, and will lock in increased emissions for years to come. The business cases for both projects are weak, and do not stand up to scrutiny when climate impacts and existing safety interventions such as average speed cameras are taken into account. Cancelling the projects would free up investment for providing sustainable alternatives to reduce the pressure on the existing roads. As found by the South East Wales Transport Commission when they studied how to deal with congestion on the M4, a “Network of Alternatives” is a more effective way to increase travel capacity than building new roads which will soon fill up again. This will see investment in rail, bus, and active travel and, importantly coordinating them and ensuring they work together as an integrated system. “A network approach puts a focus on integration, allowing for flexible journeys, reflecting the diversity of trips that people want to make. When the different parts work together, its value can be greater than the sum of its parts.”⁸⁷ Importantly, this creates a just solution as well, ensuring there are options for the 28% of the Scottish population without access to a car.

1.2. Declare a moratorium on all road-building projects so they can be assessed against Scotland’s climate policies and targets, including the 20% reduction of car kilometres by 2030.

Tackling problems such as congestion and journey times should be done by considering all transport modes and multiple approaches, and only developing options that will move Scotland to a net zero emissions economy. Expert advice, such as that from the Just Transition Commission and Infrastructure Commission for Scotland, must be followed to ensure an effective and equitable transition. As well as the imperative to act quickly to avoid catastrophic climate change, what is built in the next ten years will lock in future economic and climate benefits or costs. The infrastructure we build today will influence behaviour for many years, defining what methods of transport are attractive, convenient, and inexpensive.

1.3. Fully fund the £2+ billion maintenance backlog to fix Scotland's existing roads.

Fixing local roads would help not only car users, but also pedestrians, cyclists and bus users. The Infrastructure Commission for Scotland called in January 2020 for

“ a presumption in favour of investment to future proof existing road infrastructure and to make it safer, resilient and more reliable rather than increase road capacity. ”⁸⁸

Building expensive new dual carriageways and motorways disproportionately favours the wealthy, whereas fixing local roads benefits everyone, including the 28% of Scottish households without access to a car. Not maintaining local roads to a high standard also undermines the shift to active and sustainable options. The extensive road-building programme adds further pressure to the maintenance budget, potentially leading to further neglect of the existing road network.

1.4. Commit significant spending to develop sustainable transport options.

The Scottish Government has failed to invest in enhancements to the rail network. For instance, research by the Scottish Parliament Information Centre showed that in the 2020-21 budget, the Scottish Government claimed to have increased funding for rail and bus services by £286 million. However, the vast majority of that – £270 million – were contractual payments to support ongoing operation of the railway, with the remaining £16 million going to the increased costs of running the concessionary bus fares scheme. There has been only minimal investment in the Highland Mainline even though much more significant spending was promised to increase capacity for both passengers and freight. Yet billions are being spent to dual the A9, which runs parallel. Cutting the billions being spent to build new road capacity could allow funds to be redirected to develop new rail routes or services, support bus service improvements, and increase the availability of demand-responsive public transport in rural areas. Furthermore, while the most climate-friendly and cost effective forms of transport – walking and cycling – received a modest funding increase in the last budget, as a proportion of the total transport budget, active travel funding decreased from 3.34% in 2018-19 to 2.85% in 2020-21.⁸⁹ Given how much less expensive active travel is compared with road-building, small cuts in the programme to increase climate-destroying road capacity could easily see active travel funding reach 10% of the transport budget – considered the minimum necessary investment to increase active travel through high quality walking and cycling infrastructure.

2. CLEAR COSTS



Given the large amounts of public spending at stake, it is vital that clear, accurate costings are available for road-building projects. The public and Parliament should be able to easily assess how much these projects cost, and how the cost has changed over time. This would make it easier to encourage good governance and accountability. Specifically:

2.1. TransportScotland should publish a register of all current and past road projects that includes the most accurate cost estimates or outturn costs, as well as the original cost estimates when the projects were approved.

This register needs to be updated on a regular schedule to ensure the most up to date costings are easily available. For projects funded through some form of “public private partnership” (e.g. the Non-Profit Distributing model), the financial information must be simplified so it is clear what the total capital cost of the project is to the Scottish Government.

2.2. The additional maintenance burden of new roads should be included on the road project register.

The register should state the best estimate as to the cost of extra annual maintenance due to any project that is building new road capacity. This is particularly important given the extensive existing maintenance backlog.

2.3. 1 Year After (1YA) and 3 Year After (3YA) reports should be consistently and timeously published for all road projects and include finalised outturn costs.

Whilst these reports are published for some road projects, they are not available for all, and are often published many years after the relevant time period. Moreover, in several cases, final outturn costs are missing.

3. INTELLIGENT ASSESSMENT



Appraisal of road projects is inconsistent both in how and when it is carried out. The Scottish Transport Appraisal Guidance (STAG) is sometimes used opportunistically either by only following parts of it, or adding in metrics that help justify a project. Even when STAG is properly followed, its overemphasis of the benefits of time savings, and failure to include Scotland's climate commitments means that it is outdated and not fit for purpose. It has an over-reliance on time savings and is inconsistently applied. Therefore:

3.1. A Multi-Modal Corridor Action Plan method should be created and used to develop new projects to address problems on existing routes.

Problems such as congestion on the roads or difficulty in getting between two locations cannot be dealt with by building more roads, they must be addressed through a package of measures for the whole area or town. Developing a Multi-Modal Corridor Action Plan will allow roads, railways, buses, and active travel to be looked at as a whole and for effective, integrated solutions to be developed.⁹⁰ Instead of just focusing on cars and lorries, it is crucial to consider all travel modes to create a wholistic, credible, and sustainable solution. This is the approach the Welsh Government took in developing a solution for the congested M4.⁹¹

3.2. All transport assessments must take into account Scotland's climate targets, and keep up to date with any changes to the targets.

Projects must be assessed for their climate impact, and compared with a carbon budget that is compliant with Scotland's targets. This assessment must compare any potential emissions with a compliant carbon budget for road transport emissions in the local authority area. It is inaccurate and hugely misleading to compare local projects to the carbon budget for Scotland as a whole.⁹²

3.3. Any carbon impact assessment also needs to incorporate the effects of induced traffic.

The fact that new road capacity leads to an increase of traffic levels over any baseline increase that would have happened anyway is accepted by Government, but not incorporated into assessments. Even with the current journey time savings-biased appraisal method, if induced traffic were included the purported reduced journey times would evaporate after a few years.

3.4. Any updated appraisal system must accurately reflect the economic, social, and well-being benefits people gain from travelling by sustainable modes.

This includes activities such as being able to work, watch a film, or read on a train; impacts on social inequalities; and improved mental and physical health from exercise when travelling by foot or bicycle.

4. TRANSPORT GOVERNANCE



The way transport is managed and governed in Scotland must be reformed to enable the shift away from car-centric transport planning that encourages ever more road-building. Transport Scotland's remit is strongly skewed towards roads and cars, with three of its eight directorates (Low Carbon Economy, Major Projects, and Roads) primarily focused on them. This structure perpetuates the need for further road-building projects, particularly in the case of the Major Projects directorate which would be redundant without them. The two directorates dealing with road infrastructure – Major Projects and Roads – require urgent reform:

4.1. The Major Projects directorate should be reorganised as the Sustainable Projects directorate and its remit changed to delivering projects from STPR2.

The Major Projects directorate is primarily concerned with building new roads. With this remit they must develop and build new roads to justify their existence, which is highly problematic. Instead, this directorate should be tasked with the delivery of STPR2 so that it is aligned with Scotland's strategic transport priorities and there is a clear mechanism for delivering them. This new Sustainable Projects directorate would still be responsible for road-building, but the road projects that are delivered will have been prioritised against projects for other modes, have demonstrated a clear strategic purpose, and be part of an integrated, multi-modal, sustainable transport system.

4.2. The remit of the Roads directorate should be adjusted to more strongly reflect the interests of non-car users.

This directorate is currently responsible for maintaining trunk road infrastructure, but more focus should be put on addressing the needs of public transport and active travel users of the trunk road network, and enhancing its value to them. This would include responsibility for implementing bus priority measures, and improving conditions for people walking, wheeling, and cycling along the corridors served by the trunk road network and in places where it intersects with active travel infrastructure.

An aerial photograph showing a multi-lane highway under construction or maintenance. The road is surrounded by dense green forests and some cleared land. Several vehicles, including cars and trucks, are visible on the road. In the background, there are rolling hills and a cloudy sky. A white box with a blue number '5' is in the top right corner, and a blue box with the text 'CASE STUDIES' is in the bottom left corner. There are also decorative diagonal line patterns in the top right and bottom left corners.

5

CASE STUDIES

M74 COMPLETION

PROJECT OVERVIEW

A new five mile, six-lane urban motorway connecting the northern terminus of the M74 with the M8 in the west of Glasgow. The route runs through predominantly deprived neighbourhoods and the motorway was largely elevated. Scotland's largest road project at the time, and promoted by the Scottish Government as a "vital missing link" in the motorway network, it was widely opposed by communities near the route who faced the demolition of over 140 homes, businesses and churches, and increased traffic noise and pollution. The local population were expected to accept these life-changing impacts to save drivers 9.6 minutes of journey time in peak traffic, and 5.8 minutes off-peak. Alternative approaches to managing traffic on the M8 (such as no-car lanes and public transport improvements) were not considered.



Image from TransportScotland website

GOVERNMENT INQUIRY FINDINGS

Due to the level of objection, the Scottish Government ordered a public inquiry to be held into whether or not the project should proceed. The final report from the inquiry found that it would have "potentially **devastating effects on the local and wider economy**" for benefits that "would be much more limited, more uncertain, and (in the case of the congestion benefits) probably ephemeral." The Reporter's recommendation was therefore that "this proposal **should not be authorised**." The report found the project to be hugely detrimental in several key policy areas:

- **Journey-time reductions** used to justify the M74 **would not last**, due to induced traffic, and it would in fact **increase traffic** in the Glasgow area **by 5%**;
- Supposed **business benefits** due to increased 'access' **would not last due to traffic**, and these would in any case be at the expense of other areas in the region;
- The new road would **worsen social exclusion** by undermining public transport improvements and increasing physical severance of a community with low rates of car ownership;
- **Increased air pollution, noise, and visual impact** would be experienced by those living near the route;

M74 COMPLETION

- **Environmental justice policies would be breached** as the poorer populations living along the route would generally not gain any benefits whilst suffering the adverse environmental impacts – the benefits would instead accrue to vehicle users and businesses from outwith the area;
- **Carbon emissions would increase by around 5.7% per year** (135,000tonnes) compared with the ‘do minimum’ case.

Despite the public inquiry comprehensively demolishing the case for the M74 Completion project, and in fact showing it would be hugely detrimental, the Scottish Government overrode the Reporter’s findings and approved the project. This was a case of a massive amount of public money being spent on road-building in spite of the evidence showing that it would not achieve its goals and instead be detrimental to the local area and the economy as a whole.

ACTUAL HEALTH IMPACTS

A major academic study was carried out to measure the health impacts of the new motorway, by carrying out a “mixed-method controlled before-and-after study.” This involved the area around the M74 route as well as two control areas in Glasgow (one with an existing motorway, one without), and a variety of surveys, quantitative and qualitative studies, data analysis, and community engagement.⁹³ The study compared findings from the years following the opening of the M74 Completion project against a baseline from 2005. Overall, it “found no evidence that it had reduced road traffic casualties” and that “those living nearer to the motorway tended to experience poorer mental well-being over time than those living further away.” More specifically:

- The new motorway seems to have promoted car use;
- It has not reduced accidents or serious and fatal road traffic casualties;
- People living nearer to the motorway experience poorer mental wellbeing;
- Some local residents have found the motorway helped connect them with amenities and other places;
- Active travel has not been affected by the new motorway (i.e. no increases due to cars being removed from local roads).

SPENDING

The M74 Completion project **almost quadrupled in cost** from its initial estimate to completion, increasing by 291%. By the time of ministerial approval the cost estimate had already increased, but even compared with this, the final cost has almost tripled, with an increase of 183%.

- **1995 – initial estimate: £177million**
- **2001 – Scottish Government approval: £245 million**
- **2003 – Public Local Inquiry commences: £375–£500 million**
- **2015 – 1 Year After Evaluation Report: £692.3 million**

A9 DUALLING

PROJECT OVERVIEW

The A9 between Perth and Inverness contains 30 miles of dual-carriageway sections, and the A9 Dualling Programme aims to widen all 80 miles of single-carriageway sections so that the entire route will be dual-carriageway. Dualling the A9 was a political promise. It was not made based on an assessment of the issues along the route and how they could be best addressed. It was essentially predicated on the outdated idea that widening roads is inherently beneficial to 'the economy.' As it was clearly a very expensive project, and no appraisal had been carried out, a figure of £3 billion was given as the total cost. Despite the fact that this initial estimate was essentially a guess, it has not been refined and updated as the detailed design work for the individual sections has been carried out.



Image from TransportScotland website

JUSTIFYING THE PROJECT

Since the Scottish Government committed to the A9 Dualling Programme without first assessing whether the project was worthwhile, it was necessary to retroactively develop a business case for it. The first stage of the standard Scottish transport appraisal method (STAG) specifies that a problem should be identified and a range of solutions assessed without favouring a specific travel mode. However, it had already been decided to build new road capacity, so this stage was skipped. There are significant issues with the rest of the STAG process, mainly centred around an over-emphasis of the benefit of journey time savings and the lack of proper accounting of the climate change and other environmental impacts, as discussed elsewhere in the report.

To justify this road-building project, the STAG method for calculating a benefit-to-cost ratio (BCR) was used, and considered the monetary equivalent of journey time savings, increased road safety, and reduced vehicle operating costs as benefits. However, this showed the cost of the project would be £419 million more than the costs, giving a BCR of 0.78. So Wider Economic Benefits were included as well – but this still only raised the BCR to 0.89. Since the Government was determined to press ahead with this project, a novel metric was created: 'reduced driver frustration.' This is a metric that has not been used before or since, and assigned a monetary benefit to lower levels of frustration. This would have been a good opportunity to also include a full accounting of the impact on Scotland's climate change targets in the assessment, however this was not done. With the driver frustration metric included, the BCR inched above the threshold to 1.12.

A9 DUALLING

To make matters worse, the road safety benefits of the dualling scheme have been fatally undermined by effective, and far less costly, measures that have been brought in since the commitment to dual the A9 was made. In 2014 average speed cameras were installed and the HGV speed limit was raised from 40mph to 50mph. The impact of the speed cameras has been significant:⁹⁴

Average annual fatalities: ↓ 40%

Average number of collisions: ↓ 23%

Annual traffic volume: ↑ 13%

Total casualties: ↓ 27%

Road closure/restrictions due to collisions: ↓ 25%

Despite increased road safety being one of the core benefits in the original A9 dualling business case, the BCR has not been reassessed in light of the increase in safety due to the average speed cameras and higher HGV speed limit. The additional safety benefits from dualling the A9 will now be far less since the existing road has already realised much of them. Yet the political decision to build new road capacity is unchanged by the evidence – since the commitment was made, both the effectiveness of inexpensive safety measures, and the scale of transport's failure to contribute to emissions reductions have become clear.

SPENDING

The commitment to dual the A9 between Perth and Inverness was made for political reasons and without carrying out an analysis of the likely cost. The initial 'estimate' was therefore very rough and not based on the specific conditions and constraints of the route. In fact, full route options had not been determined at the time of approval. An accurate estimate of the cost for the whole route has still not been produced, but after a few years the lower bound of the estimate was dropped as it was clearly unrealistic.

In recent years, as issues have arisen with parts of the route and other major road projects have seen significant cost increases, transport experts have come to doubt that the quoted £3 billion cost of this project is achievable. For example, there are many constraints on the section from the Pass of Birnam to Tay Crossing. For this 8.4 kilometres stretch, the community's preferred option would cost up to £1.6 billion and involve extensive ongoing maintenance costs due to the construction of a tunnel. Even the least expensive alternative option TransportScotland developed for this short section would cost half a billion.⁹⁵ Since a total of 129 kilometres must be dualled for this project, it is unrealistic that this will be achieved for £3 billion when one-sixth of this amount will need to be spent on 6% of the route at a minimum (and against the strong preference of the community).

An overview of spending on the full A9 Dualling programme is as follows:

- 2009 – initial estimate, and Scottish Government commitment: £1.5–£3 billion
- 2012 – TransportScotland project page: £3 billion
- 2020 – Transport experts consider £3 billion unrealistic: £5 billion considered 'reasonable expectation'
- 2021 – based on 86% average cost increase of major projects in the last decade: £5.6 billion

A96 DUALLING

PROJECT OVERVIEW

Aside from sections at either end (with a combined length of 13 miles) the 99 mile A96 trunk road between Inverness and Aberdeen is a single carriageway road. Widening the A96 to dual carriageway between Inverness and Nairn, and building a bypass around Nairn were recommended by the 2008 Strategic Transport Projects Review (STPR), but the rest of the A96 was simply to receive targeted “enhancements” to provide congestion relief. These would be modest (in transport terms), costing an estimated of £10–£50 million. The STPR specifically rejected fully dualling the A96, stating that:

“ Partial dualling of the A96, with a series of complementary measures [dual carriageway between Inverness and Nairn] and [targeted road congestion relief schemes] are more likely to address the strategic objectives in a cost effective manner...dualling of the entire route would not provide value for money. ”⁹⁶

These recommendations were taken up by the Infrastructure Investment Plan (IIP) 2008 which included “improvement schemes” for the A96. However, when the IIP 2011 was published, although the projected project pipeline only included dualling the A96 between Inverness and Nairn to start in 2020, the document was ambiguous about the rest of the A96, including references to full dualling and “a view to completing the dualled road network between all our cities by 2030.”⁹⁷ By 2013 this had solidified into a definitive commitment to fully dualling the A96, even though the scheme had not been reassessed and found to represent good value. The lack of sound decision-making was confirmed by the 2014 Strategic Business Case, which found full dualling did not provide the best value for money. It, however, recommended full dualling simply because the Scottish Government had made a commitment to connect all Scottish cities by dual carriageway. Unfortunately, as also seen with the A9, if it is politically expedient to spend vast sums building new roads, evidence is simply ignored, even in a time of climate crisis.



Image from TransportScotland website

“DUALLING” OR “BUILDING A NEW FOUR-LANE ROAD”?

The “western section” of the project represents 29-miles, or one third, of the route. TransportScotland continues to describe the work to take place here as “dualling.” What is in fact being proposed is that a brand new, longer, four-lane road be built through fields and woodland, and the existing road be kept and maintained for continued use. This will split farms, decrease farmlands, and destroy wildlife habitats and corridors, impacting protected species and woodlands.⁹⁸ Widening the A96 would already increase carbon emissions – building an additional 29-mile road will have an even larger effect on creating induced traffic, further compounding the damaging climate change effects of this road-building project.

SPENDING

As noted above, the commitment to dual the A96 was made based on the principle of dual carriageways connecting all Scottish cities, not on a cost analysis. At the time the Scottish Government committed to dualling the A96, proper cost estimates had not been developed. Since it involves building many miles of dual carriageway, an ‘estimate’ for the project was given to match the similarly uninformed estimate for the A9 dualling programme. More accurate estimates for the whole programme have not been published, but transport experts think that the cost will rise above the £3 billion still being quoted by TransportScotland. Even the general press now consider that the A9 and A96 dualling programmes will likely cost more than £9 billion.⁹⁹ The average cost increases of past projects provide a reasonable guide of what to expect.

- 2008 – initial estimate (partial dualling and targeted improvements):
£0.26–£0.55 billion
- 2013 – Scottish Government commits to full dualling: £3 billion
- 2021 – based on 86% average cost increase of major projects in the last decade:
£5.6 billion



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