Academy Street

Traffic Impact and Economic Impact Assessments

April 2024

Headlines

Traffic Impact Assessment:
— The scheme triggers displacement of traffic, which can be accommodated on the wider road network.
— Within close proximity to Academy Street, the junctions and local roads see betterment in their operational performance
— Across the road network, only the Harbour Road area is forecast to have perceivable increases in delay for road users.

Economic Impact Assessment:
— A balanced economic view presented with benefits and disbenefits identified
— Wider economic benefits highlighted to be between £1.5m and £4m to the City of Inverness.
— Recognised extension in journey times for displaced traffic results in a low benefit to cost ratio, if people continue to choose to drive.
— Significant improvements for active travel users.
— Improvements for Bus, Active Travel, Environment, safety and wellbeing

In each of the technical assessments a worst-case scenario is considered, therefore does not quantify traffic evaporation.

It should be understood that the BCR is a metric used to measure the economic impact of a transport scheme against public expenditure. The BCR is calculated by multiplying small changes in journey times by millions of journeys over 60 years. In Scotland, the government acknowledges that the BCR should not be a sole determining factor of value for money. If following DfT guidance it would traditionally fall within the 'poor' category, however, a schemes alignment with local and national policy and its ability to meet the objectives should also be considered in the overarching case for investment alongside the forecast quantified wider economic benefits. The scheme and case for investment is further complemented through the delivery of a city-wide master plan to improve the sustainable travel network, making those journeys undertaken by bus and active travel easier and more accessible.

Economic Impact Assessment

EIA: Overview

❑ This evaluation is conducted within the framework of the Scottish Transport Appraisal Guidance (STAG) criteria:

  ❑ *Economy, Environment, Climate Change, Health, Safety & Wellbeing, and Equality & Accessibility.*

❑ Understand the transport economic impact of the Scheme by examining:

  ❑ *Wider economic impacts (not monetised)*
  ❑ *Monetisable outcomes 'Transport Economy Efficiency'*
  ❑ *Non-monetisable transport outcomes (e.g. environment, health and wellbeing, accessibility)*

❑ Monetised – elements that can be quantified are given a monetary value

❑ The monetised elements are used to help ascertain value for money (VfM) of the investment.

Wider Economic Impacts: Introduction

❑ Wider economic impacts are impacts not captured by the 'transport economics' impacts.

❑ This is a relatively new area of impact assessment and although the impacts are not included in scheme Benefit Cost Ratio (BCR), they nevertheless form an important part of the overall economic appraisal of a proposed scheme.

❑ Scheme appraisal guidance (including Scottish Government STAG) states that these types of impacts should be considered alongside the more traditional transport-based impacts.

Wider Impacts: Case Study Evidence

❏ Research (such as the **'Pedestrian Pound'** by **Living Streets** and in **Scotland**, the **'Environmental, Social and Economic Benefits of Sustainable Travel to Local High Streets and Town Centres'**) acknowledges that unlike conventional transport economic impacts, the majority of the evidence in support of public realm investment exists in case study form.

❏ This reflects current thinking whereby appraisers are interested in actual observed (or 'real world') wider economic impacts.

❏ The evidence used is therefore based on the metrics identified in several case studies undertaken throughout the United Kingdom, including Scotland.

Wider Impacts Evidence Base and Case Studies: Key Findings

❑ In many cases, there is understandable 'up front' concern about the impact of schemes where car traffic is diverted away from busy urban thoroughfares.

❑ There is also acknowledgment that "high streets" have faced a difficult period with 1) the rise in online retailing, 2) the impacts of the pandemic, 3) 'cost of living' issues and 4) out of town retailing (these issues have compounded the concern expressed in the first bullet above).

❑ There are several factors underlying changing town centres.

Wider Impacts: Types of Impacts

- ❑ Footfall (5%, 10% and 15% increase)

- ❑ Expenditure including by visitors

- ❑ Public Amenity

- ❑ Crime Reduction

- ❑ Land value and rates

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Wider Impacts: Types of Impacts

Increased footfall and expenditure (from the **'Pedestrian Pound'**).

(Table, right, from: https://www.livingstreets.org.uk/media/2t0hyzcm/pedestrian-pound-2018.pdf)

> Several UK studies found that footfall increases by approximately 30% after the introduction of sustainable travel measures (Momentum Transport Consultancy, 2022)

Altrincham, Greater Manchester	Various public realm improvements and new market	Increased footfall by 25% and reduced retail vacancy 22.1%	Trafford Council, 2017
Bristol	Various public realm imrpovements	Projected £1.4 million over ten	Drivers Jonas LLP and Colin Buchanon, 2008
Coventry	Pedestrianisation, a new civic square, clearer signage and better placement of street furniture	25% in footfall on Saturdays	NWDA/RENEW Northwest, 2007
Ealing	Improved lighting, street cleansing, de-cluttering, better signage	Improved visitor perception and reduction in crime	Ealing BID, 2009
Kelso, The Scottish Borders	Public realm improvementsbetter placement of street furniture	28% increase in footfall	Scottish Borders Council, 2016
London (Wanstead High Street)	Intervention to increase walking for short trips	98% increase in pedestrian numbers	Tolley, 2011
London	Canal towpath	£5.4 million in reduced absenteeism	Davis, 2010
London (Shoreditch)	Temporary 'parklet'	20% increase in takings over three-month period	Hackney Council, 2017
Sheffield	Peace Gardens	35% uplift in the number of visits for shopping and a net increase in spending of £4.2m	Genecon, 2010

Wider Impacts: Summary of Quantifiable Types of Impacts

Wider Economic Impact	Low Impact	Medium Impact	High Impact
Additional Retail Footfall Expenditure	£1.37m	£1.44m	£1.50m
Additional Property Rental Values	£55,781	£58,437	£61,093
Additional Visitor Expenditure	n/a	£2.1m	n/a
Crime Reduction Impacts	£68,819	£137,639	£275,277
Public Amenity Impacts	n/a	£113,538	n/a

Wider Impacts: how the findings are used in the Economic Impact Assessment (EIA)

❑ Based on STAG guidance for economic assessments and given the range of likely outcomes, quantified wider impacts are not included in the project Benefit Cost Ratio (BCR) but do form part of the overall evaluation.

❑ The quantified wider impacts generate benefits between £1.5 million and £4 million in present day values. Alongside the transport benefits, this strengthens the case for investment.

❑ When the wider impacts are combined with the transport-based impacts a 'Minor Benefit' score of +1 is achieved – see this on the STAG scale below:

-3

+3	+2	+1	0	-1	-2	-3
Major benefit	Moderate benefit	Minor benefit	Neutral (no benefit or impact)	Small minor cost or negative impact	Moderate cost or negative impact	Major cost or negative impacts

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Assessment Inputs: Data

❏ Multiple data sources utilised including:
- o Inputs – scheme opening year, type of infrastructure before and after, length, location, number of trips before and after the scheme is implemented, changes in journey times, bus service frequency
- o Traffic modelling outputs from the TIA
- o Viva City Walking and Cycling data
- o Automatic Vehicle Location (AVL) data from bus operators

❏ All datasets have been evaluated over a 12-hour appraisal period and have been annualised over a standard 253 days

❏ Standard appraisal periods are then applied to each impact to determine a whole-life outcome

AVL Data

Traffic modelling outputs

VivaCity Data

Data Baseline

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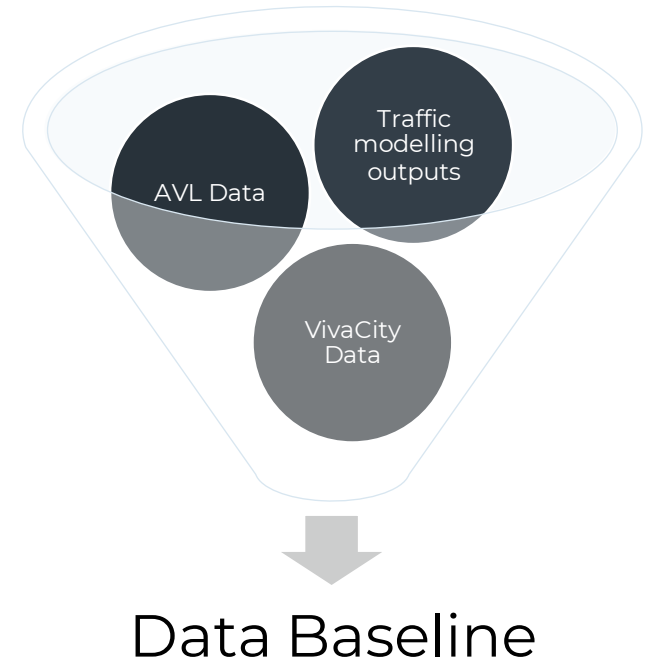
Transport Economy Efficiency (TEE): Tools

❑ User impacts have been assessed using industry standard tools:

  ❑ **Active Mode Appraisal Tool (AMAT):** assesses active travel impacts adhering to Transport Analysis Guidance (TAG) Unit A5-1, and UK government guidance including His Majesty's (HM) Treasury Green Book.

  ❑ **Ambience Benefit Calculator (ABC):** monetises changes to individual journey ambience and public realm attributes using willingness-to-pay-values.

  ❑ **Active Travel England uplift tool:** calculates forecast 'with scheme' demand using infrastructure type and cost to estimate changes in demand.

  ❑ **Transport User Benefit Appraisal (TUBA):** quantifies journey time impacts for road users.

  ❑ **Bus User Journey Time tool:** applies values from TAG to monetise bus user impacts to changes to bus routing and increases or decreases in bus journey times.

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Transport Economy Efficiency (TEE): Impact Areas

Changes in active travel user Journey ambience

Changes in delay, distance and speed,

Health

Journey Quality

Mode Shift

Travel time

Vehicle Operating Costs

E.g. Risk of premature death, increased physical activity

E.g. Congestion, infrastructure costs, local air quality, noise

Changes in fuel expenses, maintenance and repair of vehicles for all trip purposes
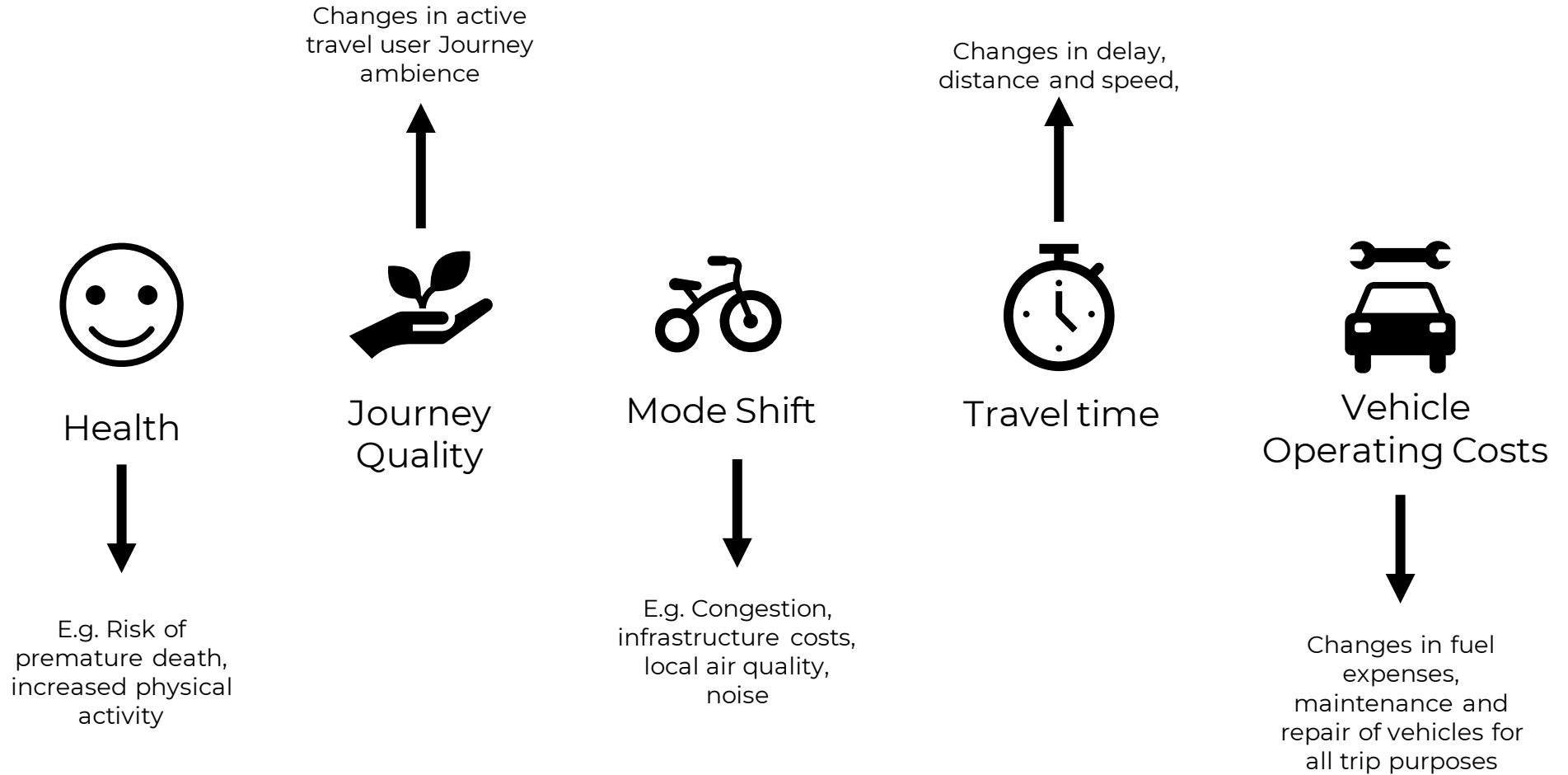
Transport Economy Efficiency (TEE): Outcomes

Outcome	Impact
Vehicle Operating Costs: Business	(negative)
Vehicle Operating Costs: Other	(slightly positive)
Vehicle Operating Costs: Commuting	(near zero)
Travel Time: Business	(negative)
Travel Time: Other	(negative)
Travel Time: Commuting	(negative)
Greenhouse Gases	(negative)
Accidents	(slightly positive)
Air Quality	(near zero)
Noise	(near zero)
Congestion savings	(positive)
Active Travel User Journey Quality	(large positive)
Absenteeism	(positive)
Reduced Risk of Premature Death	(large positive)

Negative Impact ← → **Positive Impact**

15

Non-Monetised Impacts

Environment

Improved appearance of the street

Reduced motor vehicle dominance in the street

Trees and planters slightly improve biodiversity in the street

Lower traffic volumes on Academy Street may improve local air quality and noise

Displaced traffic is expected to increase daily car kilometres

Decreases in air quality and increases in noise in other locations on the network – modelling required to determine scale of impacts

Climate Change

More car kilometres travelled will increase GHG emissions. Partially offset from modal shift to sustainable travel

The inclusion of trees and planting can improve Academy Street's ability to adapt to climate change

Health, Safety and Wellbeing

Traffic displacement will reduce the risk of accidents on Academy Street, but could transfer risk to alternative routes where traffic volumes increase

Security is likely to improve due to increased passive surveillance

Equality and Accessibility

It will be easier to walk, wheel and cycle, to other transport amenities such as the railway and bus stations

Improved coverage of Inverness's active travel network and provides opportunities for walking and cycling within the city centre

Access to blue badge parking and taxi bays remains

Economic Impact Assessment - Summary

EIA has assessed the economic performance of the Academy Street scheme to help determine VfM

- ❑ The EIA has concluded that impacts are spread across the minor beneficial to minor negative categories

- ❑ It has compared the transport economic impacts against the cost of the scheme (Benefit to Cost Ratio), and has concluded that there would be a negative monetised return on the investment
  - ❑ For every pound spent it is estimated that there will be a £0.51 return (0.51 BCR)

- ❑ VfM category traditionally defined as 'poor'

- ❑ The quantified wider impacts generate benefits between £1.5 million and £4 million in present day values

Traffic Impact Assessment

Traffic Impact Assessment (TIA) - Objectives

TIA seeks to understand what the impacts on the wider road network following the introduction of the bus lanes on Academy Street

- Utilised traffic count data and ANPR data to establish the number to through trips (i.e. cars that drive through Academy Street without stopping) who would have to use an alternative route through the scheme.
- Understand how this traffic through traffic would re-route following the proposals
- Understand what links and junctions would be affected by the displaced traffic during peak periods

In addition:

- What do traffic levels now look like on Academy Street post scheme?
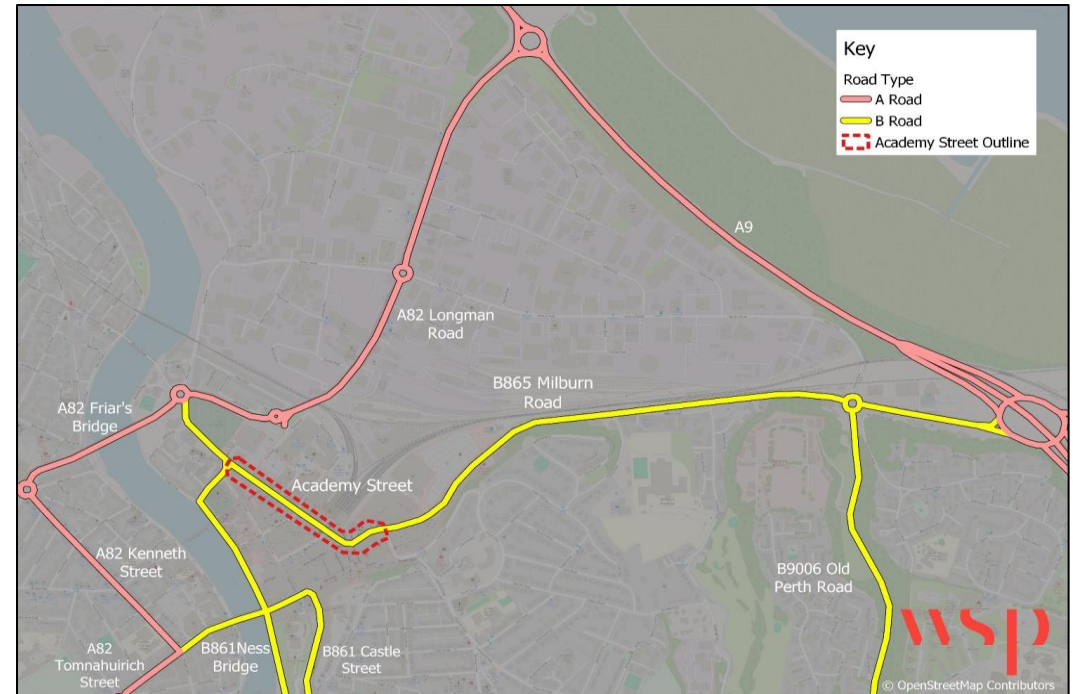
The Calculative Steps Taken...

- Traffic Baseline
- Trip Distribution
- Trip Assignment
- Threshold Assessment
- Junction Impact Assessment
- Link Capacity Assessment
- Results

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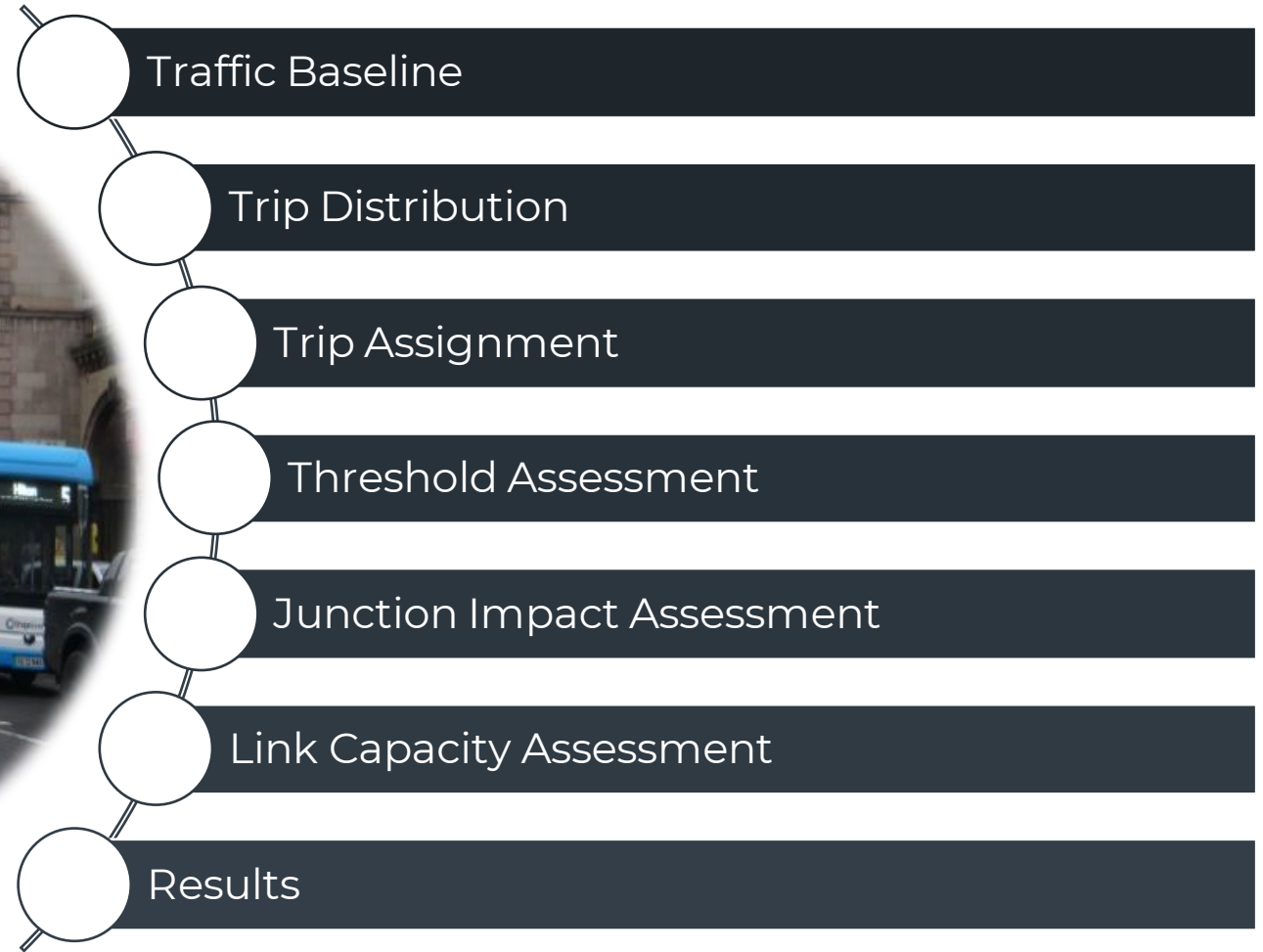
The Traffic Baseline

❑ Multiple data sources utilised including:
  o ANPR data collection on behalf of The highland Council;
  o VivaCity Real-Time data; and
  o Junction turning counts.

❑ Each dataset was screened by WSP to consider the method of collection and validity of the data.

❑ ANPR data was investigated to independently process from raw data.

❑ Site visits were undertaken to walk the study area, as well as drive through and associated video surveys.

❑ The aim of the baseline was to build an accurate picture of the network and its performance at different times of the day.

Traffic Turning Counts

ANPR Data

VivaCity Data

Data Baseline
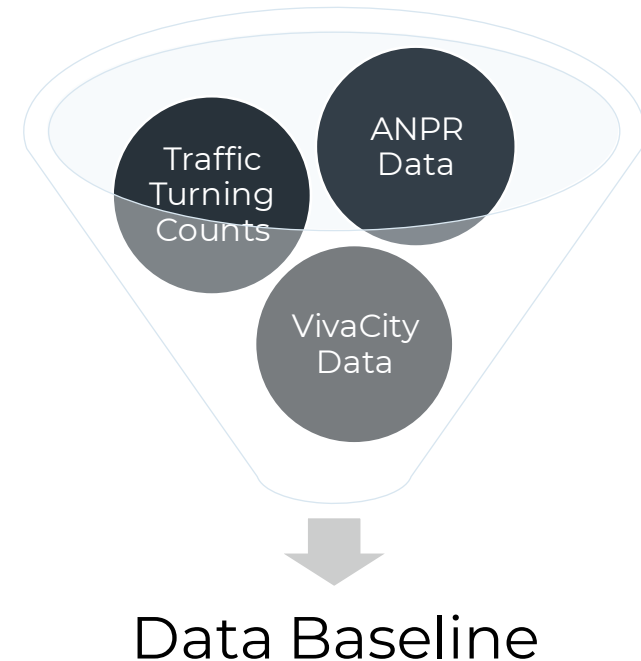
Trip Distribution

❑ A matrix of output zone to output zone, to establish realistically zone to zone movements that could potentially use Academy Street.

❑ Focused on those origin zones and used a gravity model to establish the proportion of trips from each zone to Academy Street based on resident population of driving age.

❑ The census JtW destination zone totals have been used to determine the most up to date economic activity within each zone.

❑ A gravity model has then been developed to establish the destination routing for trips exiting Academy Street.

❑ The process has been repeated for north bound and south bound 'through trips' (i.e. those that are impacted/removed post scheme implementation.

Inverness O-D Matrix (Routing through Academy Street)

Vehicle Assignment

❑ The impact of the scheme sees through traffic movements removed, therefore ANPR survey data was utilised to derive the through trips currently on Academy Street

❑ Through trips re-assignment informed by real-time google traffic routing during busiest network periods.

❑ Internal trips within close vicinity of Academy Street (i.e. those which would continue to route to Academy Street), have been re-assigned based on permitted movements.

❑ The TIA does not discount for mode shift and assumed that all traffic on the network prior to the scheme remains within the network catchment considered.

❑ Vehicle assignment undertaken manually and apportioned based on journey time. i.e. quickest journey has highest proportion assigned.
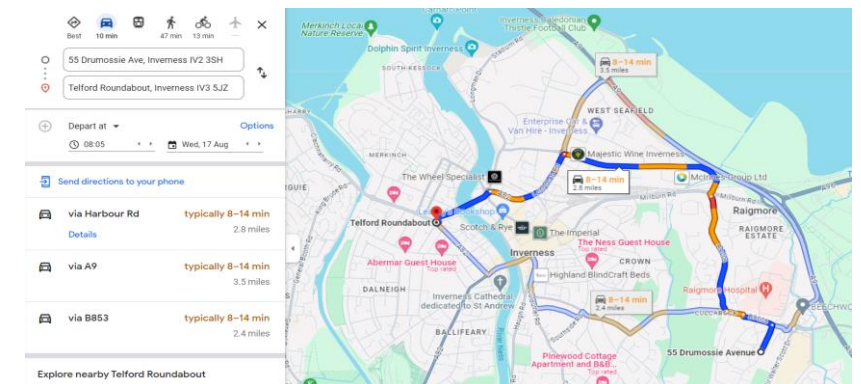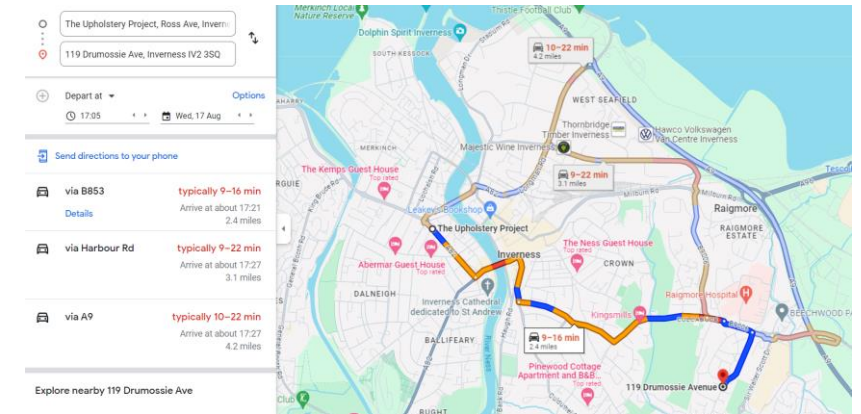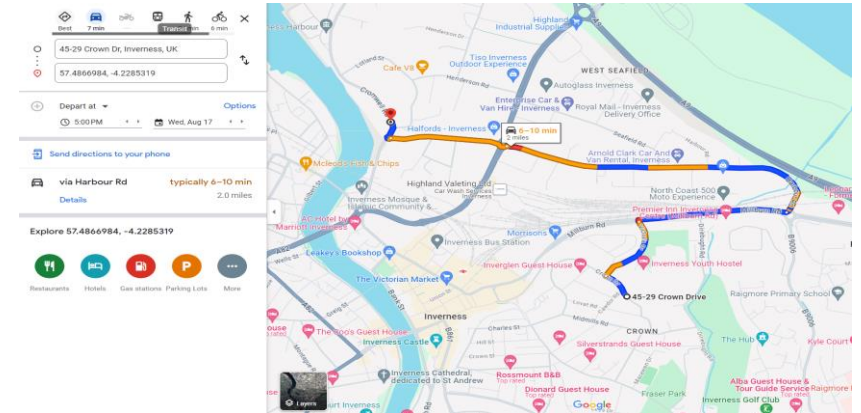
Threshold Assessment

❑ In ascertaining the area of influence/impact of the scheme, post scheme vehicle assignment was compared to the pre-scheme traffic at all junctions in the Inverness area.

❑ A change from the pre-scheme traffic of 5% or more triggered more detailed assessment.

❑ A 5% threshold is typically that which is applied in a congested network, given that a small change can often have perceivable operational impacts.

❑ A total of 15 junctions were assessed using industry standard and accepted software.

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Assessing Junction Impacts

❑ 15 junctions were assessed using industry standard software Transyt and Junctions 10.

❑ Junctions were reviewed on-site to ensure base models mirrored observed conditions.

❑ Where signalised, timings were reviewed on-site alongside signal specification reports.

❑ Two scenarios were tested:
  o Scenario 1: Without Scheme; and
  o Scenario 2: With Scheme

❑ Practical Reserve Capacity, Degree of Saturation, Queue and Delay were measured and reported.
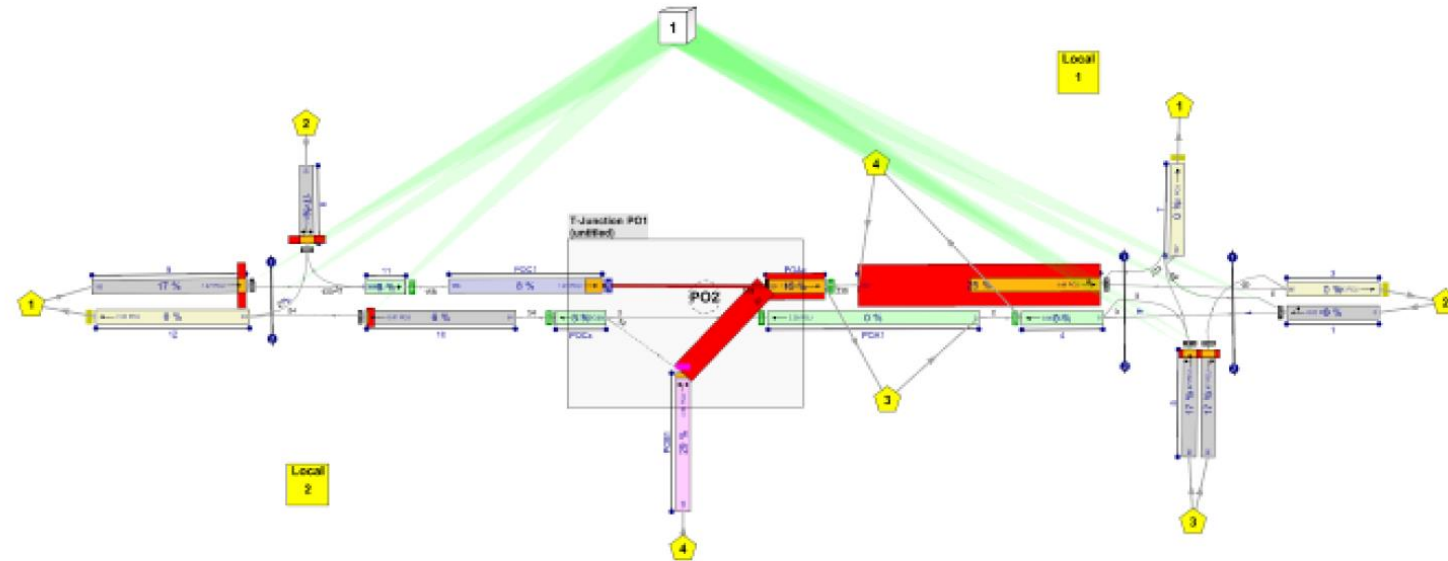
Assessing Link Impacts

- ❑ Each road is categorised by DMRB Criteria:
  - o Posted speed limit;
  - o Section width; and
  - o Road type.

- ❑ Traffic volumes in each scenario are compared with the criteria.

- ❑ Out-turn volume over capacity is presented in percentage terms.

		Two-way Single Carriageway- Busiest direction flow (Assumes a 60/40 directional split)									Dual Carriageway		
		Total number of Lanes									Number of Lanes in each direction		
		2				2-3	3	3-4	4	4+	2	3	4
Carriageway width		6.1m	6.75m	7.3m	9.0m	10.0m	12.3m	13.5m	14.6m	18.0m	6.75m	7.3m	11.0m	14.6m
Road type	UM	Not applicable									4000	5600	7200
	UAP1	1020	1320	1590	1860	2010	2550	2800	3050	3300	3350	3600	5200	*
	UAP2	1020	1260	1470	1550	1650	1700	1900	2100	2700	2950	3200	4800	*
	UAP3	900	1110	1300	1530	1620	*	*	*	*	2300	2600	3300	*
	UAP4	750	900	1140	1320	1410	*	*	*	*	*	*	*	*

Table 2 Capacities of Urban Roads
One-way hourly flows in each direction

Table 9-1 – Academy Street Link Capacity Assessment Results

Link Description	Academy Street - Crown Road to Union Street			Academy Street - Union Street to Queensgate			Academy Street - Queensgate to Post Office Avenue			Academy Street - Post Office Avenue to Friars Lane		
UAP Road Type	UAP4			UAP4			UAP4			UAP4		
Posted Speed Limit	20mph			20mph			20mph			20mph		
Indicative Section Road Width	10.0m			6.75m			6.75m			6.75m		
Max Directional Capacity	1410			900			900			900		
Max Two-Way Capacity	2350			1500			1500			1500		
Comments												
	Northbound	Southbound	Two-Way	Northbound	Southbound	Two-Way	Northbound	Southbound	Two-Way	Northbound	Southbound	Two-Way
2025 Scenario 1 AM Peak	293	275	568	251	325	576	239	285	524	268	248	516
2025 Scenario 1 PM Peak	404	381	785	333	427	760	336	365	701	376	321	697
2025 Scenario 2 AM Peak	83	117	200	-1	83	82	0	195	195	49	133	182
2025 Scenario 2 PM Peak	235	91	326	3	93	96	6	239	245	130	190	320
2025 Scenario 1 AM Peak - Absolute % V/C	20.8%	19.5%	24.2%	27.9%	36.1%	38.4%	26.5%	31.7%	35.0%	29.8%	27.5%	34.4%
2025 Scenario 1 PM Peak - Absolute % V/C	28.7%	27.0%	33.4%	37.0%	47.4%	50.7%	37.4%	40.5%	46.7%	41.8%	35.7%	46.5%
2025 Scenario 2 AM Peak Absolute % V/C	5.9%	8.3%	8.5%	-0.1%	9.2%	5.5%	0.0%	21.7%	13.0%	5.4%	14.8%	12.1%
2025 Scenario 2 PM Peak Absolute % V/C	16.7%	6.5%	13.9%	0.3%	10.3%	6.4%	0.7%	26.6%	16.3%	14.4%	21.1%	21.3%

Key

Link Capacity
— Significantly Under Capacity
— Busier but Within Capacity
— Approaching Capacity

Junctions Assessments
● Operates Within Capacity
● Operates Over Capacity

Traffic Impact Assessment – Results (AM)

❑ Summary of results presented visually below for the critical AM network peak, with scenario 1 representing network performance **without** the scheme and scenario 3 **with** the scheme in place.

❑ Majority of network will continue to operate within capacity, on both links and junctions post scheme.

❑ Post Scheme, Harbour Road is approaching the theoretical maximum capacity of the road, which may lead to regular queuing during peak periods.

❑ A82 / Harbour Road roundabout is expected to operate over-capacity following the scheme.

❑ Millburn Road / Harbour Road roundabout is expected to continue to operate over-capacity following the scheme.

❑ Harbour Road / Shore Street roundabout is expected to continue to operate over-capacity following the scheme, albeit performing slightly better than it is currently.

AM Peak – Before Scheme

AM Peak – After Scheme

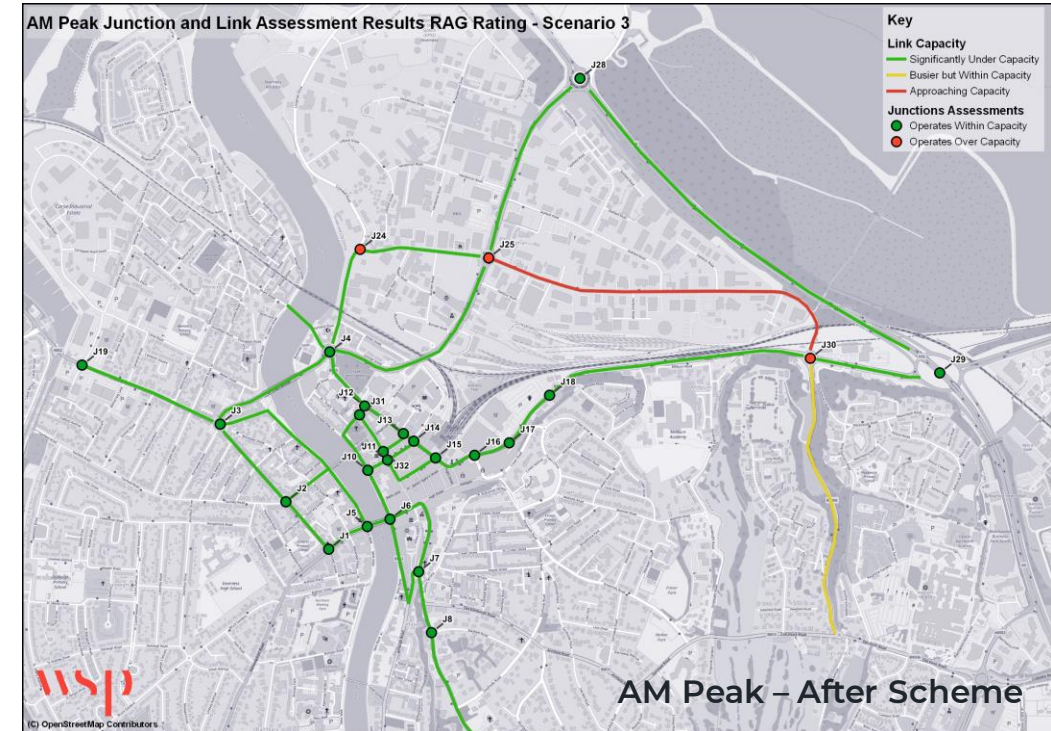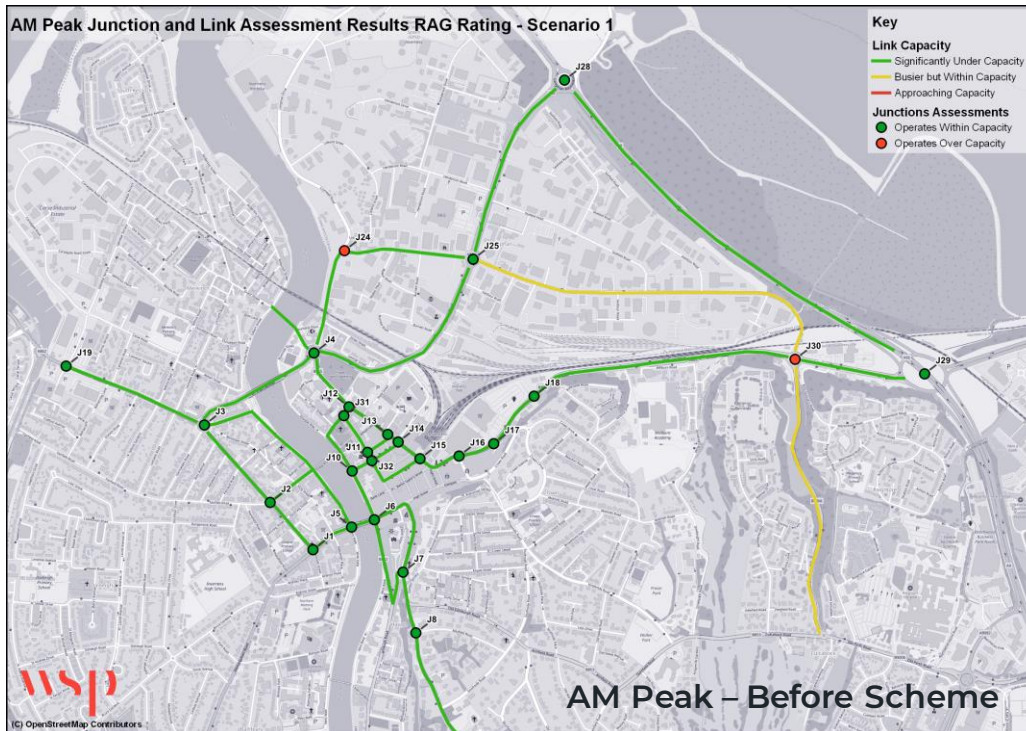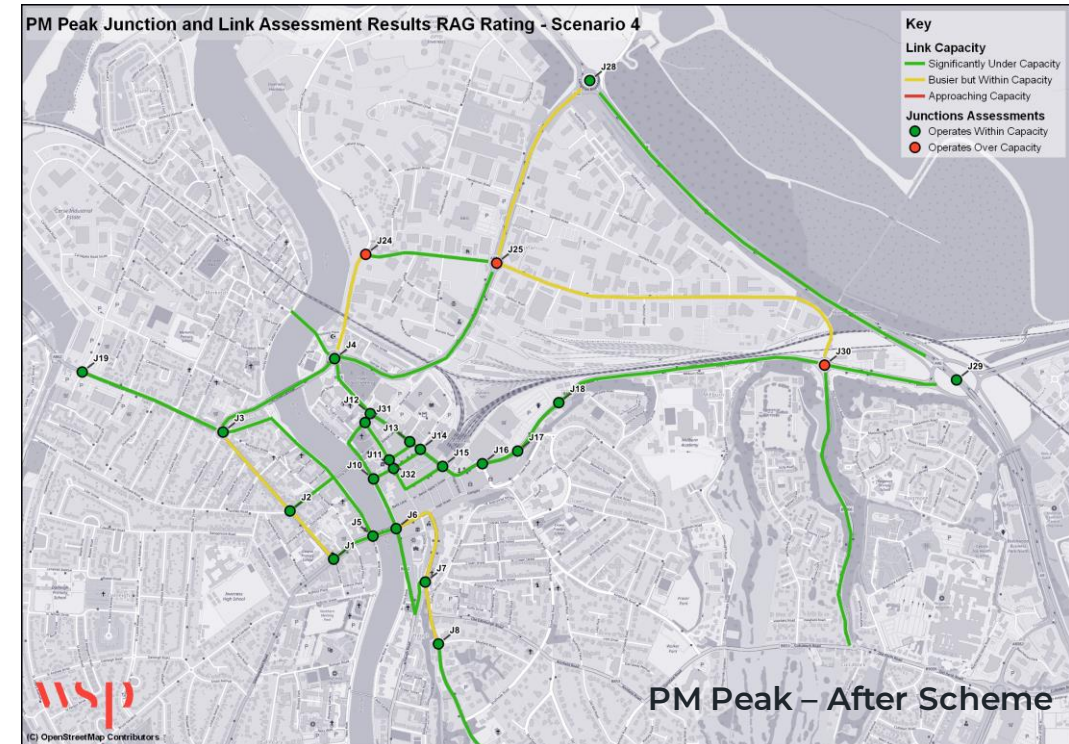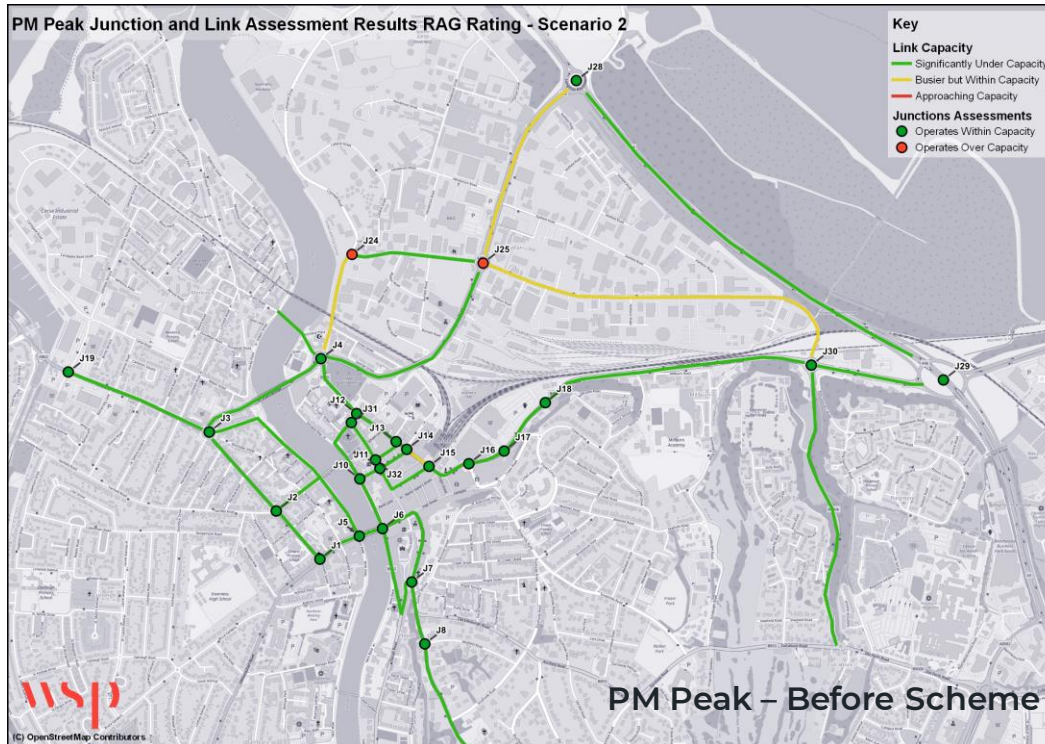## Traffic Impact Assessment – Results (PM)

Key

Link Capacity
- ▬ Significantly Under Capacity
- ▬ Busier but Within Capacity
- ▬ Approaching Capacity

Junctions Assessments
- 🟢 Operates Within Capacity
- 🔴 Operates Over Capacity

❑ Summary of results presented visually below for the critical PM network peak, with scenario 2 representing network performance **without** the scheme and scenario 4 **with** the scheme in place.

❑ Majority of network will continue to operate within capacity on both links and junctions post scheme.

❑ Post Scheme, A82 Kenneth Street and B861 Castle St / Culduthel Road is expected to see an increase in traffic. However, they are expected to continue operating within capacity but with increasing levels of interaction between vehicles occasionally leading to short lived period of queuing

❑ A82 / Harbour Road roundabout is expected to continue to operate over-capacity following the scheme.

❑ Millburn Road / Harbour Road roundabout is expected to operate over-capacity following the scheme.

❑ Harbour Road / Shore Street roundabout is expected to continue to operate over-capacity following the scheme, albeit performing slightly better than currently.

PM Peak – Before Scheme


PM Peak – After Scheme

Traffic Flows – Academy Street

❑ Two – way traffic flows on Academy Street have been compared before and after the scheme's implementation.

❑ The results have been measured against Cycling By Design's Levels of Service for a Mixed Traffic Street which requires two-way traffic flows to be under 2000 PCUs/day or under 200 PCUs/hour.

Academy Street Pre Scheme Traffic

Link	1 - Friars Ln to Margaret Ln		2 - Post Office Ave to Strothers Ln		3 - Queensgate to Union Street	
Time	NB	SB	NB	SB	NB	SB
0700 - 0800	161	111	150	141	122	172
0800 - 0900	288	240	246	272	193	319
0900 - 1000	291	260	249	305	192	371
1000 - 1100	340	299	313	348	250	404
1100 - 1200	348	336	294	381	234	458
1200 - 1300	376	350	339	390	269	470
1300 - 1400	380	282	325	353	265	436
1400 - 1500	400	334	373	383	298	497
1500 - 1600	430	336	354	396	283	487
1600 - 1700	381	286	348	325	265	398
1700 - 1800	408	374	348	432	275	497
1800 - 1900	386	264	353	297	282	389
Total	4190	3474	3691	4022	2929	4899
Two-Way Traffic	7664		7713		7828	

Academy Street Post Scheme Traffic

Link	1 - Friars Ln to Margaret Ln		2 - Post Office Ave to Strothers Ln		3 - Queensgate to Union Street	
Time	NB	SB	NB	SB	NB	SB
0700 - 0800	41	36	12	68	7	77
0800 - 0900	83	58	17	98	7	92
0900 - 1000	85	59	14	131	7	113
1000 - 1100	106	55	29	117	13	102
1100 - 1200	101	69	12	119	17	136
1200 - 1300	106	54	26	113	19	131
1300 - 1400	98	9	11	91	3	148
1400 - 1500	122	57	21	127	17	158
1500 - 1600	135	67	29	139	24	162
1600 - 1700	143	66	29	119	21	105
1700 - 1800	143	74	16	132	5	138
1800 - 1900	130	63	22	114	21	120
Total	1293	667	240	1368	162	1483
Two-Way Traffic	1959		1608		1645	
Cycling By Design Level of Service	High		High		High	
Difference	-2897	-2807	-3451	-2654	-2767	-3416
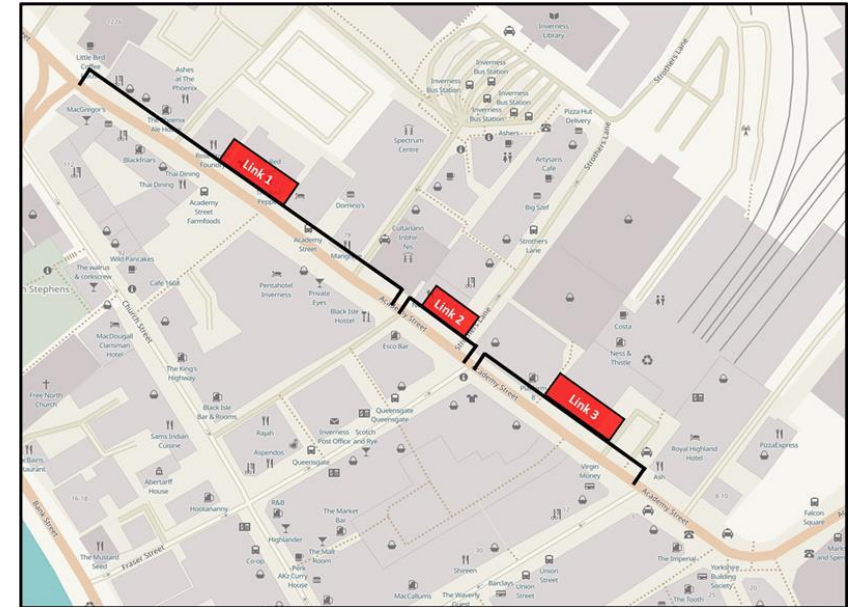
Next Steps

❑ Incorporating feedback

❑ Publish the reports

❑ Traffic Regulation Order

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