GEORGE STREET DRAFT MASTERPLAN

TRAFFIC MODEL TESTING

IDENTIFICATION TABLE	
Client/Project owner	Aberdeen City Council
Project	George Street Draft Masterplan
Study	Traffic Model Testing
Type of document	Report
Date	14/07/2023
Reference number	GB01T21D88/14_07_23
Number of pages	24

1. INTRODUCTION

1.1 Background

1.1.1 SYSTRA Ltd (SYSTRA) is supporting Aberdeen City Council (ACC) to develop the transport-related elements of the George Street Draft Masterplan (GSM), which examines proposals (including streetscape, public realm and transport network etc.) on George St and the immediately surrounding area. An initial draft GSM was presented to elected members in December 2022, this was further developed and subject to public consultation throughout the first half of 2023, with the finalised draft Masterplan presented to August 2023 Council.

1.1.2 To support the ongoing GSM development and to help facilitate responses to stakeholders during consultation, SYSTRA was appointed to undertake traffic modelling. For consistency and efficiency, the GSM modelling built upon associated modelling work already underway to support the development and delivery of the Aberdeen City Centre Masterplan (CCMP) and Beachfront Development Framework (BDF). The traffic modelling and associated technical analysis provided the analytical framework to understand critical issues such as through-routeing within the study area. It also provided a consistent baseline for assessing the impacts and benefits of the proposed changes associated with the GSM.

1.1.3 The impacts and benefits of the proposed measures outlined in the draft GSM were assessed in the traffic modelling. Refinements to the proposals were subsequently assessed and analysed to support the development of GSM recommendations for change that benefit the study area as a connected and inclusive part of the city centre, aligned with the wider City Centre Masterplan objective to create a place as a destination and not a through route.

1.1.4 The purpose of this report is to present the data and analysis supporting the recommended implementation of proposed GSM measures that include:

- Traffic management proposals that reduce opportunities for through-traffic in the area while maintaining and enhancing accessibility for all travel modes

- Recording the displacement of traffic from local roads in the core of the study area onto streets at the top of the revised Roads Hierarchy while minimising the overall impacts on the network as a whole
- Balancing the accessibility requirements across all travel modes

1.1.5 The traffic modelling provides an indication of the impacts and benefits in the central core of the study area achievable by introducing the proposed GSM while also considering any network impacts within the wider context of Aberdeen City Centre Masterplan project delivery.

1.2 Summary Conclusions

1.2.1 The traffic modelling exercise undertaken to support the development of the George Street Draft Masterplan helped to understand its impacts and benefits and assisted in refining the package of measures being proposed. The results of the modelling have demonstrated that the proposed measures would introduce changes that help deliver the wider ambitions of the Masterplan through:

- Traffic management proposals that reduce opportunities for through-traffic in the area (circa 21% reduction in through-trips across the day) while maintaining and, in some cases, enhancing accessibility for all modes
- Encouraging traffic to route away from certain local roads in the core of the study area onto streets at the top of the revised Roads Hierarchy which are of a standard appropriate for higher volumes of traffic, while minimising the overall impacts on the network as a whole
- Balancing the accessibility requirements across different modes (e.g. using roadspace formerly occupied by general traffic to provide opportunities for improved public transport and active travel, ensuring that suitable alternative routes for general traffic are available where restrictions are introduced etc.)

1.2.2 The traffic flow changes proposed are intuitive in nature and are most evident in the core of the study area and its immediate environs. Through successive iterations of model testing, a balanced set of proposals has been arrived at, which seek to deliver the overall Masterplan vision (e.g. by reducing private vehicle through routeing and creating opportunities for repurposing road space).

1.2.3 Minimising any traffic impacts of the proposed measures was also a focus of the modelling work and the proposals were successively refined in accordance with this principle. Therefore, while certain streets in the Masterplan area do see an increase in general traffic in one direction, these are often counter-balanced by reductions in traffic in the opposite direction or on adjacent routes. The local network within the GSM study area is shown to operate within the available capacity and without significant congestion or delays being evident throughout the modelled period.

1.2.4 The modelling has helped demonstrate that the proposals can deliver significant positive change through reduced traffic flows on key streets that are central to the masterplan objectives and priority projects. This provides opportunities for better public transport and active travel facilities, spill-out space and diversity of street activity in these areas.

2. TRAFFIC MODELLING

2.1 Existing Model Scenarios

2.1.1 The Aberdeen City Centre Paramics Model (ACCPM) forms the basis of the modelling work undertaken. The 2019 Base Year model was recently updated in assessing the proposed Beachfront Development Framework and forecast scenarios available from that work have been used to efficiently produce a consistent Reference Case scenario for the GSM. Figure 1 provides a flow chart of the model development and testing for the BDF work and shows how this supports a number of parallel studies in Aberdeen City Centre, including the GSM.

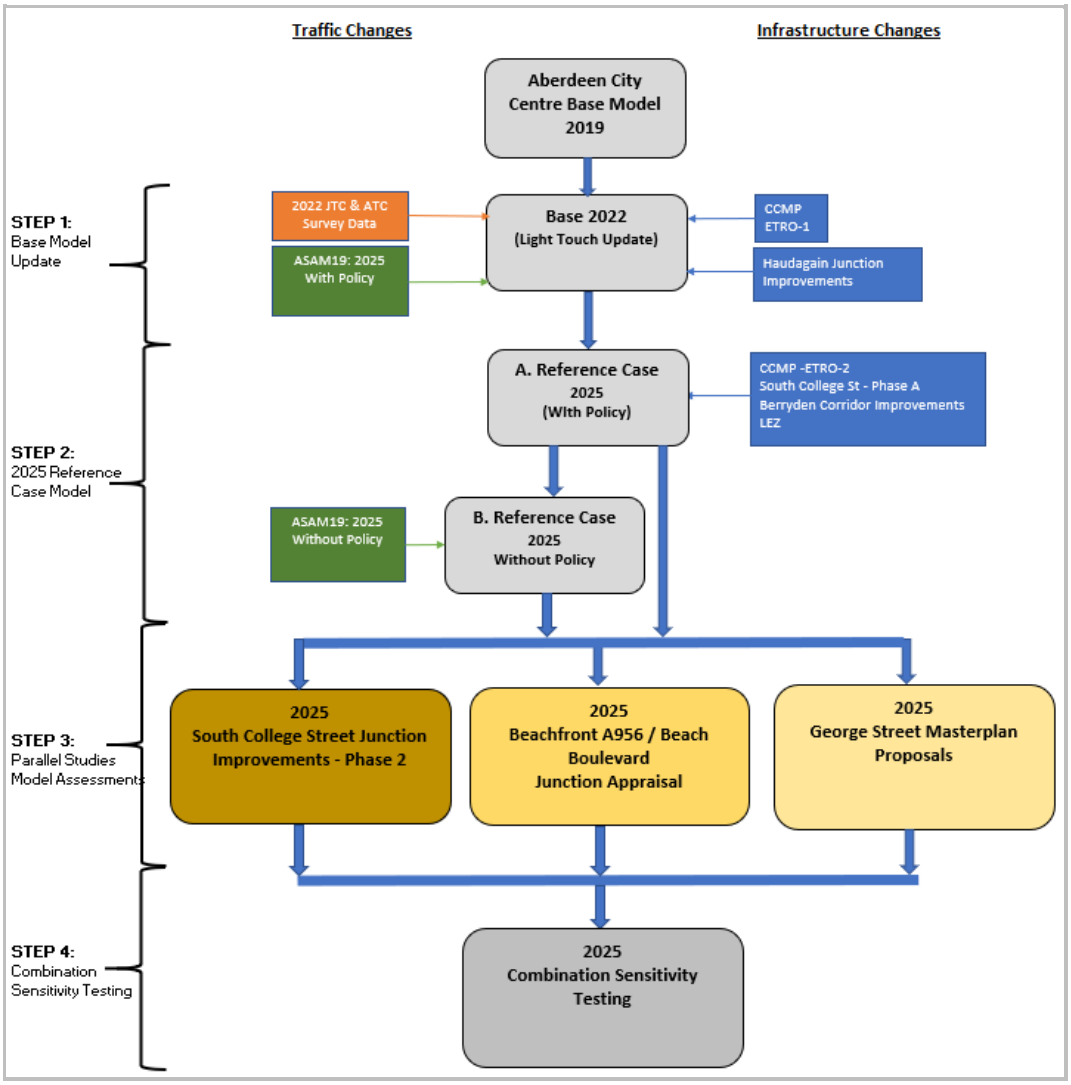


Figure 1. Model Development & Testing for BDF

2.1.2 In simple terms, the currently available versions of the ACCPM available are:

1. ACCPM Base 2019
2. Base 2022 Light Touch update: ACCPM Base plus CCMP ETRO-1 & Haudagain improvements with demand changes from ASAM19 2025 "with policy" forecast
3. Reference Case 2025:
   - 3.1. Reference Case A: 2. plus CCMP ETRO-2, South College St Phase A, Berryden Corridor improvements & LEZ

2.1.3 For clarity, the acronym ETRO relates to packages of traffic management measures associated with the City Centre Masterplan that will be implemented through Experimental Traffic Regulation Orders (ETRO). The acronym has been used for brevity in this document rather than listing all measures individually. For further details of the measures included in ETRO-1 and ETRO-2 the reader is referred to the report *'Aberdeen City Centre Masterplan – Traffic Management Plan – Phase 2'* (Ref: GB01T21D88-0622_1, 13th June 2022).

2.1.4 The term Reference Case is used to indicate a forecast baseline model that will be used as a consistent means for comparing the impacts and benefits of proposed interventions. The forecast year of 2025 has been selected in this case as it coincides with the first future year for which forecasts are available from the regional ASAM19. A Reference Case network is typically developed by adding committed (or highly likely) transport interventions into the Base network to best represent the transport network likely to be in place for each forecast year.

2.1.5 For the GSM modelling, it was agreed with ACC that the Reference Case 2025 network (Model Version 3) would be adopted as this includes additional measures that will be in place in the near future (e.g. City Centre Masterplan, Low Emission Zone etc.), and therefore offers the most realistic baseline against which to assess the potential impacts of the GSM. For consistency, with other ongoing adjacent studies, the modelling and analysis has focused on the "with policy" variant (Model Version 3.1). Further details of the "With" and "Without Policy" forecasts can be found in the report *'Addressing Uncertainty in transport Appraisal Assessment – Aberdeen Case Study'* (Ref: GB01T21D88-0623, June 2023).

2.2 Local Traffic Context

2.2.1 The streets within the study area serve a variety of different purposes, providing access for private vehicles and public transport services both travelling to and through the area. Local resident access is served by a combination of private off-street and permit holder parking while some short-term on-street parking is also available for visitors and those accessing local shops and businesses. There are also key land-uses with off-street parking within the study area, including:

- Bon Accord retail centre
- North East Scotland College
- Robert Gordon's College

2.2.2 This diversity of residential, educational, retail and other business land-uses demands flexible access for users across all modes within the study area.

2.2.3 The current traffic management regime in place also provides opportunities for through-traffic on certain movements. In particular, west to east movements can currently travel from Woolmanhill to Gallowgate/West North St via John St, Loch St and Berry St. This can be seen by some drivers as an attractive alternative to travelling via the priority road network (e.g. Skene Square, Hutcheon St, Mounthooly, West North Street). Private vehicles can also currently travel the length of George St between Hutcheon St and St Andrew St, which provides a through-routeing opportunity to Rosemount Viaduct and beyond for north to south (and some longer-distance east to west) trips. The presence of vehicular through routing can be seen as adding a degree of friction to local movements across all modes, particularly for active travel and public transport. This negatively impacts the sense of place

within the study area and is considered to be detrimental to a positive sense of neighbourhood.

2.2.4 Analysis was undertaken to indicate the approximate scale of through-routeing within the study area. The analysis was based on the trip matrices from the 2025 ACCPM "with policy" forecasts as this provided a consistent dataset enabling all trips entering and/or exiting the study area to be identified, in the absence of bespoke survey data. Figure 2 helps provide some geographical context to the analysis undertaken.

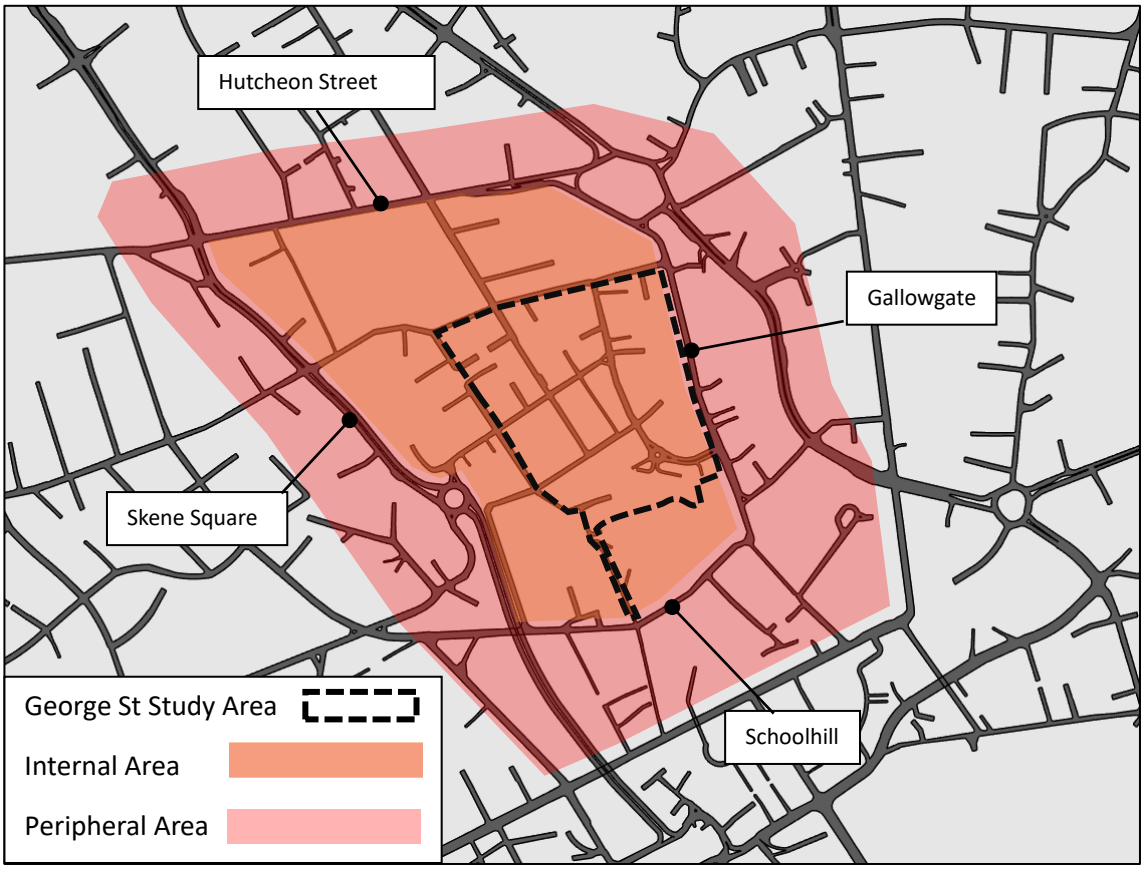


Figure 2. Internal and Peripheral Areas for Through-Routeing Analysis

2.2.5 Analysis was firstly undertaken to assess the total volume of trips that cross the Internal Area (i.e. the geographical area bounded by Hutcheon Street (north), Skene Square/Denburn Rd (west), Schoolhill (south) and Gallowgate (east)) boundary. Any trips crossing the boundary where both the start and end point lies physically outside the internal boundary were considered to be through-trips. For the 2025 Reference Case scenario:

- Total Trips Crossing the Internal Area boundary 0700-1900 = 33,413
  - Of which: 11,675 (35%) are through-trips

2.2.6 The above provides an indication of the average level of through routeing across the Internal Area as a whole (i.e. the average across all links combined). A second level of analysis focused on specific streets within the study area to assess their individual levels of through-routeing. For this analysis, the Peripheral Area was added to the Internal Area to ensure that the level of through routeing is not exaggerated by including trips going to or from locations very close to the study area. Therefore, any trips traversing the link where both the start and end point lies physically outside the combined Internal and Peripheral area were considered to be through-trips. Table 1 presents these for the 2025 Reference Case scenario.

Through-trips (0700-1900)		2025 Ref Case Through-trips	%age Through-trips on link
Location	Direction		
John Street between Woolmanhill and Charlotte Street	EB	598	15%
	WB	137	8%
John Street between Charlotte Street & George St	EB	601	15%
	WB	0	0%
John Street between George Street and Loch Street	EB	504	12%
George Street between Hutcheon Street and Spring Garden	NB	481	20%
	SB	158	9%
George Street between Spring Garden and John Street	NB	137	9%
	SB	49	4%
George Street between John Street and St Andrew Street	NB	39	4%
	SB	50	15%
Maberley Street east of Skene Square	EB	903	33%
	WB	1365	38%
Maberly Street between Charlotte St & George St	EB	905	34%
	WB	1374	41%
Spring Garden west of Loch St	EB	624	30%
	WB	1328	38%

Table 1. Through Routeing at Key Locations - 2025 Reference Case

2.2.7 This secondary analysis demonstrates, as may be expected, a wide variation in the percentage of through trips on individual links across the study area, ranging between 4% and 41% (depending on location and direction) for the subset of links presented. It should be noted that the 35% through-trips figure (ref. §2.2.5) represents the cross-area average for the whole of the Internal Area while the figures for individual links in Table 1 present a selected subset of through-trip percentages at salient locations. As such, the absolute and percentage figures for the subset of individual links should not be expected to sum to the cross-area average.

2.3 George Street Draft Masterplan Scenario

2.3.1 The draft GSM presented to Council in December 2022 contained a range of potential measures that could be included to achieve the objectives. From a transport perspective, these focused on access for pedestrians, cyclists, public transport (bus) and general traffic. The draft GSM presented formative proposals for further testing and to generate consultation response, with an ethos to propose changes to vehicular movement in the area that limited through routing while providing opportunities to realise the proposed 'Vision'. The proposed GSM movement and accessibility scenario reflected in the modelling reported in this document is shown in Figure 3.

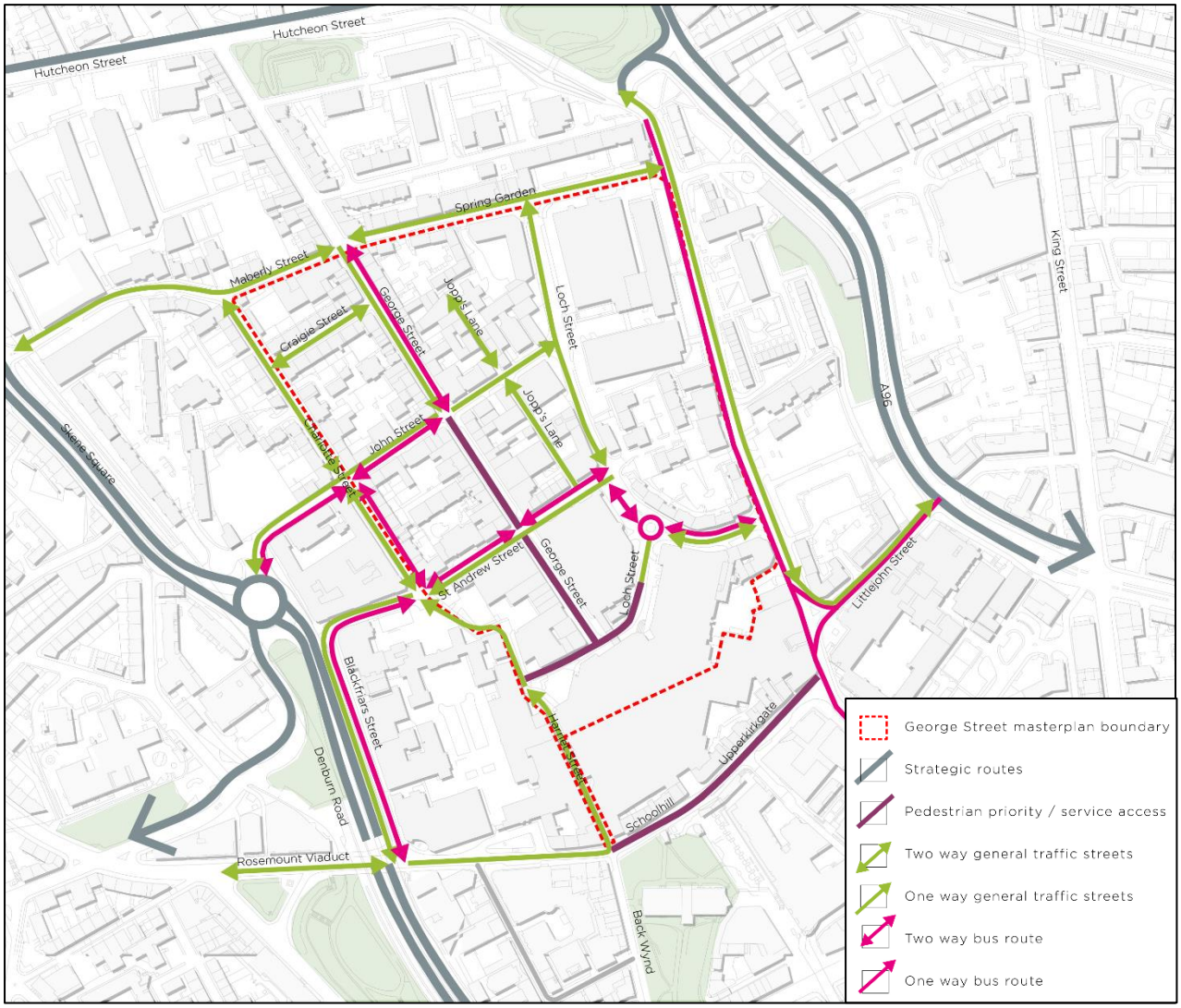


Figure 3. GSM Movement and Accessibility Plan

2.3.2 To provide a suitable representation of the proposed measures within the ACCPM for the modelling, the key traffic management changes affecting general traffic and bus routes/stops were reflected. This ensured that general traffic routeing, bus routeing and stopping patterns through the study area would adapt in line with the proposed measures. In cases where pedestrian and cycling measures are proposed to be incorporated into existing road space that will be freed up by restrictions to general traffic and/or buses, this is reflected in the model by amendments to the number of lanes and/or direction of travel available for use by general traffic, buses etc. on the relevant links. Therefore, the effects of all proposed measures were reflected in the model where their implementation results in some restriction to either buses or general traffic (e.g. one-way links, road/lane closures, barred movements etc.).

2.3.3 The draft GSM provided an initial start point for the modelling (Test 1), which was undertaken in an iterative manner with results being produced for discussion with ACC. Locations where congestion was evident in the modelling were examined to identify potential remediation and consider potential variants to the initial GSM option. For example, in the first Option Test model runs, congestion was evident at locations including:

- Skene Square/Caroline Place northbound approach to the junction at Hutcheon Street
- Hutcheon Street eastbound approach to the junction at George Street
- George Street southbound approaches to the junctions at Spring Garden and John Street and Spring Garden westbound approach to the junction at George Street

2.3.4 Upon examination of the reasons, it became evident that these areas of congestion were heavily influenced by the introduction of one-way only northbound operation on Loch Street in the first GSM Option Test. The removal of the southbound access to and egress from land uses on Loch Street (e.g. NESCol, residential parking etc.) resulted in an increase in traffic turning from Hutcheon Street to access George Street southbound and on Spring Garden westbound leading to queue formation and congestion at the locations mentioned. Therefore, in developing a more refined set of proposals all subsequent Option Test variants adopted two-way operation on Loch Street.

2.3.5 Proposed refinements were incrementally incorporated into the model (creating Test 2, Test 3 etc.) and revised results produced for further discussion, resulting in a total of seven test variants being modelled. For brevity, the results of each individual model iteration are not discussed in this report but details of the measures reflected in, and the rationale for each of the different variants modelled are provided in Appendix B.

2.3.6 The results outlined in this report relate to the most recent (Test 7) model variant, with the proposed network measures incorporated in the GSM Test Scenario model being:

- One-way general traffic operation on:
  - George St southbound between Spring Garden & John St (currently 2-way)
  - John St westbound between George St & Charlotte St (currently 1-way eastbound) with cyclist, bus, taxi and private hire access retained eastbound
  - Blackfriars St southbound between St Andrew St & Rosemount Viaduct (currently 2-way)
  - St Andrew St westbound from George St to Charlotte St (currently 2-way)
- Local access (i.e. no through traffic) either implemented or retained as existing on George St south of John St, Jopp's Lane, Craigie St and Charlotte St between Maberly St & John St
- Bus Routes diverted to use Charlotte St instead of George St between John St & St Andrew St

Note: Restrictions apply to general traffic with 2-way bus, taxi and private hire operation maintained on all relevant routes.

2.3.7 These measures were aimed at discouraging through-traffic from the area while maintaining access across all modes for residents, businesses and visitors as required. The above measures were added to the 2025 Reference Case network to create the GSM Test Scenario for comparison.

3. MODEL TEST RESULTS

3.1 General

3.1.1 Both the Reference Case and GSM Option Test models were run using the same forecast 2025 (With Policy) travel demand levels for the AM (0700-1000), inter (1000-1600) and PM (1600-1900) peak periods represented in the ACCPM. The general operational conditions in the network were compared visually and the impacts in terms of traffic flow differences at key locations were extracted as a key comparator between the Reference Case and Option Test models.

3.2 Traffic Flow Comparisons

3.2.1 The ACCPM includes comprehensive coverage of the city centre streets and includes all relevant streets within the GSM study area. Modelled traffic volumes have been compared across the network but with a particular focus on the streets in and directly adjacent to the study area. This approach ensures that the impacts are understood:

- On the streets in the core of the GSM study area (e.g. George St, John St, Loch St etc.)
- In the wider context and at key locations within the local roads hierarchy (e.g. Skene Square, Hutcheon St, West North St etc.)

3.2.2 Figures 4 to 6 present diagrams of the change in traffic volumes between the 2025 Reference Case and 2025 Option Test model runs for the 3 hour AM, 6 hour inter and 3 hour PM peak periods respectively, hence hourly volumes can be approximated by dividing by 3 (AM & PM peak) or 6 (inter peak), if required. The traffic volumes at key locations in the study area for the 2025 GSM Option Test are represented by the blue text and directional arrows while the percentage change in traffic volume compared with the 2025 Reference Case are shown in red text. It should be noted that the traffic volumes and percentage differences are unique to the location and direction of the link shown, hence volumes and percentages will differ between links, even in cases where they appear to be directly adjacent.

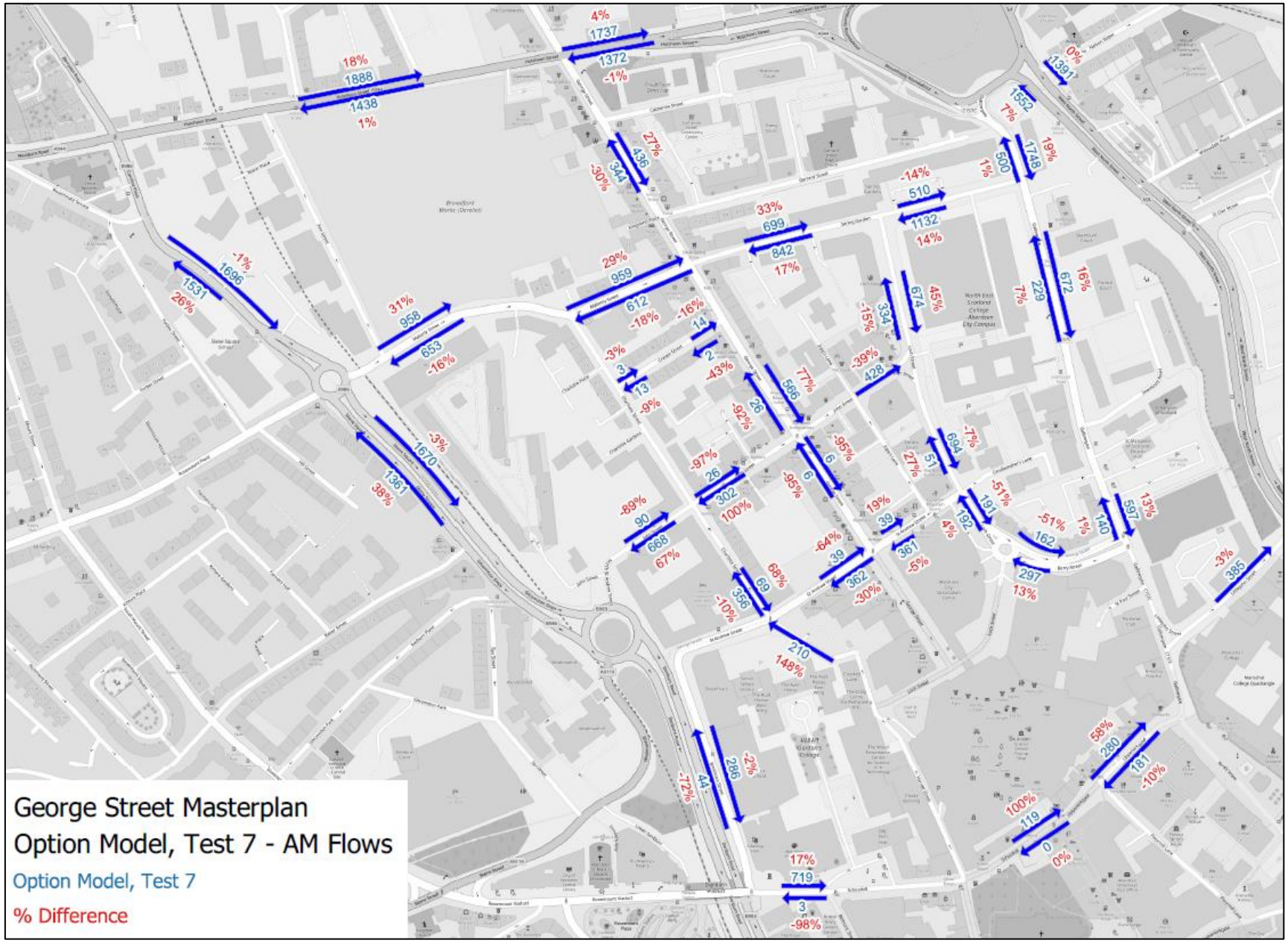


Figure 4. AM Peak Period (0700-1000) Traffic Flow and Difference Plot

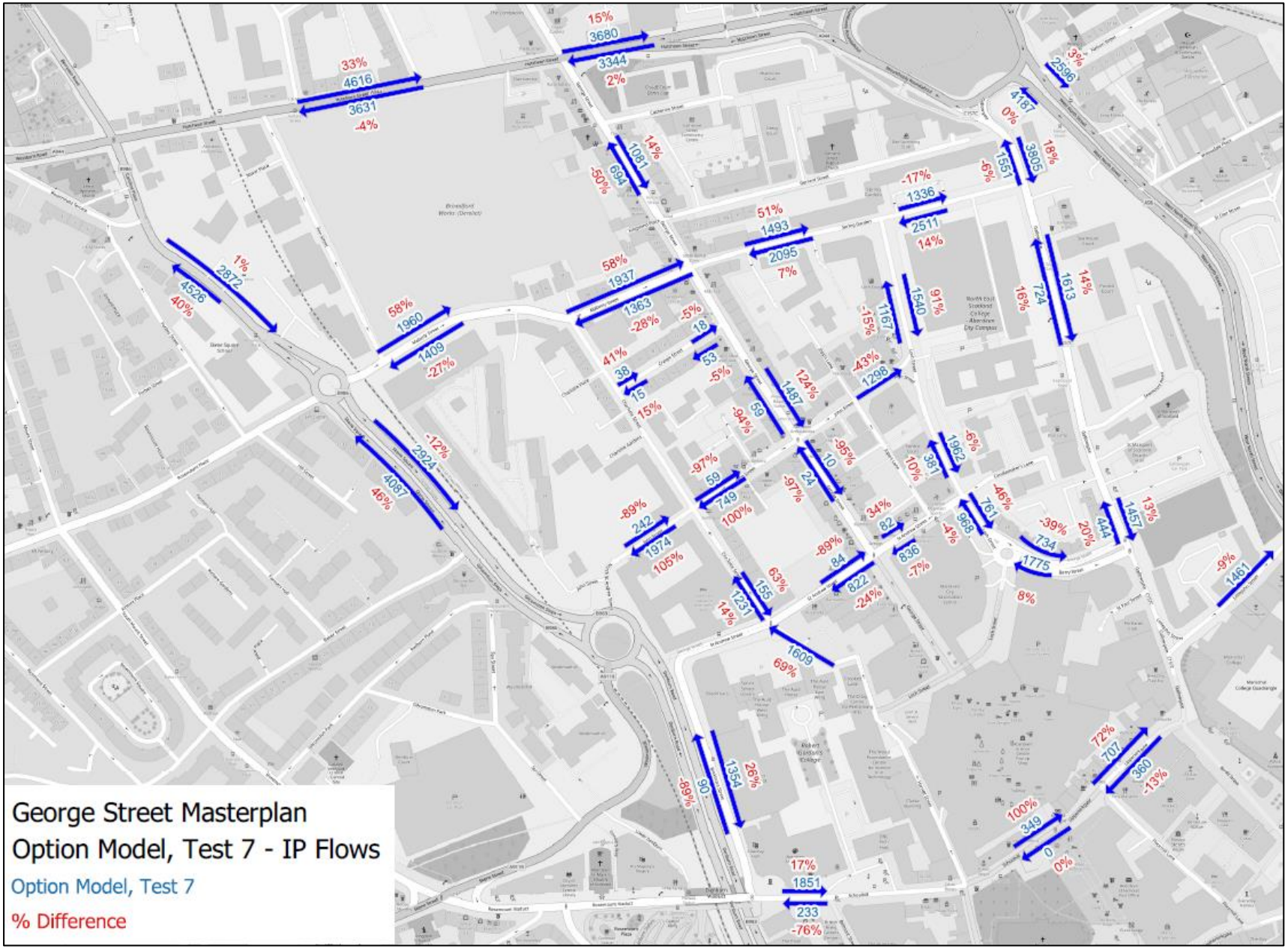


Figure 5. Inter Peak Period (1000-1600) Traffic Flow and Difference Plot

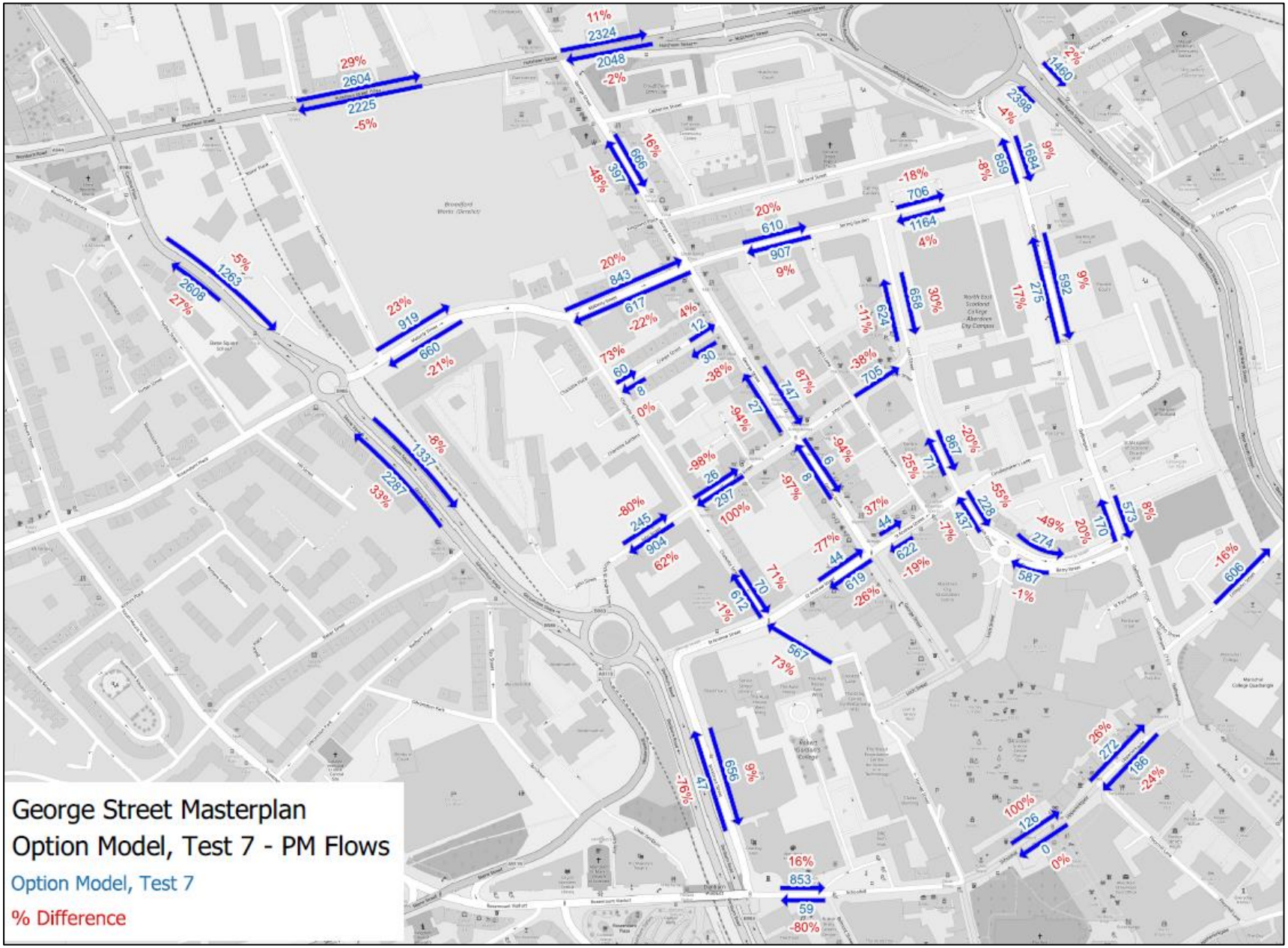


Figure 6. PM Peak Period (1600-1900) Traffic Flow and Difference Plot

3.2.3 More detailed results of the traffic flow analysis for the 2025 forecasts are presented in Appendix A in tabular form. These have been tabulated for five separate "screenlines", where adjacent modelled links are chosen by drawing a line that dissects the core area of the network in either a north/south or east-west direction. To aid understanding of the data presented in Appendix A, a summary of notable impacts at key locations is provided below:

Core Area

- George Street
  - Traffic volumes reduced by approximately 95% in both directions between John St and St Andrew St (see Screenline 3)

Note: while the modelling assumed 2-way operation on George Street between John Street and St Andrew St in the GSM Test, the low volumes of traffic evident could be accommodated by one-way operation, if required

  - Northbound traffic volumes reduced north of John St (by 92-94% on Screenline 2 and 33-55% on Screenline 1) due to introduction of one-way system
  - Southbound traffic volumes increased north of John St (by 77-124% on Screenline 2 and 12-23% on Screenline 1) due to one-way westbound operation of John St west of George St enabling route through to Woolmanhill

- John Street
  - Eastbound traffic volumes reduced (by 80-90% on Screenline 4 and 38-43% on Screenline 5) due to the removal of eastbound access from Woolmanhill
  - Westbound traffic volumes increased (by 66-105% on Screenline 4) due to reversal of John St to be westbound only west of George St (Note: westbound operation forms part of the GSM proposed measures)

- Maberly St
  - Eastbound traffic volumes increased (by 20-58% see Screenlines 4 & 5) alongside southbound volumes on Loch St (by 30%-91% on Screenline 2) and Gallowgate (by 9%-19% on Screenlines 1 & 2) due to the removal of eastbound access from Woolmanhill/John St resulting in localised re-routeing to access eastern/south eastern part of study area and beyond
  - Westbound traffic volumes decreased west of George St (by 16%-27% on Screenline 4) and increased east of George St (by 7%-17% on Screenline 5) due to reversal of John St to be westbound only west of George St impacting localised routeing

Wider Network

- Skene Square/Hutcheon St
  - Northbound volumes on Skene Square increased (by between 26% and 46% - see Screenlines 1 and 2) and eastbound volumes on Hutcheon St increased (by between 18% and 33% - see Screenline 4) due to removal of eastbound access to John St from Woolmanhill resulting in wider re-routeing via the priority road network

3.2.4 The traffic flow changes evident at other locations on the wider network are relatively minor in terms of absolute traffic volumes.

3.2.5 Overall, the location and nature of these traffic flow changes are in line with the expectations based on the amendments to the traffic management regime with the proposed GSM measures in place. That is to say that the most significant changes in traffic volume occur within the study area and its immediate environs (i.e. where the proposed GSM measures are introduced). When interpreting the results of the traffic flow analysis, It is worth noting that all volumes of traffic have been presented for the full 3 hour (AM & PM) and 6 hour (inter) peak periods and that a seemingly large percentage change in traffic volume does not necessarily equate to a large volume of traffic on an hourly basis.

3.2.6 To provide some context to the overall scale of change, the largest absolute increase in traffic volume is evident on Skene Square northbound (+1,287 vehicles) during the inter peak period. When examining this on an hourly basis, this equates to approximately 215 vehicles per hour or between 3 and 4 vehicles per minute. It should also be borne in mind that roads such as the A944 Hutcheon Street and Skene Square are designated as priority radial routes at the highest (primary) level of the local roads hierarchy. Their design and configuration are therefore of an appropriate standard to accommodate higher volumes of traffic compared with the other secondary and tertiary roads within the core study area.

3.2.7 Accordingly, the general operational performance across the whole ACCPM network is similar when comparing the Reference Case and the GSM Option Test. The local network within the Internal Area of the GSM is shown to operate within the available capacity and without significant congestion or delays being evident throughout the modelled period.

3.2.8 The increases in traffic volumes on the wider network (e.g. on Denburn Road/Skene Square northbound and Hutcheon St eastbound) with the GSM measures in place indicate that drivers could expect to experience some additional queuing and delays at these locations compared with the Reference Case. The modelling indicates that these are likely to be more prevalent during the typically more congested PM peak period. These impacts are at the locations expected, on the priority radial routes at the highest level of the road hierarchy, which are configured and designed to accommodate higher traffic volumes. Furthermore, it would be expected that traffic signal optimisation could assist in minimising future delays and congestion as a result of changes in traffic routeing patterns.

3.3 Impacts on Through-Routeing

3.3.1 The analysis of through-routeing was repeated for the GSM Test Option to assess the impact of the measures on through trips. Firstly, considering the total volume of trips that cross the Internal Area for the 2025 GSM Option Test scenario:

- Total Trips Crossing the Internal Area boundary 0700-1900 = 33,220 (Reference Case = 33,413)
  - Of which: 9,280 are through-trips (Reference Case = 11,675)

3.3.2 This analysis shows that in comparison to the Reference Case, the total number of trips crossing the Internal Area boundary remains similar, albeit there is a slight reduction. However there is a reduction of 2,395 through trips, approximately 21%, as a result of introducing the proposed GSM measures.

3.3.3 The change in volumes of through-routeing traffic at key locations within the Internal Area is presented in Table 2.

Through-trips (0700-1900)		2025 Ref Case Through-trips	2025 Option Through-trips	Difference	%age Difference
Location	Direction				
John Street between Woolmanhill and Charlotte Street	EB	598	0	-598	-100%
	WB	137	448	311	227%
John Street between Charlotte Street & George St	EB	601	0	-601	-100%
	WB	0	440	440	100%
John Street between George Street and Loch Street	EB	504	28	-476	-94%
George Street between Hutcheon Street and Spring Garden	NB	481	260	-221	-46%
	SB	158	218	60	38%
George Street between Spring Garden and John Street	NB	137	0	-137	-100%
	SB	49	468	419	855%
George Street between John Street and St Andrew Street	NB	39	0	-39	-100%
	SB	50	3	-47	-94%
Maberley Street east of Skene Square	EB	903	820	-83	-9%
	WB	1365	982	-383	-28%
Maberly Street between Charlotte St & George St	EB	905	824	-81	-9%
	WB	1374	983	-391	-28%
Spring Garden west of Loch St	EB	624	578	-46	-7%
	WB	1328	1251	-77	-6%

Table 2. Through Routeing Comparison at Key Locations

3.3.4 To summarise the salient observations from this analysis, when the proposed GSM measures are implemented:

- Through-routeing is eliminated on George Street northbound between St Andrew St and Spring Garden due to the combination of local access only measures south of John St and one way southbound operation only between Spring Garden and John St
- Through routeing is eliminated on John Street eastbound (between Woolmanhill and Charlotte Street) and reduced by 94% eastbound between George St and Loch St due to the removal of eastbound access for private vehicles from Woolmanhill
- Through routeing is increased on George St southbound between Hutcheon St and John St and on John St westbound west of George St due to the opening of one-way operation westbound on John St between George St and Woolmanhill, however:
    - The overall volume of traffic on John St west of George St is significantly lower in the GSM Option test (1,290 westbound operation only) than in the Reference Case (4,003 eastbound operation only)
    - The volume of through trips on John St west of George St is lower in the GSM Option test (440 westbound operation only) than in the Reference Case (601 eastbound operation only)
    - While there is an increase in general traffic volumes on George St southbound, the combined 2-way volumes are lower in the GSM Option Test due to the removal of northbound general traffic (George St between Spring Garden and John St: Reference Case = 1,560 northbound + 1,265 southbound (Total 2,825); GSM Option Test = 0 northbound + 2,654 southbound (Total 2,654)
    - The two-way volume of through trips on George St between Spring Garden and John St increases from 186 in the Reference Case to 468 in the GSM Option Test across the 12 hour period 0700-1900. Therefore, while the southbound percentage increase in through routeing appears high, the total change in through routeing on this section of George St equates to between 23 and 24 vehicles per hour, less than 1 vehicle per minute – while total 2-way traffic volumes are reduced
    - The modelling does not include specific measures to dissuade general traffic from using the George Street southbound to John Street westbound movement as a through route to Woolmanhill. In reality, measures such as changes to the traffic signal staging/timings, amendments to the local carriageway or

streetscape etc. could be introduced to make this route less attractive for traffic and lower the volume of trips using this as a through route

- There are reductions in eastbound and westbound through routeing volumes on both Maberly St and Spring Garden when the GSM measures are introduced due to the changes in east-west routeing and study area access/egress at Woolmanhill/Denburn Road.

3.3.5 The changes in through-routeing trips at key locations within the Internal Area are in line with the expectations given the proposed GSM measures implemented in the modelling. As in the Reference Case, there remains a wide variation in the percentage of through trips on individual links across the study area (depending on location and direction) when the proposed GSM measures are introduced. However, the proposed changes result in a general reduction in the level of through-routeing across the George Street study area as a whole.

3.4 Conclusions

3.4.1 The traffic modelling exercise undertaken to support the development of the George Street Draft Masterplan helped to understand its impacts and benefits and assisted in refining the package of measures being proposed. The results of the modelling have demonstrated that the proposed measures would introduce changes that help deliver the wider ambitions of the Masterplan through:

- Traffic management proposals that reduce opportunities for through-traffic in the area (circa 21% reduction in through-trips across the day) while maintaining and, in some cases, enhancing accessibility for all modes
- Encouraging traffic to route away from certain local roads in the core of the study area onto streets at the top of the revised Roads Hierarchy which are of a standard appropriate for higher volumes of traffic, while minimising the overall impacts on the network as a whole
- Balancing the accessibility requirements across different modes (e.g. using roadspace formerly occupied by general traffic to provide opportunities for improved public transport and active travel, ensuring that suitable alternative routes for general traffic are available where restrictions are introduced etc.)

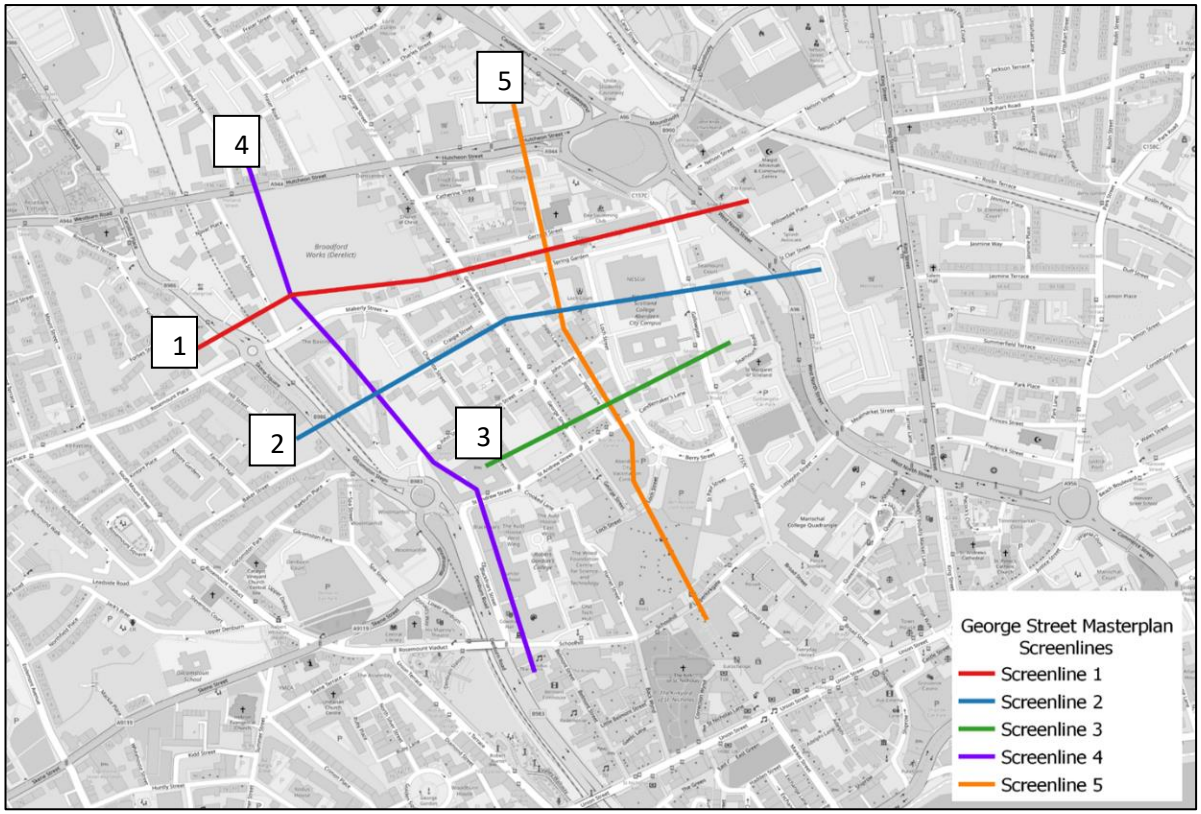
3.4.2 The traffic flow changes proposed are intuitive in nature and are most evident in the core of the study area and its immediate environs. Through successive iterations of model testing, a balanced set of proposals has been arrived at, which seek to deliver the overall Masterplan vision (e.g. by reducing private vehicle through routeing and creating opportunities for repurposing road space).

3.4.3 Minimising any traffic impacts of the proposed measures was also a focus of the modelling work and the proposals were successively refined in accordance with this principle. Therefore, while certain streets in the Masterplan area do see an increase in general traffic in one direction, these are often counter-balanced by reductions in traffic in the opposite direction or on adjacent routes. The local network within the GSM study area is shown to operate within the available capacity and without significant congestion or delays being evident throughout the modelled period.

3.4.4 The modelling has helped demonstrate that the proposals can deliver significant positive change through reduced traffic flows on key streets that are central to the masterplan objectives and priority projects. This provides opportunities for better public transport and active travel facilities, spill-out space and diversity of street activity in these areas.

APPENDIX A – LINK FLOW & SCREENLINE ANALYSIS

A set of five screenlines[1] crossing the city centre, broadly in the north-south and east-west directions was derived. These enable flow differences between the Reference Case and Test Option at key locations in and around the GSM study area to be understood. The screenline locations are shown in the adjacent Figure.



[1] A screenline is a line joining adjacent links in a modelled network, which generally dissects an area of interest, enabling the traffic flow trends (e.g. local volumes, routeing patterns etc.) to be assessed for each direction.
For example, Screenline 1 in the adjacent Figure enables the northbound and southbound traffic flow trends to be assessed collectively for Skene Square, Ann Street, George Street, Gallowgate and West North Street

			AM Peak 0700-1000				Inter Peak 1000-1600				PM Peak 1600-1900			
Screenline 1			2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference
Location	Description	Direction												
1	Skene Square	NB	1211	1531	321	26%	3248	4532	1284	40%	2052	2606	554	27%
		SB	1706	1693	-12	-1%	2833	2860	27	1%	1321	1248	-73	-6%
2	Ann Street	NB	8	8	0	-2%	38	36	-2	-5%	30	29	-1	-3%
3	George Street	NB	508	342	-165	-33%	1418	661	-757	-53%	775	347	-428	-55%
		SB	407	500	93	23%	1054	1184	130	12%	633	727	94	15%
4	Gallowgate	NB	497	500	3	1%	1644	1551	-93	-6%	930	859	-70	-8%
		SB	1472	1748	276	19%	3233	3806	573	18%	1547	1683	136	9%
5	West North Street	NB	1447	1551	105	7%	4206	4190	-16	0%	2490	2395	-94	-4%
		SB	1391	1391	0	0%	2531	2596	66	3%	1426	1460	34	2%

			AM Peak 0700-1000				Inter Peak 1000-1600				PM Peak 1600-1900			
Screenline 2			2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference
Location	Description	Direction												
1	Skene Square	NB	985	1361	375	38%	2799	4087	1287	46%	1720	2287	567	33%
		SB	1728	1670	-58	-3%	3323	2924	-399	-12%	1454	1337	-117	-8%
2	George Street	NB	321	26	-295	-92%	969	59	-910	-94%	476	27	-449	-94%
		SB	320	566	246	77%	664	1487	822	124%	400	747	348	87%
3	Loch Street	NB	394	334	-61	-15%	1367	1167	-199	-15%	704	624	-80	-11%
		SB	464	674	210	45%	807	1540	733	91%	508	658	150	30%
4	Gallowgate	NB	214	229	15	7%	626	724	99	16%	235	275	40	17%
		SB	582	672	90	15%	1414	1613	199	14%	543	592	50	9%
5	West North Street	NB	1161	1272	112	10%	3029	3099	70	2%	1801	1770	-31	-2%
		SB	1302	1313	11	1%	2352	2489	138	6%	1271	1375	104	8%

Screenline 3			AM Peak 0700-1000				Inter Peak 1000-1600				PM Peak 1600-1900			
Location	Description	Direction	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference
1	Charlotte Street	NB	397	356	-40	-10%	1084	1231	148	14%	616	612	-5	-1%
		SB	41	69	28	68%	95	155	60	63%	41	70	29	70%
2	George Street	NB	127	6	-121	-95%	735	24	-711	-97%	287	8	-279	-97%
		SB	129	6	-123	-95%	219	10	-210	-96%	107	6	-101	-94%
3	Jopps Lane	NB	12	13	1	11%	103	127	25	24%	35	52	17	49%
4	Loch Street	NB	40	51	11	28%	346	381	35	10%	57	71	14	25%
		SB	744	694	-49	-7%	2095	1962	-133	-6%	1081	867	-214	-20%
5	Gallowgate	NB	225	242	17	8%	631	736	105	17%	236	276	41	17%
		SB	602	690	88	15%	1491	1693	203	14%	611	663	52	8%

Screenline 4			AM Peak 0700-1000				Inter Peak 1000-1600				PM Peak 1600-1900			
Location	Description	Direction	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference
1	Hutcheon Street	EB	1600	1888	289	18%	3479	4616	1138	33%	2015	2604	588	29%
		WB	1430	1438	7	1%	3782	3631	-151	-4%	2350	2225	-124	-5%
2	Maberly Street	EB	731	957	227	31%	1242	1962	720	58%	750	919	169	23%
		WB	774	653	-121	-16%	1933	1412	-521	-27%	830	661	-168	-20%
3	John Street	EB	854	90	-765	-90%	2205	242	-1963	-89%	1197	245	-952	-80%
		WB	410	680	271	66%	975	2002	1027	105%	586	971	385	66%
4	St Andrew Street	EB	157	43	-114	-73%	786	90	-696	-89%	197	48	-149	-76%
		WB	290	286	-3	-1%	1077	1355	277	26%	605	656	52	9%
5	Schoolhill	EB	615	719	104	17%	1588	1851	262	17%	736	853	117	16%
		WB	155	3	-152	-98%	989	233	-756	-76%	290	59	-231	-80%

Screenline 5			AM Peak 0700-1000				Inter Peak 1000-1600				PM Peak 1600-1900			
Location	Description	Direction	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference	2025 Reference Case Flow	2025 Option Test Flow	Difference	%age Difference
1	Hutcheon Street	EB	1699	1762	63	4%	3615	4082	467	13%	2132	2375	243	11%
		WB	1383	1377	-7	0%	3305	3357	53	2%	2092	2057	-35	-2%
2	Maberly Street	EB	527	698	172	33%	992	1492	501	51%	507	609	102	20%
		WB	720	843	123	17%	1958	2096	137	7%	835	907	72	9%
3	John Street	EB	697	428	-268	-38%	2281	1298	-983	-43%	1136	705	-431	-38%
4	St Andrew Street	EB	33	39	6	18%	61	82	21	35%	32	44	12	38%
		WB	382	361	-21	-6%	897	836	-61	-7%	763	622	-141	-19%
5	Schoolhill	EB	0	119	119	0%	0	349	349	0%	0	126	126	0%
		WB	0	0	0	0%	0	0	0	0%	0	0	0	0%

APPENDIX B – MODELLED SCENARIOS

The tables below provide a summary of the main measures included within each of the different model variants used in this phase of model testing and to briefly describe the rationale for each Test.

Measures Included	Reference Case	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7
2019-2025 ASAM19 "With Policy" Demand Forecasts	✓	✓	✓	✓	✓	✓	✓	✓
CCMP ETRO-1 & ETRO-2	✓	✓	✓	✓	✓	✓	✓	✓
Haudagain Junction Improvements	✓	✓	✓	✓	✓	✓	✓	✓
South College Street - Phase A	✓	✓	✓	✓	✓	✓	✓	✓
Berryden Corridor Improvements	✓	✓	✓	✓	✓	✓	✓	✓
Low Emission Zone	✓	✓	✓	✓	✓	✓	✓	✓
Local access (i.e. no through traffic) on George St south of John St, Jopp's Lane, Craigie St and Charlotte St between Maberly St & John St	✗	✓	✓	✓	✓	✓	✓	✓
George St southbound only between Spring Garden & John St	✗	✓	✓	✓	✓	✓	✓	✓
John St Westbound only between George St & Charlotte St	✗	✓	✓	✓	✓	✓	✓	✓
Loch St northbound only between St Andrew St & Spring Garden	✗	✓	✗	✗	✗	✗	✗	✗
Blackfriars St southbound only between St Andrew St & Rosemount Viaduct	✗	✓	✓	✓	✓	✓	✓	✓
Berry St for access to Loch St car park only, no through route to/from Loch St	✗	✓	✓	✗	✗	✓	✗	✗
Bus routes diverted from George St to Charlotte St between John St & St Andrew St	✗	✓	✓	✓	✓	✓	✓	✓
Right turn from Loch St southbound to St Andrew St westbound barred	✗	✗	✗	✗	✓	✗	✗	✗
St Andrew St bus/taxi only both directions between Jopp's Lane and George St	✗	✗	✗	✗	✗	✓	✗	✗
St Andrew St bus/taxi only eastbound between Jopp's Lane and George St	✗	✗	✗	✗	✗	✗	✓	✓
No through traffic on George St south from St Andrew St	✗	✗	✗	✗	✗	✗	✗	✓

Option Test	Rationale for Test
Test 1	Original option as outlined in Draft GSMM
Test 2	2-way access reinstated on Loch St to avoid congestion caused by wider rerouteing for local access to NESCol, local residential etc.
Test 3	Impact of reinstating through route via Berry Street assessed
Test 4	To test impact of reduced level of through-routeing via St Andrew St
Test 5	To test impact of eastern section of St Andrew St being bus and taxi only in both directions
Test 6	To test impact of eastern section of St Andrew St being bus and taxi only eastbound but permitting general traffic westbound
Test 7	To prevent southern section of George St being accessed as a through route via St Andrew St

APPROVAL					
Version	**Name**		**Position**	**Date**	**Modifications**
1	Author	Boris Johansson	Project Manager	31/05/2023	Version 1 for ACC comment
	Checked by	Callum Guild	Associate	31/05/2023	
	Approved by	Callum Guild	Associate	31/05/2023	
2	Author	Boris Johansson	Project Manager	26/06/2023	Version 2 addressing previous comments
	Checked by	Callum Guild	Associate	26/06/2023	
	Approved by	Callum Guild	Associate	26/06/2023	
3	Author	Boris Johansson	Project Manager	30/06/2023	Version 3 addressing additional comments
	Checked by	Callum Guild	Associate	30/06/2023	
	Approved by	Callum Guild	Associate	30/06/2023	
4	Author	Boris Johansson	Project Manager	14/07/2023	Version 4 addressing final comments
	Checked by	Callum Guild	Associate	14/07/2023	
	Approved by	Callum Guild	Associate	14/07/2023	

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