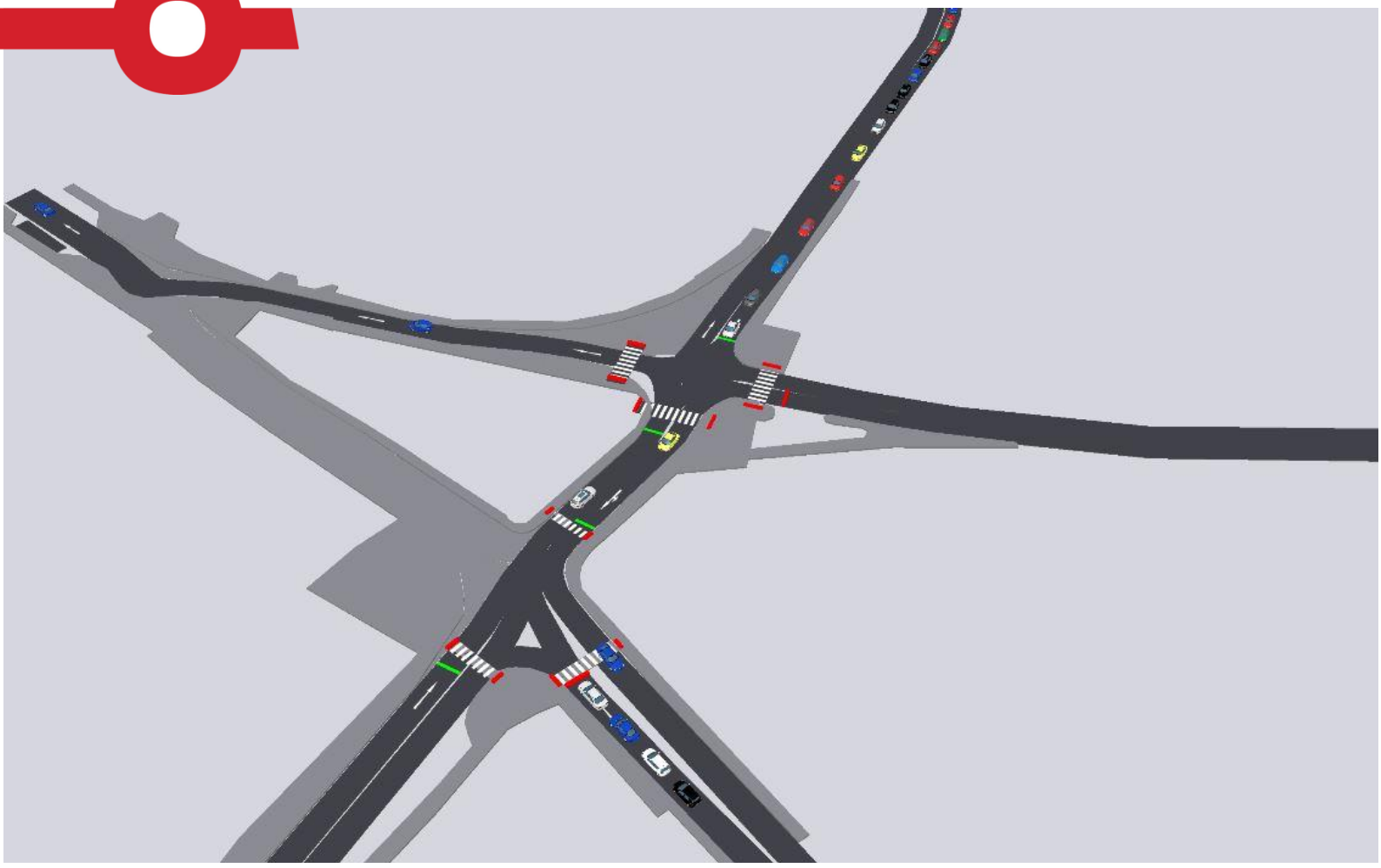
11/03/2021

Reference Number 300706

ATHLONE TOWN CENTRE ENHANCEMENT WORKS

MICRO-SIMULATION TRAFFIC MODELLING REPORT



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SYSTRA

ATHLONE TOWN CENTRE ENHANCEMENT WORKS

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1	Author	Arantxa Martinez-Peral	Principal Consultant	10/03/2021	Draft Report
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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

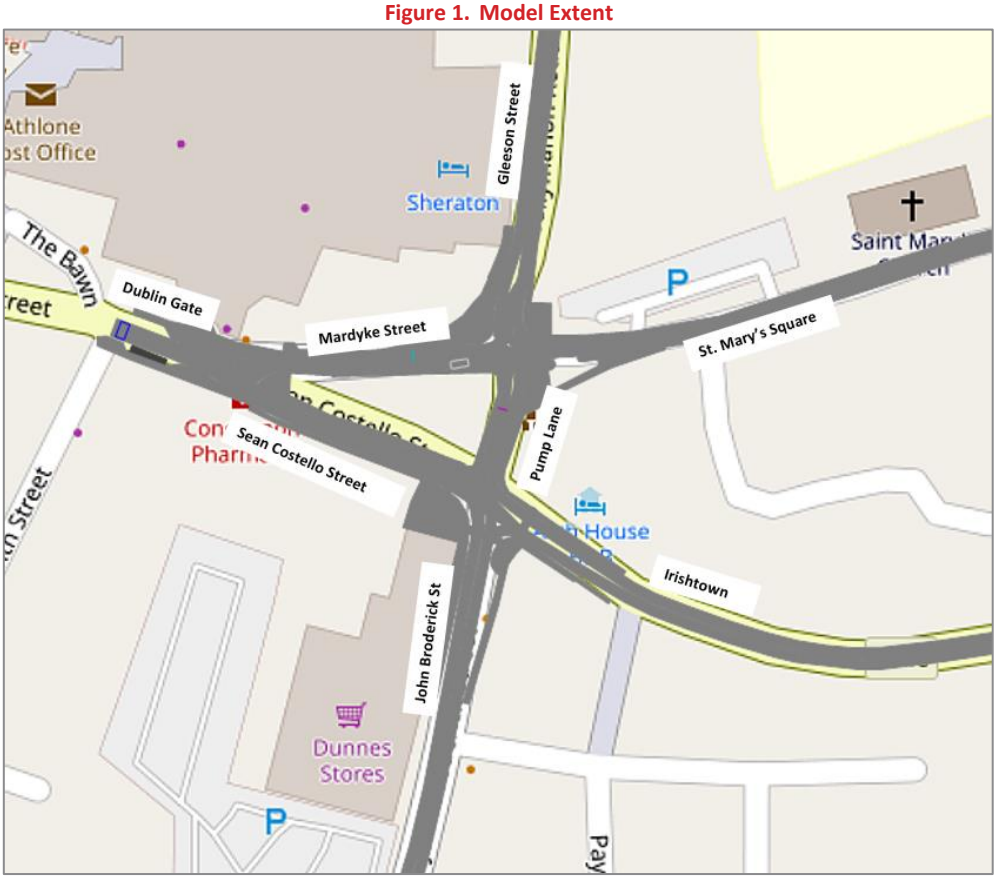
1. INTRODUCTION

1.1 Background

1.1.1 SYSTRA has been commissioned by Westmeath County Council to undertake an assessment of the traffic impacts of the public realm proposals for Athlone Town Centre Public Realm Enhancement Works. The study area is shown in Figure 1, consisting of the following two junctions:

- **R915 Gleeson St / Mardyke St / St Mary's Square**: this junction is currently a priority junction.
- **Sean Costello St / John Broderick St/ Irish Town / Pump Lane**: this junction is currently a 4-arm traffic signals junction.

Figure 1. Model Extent



1.2 Development Description

1.2.1 The Development of Public Realm Enhancement Works, encompassing approximately 0.6HA at Mardyke St, Pump Lane and Sean Costello St, Athlone, Co. Westmeath, includes the following public realm improvements:

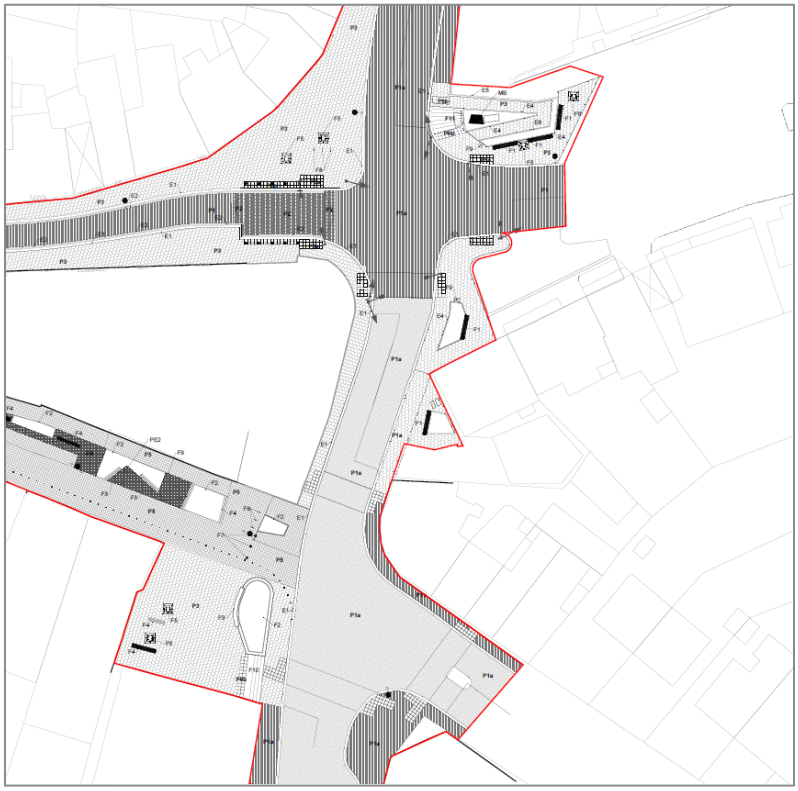
- Provision of upgraded footpaths and realignment of existing carriageway along Mardyke Street, including pedestrianisation of Sean Costello Street, from its junction with Pump Lane to the junction with Mardyke Street, to account for the access needs of pedestrians, mobility impaired persons and service vehicles;

- Provision of an enhanced public realm and landscape improvements, including street furniture, incidental play equipment, cycle parking, trees, and soft landscaping to enhance biodiversity;
- Provision of a priority signalised junction, including enhanced pedestrian facilities, at the junction of Mardyke Street, Gleeson Street, Pump Lane, and St Mary's Square;
- Upgrade to public lighting, including focal lighting to Sean Costello Street; and
- All necessary accommodation works, including utility provision, drainage, signage, and other ancillary works.

1.2.2 The proposed works will imply the following changes on the traffic network:

- Pedestrianisation of Sean Costello Street. Traffic wishing to travel to Dublin Gate / Church Street will be diverted to Mardyke Street.
- Mardyke Street junction will be upgraded to a traffic signals junction with pedestrian crossings on three arms i.e. Pump Lane, Mardyke Street and St. Mary's Square. Figure 2 shows the general arrangement drawing of the proposed works at the two junctions.

Figure 2. Proposed Works at the Junctions



1.3 Purpose of this report

1.3.1 This report is part of the Part 8 Planning Documents to present the results of the traffic analysis undertook with VISSIM – Microsimulation Modelling. Microsimulation modelling software captures the impacts of individual driver behaviour characteristics on the performance of road networks and junctions, it provides a more accessible representation of modelling results than traditional modelling outputs.

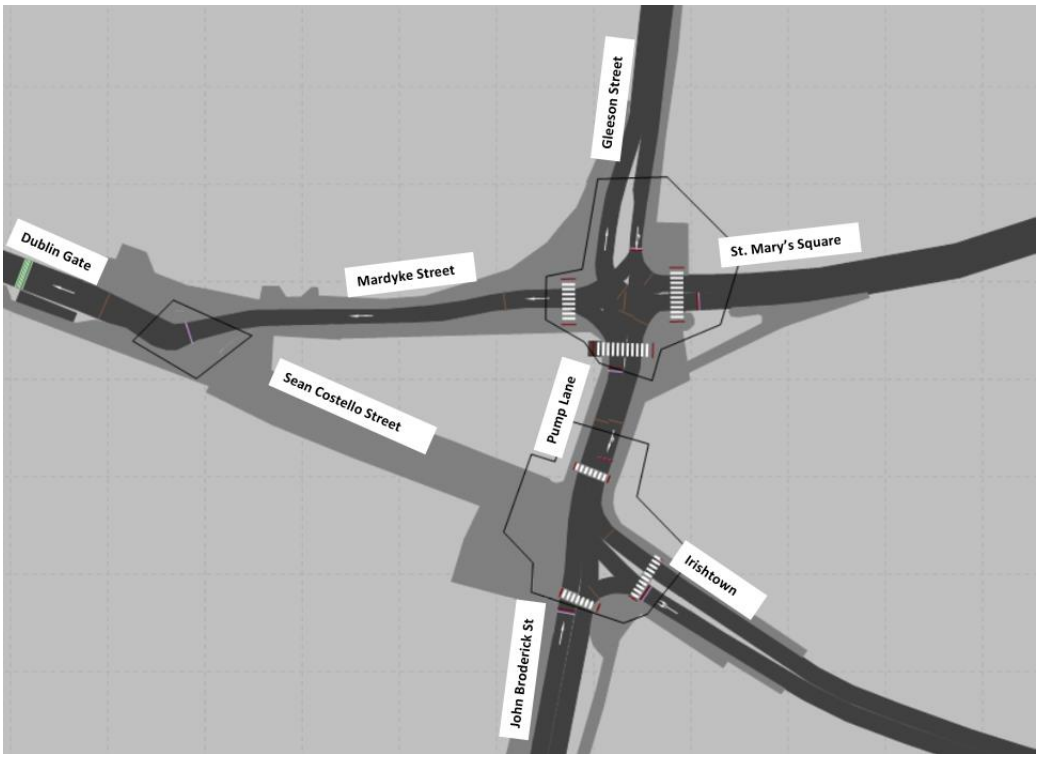
2. TRAFFIC ANALYSIS METHODOLOGY

2.1 Scenarios Modelled

2.1.1 The scenarios modelled and presented in this report are:

- 2022 Do Minimum (DM) – to include background traffic growth up to 2022, with no network changes.
- 2040 Do Minimum (DM) – to include background traffic growth up to 2040, with no network changes.
- 2022 Do Something – to include background traffic growth up to 2022, including proposed pedestrianisation of Sean Costello Street and Mardyke Street junction upgraded to traffic signals.
- 2040 Do Something – to include background traffic growth up to 2040, including proposed pedestrianisation of Sean Costello Street and Mardyke Street junction upgraded to traffic signals.

Figure 3. Do Something Model



2.2 Traffic Demand

2.2.1 The base year matrices were calculated from traffic surveys carried out in September 2020, during the COVID-19 Pandemic. To include any impacts of COVID-19 on traffic demand the following methodology was followed.

- Comparison of traffic data from the Urban Traffic Control (UTC) signal system to show the difference between September 2020 and September 2019. This factor was applied to growth the 2020 matrices to a 2019 pre-COVID level;

- Applied Westmeath Transport Infrastructure Ireland Travel Demand Projections to the matrices to growth from the base traffic counts to 2022 and 2040;
- It has been assumed for this study that no traffic has redistributed elsewhere on the network. This means that the worst-case methodology has been used to test the key junctions.
- AM Peak hour is 08:30 – 09:30, PM Peak Hour is 17:00 – 18:00

2.3 Background Growth

2.3.1 The factors calculated were as follows:

2020 COVID (Base) to 2019 Pre-COVID:

- AM Peak 1.09;
- PM Peak 1.17.

2019 to 2022:

- Lights 1.05;
- Heavies 1.10;

2019 to 2040:

- Lights 1.27;
- Heavies 1.63;

2.3.2 The traffic demand matrix totals are shown in Table 1 below.

Table 1. Demand Matrix Totals

Matrix Totals		Base	2019	2022	2040
AM	Lights	892	969	1014	1062
AM	Heavies	28	29	33	47
PM	Lights	1040	1220	1277	1339
PM	Heavies	9	9	17	24

2.4 Optimisation of signals

2.4.1 Both traffic signals junctions have been linked and optimised in the Model to improve the overall efficiency of the junction, in particular to avoid queues on Pump Lane.

2.4.2 John Broderick St/ Irish Town / Pump Lane. Total Cycle Time = 100s

- John Broderick & Pump Lane to all directions = 46s Green, 3s Intergreen and 2s Red
- Irishtown to all directions = 26s Green, 3s Intergreen and 2s Red
- Pedestrians on all the junction = 7s Green and 5s Intergreen

2.4.3 R915 Gleeson St / Mardyke St / St Mary's Square. Total Cycle Time = 100s

- Gleeson Street to all directions = 38s Green*, 3s Intergreen and 2s Red
- Pump Lane to all directions = (38s of Gleeson Street)** + 36s Green, 3s Intergreen and 2s Red

- St Mary's Square to all directions = 7s Green, 3s Intergreen and 1s Red
- Pedestrians on all the junction = 7s Green and 5s Intergreen

* on the PM scenario the green time for Gleeson Street has been increased to 45 seconds to reduce the queues along Gleeson Street to avoid impacts on The Crescent

** The green time on Pump Lane is adding the green time for Gleeson St in order to avoid queuing, i.e. 38s + 36s = 74s.

3. FORECAST MODELLING RESULTS

3.1.1 This section of the report summarises the results obtained from the VISSIM Micro-simulation modelling, for 2022 and 2040 in the AM and PM peak hours. Results provided are for the Network Statistics, the Traffic Flow Throughput and the Queue Lengths.

3.2 Network Statistics

2022 AM Peak Model Results

3.2.1 Table 2 presents the Network Performance Statistics from the AM peak models comparing the 2022 Do Minimum (DM) and the 2022 Do Something.

Table 2. 2022 AM Peak Network Performance Statistics

Summary Network Statistics

Measure	DM	Do Something
Total Travel Time (hrs)	17	24
Total Distance Travelled (km)	529	547
Average Speed (kph)	32	23
Average Travel Time (s)	57	82
Completed Journeys (veh)	1041	1049
Latent Demand (veh)	0	0
Vehicles still in network (veh)	14	17
Latent Delay (seconds)	134	212
Total Travel Time (seconds)	60424	86988

3.2.2 In the 2022 AM peak there is an increase in the average travel time per vehicle for the Do Something when compared to the DM model (25 seconds).

2022 PM Peak Model Results

3.2.3 Table 3 presents the Network Performance Statistics from the PM peak models comparing the 2022 Do Minimum (DM) and the 2022 Do Something.

Table 3. 2022 PM Peak Network Performance Statistics

Summary Network Statistics

Measure	DM	Do Something
Total Travel Time (hrs)	21	36
Total Distance Travelled (km)	640	660
Average Speed (kph)	31	20
Average Travel Time (s)	57	97
Completed Journeys (veh)	1289	1287
Latent Demand (veh)	0	2
Vehicles still in network (veh)	25	43
Latent Delay (seconds)	159	5128
Total Travel Time (seconds)	74608	124414

3.2.4 In the 2022 PM peak there is an increase in the average travel time per vehicle for the Do Something when compared to the DM model (40 seconds).

2040 AM Peak Model Results

3.2.5 Table 24 presents the Network Performance Statistics from the AM peak models comparing the 2040 Do Minimum (DM) and the 2040 Do Something.

Table 4. 2040 AM Peak Network Performance Statistics

Summary Network Statistics

Measure	DM	Do Something
Total Travel Time (hrs)	18	28
Total Distance Travelled (km)	562	580
Average Speed (kph)	31	21
Average Travel Time (s)	58	89
Completed Journeys (veh)	1105	1112
Latent Demand (veh)	0	0
Vehicles still in network (veh)	15	18
Latent Delay (seconds)	151	1346
Total Travel Time (seconds)	64809	98778

3.2.6 In the 2040 AM peak there is an increase in the average travel time per vehicle for the Do Something when compared to the DM model (31 seconds).

2040 PM Peak Model Results

3.2.7 Table 5 presents the Network Performance Statistics from the PM peak models comparing the 2040 Do Minimum (DM) with the 2040 Do Something.

Table 5. 2040 PM Peak Network Performance Statistics

Summary Network Statistics

Measure	DM	Do Something
Total Travel Time (hrs)	22	48
Total Distance Travelled (km)	674	691
Average Speed (kph)	31	17
Average Travel Time (s)	57	122
Completed Journeys (veh)	1358	1348
Latent Demand (veh)	0	7
Vehicles still in network (veh)	26	52
Latent Delay (seconds)	179	19998
Total Travel Time (seconds)	79108	151161

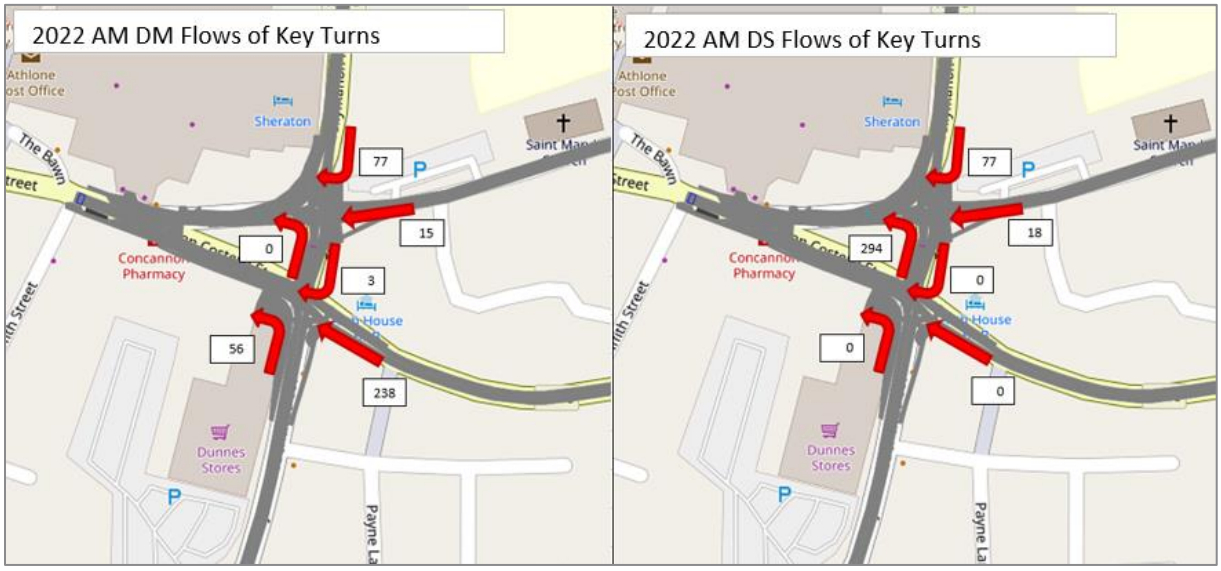
3.2.8 In the 2040 PM peak there is an increase in the average travel time per vehicle for the Do Something Scenario when compared to the DM model (65 seconds).

3.3 Traffic Flow Throughput

3.3.1 The following figures show the traffic flows going to Mardyke Street and Sean Costello Street on the DM Scenario, and the traffic flows on Mardyke Street as a consequence of the pedestrianisation of Sean Costello Street.

2022 AM Peak Model

Figure 4. AM 2022 Traffic Flows

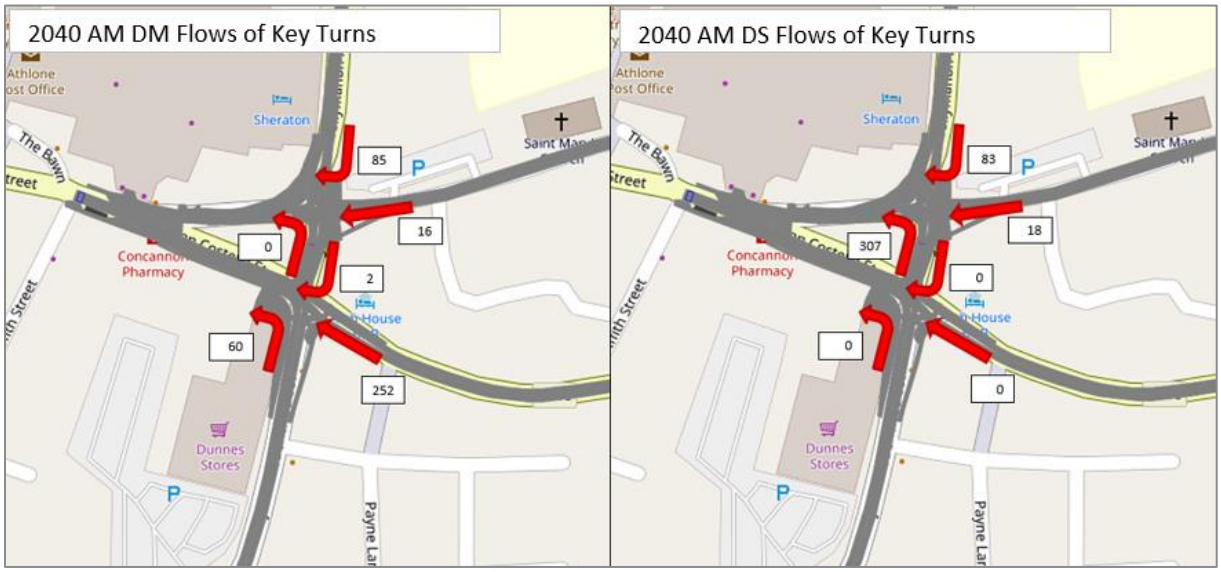


2022 PM Peak Model

Figure 5. PM 2022 Traffic Flows

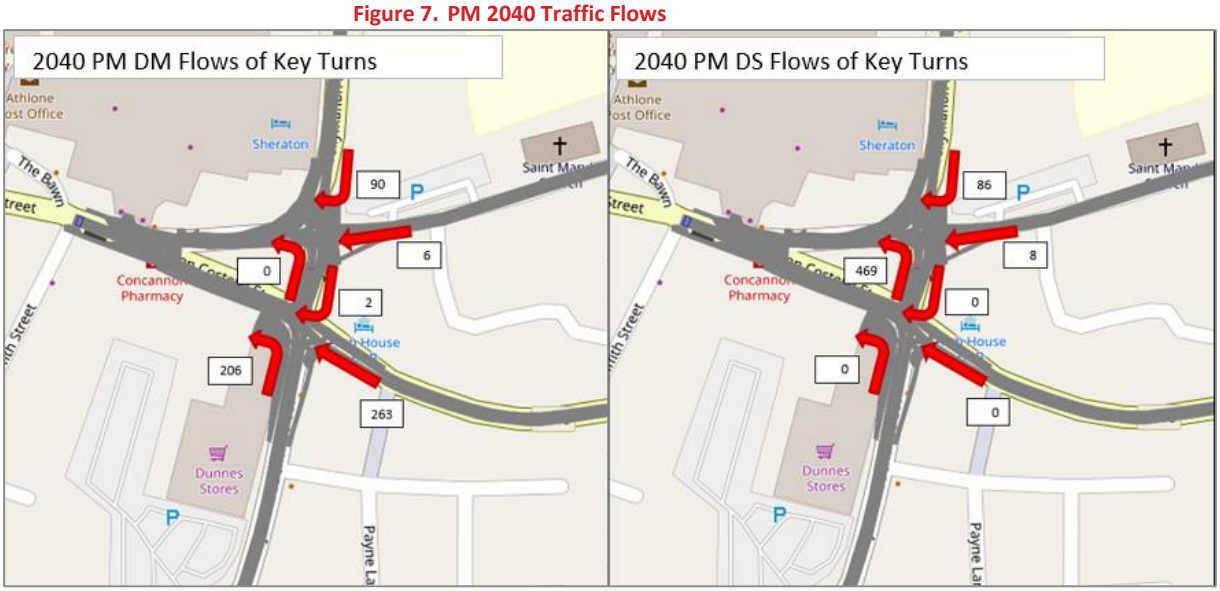
2040 AM Peak Model

Figure 6. AM 2040 Traffic Flows



2040 PM Peak Model

Figure 7. PM 2040 Traffic Flows



3.4 Queue Lengths

3.4.1 The following tables show the forecast mean – max queue lengths, in PCU (Passenger Car Units).

2022 AM Peak Model - Gleeson Street / Mardyke Street Junction

- Do Something will have an average maximum queue length along Gleeson Street of 29 PCU in AM Peak hour, compared to the DM average queue length of 10 PCU in the AM peak hour.
- Do Something will have an average maximum queue length along St. Mary's Square of 6 PCU in AM Peak hour, compared to the DM average queue length of 2 PCU in the AM peak hour.
- Do Something will have an average maximum queue length along Pump Lane of 5 PCU in AM Peak hour, meanwhile the DM average queue length is 0 as it is currently a primary junction.

Table 6. AM 2022 Queue Lengths – Gleeson Street Junction

Time	Gleeson St		St Mary's Square		Pump Lane	
	Arm A		Arm B		Arm C	
	DM	DS	DM	DS	DM	DS
8:15	0	9	1	2	0	2
8:30	6	17	1	4	0	3
8:45	10	27	2	6	0	3
9:00	14	38	2	6	0	6
9:15	9	31	2	6	0	6
9:30	8	21	2	4	0	5
9:45	6	20	1	4	0	4
10:00	2	16	2	4	0	3
Average peak hour	10	29	2	6	0	5

2022 AM Peak Model - John Broderick Street / Irishtown Junction

- Both scenarios will have very similar queues along Irishtown and John Broderick Street.
- Queues along Pump Lane in Do Something are shorter due to the introduction of traffic signals in the northern junction which retain the traffic.

Table 7. AM 2022 Queue Lengths – John Broderick Street Junction

Time	Pump Lane		Irishtown		John Broderick Street	
	Arm A		Arm B		Arm C	
	DM	DS	DM	DS	DM	DS
8:15	7	1	6	6	3	3
8:30	14	2	9	10	4	4
8:45	17	3	12	12	5	5
9:00	21	4	13	14	6	5
9:15	17	5	11	12	6	5
9:30	15	3	10	10	5	5
9:45	13	2	9	10	5	5
10:00	11	3	7	7	4	4
Average peak hour	18	4	11	12	5	5

2022 PM Peak Model - Gleeson Street / Mardyke Street Junction

- Do Something will have an average maximum queue length along Gleeson Street of 36 PCU in PM Peak hour, compared to the DM average queue length of 8 PCU in the PM peak hour.
- Do Something will have an average maximum queue length along St. Mary's Square of 5 PCU in PM Peak hour, compared to the DM average queue length of 2 PCU in the PM peak hour.
- Do Something will have an average maximum queue length along Pump Lane of 7 PCU in PM Peak hour, meanwhile the DM average queue length is 0 as it is currently a primary junction.

Table 8. PM 2022 Queue Lengths – Gleeson Street Junction

Time	Gleeson St		St Mary's Square		Pump Lane	
	Arm A		Arm B		Arm C	
	DM	DS	DM	DS	DM	DS
16:45	10	29	2	4	0	6
17:00	8	33	1	4	0	7
17:15	10	38	2	5	0	8
17:30	7	40	1	4	0	5
17:45	6	30	2	5	0	6
18:00	10	35	1	5	0	8
18:15	8	41	2	5	0	6
18:30	5	35	1	4	0	6
Average peak hour	8	36	2	5	0	7

2022 PM Peak Model - John Broderick Street / Irishtown Junction

- Both scenarios will have very similar queues along Irishtown and John Broderick Street.
- Queues along Pump Lane in Do Something are shorter as we are introducing traffic signals in the northern junction which retain the traffic.

Table 9. PM 2022 Queue Lengths – John Broderick Street Junction

Time	Pump Lane		Irishtown		John Broderick Street	
	Arm A		Arm B		Arm C	
	DM	DS	DM	DS	DM	DS
16:45	18	3	11	12	14	15
17:00	15	5	13	14	12	12
17:15	18	5	12	13	12	13
17:30	15	6	11	12	13	13
17:45	14	6	11	11	13	12
18:00	18	5	13	13	14	14
18:15	15	4	12	13	15	15
18:30	13	5	10	11	11	12
Average peak hour	16	6	12	12	13	13

3.5 SUMMARY

3.5.1 This report details the VISSIM Micro-simulation modelling assessment and results for the proposed scheme for Athlone Town Centre Enhancement Works.

3.5.2 The scenarios modelled and presented in this report are:

- 2022 Do Minimum (DM) – to include background traffic growth up to 2022, with no network changes.
- 2040 Do Minimum (DM) – to include background traffic growth up to 2040, with no network changes.
- 2022 Do Something – to include background traffic growth up to 2022, including proposed pedestrianisation of Sean Costello Street and Mardyke Street junction upgraded to traffic signals.
- 2040 Do Something – to include background traffic growth up to 2040, including proposed pedestrianisation of Sean Costello Street and Mardyke Street junction upgraded to traffic signals.

3.5.3 The model forecasts the following:

- The introduction of traffic signals and the pedestrianisation of Sean Costello Street will have a minimal impact on the queues along John Broderick Street, Irishtown and St. Mary's Square.
- Gleeson Street will present longer queues on the Do Something Scenario. However, the maximum queue will not affect the northern junction The Crescent.
- There is an increase in travel journeys due to the re-routing of traffic via Mardyke Street and the introduction of traffic signals in Mardyke Street Junction.
- The traffic flows along John Broderick Street, Irishtown and St. Mary Square will clear in a single cycle. However, traffic flows on Gleeson Street on AM and PM peak hour will not clear in a single cycle.

3.5.4 Benefits of this scheme

- This scheme is providing safe and legible pedestrian crossings on Mardyke Street, Pump Lane and Mary's Square in line with the project objective of placing pedestrians at the highest level of consideration.
- The upgrade of Mardyke Street junction to traffic signals resolves the visibility issues on the existing primary junction, highlighted by the Road Safety Audit Report.

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