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Car Parking Facility at Rock of Dunamase, Portlaoise, Co Laois

Traffic Impact Assessment

for

Laois County Council

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1 INTRODUCTION

1 Introduction

1.1 INTRODUCTION

Roadplan Consulting was commissioned by Laois County Council to prepare a Traffic Impact Assessment for a proposed car parking facility at the Rock of Dunamase, Portlaoise, Co. Laois.

In preparing this report, Roadplan Consulting has made reference to:

- The Laois County Development Plan 2021 - 2027;
- The Institute of Highways and Transportation Guidelines on the Preparation of Traffic Impact Assessments;
- The TII Transport Assessment Guidelines;
- The TII National Traffic Model;

1.2 OBJECTIVES

The objective of this report is to examine the traffic implications of the provision of a car parking facility at the Rock of Dunamase in terms of how it can integrate with existing traffic in the area. The report will determine and quantify the extent of expected trips generated by the tourist attraction (Rock of Dunamase) and the impact of such trips on the operational performance of the local road network and junctions, in particular the existing N80 / L7830 priority junction and the existing eastern roundabout at the M7 interchange.

1.3 STUDY METHODOLOGY

The methodology adopted for this report is summarised as follows:

- Traffic counts were undertaken by Irish Traffic Surveys on Wednesday 25th of January 2023 during a 12-hour period (07:00 – 19:00). Count information was obtained at the existing N80 / L7830 priority junction and the existing eastern roundabout at the M7 interchange.
- Existing Traffic Assessment – A spreadsheet model was created which contains the base year DO-NOTHING traffic count data described above. The traffic count data was used to develop an ARCADY model of the existing eastern roundabout at the M7 interchange and a PICADY model of the existing N80 / L7830 priority junction.
- Future Year Assessment – The estimated future year traffic volumes on the study area road network, as a result of the increase in background traffic and development related traffic was used to assess the future operational performance of the junction at the year of opening of the proposed development, 5 years after opening and 15 years after opening.

1.4 STRUCTURE OF REPORT

Following this introduction, the report is set out as follows:

- Chapter 2 provides details of the proposed development;
- Chapter 3 provides an overview of the existing traffic conditions and the local road network, identifying any existing issues related to traffic flow or road infrastructure;
- Chapters 4 and 5 outline the analysis as described in the Study Methodology above. The analysis examines trip generation, distribution and resulting junction operational performance with the car park operational;
- Chapter 6 establishes the parking requirements for the development and sets out how these needs are provided for;
- Chapter 7 presents the conclusions and a summary of the report.

2 PROPOSED DEVELOPMENT

2 Proposed Development

2.1 SITE LOCATION

The proposed car park is located at the Rock of Dunamase, Portlaoise, Co. Laois. The proposed car park is bounded by the L7830 to the north and east and the Rock of Dunamase to the west and south as shown on Figure 2.1 'Site Location Map'.

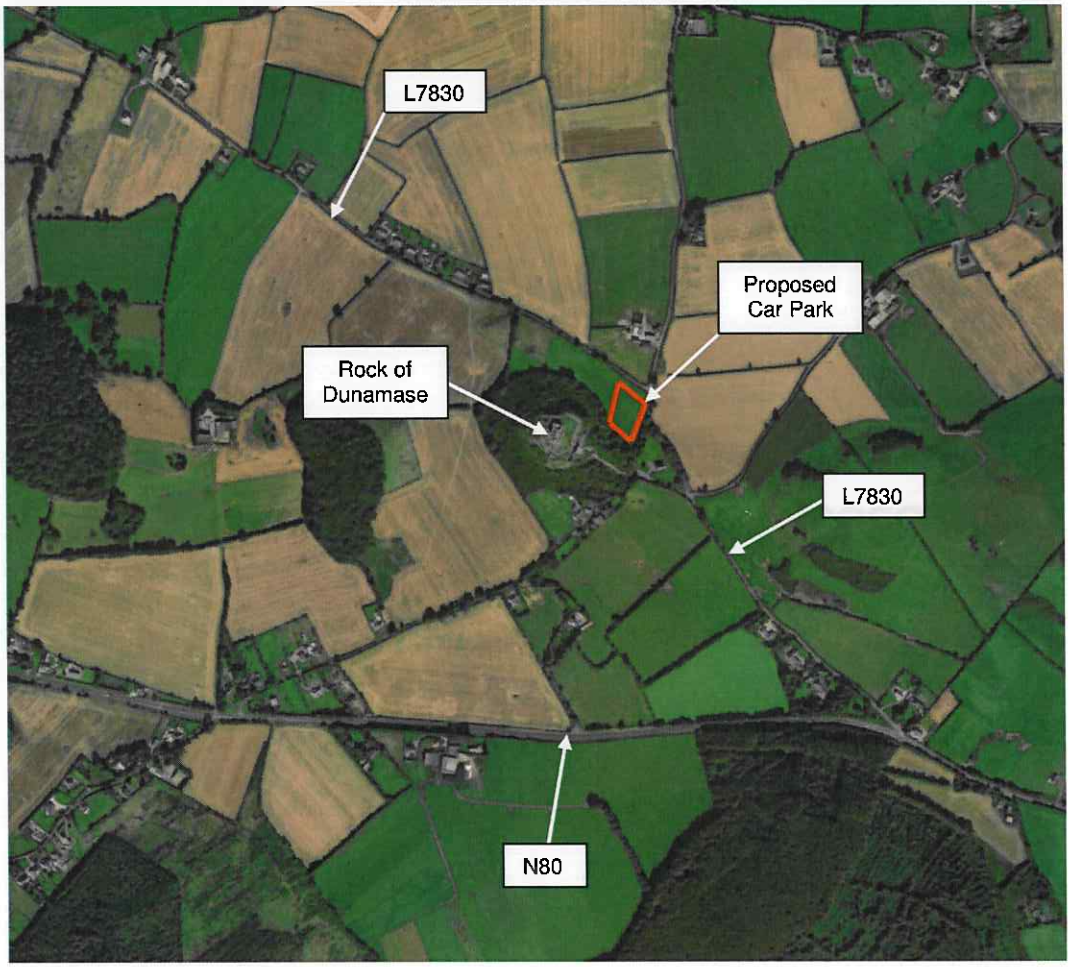


Figure 2.1: Site Location Map

2.2 DESCRIPTION OF PROPOSED DEVELOPMENT

The proposed development will consist of the provision of car parking facility which can cater for 44 car parking spaces, 4 bus parking spaces and cycle parking.

Access to the car park will be via the L7830. A layout of the proposed car park is shown on the site plan which is contained in Appendix A – Drawings.

3 EXISTING AND PROPOSED TRAFFIC CONDITIONS

3 Existing and Proposed Traffic Conditions

3.1 EXISTING TRAFFIC FLOWS

A traffic count was undertaken by Irish Traffic Surveys on the 25th of January 2023 during 12-hour period (07:00 to 19:00). The count data is provided in Appendix B – Traffic Counts. Count information was obtained at the following junctions:

- the existing N80 / L7830 priority junction
- the existing M7 Junction 16 eastern grade separated roundabout

The traffic flows during the AM and PM peak hours were abstracted from the surveyed data and are shown in the following tables:

Existing N80 / L7830 Priority Junction

2023 AM Peak - Existing Flows (08:00 – 09:00)

From / To	N80 (west)	L7830	N80 (east)	**Totals**
N80 (west)	0	2	306	**308**
L7830	5	0	6	**11**
N80 (east)	447	9	0	**456**
Totals	**452**	**11**	**312**	**775**

2022 PM Peak - Existing Flows (16:45 – 17:45)

From / To	N80 (west)	L7830	N80 (east)	**Totals**
N80 (west)	0	9	474	**483**
L7830	3	0	5	**8**
N80 (east)	319	7	0	**326**
Totals	**322**	**16**	**479**	**817**

Principal features of the existing traffic flows at the existing R448 / R704 priority junction are as follows:

- Traffic flows during the PM are slightly higher than the AM peak.
- Turning movements to and from the L7830 are low.

M7 Junction 16 Eastern Grade Separated Roundabout

2022 AM Peak - Existing Flows (08:15 – 09:15)

From / To	M7 (exit slip Rd)	L3811	L7830	M7 (entry slip Rd)	R445	**Totals**
M7 (exit slip Rd)	0	0	1	0	209	**210**
L3811	0	0	0	20	58	**78**
L7830	0	0	0	9	34	**43**
M7 (entry slip Rd)	0	0	0	0	0	**0**
R445	0	58	13	232	1	**304**
Totals	**0**	**58**	**14**	**26**	**302**	**635**

2022 PM Peak - Existing Flows (16:45 – 19:45)

From / To	M7 (exit slip Rd)	L3811	L7830	M7 (entry slip Rd)	R445	**Totals**
M7 (exit slip Rd)	0	3	6	0	342	**351**
L3811	0	2	1	11	35	**49**
L7830	0	0	0	6	18	**24**
M7 (entry slip Rd)	0	0	0	0	0	**0**
R445	0	48	23	161	0	**232**
Totals	**0**	**53**	**30**	**178**	**395**	**656**

Principal features of the existing traffic flows at the existing M7 Junction 16 eastern grade separated roundabout are as follows:

- Traffic flows during the AM and PM peak periods are very similar
- Majority of turning movements are to and from the R445 in both the AM and PM peaks.

3.2 EXISTING ROAD NETWORK

The access to the Rock of Dunamase car park will be via the L7830. The L7830 is a local road which carries local traffic from the N80 to the M7.

The existing L7830 local road varies in width from 4m to 4.5m wide. The posted speed limit along the L7830 is 80 km/h.

4 TRAFFIC GENERATION & TRIP DISTRIBUTION

4 Traffic Generation and Trip Distribution

4.1 DEVELOPMENT TRIP GENERATION

The TRICS database has been used to predict the trip generation to and from the Rock of Dunamase tourist attraction for the AM and PM peak periods. Full details of the TRICS information used for the assessments are provided in Appendix D - TRICS information.

The TRICS data used is from a similar site in Ireland (Rock of Cashel). A vehicle survey was undertaken at the Rock of Cashel in July 2021 and it is assumed that the Rock of Dunamase will attract similar trips.

4.1.1 Tourist Attraction

The category of Tourist Attractions" has been assessed as the most appropriate development type category for the Rock of Dunamase and the predicted vehicular trips for the AM and PM peak periods are shown below:

Trips to / from Rock of Dunamase

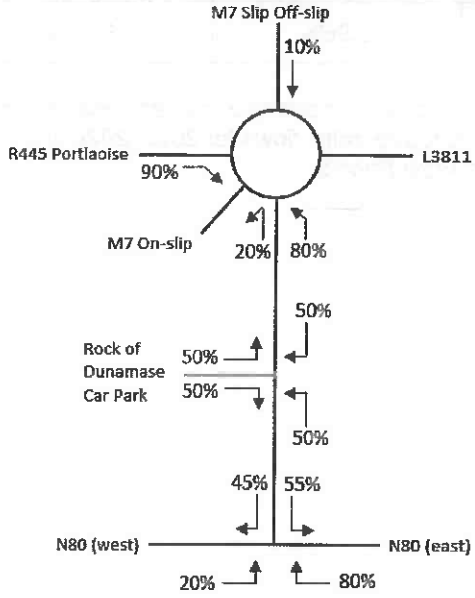
	Trips to Rock of Dunamase	Trips from Rock of Dunamase
AM Peak	12	1
PM Peak	8	20

4.2 TRIP DISTRIBUTION

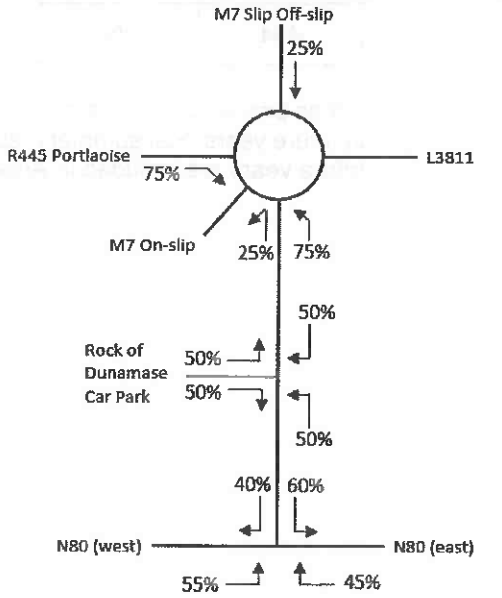
The access to the Rock of Dunamase will be via the L7830. It is assumed that vehicles accessing the Rock of Dunamase will travel via the N80 and the M7. Due to the location of the Rock pf Dunamase it is predicted that approximately 50% of traffic will arrive via the N80 direction and 50% of traffic will arrive via the M7.

The following diagrams show the proposed traffic distribution percentage for the AM and PM peak at the proposed car park to the Rock of Dunamase, the existing N80 / L7830 priority junction and the existing existing M7 Junction 16 eastern grade separated roundabout.

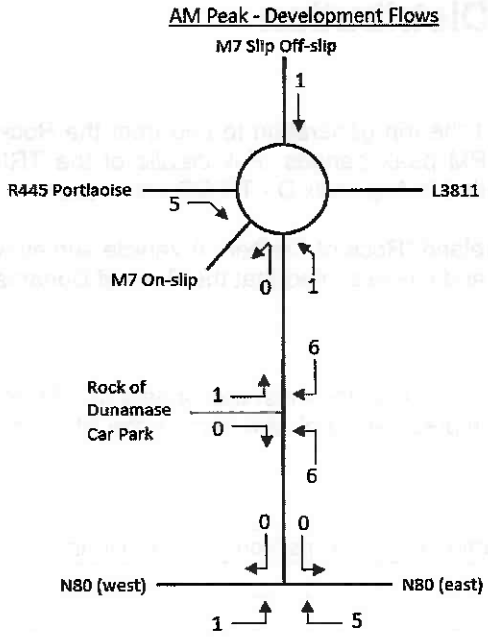
AM Peak - Development Trip Distribution (Percentage)

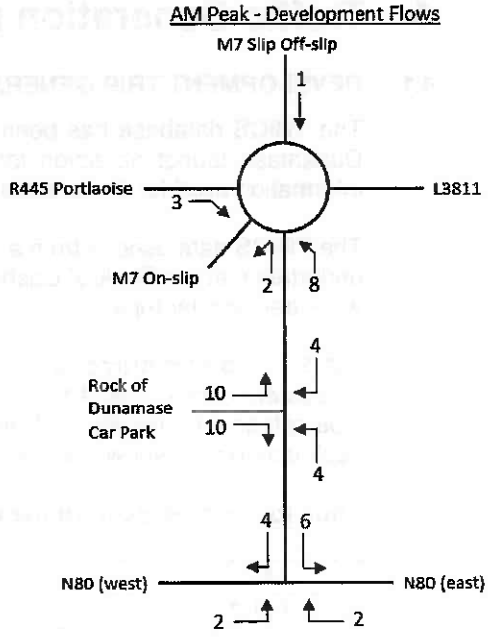


PM Peak - Development Trip Distribution (Percentage)



Using the proposed directional splits shown above and the trips generated by the tourist attraction outlined in 4.1, the following diagrams show the turning movements of predicted development traffic at proposed car park to the Rock of Dunamase, the existing N80 / L7830 priority junction and the existing existing M7 Junction 16 eastern grade separated roundabout during the AM and PM peak hours:





4.3 FUTURE YEAR TRAFFIC GROWTH

The TII issues a range of forecasts: low growth, medium growth and high growth. Due to the location and nature of the development, and given the recent economic expansion, we have used medium growth factors in our assessment.

The zone in which the site is located is number 454 in the TII National Traffic Model. The medium growth factors for each future year assessment are as follows:

Zone	2023 Existing	2023 Development Completion	2028 5 years after dev. completion	2038 15 years after dev. completion
454	1.00	1.00	9.98%	18.73%

These percentages have been used to predict the increase in background traffic that will occur in future years. Full summary tables and predicted future traffic flows for 2023, 2028 and 2038 future years are included in Appendix C – Traffic Flow Sheets.

5 OPERATIONAL ASSESSMENTS

5 Operational Assessments

5.1 INTRODUCTION

Traffic generated by the proposed storage facility will have some effect on the local road network surrounding the site. The following junctions were assessed:

- the existing M7 Junction 16 eastern grade separated roundabout
- the existing N80 / L7830 priority junction

5.2 M7 JUNCTION 16 EASTERN GRADE SEPARATED ROUNDABOUT

A capacity assessment has been undertaken using the computer program ARCADY for the AM and PM peak hours.

The following tables summarise the effects that the Rock of Dunamase tourist attraction will have on this junction in 2023, 2028 and 2033 using the existing and predicted traffic flows shown in Appendix C – Traffic Flow Sheets. Full ARCADY printouts are provided in Appendix E – ARCADY Results.

The parameters shown in the tables are defined as follows:

Ratio of Flow to Capacity (RFC) is a factor indicating the flow on a junction arm relative to its capacity. An RFC of 1.0 means the junction has reached its ultimate capacity and an RFC of 0.85 means that the junction has reached its practical capacity.

Avg. Queue is the average number of vehicles queued over the time period on the junction approach.

Queue delay is the average number of seconds delay to each vehicle in the time period.

Total Delay is the total number of vehicle hours of delay to all vehicles at the junction over the time period.

Existing M7 Junction 16 Eastern Grade Separated Roundabout – Capacity Results

Year	Period	Approach	Predicted RFC value	Avg Queue (vehicles)	Queue delay (secs./veh.)
2023 Base Year	AM Peak	M7 (exit slip Rd)	0.16	0	3
		L3811	0.07	0	3
		L7830	0.05	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.30	0	5
	PM Peak	M7 (exit slip Rd)	0.25	0	3
		L3811	0.05	0	3
		L7830	0.03	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.23	0	4
2023 With Dev.	AM Peak	M7 (exit slip Rd)	0.16	0	3
		L3811	0.08	0	3
		L7830	0.05	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.30	0	5
	PM Peak	M7 (exit slip Rd)	0.25	0	3
		L3811	0.05	0	3
		L7830	0.04	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.23	0	4
2028 No Dev.	AM Peak	M7 (exit slip Rd)	0.17	0	3
		L3811	0.08	0	4
		L7830	0.06	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.33	1	5

Year	Period	Approach	Predicted RFC value	Avg Queue (vehicles)	Queue delay (secs./veh.)
	PM Peak	M7 (exit slip Rd)	0.28	0	3
		L3811	0.05	0	4
		L7830	0.03	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.25	0	4
2028 With Dev.	AM Peak	M7 (exit slip Rd)	0.18	0	3
		L3811	0.08	0	4
		L7830	0.06	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.33	1	5
	PM Peak	M7 (exit slip Rd)	0.28	0	3
		L3811	0.05	0	4
		L7830	0.04	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.25	0	4
2038 No Dev.	AM Peak	M7 (exit slip Rd)	0.19	0	3
		L3811	0.09	0	4
		L7830	0.06	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.35	1	5
	PM Peak	M7 (exit slip Rd)	0.31	0	4
		L3811	0.06	0	4
		L7830	0.03	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.27	0	4
2038 With Dev.	AM Peak	M7 (exit slip Rd)	0.19	0	3
		L3811	0.09	0	4
		L7830	0.06	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.36	1	5
	PM Peak	M7 (exit slip Rd)	0.31	0	4
		L3811	0.06	0	4
		L7830	0.05	0	4
		M7 (entry slip Rd)	-	-	-
		R445	0.27	0	4

At present the existing M7 Junction 16 eastern grade separated roundabout operates within capacity with no queues and minimal delays during the AM and PM peak hour.

In 2023, 2028 and 2038 with the car park provided at the Rock of Dunamase tourist attraction the existing M7 Junction 16 eastern grade separated roundabout will continue to operate within capacity with minimal queues and delays during the AM and PM peak hour.

5.3 N80 / L7830 PRIORITY JUNCTION

A capacity assessment has been undertaken using the computer program PICADY for the AM and PM peak hours.

The following tables summarise the effects that the proposed storage facility will have on this junction in 2023, 2028 and 2038 using the existing and predicted traffic flows shown in Appendix C – Traffic Flow Sheets. Full PICADY printouts are provided in Appendix F – PICADY Results.

N80 / L7830 Priority Junction – Capacity Results

Year	Period	Approach	Predicted RFC value	Avg Queue (vehicles)	Queue delay (secs./veh.)
2023 Base Year	AM Peak	N80 (west)	-	-	-
		L7830	0.03	0	9
		N80 (east)	0.03	0	5
	PM Peak	N80 (west)	-	-	-
		L7830	0.02	0	10
		N80 (east)	0.02	0	5
2023 With Dev.	AM Peak	N80 (west)	-	-	-
		L7830	0.03	0	9
		N80 (east)	0.04	0	5
	PM Peak	N80 (west)	-	-	-
		L7830	0.05	0	10
		N80 (east)	0.03	0	5
2028 No Dev.	AM Peak	N80 (west)	-	-	-
		L7830	0.03	0	9
		N80 (east)	0.03	0	5
	PM Peak	N80 (west)	-	-	-
		L7830	0.02	0	10
		N80 (east)	0.03	0	5
2028 With Dev.	AM Peak	N80 (west)	-	-	-
		L7830	0.03	0	9
		N80 (east)	0.05	0	5
	PM Peak	N80 (west)	-	-	-
		L7830	0.05	0	10
		N80 (east)	0.03	0	5
2038 No Dev.	AM Peak	N80 (west)	-	-	-
		L7830	0.04	0	10
		N80 (east)	0.04	0	5
	PM Peak	N80 (west)	-	-	-
		L7830	0.03	0	11
		N80 (east)	0.03	0	5
2038 With Dev.	AM Peak	N80 (west)	-	-	-
		L7830	0.04	0	10
		N80 (east)	0.06	0	5
	PM Peak	N80 (west)	-	-	-
		L7830	0.06	0	11
		N80 (east)	0.03	0	5

At present the existing N80 / L7830 priority junction operates within capacity with no queues and minimal delays during the AM and PM peak hour.

In 2023, 2028 and 2038 with the car park provided at the Rock of Dunamase tourist attraction the N80 / L7830 priority junction will continue to operate within capacity with no queues and minimal delays during the AM and PM peak hour.

5.4 OPERATIONAL ASSESSMENTS – CONCLUSIONS

Junction analyses to assess the effects of traffic generated by the Rock of Dunamase tourist attraction have been undertaken for the existing existing M7 Junction 16 eastern grade separated roundabout and the existing N80 / L7830 priority junction. The analysis shows that:

- The existing M7 Junction 16 eastern grade separated roundabout currently operates within capacity with no queues and minimal delays.
- The existing M7 Junction 16 eastern grade separated roundabout will operate within capacity with minimal queues and delays with the car park provided at the Rock of Dunamase tourist attraction in 2023, year of opening, 2028, five years after completion and in 2038, fifteen years after completion.
- The existing N80 / L7830 priority junction currently operates within capacity with no queues and minimal delays.
- The existing N80 / L7830 priority junction will operate within capacity with no queues and minimal delays with the car park provided at the Rock of Dunamase tourist attraction in

2023, year of opening, 2028, five years after completion and in 2038, fifteen years after completion.

6 PARKING

6 Parking

6.1 CAR PARKING PROVISION

A total of 44 car parking spaces including 4 disable spaces will be provided to cater for the parking demand. In addition, 4 bus parking spaces and a bus drop-off space will be provided within the proposed car park. A layout of the parking facilities is provided in Appendix A – Drawings.

6.2 CAR PARKING REQUIREMENTS

The *'Laois County Development Plan 2021-2027'* lists standard provision for car parking. No parking standards for tourist attractions are provided within the county development plan.

However, the TRICS data used to generate the predicted trips to and from the Rock of Dunamase was taken from a similar site in Ireland (Rock of Cashel). A vehicle survey was undertaken at the Rock of Cashel in July 2021 and the parking accumulation was also recorded which is shown in the table below.

Time	Arr 181	Dep 174	Totals 355	Parking Accum
00:00-01:00				
01:00-02:00				
02:00-03:00				
03:00-04:00				
04:00-05:00				
05:00-06:00				
06:00-07:00	0	0	0	0
07:00-08:00	2	1	3	1
08:00-09:00	12	1	13	12
09:00-10:00	5	1	6	16
10:00-11:00	9	8	17	17
11:00-12:00	17	9	26	25
12:00-13:00	26	11	37	40
13:00-14:00	19	22	41	37
14:00-15:00	27	19	46	45
15:00-16:00	22	26	48	41
16:00-17:00	9	24	33	26
17:00-18:00	8	20	28	14
18:00-19:00	9	15	24	8
19:00-20:00	4	6	10	6
20:00-21:00	12	11	23	7
21:00-22:00				
22:00-23:00				
23:00-24:00				

The maximum difference between cumulative arrivals and cumulative departures occurs between 2pm till 3pm and is shown to be 45 vehicles.

A total of 48 parking spaces including 4 bus spaces will be provided to cater for all vehicles. The parking provision provided within the proposed car park is therefore considered adequate to cater for the parking demand when assessed using the TRICS parking profile.

7 CONCLUSIONS

7 Conclusions

The main conclusions of this study are summarised as follows:

- The existing M7 Junction 16 eastern grade separated roundabout currently operates within capacity with no queues and minimal delays.
- The existing M7 Junction 16 eastern grade separated roundabout will operate within capacity with no queues and minimal delays with the car park provided at the Rock of Dunamase tourist attraction in 2023, year of opening, 2028, five years after completion and in 2038, fifteen years after completion.
- The existing N80 / L7830 priority junction currently operates within capacity with no queues and minimal delays.
- The existing N80 / L7830 priority junction will operate within capacity with no queues and minimal delays with the car park provided at the Rock of Dunamase tourist attraction in 2023, year of opening, 2028, five years after completion and in 2038, fifteen years after completion.
- The parking provisions provided at the Rock of Dunamase is considered adequate to cater for the parking demand as set-out in Chapter 6 above.