consulting engineers

NRB

Transportation Assessment Report

for

Proposed Residential Development

At

Dunlo Hill, Ballinasloe, Co. Galway

FINAL ISSUE

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EXECUTIVE SUMMARY

NRB Consulting Engineers Ltd were appointed to address the Traffic & Transportation issues associated with a planning application for a small residential development at Dunlo Hill, Ballinasloe, Co. Galway.

The proposed residential development consists of a total of 13 No residential homes (12 no. Duplex Apartments and 1 No. Apartment), redeveloping the existing terrace houses on Dunlo Hill (R446 Regional Road).

This Transportation Assessment Report (TA) has been prepared to address the Traffic and Transportation issues associated with the proposal, the capacity of the existing road network and the impact of the development locally, conscious that the proposed site use will generate very low traffic volumes indeed in the context of the road network in the area. The Report has been prepared in accordance with TII's Traffic & Transportation Assessment Guidelines and addresses the worst case traffic impact of the proposal.

We commissioned and undertook new traffic surveys of the adjacent road network during March 2023 when schools were fully open. This traffic survey data formed the basis of the study.

The analysis includes the effects of the existing traffic on the local roads and assesses the impact during the traditional peak commuter periods in accordance with Traffic & Transport Assessment Guidelines.

The Transportation Assessment confirms that the road network is more than adequate to accommodate the worst-case traffic associated with the development, and full occupation will have a negligible and unnoticeable impact upon the operation of the local roads.

Based on our study and assessment, we believe that there are no adverse traffic/transportation capacity or operational issues associated with the construction and occupation of the residential development that would prevent planning permission being granted by Galway County Council (GCC).

1.0 INTRODUCTION

1.1 This Transportation Assessment (TA) has been prepared by NRB Consulting Engineers Ltd and addresses the Traffic/ Transportation issues associated with a planning application for a small residential development at Dunlo Hill, Ballinasloe, Co. Galway.

1.2 It is not proposed to provide additional parking in the rear courtyard area, but 6no. on-street parking is proposed fronting the site. A site location plan for the site is included below as ***Figure 1.1***.

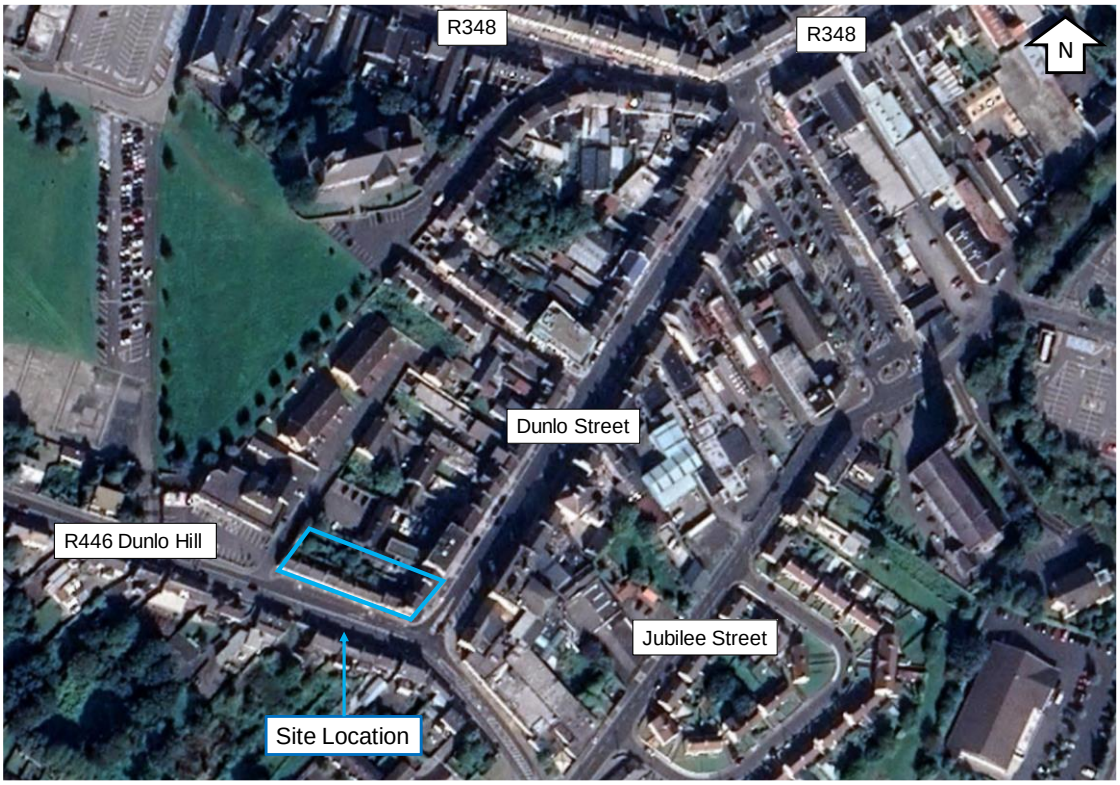


Figure 1.1 - Site Location

1.3 In describing the Receiving Environment and the Proposed Future Environment, this report addresses the following aspects of the proposed development:

- Very small scale of the development in traffic generation terms in the context of the local road network (Reflected in the very Low Traffic Generation of the Development, consistent with the proposed uses),
- Location of the development on the site, being on zoned lands in close proximity to local amenities for residents,
- Traffic & Transportation Impact,
- Impact upon the adjacent affected junctions locally.

1.4 The Recommendations contained within this Transportation Assessment are based on the following sources of information and industry-standard practices; -

- TII Traffic & Transport Assessment Guidelines,
- Design Manual for Urban Roads and Streets,
- 2023 Traffic Survey Data collected,
- TRICS Database (being the recommended method referenced within the TII Guidelines),
- Relevant Roads Design Guidance, and,
- Our experience in assessing the impact of Developments of this Nature.

1.5 The Report has been prepared in accordance with the requirements of the TII's Traffic & Transport Assessment Guidelines. These are the professional Guidelines used to assess the impact of developments on public roads.

2.0 DEVELOPMENT PROPOSALS & EXISTING CONDITIONS

2.1 The proposal consists of the development of the town centre site to provide;

- 12 No. Duplex Apartments,
- 1 No. Apartment,
- Community Centre,
- Associated 6 no. Car parking spaces & 48 no Bicycle parking spaces, and
- Associated ancillary roads/footpaths, refuse storage & landscaping.

2.2 An extracted image from the Architects Layout Plans, showing the development in the context of the site and the adjoining roads, is reproduced below as ***Figure 2.1*** with more detailed plans of the site included as ***Appendix A.***

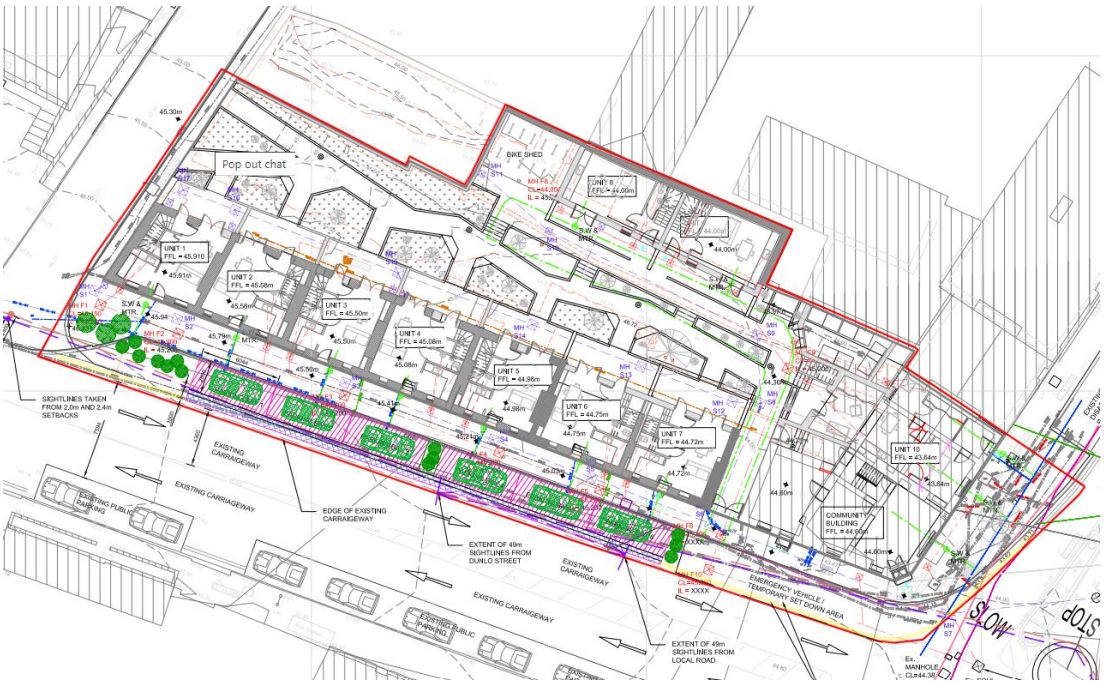


Figure 2.1 –Extract Architects Plans

Existing Conditions

2.3 The site is bound along the southern boundary by Dunlo Hill, the R446 Regional Road, the eastern boundary by Dunlo Street, and the western boundary by a local residential access road. The site is bound to the northern boundary by existing established residential development.

2.4 The R446 regional road connects Kinnegad in County Westmeath to Galway City. Prior to the construction of the M6 motorway the R446 formed the main N6 road connecting Dublin and Galway. Being an established urban area / town centre, the

R446 Dunlo Hill is subject to a 50kph urban speed restriction. It is a moderately trafficked single carriageway 2-way road, provided with footpaths.

2.5 Dunlo Hill carries a weekday AM Peak Hour 2-way flow of approximately 936 PCUs and a weekday PM Peak Hour 2-Way flow of approximately 1,120 PCUs, measured at the development location. In these terms, it can be considered as moderately trafficked in terms of its link carrying capacity.

2.6 To set the traffic flows in context, urban roads of this nature have a theoretical free flow link capacity of approximately 1,500 to 1,800 PCUs per-direction per-hour. In this regard, the R446 can be considered moderately trafficked in comparison with the link carrying capacity. However, it is accepted that the capacity of any road is generally limited by the capacity of road junctions along its length, particularly in urban areas.

2.7 A site layout plan showing the development arrangement in relation to the existing site and roads is included herein as ***Appendix A***.

3.0 VEHICULAR TRIP GENERATION, ASSIGNMENT & DISTRIBUTION

3.1 The Trip Rate Information Computer System (TRICS) database is ordinarily used to ascertain vehicular trip generation associated with the use of any particular site. This represents industry standard practice for Transportation Assessments in Ireland and is specifically referenced and recommended for use in the TII Guidelines for Traffic & Transport Assessment. In this case the worst case assessment has been undertaken based on Private Residential Houses (using the licensed version of TRICS). The use of Trip Rates from TRICS in this fashion represents industry-standard practice.

3.2 A robust and onerous assessment has been undertaken of the impact in the network emanating from the site. We commissioned an independent Classified Interval Turning Movement Traffic Survey of the network in the vicinity of the site as set out in an image included below as ***Figure 3.1***.

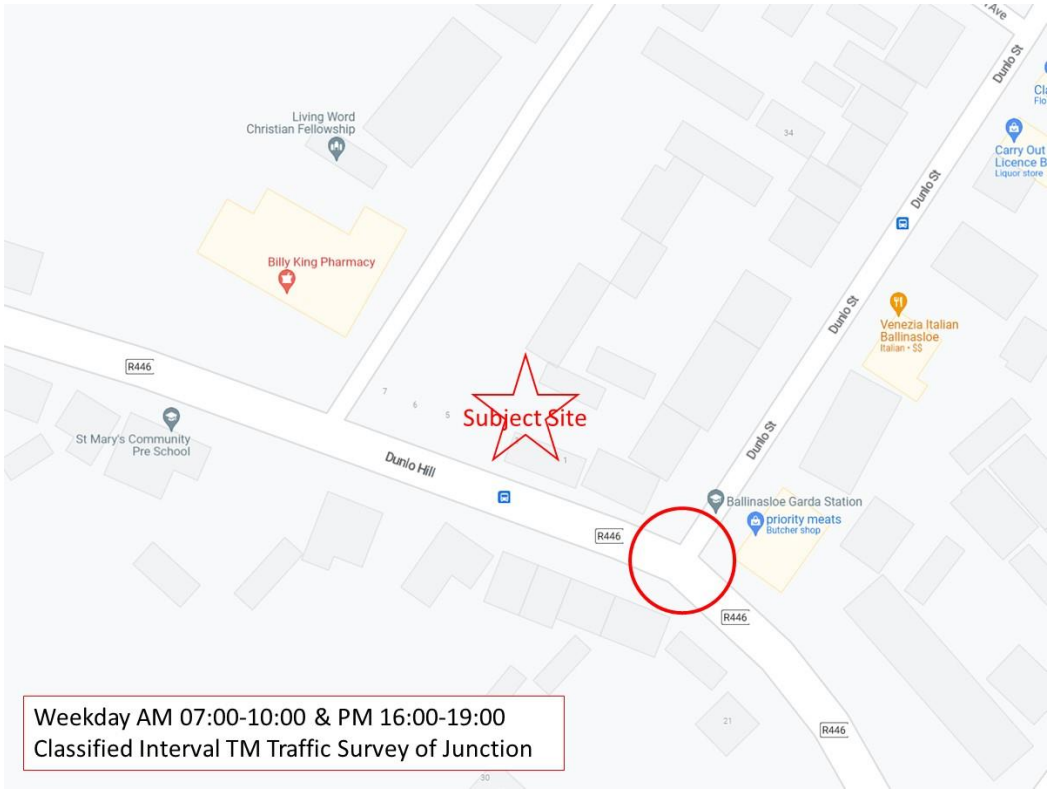


Figure 3.1 – Details of Traffic Data Collection/Surveys Commissioned

3.3 The quantification of traffic generated, and the associated network assessment is undertaken in accordance with the Guidelines in the context of the demonstrably low levels of traffic generated by the proposed development, being a small infill Residential Development Scheme.

3.4 We have undertaken the Traffic Generation calculations using the appropriate categories from within TRICS. The resulting TRICS Trip Rates applied for the Development in this case are as set out below as ***Table 3.1***.

Table 3.1; - TRICS Data Summary, Proposed Development

13 No. Resi Units	Arrivals (PCUs)		Departures (PCUs)		Total 2-Way Vehicular Traffic Generated
Network Hour	per unit	Dev	per unit	Dev	
Weekday AM Peak Hr 8-9	0.173	2	0.383	5	7
Weekday PM Peak Hr 5-6	0.288	4	0.192	2	6
24 Hours	2.117	28	2.270	30	58

3.5 We have included herein as ***Appendix C*** the TRICS data output upon which the above is based.

Assignment/Distribution - Future Year Traffic

3.6 We have used hand assignment techniques based on the observed movements, with the worst-case traffic assigned to the roads based on the observed established traffic patterns, being the industry standard methodology.

3.7 The standard methodology applied was to firstly ascertain the base background traffic conditions for both the weekday AM and weekday PM Commuter Peak periods. To this end we commissioned and undertook the 2023 Traffic Survey of the network serving the site, in order to establish base background traffic conditions.

3.8 Details of the traffic surveys are included as ***Appendix B*** and are reproduced as commuter peak hour Network Flow Diagrams as ***Appendix D.*** We then used the TII PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3 (Travel Demand Projections 2019, Table 6.2: Central Growth Rates: Annual Growth Factors), to establish projected occupation/opening year 2026 and design year 2041 traffic conditions 15 years following opening on the local road network.

3.9 The worst case traffic based on the content of ***Table 3.1*** above was then applied in order to establish Opening Year and Design Year Traffic Conditions with the proposed development in place and fully occupied. This is all included in the calculations included herein as ***Appendix D***.

3.10 It should be noted that we have selected an opening year of 2026 as being reasonable and appropriate. However, in our experience, varying the opening year and design year by 1-3 years, if required, would have no significant impact upon

the conclusions of the study. In addition, given the favourable results reported in this study, if required to apply higher background traffic conditions for any reason we would not anticipate any changes whatsoever to the conclusions.

3.11 Traffic growth factors for future year assessments were calculated from data obtained in the TII PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3 which provides the recommended method of predicting future year traffic growth on Roads. Calculations of the relevant growth factors are included in ***Table 3.2*** below (based on tabulated 'Central Growth' for County Galway). It should be noted that any requirement to use different or higher growth factors will also have no implications whatsoever for the conclusions of the study.

Table 3.2 - Traffic Growth Rates, TII Travel Demand Projections Unit 5.3

Year	to Year	Table 6.2:
Surveyed	2026	1.080
2026	2041	1.248

3.12 The resulting Traffic Flow Projections and Figures within ***Appendix D*** allowed the assessment of impact of the development to be undertaken.

4.0 TRAFFIC IMPACT - THRESHOLD ASSESSMENT/TRAFFIC CAPACITY

4.1 The Institution of Highways and Transportation (IHT) Guidelines for Traffic Impact Assessment and the TII Traffic and Transport Assessment Guidelines sets out a strict mechanism for assessment of developments of this nature and determining whether further assessment is indeed required.

4.2 This TII Traffic and Transport Assessment Guidelines requires a **Threshold Assessment** of the impact on the local roads to be provided in order to determine whether additional detailed modelling and assessment of particular critical junctions is necessary.

4.3 The professional guidance referenced above sets out specific increases in traffic volume associated with new development, which, if breached, requires further more detailed analysis and assessment to be undertaken. The recommendation is that, if the expected increase is **5%** for networks that are considered heavily trafficked or congested, then further analysis is warranted. The threshold is set at 10% for lightly trafficked or uncongested networks. For robustness we have used the more onerous 5% threshold.

4.4 It is demonstrated herein that the proposed opening and occupation of the entire small residential development, with very low volumes of vehicular traffic added to the local road network, will not result in any significant or noticeable level of new trips on the local roads, with all anticipated traffic increases beyond the development expected to be **well below** the Industry-Standard level of 5% above which further assessment is required.

Table 4.1; - Threshold Assessment, Worst-Case Impact - AM & PM Peak Hours

Assessed Road or Junction	Traffic Increase %		COMMENT
	AM Pk Hr	PM Pk Hr	
Dunlo Hill / Dunlo Street Junction	0.7%	0.4%	<5%; No Further Assessment Req'd. However, Capacity Assessment Undertaken for completeness

4.5 The Threshold assessment clearly confirms that, beyond the proposed development, the worst case traffic increase are in all cases imperceptible AND significantly below the IHT and TII recommended level of 5% above which further assessment is warranted (5% being the lower threshold for congested networks). To set these predicted increased levels of traffic in context, the day-to-day variation in traffic volume (due to day-of-week or weather conditions) is accepted as being

10%, so, in this context alone, increases of in all cases way less than 5% in Traffic on the local road links will go entirely unnoticed.

4.6 It is clear that the introduction of the proposed development will have an absolutely negligible & unnoticeable impact upon vehicular traffic conditions locally. Notwithstanding the above we have undertaken detailed capacity modelling of the Dunlo Hill / Dunlo Street Junction, with the results summarised below.

4.7 We have used the TII-approved software package 'Junctions 10' PiCADY' (**P**riority **I**ntersection **C**apacity **A**nd **D**elay) software package (as part of the TRL Package 'Junction 10') to assess the capacity of the junction. PiCADY produces results based on a 'Ratio of Flow to capacity' (RFC) and queue length. An RFC greater that 1.00 indicates that a junction is operating at or above capacity, with 0.85 considered to be the optimum RFC value. We have appended the detailed computer simulation model results for the Dunlo Hill / Dunlo Street Junction in ***Appendix E.***

Dunlo Hill / Dunlo Street Junction Capacity Analysis

4.8 A summary of the results is included below as ***Table 4.1***

Table 4.1 - PiCADY Summary Results, Existing Dunlo Hill / Dunlo Street Junction

Modelled Scenario	*Period Mean Max Q (PCUs)*	*Period Max RFC*
2026 Opening Year AM Peak Hr	0.1	0.10
2026 Opening Year PM Peak Hr	0.4	0.30
2041 Design Year AM Peak Hr	0.2	0.15
2041 Design Year PM Peak Hr	0.9	0.48

4.9 The results of the modelling clearly shows that the existing junction will have significantly more than adequate capacity to accommodate the worst case traffic associated with the development. All of the RFCs are way below the theoretical optimum capacity of 0.85 and no queuing is anticipated. These results are unsurprising given the low traffic volumes generated.

5.0 CONCLUSIONS

This Transportation Assessment Report assesses the traffic and transportation impact associated with a planning application for a small residential development at Dunlo Hill, Ballinasloe, Co. Galway. The proposed residential development consists of a total of 13 No residential homes, redeveloping existing terrace houses on Dunlo Hill (R446 Regional Road).

5.1 This Report has been prepared in accordance with the TII Traffic & Transport Assessment Guidelines and is based on industry-standard Trip Generation Rates established using the most up to date version of the TRICS Database.

5.2 The impact of the development traffic on the local roads has been modelled and assessed, based on a comprehensive traffic survey undertaken in March 2023. Appropriate industry standard TII traffic growth factors have been applied to establish selected opening year and design year traffic conditions.

5.3 This report demonstrates that the proposed Development will have an absolutely negligible impact upon the established local traffic conditions in the town centre and can easily be accommodated on the road network without any capacity concerns arising.

5.4 The assessment confirms that the existing Dunlo Hill / Dunlo Street junction is of more than adequate capacity to accommodate the worst-case traffic associated with the proposed development during the selected year of opening and the design year 15 years following opening.

5.5 It is considered that there are no significant Operational Traffic Safety or Road Capacity issues that prevent a positive determination of the application by Galway County Council.

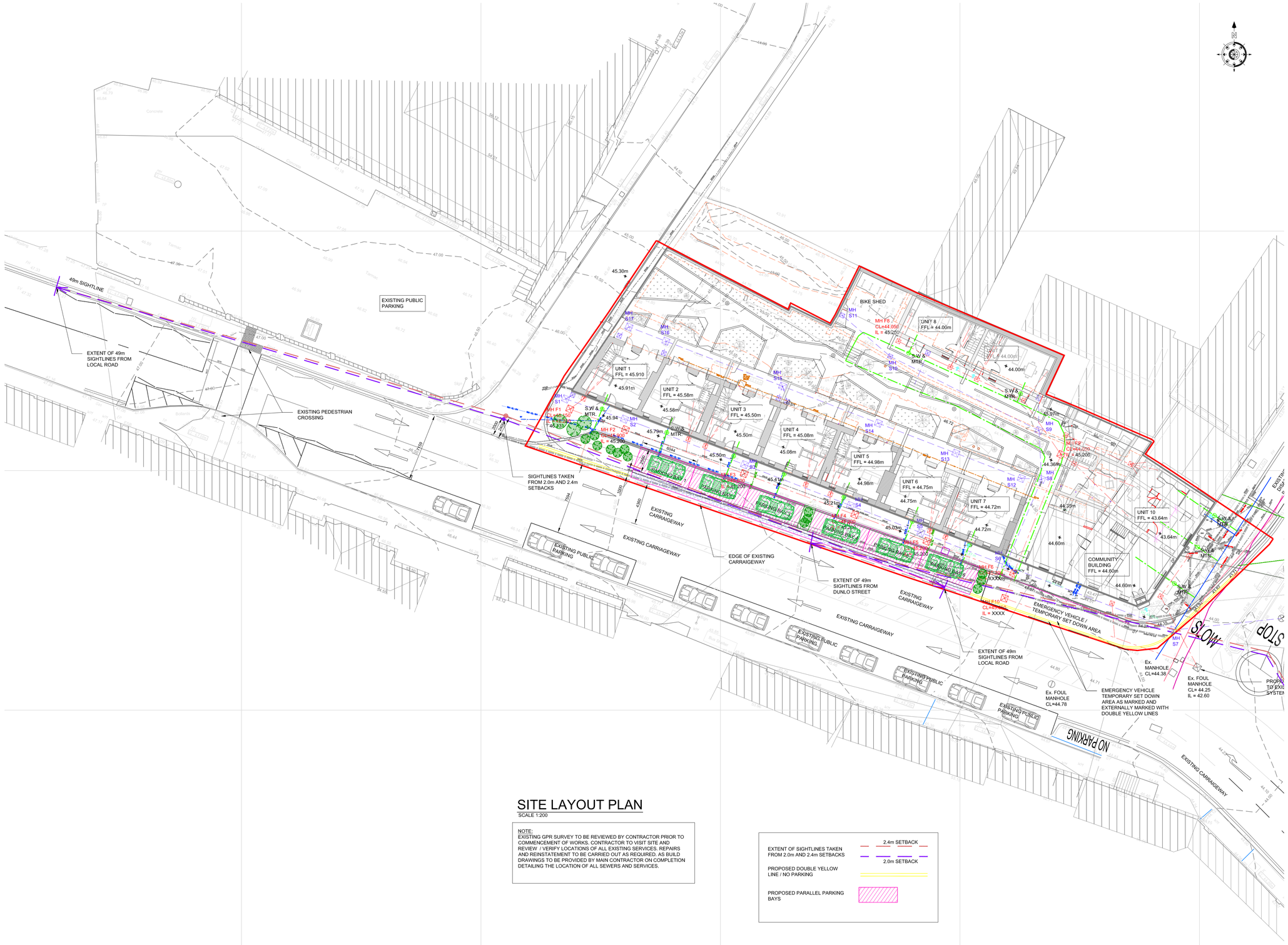
APPENDICES - CONTENT

A	Proposed Development – Site Layout
B	2023 Raw Traffic Survey Data Collected
C	TRICS Trip Generation Output *(Residential Housing)*
D	Traffic Surveys, Trip Distribution & Network Traffic Flow Diagrams
E	PICADY Junction Capacity Model Output – Existing Dunlo Hill / Dunlo Street Junction

APPENDIX A

Proposed Development - Site Layout

A1



SITE LAYOUT PLAN

SCALE 1:200

NOTE:
EXISTING GPR SURVEY TO BE REVIEWED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS. CONTRACTOR TO VISIT SITE AND REVIEW / VERIFY LOCATIONS OF ALL EXISTING SERVICES, REPAIRS AND REINSTATEMENT TO BE CARRIED OUT AS REQUIRED. AS BUILD DRAWINGS TO BE PROVIDED BY MAIN CONTRACTOR ON COMPLETION DETAILING THE LOCATION OF ALL SEWERS AND SERVICES.

EXTENT OF SIGHTLINES TAKEN FROM 2.0m AND 2.4m SETBACKS — 2.4m SETBACK / 2.0m SETBACK

PROPOSED DOUBLE YELLOW LINE / NO PARKING

PROPOSED PARALLEL PARKING BAYS

IRISH WATER NOTES & DETAILS

1.ATTACHED NOTES AND DETAILS ON WATERMAIN AND WASTEWATER EXTRACTED FROM FOLLOWING IRISH WATER DOCUMENTS;
- WATER INFRASTRUCTURE STANDARD DETAILS; CONNECTION AND DEVELOPER SERVICES; JULY 2020 (REVISION 04) AS AMENDED.
-WASTEWATER INFRASTRUCTURE STANDARD DETAILS; CONNECTIONS AND DEVELOPER SERVICES; JULY 2020 (REVISION 04) AS AMENDED.

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS,ARCHITECTS AND SERVICE ENGINEERS DRAWINGS AND SPECIFICATION.
2. DO NOT SCALE USE FIGURE DIMENSIONS ONLY.
3. ALL LEVELS ARE STRUCTURAL UNLESS NOTED OTHERWISE.
4. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS AND PRIOR TO COMMENCEMENT OF ANY MATERIALS BEING ORDERED AND ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE DESIGNERS IMMEDIATELY.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY SUPPORT OF ALL WORK.

ALL FILL MATERIAL TO COMPLY WITH SPECIFICATION FOR ROAD WORKS SERIES 800 (NRA)

ALL EXCAVATIONS AND ROCK BREAKING TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE SPECIFICATION AND IN STRICT ACCORDANCE WITH SERIES 600, SPECIFICATIONS FOR ROADWORK'S AS PUBLISHED WITH THE NRA

ALL WORK TO BE CARRIED OUT IN STRICT ACCORDANCE WITH CURRENT BUILDING REGULATIONS - AS PER THE BUILDING CONTROL REGULATIONS 1997-2014 & THE BUILDING REGULATIONS 1997-2017 WITH REFERENCE TO UPDATES TO THE TECHNICAL GUIDANCE DOCUMENTS AS PER THE DEPARTMENT OF ENVIRONMENT, HERITAGE & LOCAL GOVERNMENT.

ALL SIGNS AND ROAD MARKINGS AS PER TRAFFIC SIGNS MANUAL 2019 AS AMENDED.

UNCONTROLLED PEDESTRIAN CROSSING AS PER STANDARD DETAIL CC-SCD-05030 & CC-SCD-05042

LEGEND

- DENOTES EXISTING SURFACE WATER SEWER
- EX. SMH — DENOTES EXISTING SURFACE WATER MANHOLE
- DENOTES EXISTING FOUL SEWER
- EX. FMH — DENOTES EXISTING FOUL MANHOLE
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- S.V. — SLUICE VALVE
- S.W. — STOP COCK
- BBX. — BOUNDARY BOX

Received 04 May 23

PLANNING ISSUE 04.05.23

REV.	DESCRIPTION	DATE	BY
PL -	PART 8 PLANNING ISSUE	23/03/23	JS

CLIENT: Galway County Council

JOB: Dunlo Hill Housing Development

TITLE: Site Layout Plan 1:200

Comhairle Chontae na Gaillimhe
Galway County Council

McKenna Consulting Engineers
Civil & Structural
Bank Place, Miltown Malbay, Co Clare.
Email - info@mckennaconsultingengineers.com
Tel. - 065 7085651 / 086 865 7569

SCALES	AS SHOWN
DATE	03/01/'23
DRAWN	JS
CHECKED	TMcK
APPROVED	TMcK

DRG. No. 22257/CE/001/PL

A1

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SCALES	AS SHOWN
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DRG. No. 22257/CE/002/PL

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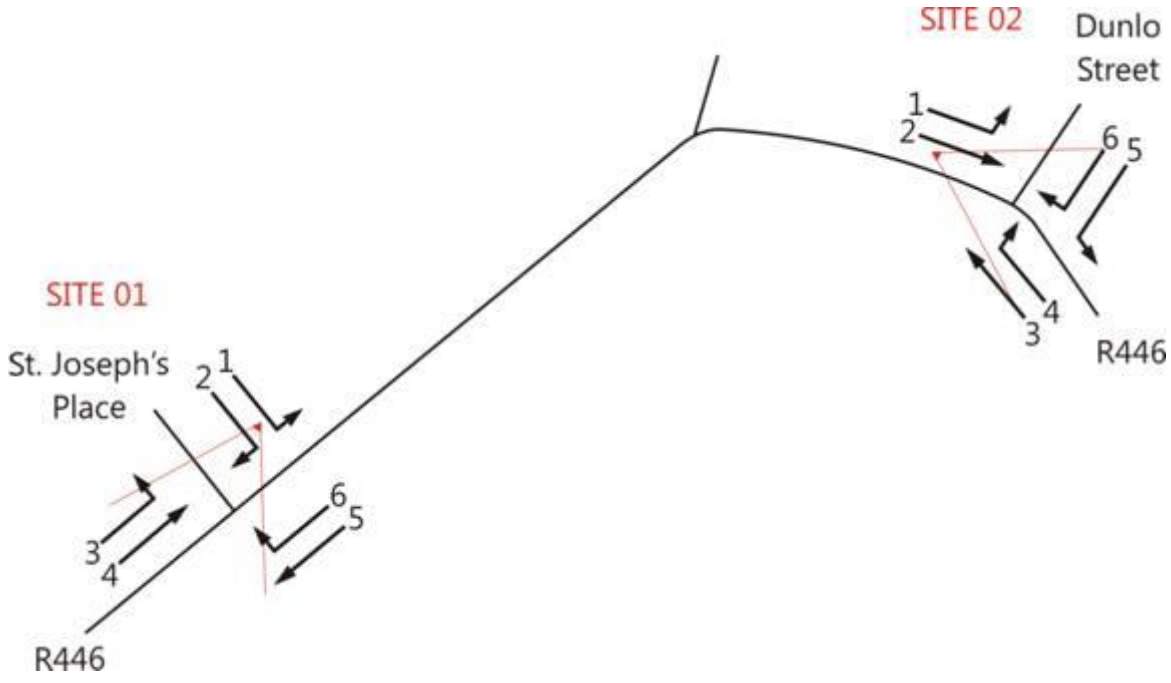
APPENDIX B

2023 Raw Traffic Survey Data Collected

Site Locations

Movement Numbering



Job number: TRA/23/056	Job Date: 9th March 2023	Drawing No: TRA/23/056-01	traffinomics.ie
Client: NRB	Job Day: Thursday	Author: SPW	

TRAFFINOMICS LIMITED

BALLINASLOE TRAFFIC COUNTS **MARCH 2023**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/23/056**

SITE: 02 DATE: 9th March 2023

LOCATION: R446/Dunlo Street DAY: Thursday

	MOVEMENT 1								MOVEMENT 2								MOVEMENT 3							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
07:00	0	0	3	2	0	0	5	5	0	0	14	2	3	0	19	22	0	0	21	2	1	1	25	27
07:15	0	0	2	0	0	1	3	4	0	0	21	5	2	2	30	34	0	0	27	8	4	1	40	45
07:30	0	0	2	1	0	1	4	5	1	0	39	17	1	1	59	60	2	0	48	21	2	1	74	75
07:45	0	0	4	1	1	0	6	7	1	0	50	9	0	0	60	59	0	0	53	5	2	1	61	64
H/TOT	0	0	11	4	1	2	18	21	2	0	124	33	6	3	168	175	2	0	149	36	9	4	200	211
08:00	0	0	6	1	0	0	7	7	1	0	35	3	4	1	44	48	0	0	58	22	4	5	89	98
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09:00	0	0	23	1	1	2	27	30	0	0	92	10	4	5	111	120	0	0	65	12	4	4	85	93
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H/TOT	0	0	82	10	1	4	97	102	0	0	291	45	18	10	364	392	0	0	289	53	21	9	372	402
P/TOT	0	0	144	22	3	7	176	186	4	0	714	121	38	20	897	952	3	0	777	150	47	27	1004	1076

	MOVEMENT 1								MOVEMENT 2								MOVEMENT 3							
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU
16:00	0	0	32	3	0	1	36	37	0	0	122	11	4	8	145	157	0	0	114	13	4	3	134	141
16:15	0	0	23	1	0	0	24	24	0	0	91	13	4	0	108	112	0	0	92	15	5	3	115	123
16:30	0	0	22	7	0	0	29	29	0	0	95	12	0	2	109	111	0	0	93	8	4	0	105	109
16:45	0	0	21	3	0	0	24	24	0	0	91	20	4	1	116	121	0	0	97	15	1	3	116	120
H/TOT	0	0	98	14	0	1	113	114	0	0	399	56	12	11	478	501	0	0	396	51	14	9	470	493
17:00	0	0	22	2	0	1	25	26	0	0	120	10	1	0	131	132	1	0	117	25	3	2	148	152
17:15	0	0	21	1	0	2	24	26	0	0	73	9	0	2	84	86	0	0	93	17	1	1	112	114
17:30	0	0	18	5	0	1	24	25	0	0	101	8	2	1	112	115	0	0	120	13	1	0	134	135
17:45	0	0	10	2	0	0	12	12	0	0	88	9	1	1	99	101	0	0	107	13	2	0	122	124
H/TOT	0	0	71	10	0	4	85	89	0	0	382	36	4	4	426	434	1	0	437	68	7	3	516	525
18:00	0	0	9	1	0	1	11	12	0	0	75	10	2	0	87	89	0	0	88	12	4	2	106	112
18:15	0	0	9	3	0	0	12	12	0	0	63	9	3	0	75	78	1	0	74	9	0	0	84	83
18:30	0	0	10	2	0	0	12	12	0	0	75	11	2	0	88	90	0	0	77	6	0	2	85	87
18:45	0	0	15	3	0	1	19	20	0	0	55	6	2	1	64	67	0	0	68	17	3	1	89	93
H/TOT	0	0	43	9	0	2	54	56	0	0	268	36	9	1	314	324	1	0	307	44	7	5	364	375
P/TOT	0	0	212	33	0	7	252	259	0	0	1049	128	25	16	1218	1259	2	0	1140	163	28	17	1350	1393

TRAFFINOMICS LIMITED

BALLINASLOE TRAFFIC COUNTS **MARCH 2023**
MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/23/056**

SITE: 02 DATE: 9th March 2023

LOCATION: R446/Dunlo Street DAY: Thursday

	MOVEMENT 4								MOVEMENT 5								MOVEMENT 6								PCU's Through Junction
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	
07:00	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2	0	0	1	1	0	0	2	2	58
07:15	0	0	1	1	0	0	2	2	0	0	1	0	0	0	1	1	0	0	4	1	0	0	5	5	91
07:30	0	0	0	1	0	0	1	1	0	0	1	1	0	0	2	2	0	0	2	2	0	1	5	6	150
07:45	0	0	2	0	1	0	3	4	1	0	8	0	0	0	9	8	0	0	5	1	0	1	7	8	150
H/TOT	0	0	3	2	1	0	6	7	1	0	12	1	0	0	14	13	0	0	12	5	0	2	19	21	449
08:00	0	0	2	0	0	0	2	2	0	0	4	1	0	1	6	7	0	0	3	1	0	0	4	4	166
08:15	0	0	1	2	0	0	3	3	0	0	5	2	0	0	7	7	0	0	3	1	0	1	5	6	189
08:30	0	0	4	0	0	0	4	4	0	0	1	1	0	0	2	2	0	0	7	1	0	1	9	10	303
08:45	0	0	11	0	1	0	12	13	0	0	8	0	1	0	9	10	0	0	8	0	0	0	8	8	327
H/TOT	0	0	18	2	1	0	21	22	0	0	18	4	1	1	24	26	0	0	21	3	0	2	26	28	986
09:00	0	0	19	0	0	0	19	19	0	0	12	1	0	0	13	13	0	0	5	1	0	1	7	8	283
09:15	0	0	8	2	0	0	10	10	0	0	16	3	0	0	19	19	0	0	14	1	0	1	16	17	299
09:30	0	0	9	0	0	0	9	9	0	0	13	0	0	0	13	13	0	0	12	1	0	1	14	15	242
09:45	0	0	21	1	0	0	22	22	0	0	9	3	1	0	13	14	0	0	7	2	0	1	10	11	242
H/TOT	0	0	57	3	0	0	60	60	0	0	50	7	1	0	58	59	0	0	38	5	0	4	47	51	1066
P/TOT	0	0	78	7	2	0	87	89	1	0	80	12	2	1	96	98	0	0	71	13	0	8	92	100	2501

	MOVEMENT 4								MOVEMENT 5								MOVEMENT 6								PCU's Through Junction
TIME	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	PCL	MCL	CAR	LGV	HGV	BUS	TOT	PCU	
16:00	0	0	15	1	0	1	17	18	0	0	15	2	0	0	17	17	0	0	11	3	1	0	15	16	386
16:15	0	0	14	4	0	0	18	18	0	0	12	2	1	2	17	20	0	0	16	4	0	0	20	20	317
16:30	0	0	12	2	0	0	14	14	0	0	18	0	0	0	18	18	0	0	13	1	0	1	15	16	297
16:45	0	0	23	3	0	0	26	26	0	0	15	4	0	0	19	19	0	0	10	2	0	0	12	12	322
H/TOT	0	0	64	10	0	1	75	76	0	0	60	8	1	2	71	74	0	0	50	10	1	1	62	64	1322
17:00	0	0	18	1	0	0	19	19	0	0	27	6	0	2	35	37	0	0	18	0	0	1	19	20	386
17:15	0	0	14	1	0	3	18	21	0	0	17	0	0	1	18	19	0	0	19	0	0	1	20	21	287
17:30	0	0	18	2	0	0	20	20	0	0	22	3	0	0	25	25	0	0	16	2	0	0	18	18	338
17:45	0	0	21	1	0	1	23	24	0	0	15	0	0	0	15	15	0	0	11	2	0	0	13	13	289
H/TOT	0	0	71	5	0	4	80	84	0	0	81	9	0	3	93	96	0	0	64	4	0	2	70	72	1300
18:00	0	0	14	4	0	0	18	18	1	0	11	1	0	0	13	12	0	0	12	2	0	1	15	16	259
18:15	0	0	14	0	0	0	14	14	0	0	8	4	1	0	13	14	0	0	9	1	0	0	10	10	211
18:30	0	0	10	2	0	0	12	12	0	0	9	1	0	0	10	10	0	0	8	2	0	0	10	10	221
18:45	0	0	11	1	0	0	12	12	0	0	13	4	0	0	17	17	0	0	11	0	0	0	11	11	220
H/TOT	0	0	49	7	0	0	56	56	1	0	41	10	1	0	53	53	0	0	40	5	0	1	46	47	911
P/TOT	0	0	184	22	0	5	211	216	1	0	182	27	2	5	217	223	0	0	154	19	1	4	178	183	3534

APPENDIX C

TRICS - Trip Generation Output

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
TOTAL VEHICLES
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
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									
07:00 - 08:00	12	50	0.062	12	50	0.198	12	50	0.260
08:00 - 09:00	12	50	0.173	12	50	0.383	12	50	0.556
09:00 - 10:00	12	50	0.172	12	50	0.143	12	50	0.315
10:00 - 11:00	12	50	0.125	12	50	0.142	12	50	0.267
11:00 - 12:00	12	50	0.145	12	50	0.145	12	50	0.290
12:00 - 13:00	12	50	0.148	12	50	0.165	12	50	0.313
13:00 - 14:00	12	50	0.157	12	50	0.167	12	50	0.324
14:00 - 15:00	12	50	0.165	12	50	0.197	12	50	0.362
15:00 - 16:00	12	50	0.212	12	50	0.173	12	50	0.385
16:00 - 17:00	12	50	0.265	12	50	0.183	12	50	0.448
17:00 - 18:00	12	50	0.288	12	50	0.192	12	50	0.480
18:00 - 19:00	12	50	0.205	12	50	0.182	12	50	0.387
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.117			2.270			4.387

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

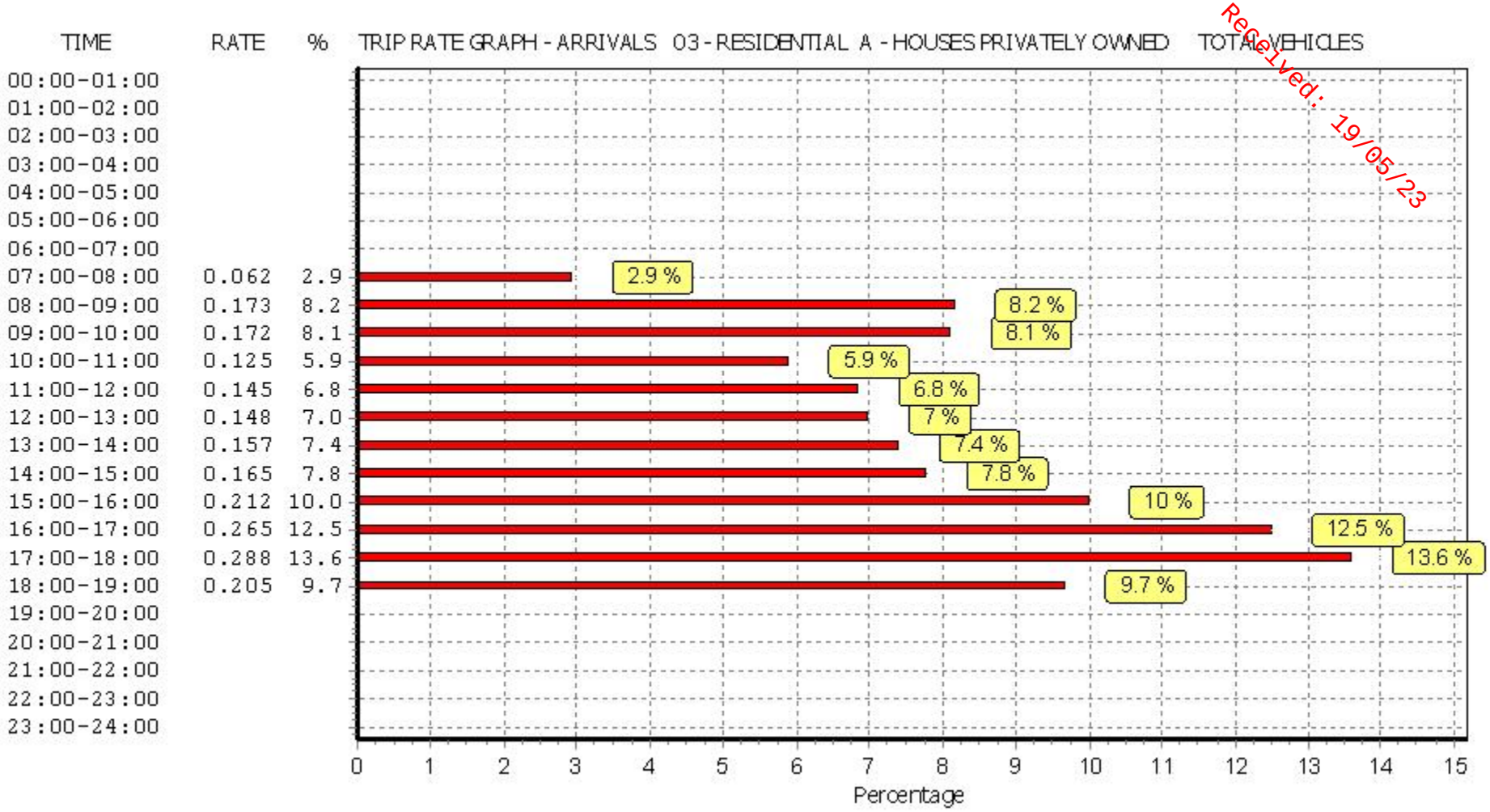
*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	9 - 180 (units:)
Survey date date range:	01/01/14 - 29/09/22
Number of weekdays (Monday-Friday):	12
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

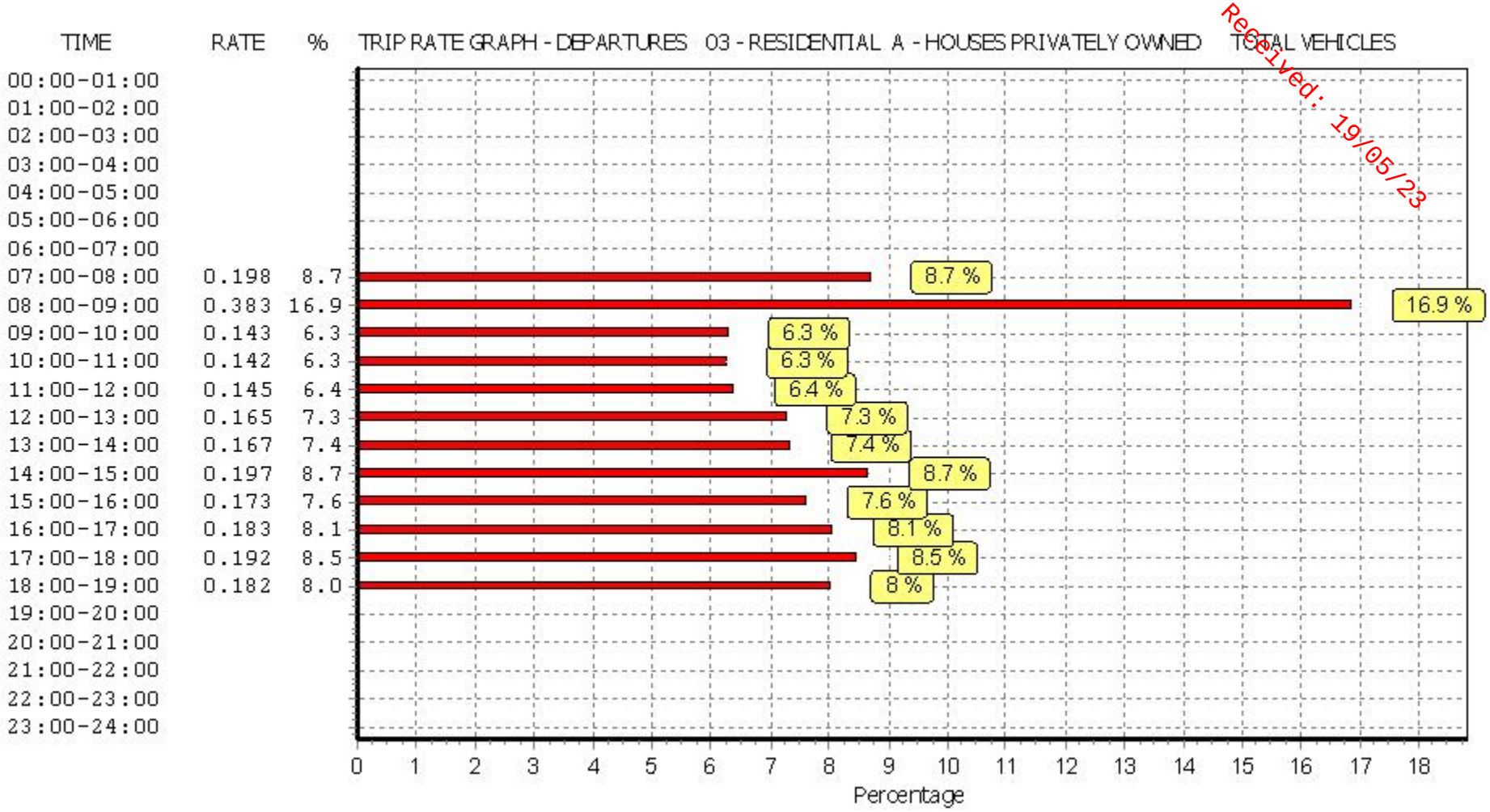
This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

NRB Consulting Engineers Ltd 8 Leopardstown Business Centre, Ballyogan Avenue Dublin 18 Licence No: 160301

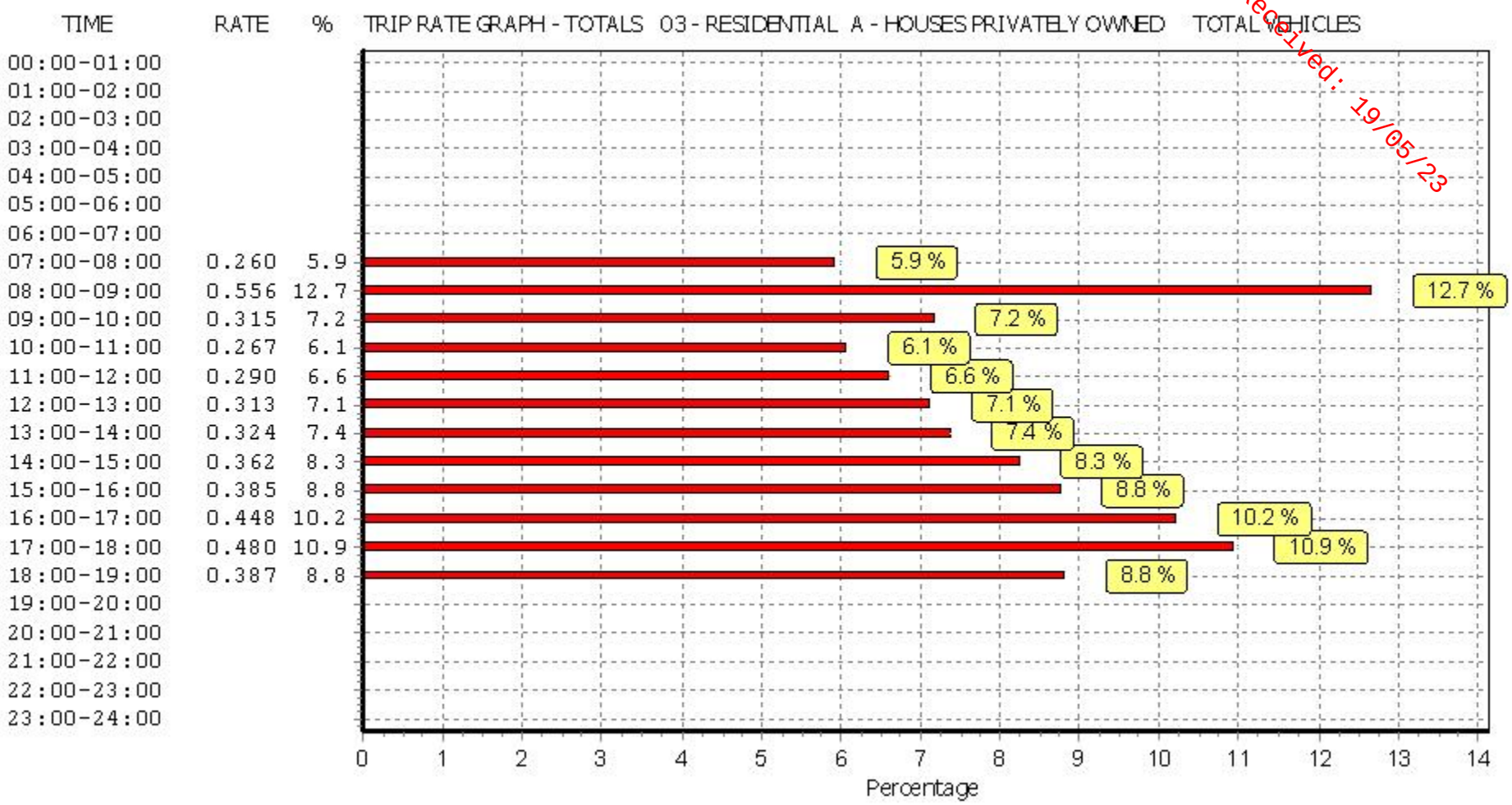


This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.

NRB Consulting Engineers Ltd 8 Leopardstown Business Centre, Ballyogan Avenue Dublin 18 Licence No: 160301



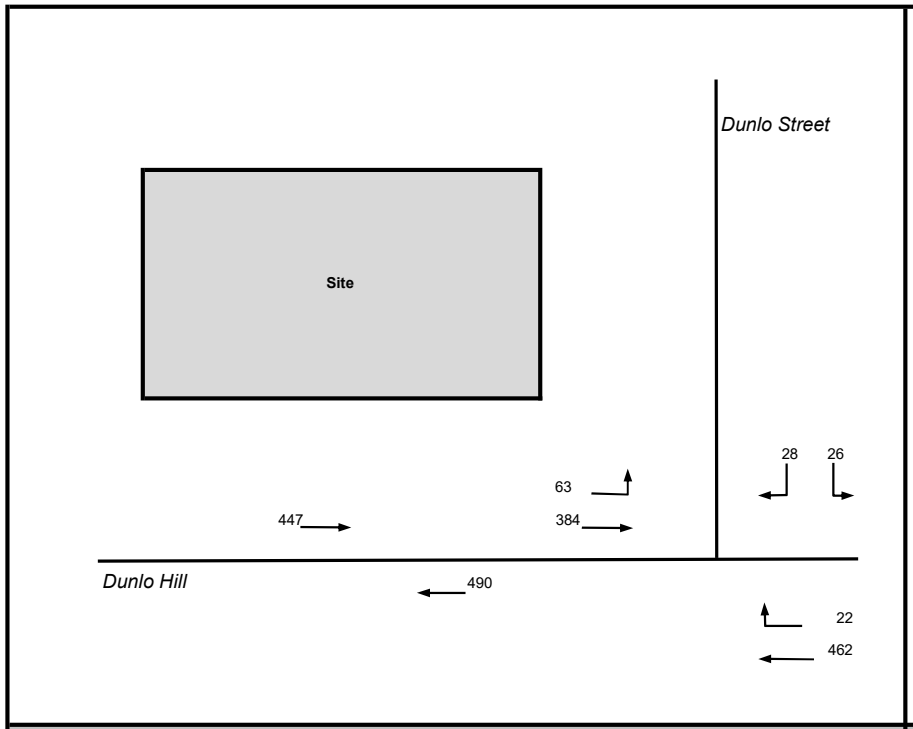
This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.



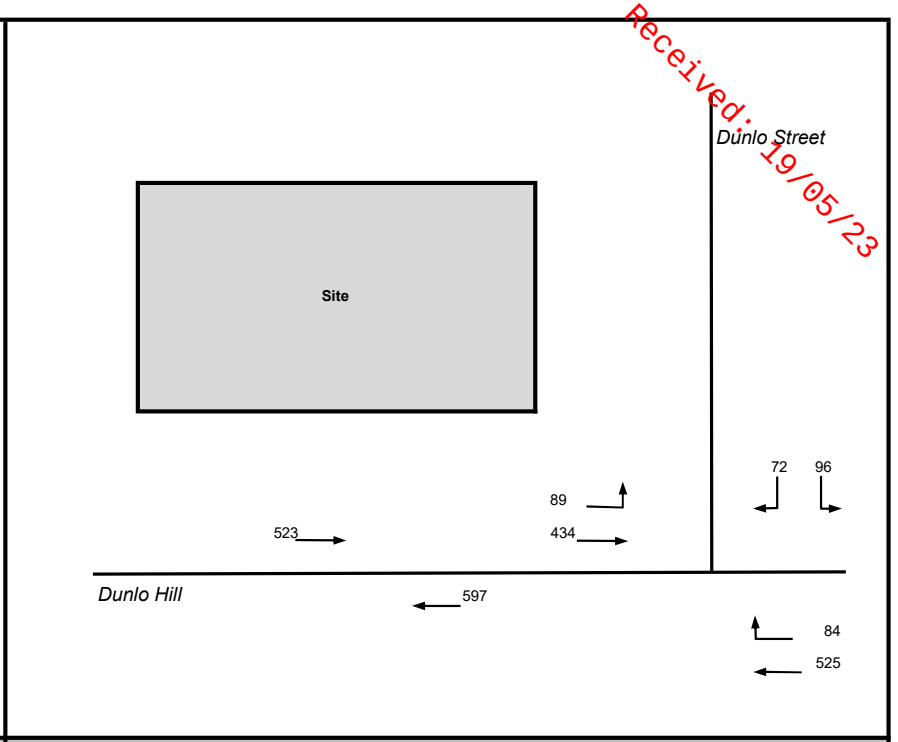
This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.

APPENDIX D

Trip Generation, Trip Distribution & Network Traffic Flow Diagrams



AM PEAK HR 8-9am

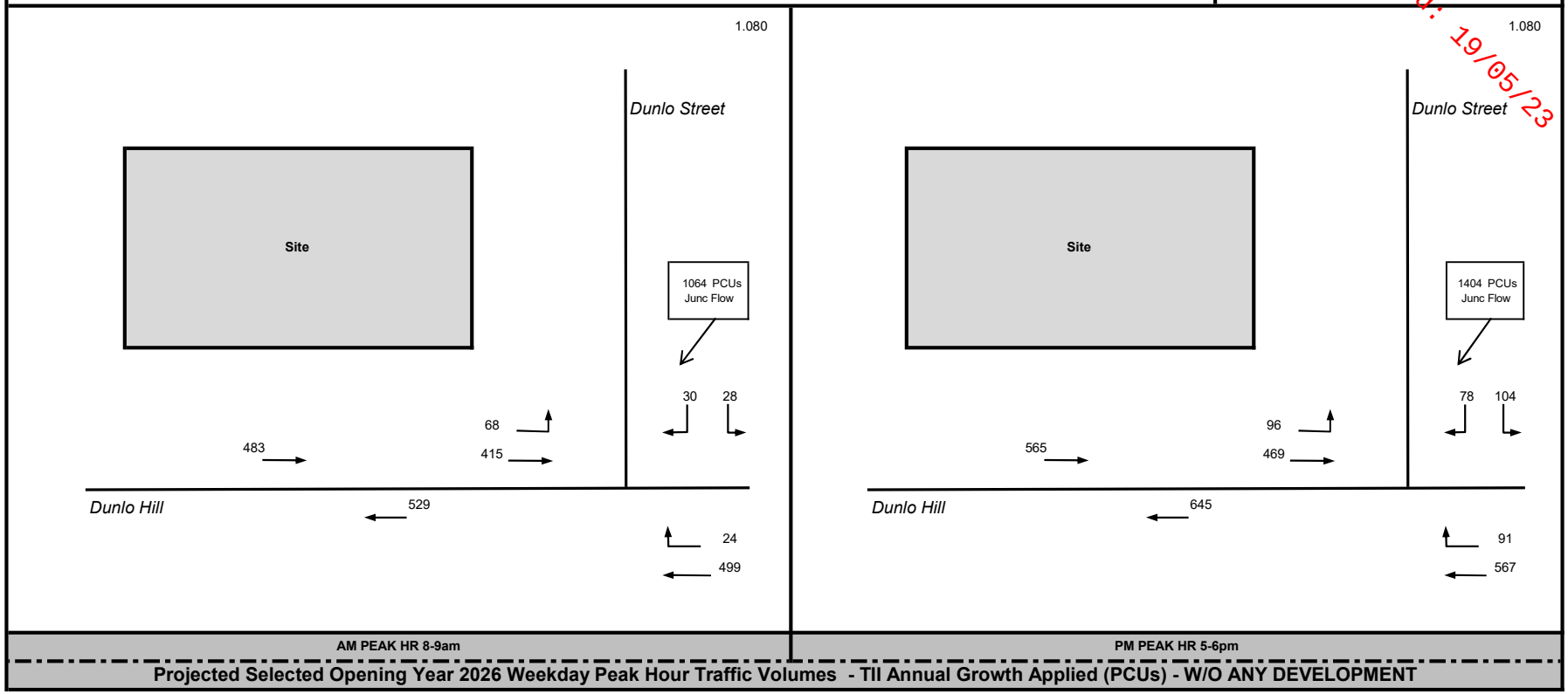


PM PEAK HR 5-6pm

Existing As Surveyed 2023 Traffic (PCUs) - WITHOUT NEW DEVELOPMENT (Refer Appendix B).

TII PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3
(Travel Demand Projections 2021, Table 6.2: Central Growth Rates: Annual Growth Factors (Excluding Metropolitan Area)

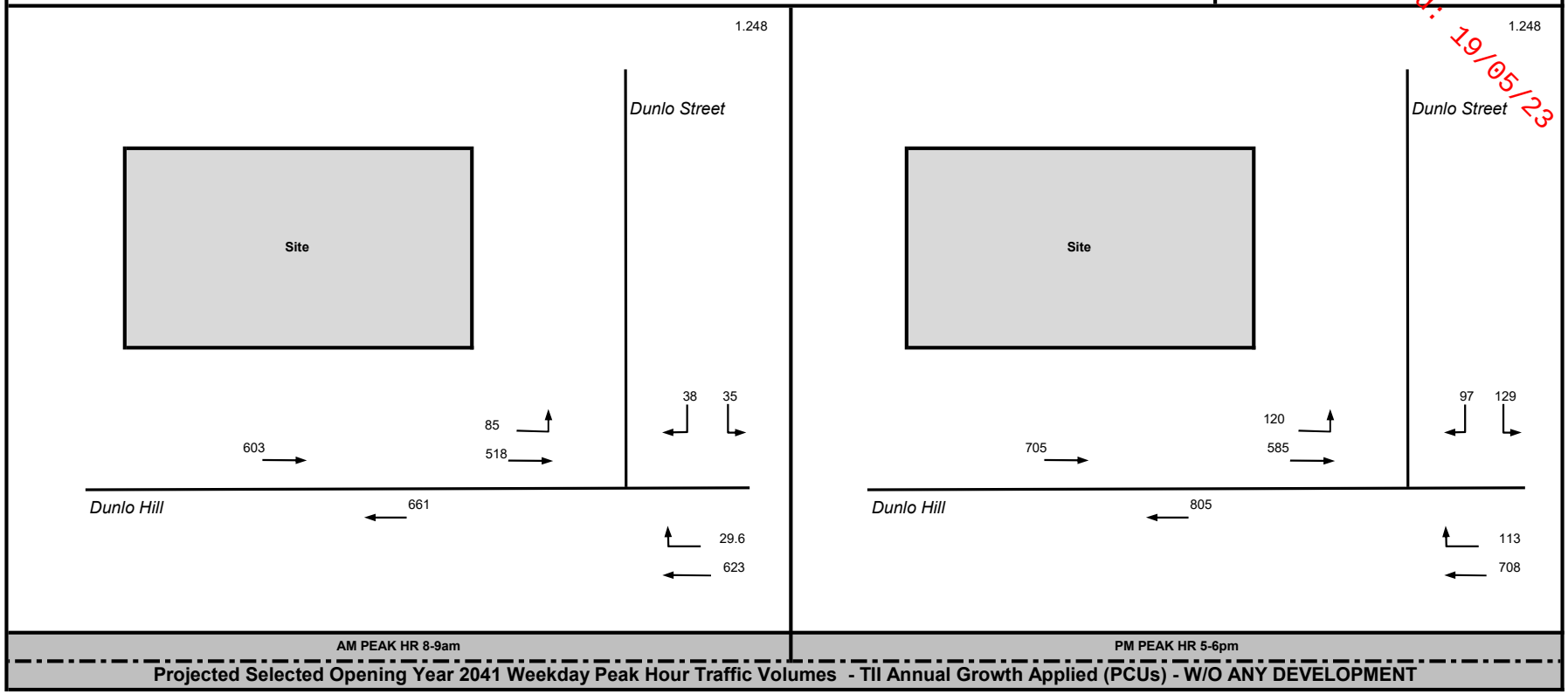
2023 to 2026 = 1.080
2026 to 2041 = 1.248



Projected Selected Opening Year 2026 Weekday Peak Hour Traffic Volumes - TII Annual Growth Applied (PCUs) - W/O ANY DEVELOPMENT

TII PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3
(Travel Demand Projections 2021, Table 6.2: Central Growth Rates: Annual Growth Factors (Excluding Metropolitan Area)

2023 to 2025 = 1.030
2025 to 2040 = 1.248

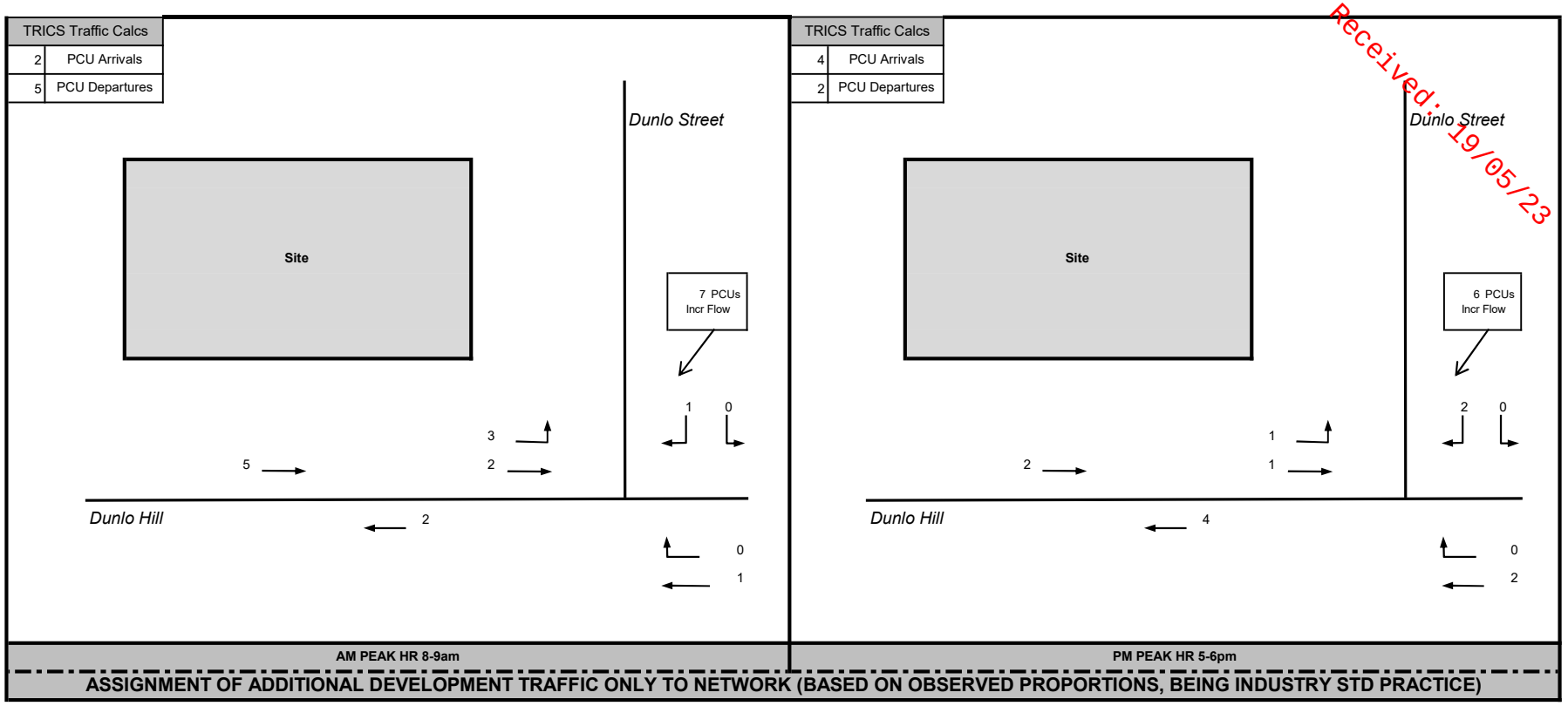


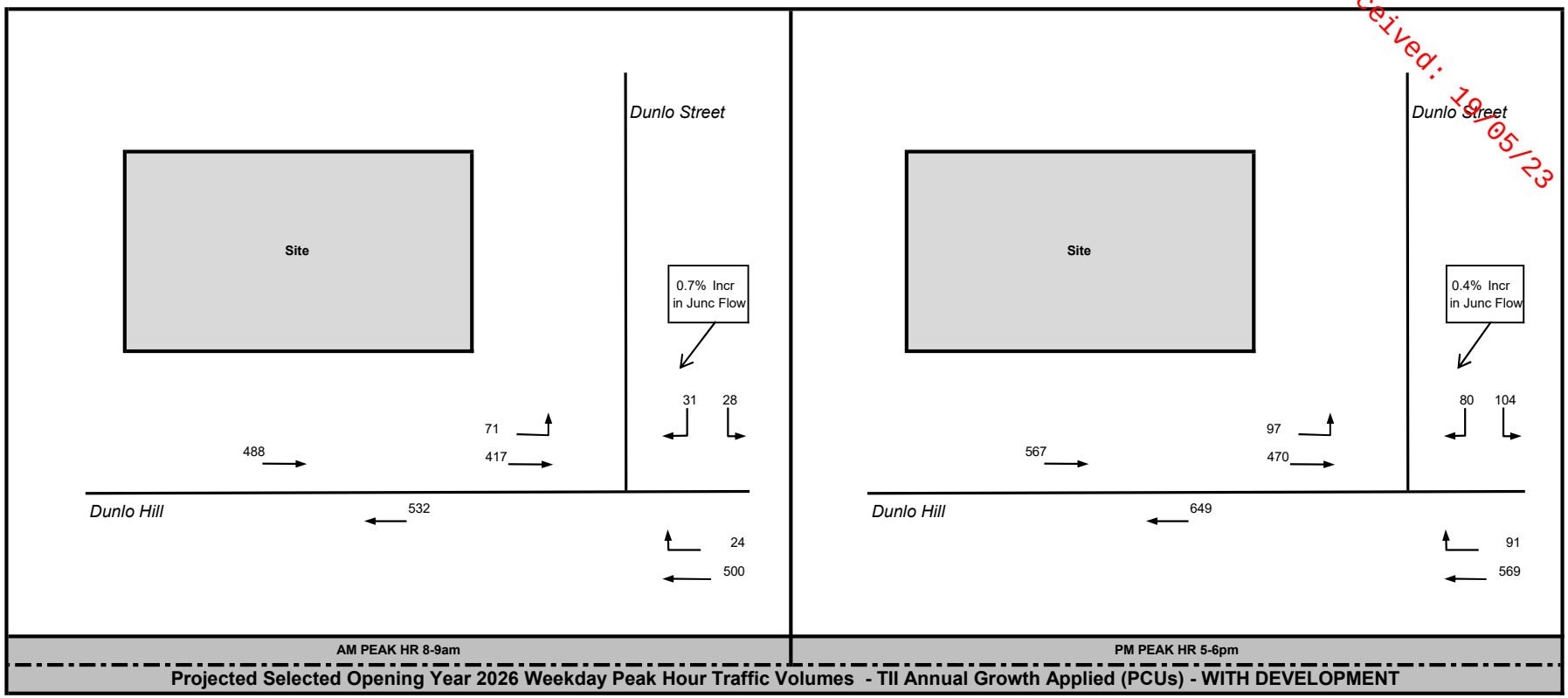
Projected Selected Opening Year 2041 Weekday Peak Hour Traffic Volumes - TII Annual Growth Applied (PCUs) - W/O ANY DEVELOPMENT

TRICS ASSESSMENT OF WORST-CASE TRAFFIC GENERATED BY APPROX DEVELOPMENT (PCUs) (Refer Appendix C)

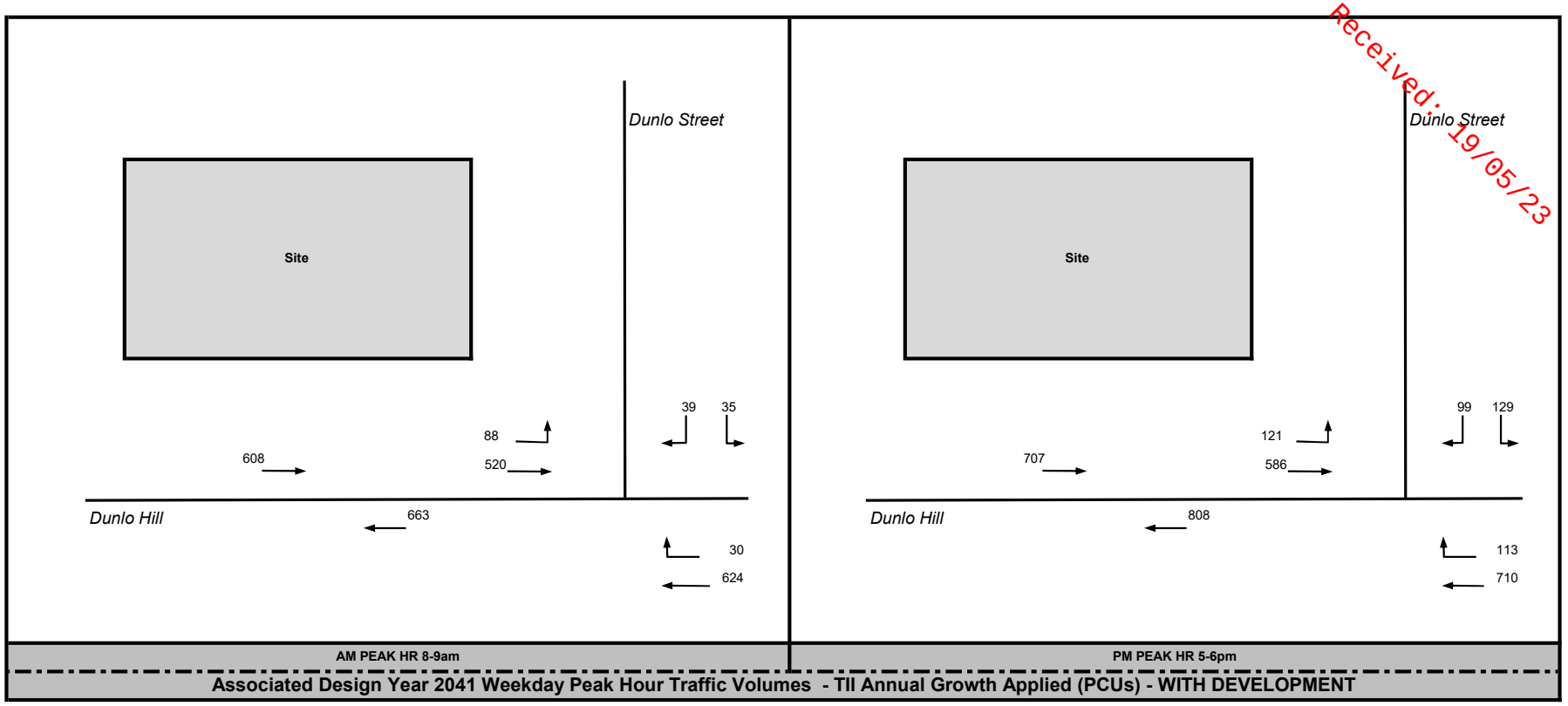
13 Resi Units	Arrivals (PCUs)		Departures (PCUs)		Total 2-Way Vehicular Traffic Generated
Network Hour	per unit	Dev	per unit	Dev	
Weekday AM Peak Hr 8-9	0.173	2	0.383	5	7
Weekday PM Peak Hr 5-6	0.288	4	0.192	2	6
24 Hours	2.117	28	2.270	30	58

Based on TRICS Database for Private Homes





Projected Selected Opening Year 2026 Weekday Peak Hour Traffic Volumes - TII Annual Growth Applied (PCUs) - WITH DEVELOPMENT



Associated Design Year 2041 Weekday Peak Hour Traffic Volumes - TII Annual Growth Applied (PCUs) - WITH DEVELOPMENT

NRB consulting engineers

APPENDIX E

JUNCTION 10 - PICADY
Simulation Capacity Model Output

Existing Dunlo Hill / Dunlo Street Junction Priority Junction
Summary PICADY Results in Order as included herein

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2026 Opening Year AM Peak Hr	0.1	0.10
2026 Opening Year PM Peak Hr	0.4	0.30
2041 Design Year AM Peak Hr	0.2	0.15
2041 Design Year PM Peak Hr	0.9	0.48

All Results Above are WAY below the recommended RFC of 0.85 (85% Capacity) and therefore no problems whatsoever are anticipated at the Junction in terms of Capacity or excessive vehicle Queues.

NB - Any Small Changes to Selected Opening Year 2026 or Design Year 2041, or indeed significantly higher traffic volumes experienced, as clearly deductable from the positive results presented, will clearly have no significant implications in terms of the conclusions of the Study.

Junctions 10

PICADY 10 - Priority Intersection Module

Version: 10.0.4.1693

For sales and distribution information, program advice and maintenance, contact TRL Software:
+44 (0)1344 379777 software@trl.co.uk trlsoftware.com

Filename: 2026 Dunlo Hill - Dunlo Street.j10
Path: C:\Users\BrianMc\OneDrive\OneDrive - NRB Consulting Engineers Ltd\Documents\2023\23-021 Dunlo Hill\Calculations\PICADY
Report generation date: 21/03/2023 18:11:08

Summary of junction performance

	AM						PM					
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
	2026											
Stream B-C	D1	0.1	7.10	0.06	A	89 % [Stream B-A]	D2	0.3	9.48	0.23	A	30 % [Stream B-A]
Stream B-A		0.1	11.83	0.10	B			0.4	17.92	0.30	C	
Stream C-AB		0.1	7.66	0.05	A			0.3	9.42	0.21	A	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	
Site number	
Date	20/03/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	Office-LT\BrianMc
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2026	AM	ONE HOUR	07:45	09:15	15
D2	2026	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2026, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	Two-way	Two-way		0.70	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	89	Stream B-A	0.70	A

Arms

Arms

Arm	Name	Description	Arm type
A	Dunlo Hill		Major
B	Dunlo Street		Minor
C	Dunlo Hill		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right-turn storage	Width for right-turn storage (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	8.20		✓	2.20	65.0	✓	3.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane Width (Left) (m)	Lane Width (Right) (m)	Visibility to left (m)	Visibility to right (m)
B	Two lanes	3.00	3.00	65	68

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	532	0.088	0.222	0.139	0.317
B-C	666	0.092	0.234	-	-
C-B	612	0.214	0.214	-	-

The slopes and intercepts shown above include custom intercept adjustments only.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2026	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	488	100.000
B		✓	59	100.000
C		✓	524	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	71	417
	B	31	0	28
	C	500	24	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	4
	B	0	0	0
	C	5	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.06	7.10	0.1	A
B-A	0.10	11.83	0.1	B
C-AB	0.05	7.66	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	21	580	0.036	21	0.0	6.442	A
B-A	23	400	0.058	23	0.1	9.550	A
C-AB	18	533	0.034	18	0.0	6.989	A
C-A	376			376			
A-B	53			53			
A-C	314			314			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	25	562	0.045	25	0.0	6.702	A
B-A	28	374	0.075	28	0.1	10.393	B
C-AB	22	518	0.042	22	0.0	7.256	A
C-A	449			449			
A-B	64			64			
A-C	375			375			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	31	538	0.057	31	0.1	7.097	A
B-A	34	339	0.101	34	0.1	11.817	B
C-AB	26	497	0.053	26	0.1	7.656	A
C-A	551			551			
A-B	78			78			
A-C	459			459			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	31	538	0.057	31	0.1	7.098	A
B-A	34	339	0.101	34	0.1	11.827	B
C-AB	26	497	0.053	26	0.1	7.656	A
C-A	551			551			
A-B	78			78			
A-C	459			459			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	25	562	0.045	25	0.0	6.707	A
B-A	28	374	0.075	28	0.1	10.406	B
C-AB	22	518	0.042	22	0.0	7.260	A
C-A	449			449			
A-B	64			64			
A-C	375			375			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	21	579	0.036	21	0.0	6.449	A
B-A	23	400	0.058	23	0.1	9.568	A
C-AB	18	533	0.034	18	0.0	6.995	A
C-A	376			376			
A-B	53			53			
A-C	314			314			

2026, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	Two-way	Two-way		2.33	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	30	Stream B-A	2.33	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2026	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	567	100.000
B		✓	184	100.000
C		✓	660	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	97	470
	B	80	0	104
	C	569	91	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	2
	B	0	0	0
	C	2	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.23	9.48	0.3	A
B-A	0.30	17.92	0.4	C
C-AB	0.21	9.42	0.3	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	78	553	0.142	78	0.2	7.559	A
B-A	60	366	0.165	59	0.2	11.713	B
C-AB	69	521	0.132	68	0.2	7.936	A
C-A	428			428			
A-B	73			73			
A-C	354			354			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	93	529	0.177	93	0.2	8.255	A
B-A	72	334	0.216	72	0.3	13.723	B
C-AB	82	505	0.163	82	0.2	8.516	A
C-A	511			511			
A-B	87			87			
A-C	423			423			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	115	494	0.232	114	0.3	9.459	A
B-A	88	289	0.305	87	0.4	17.810	C
C-AB	101	484	0.210	101	0.3	9.408	A
C-A	625			625			
A-B	107			107			
A-C	517			517			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	115	494	0.232	114	0.3	9.483	A
B-A	88	289	0.305	88	0.4	17.923	C
C-AB	101	484	0.210	101	0.3	9.420	A
C-A	625			625			
A-B	107			107			
A-C	517			517			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	93	529	0.177	94	0.2	8.282	A
B-A	72	333	0.216	73	0.3	13.827	B
C-AB	82	505	0.163	82	0.2	8.534	A
C-A	511			511			
A-B	87			87			
A-C	423			423			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	78	553	0.142	78	0.2	7.591	A
B-A	60	366	0.165	61	0.2	11.805	B
C-AB	69	521	0.132	69	0.2	7.962	A
C-A	428			428			
A-B	73			73			
A-C	354			354			

Junctions 10

PICADY 10 - Priority Intersection Module

Version: 10.0.4.1693

For sales and distribution information, program advice and maintenance, contact TRL Software:
+44 (0)1344 379777 software@trl.co.uk trlsoftware.com

Filename: 2041 Dunlo Hill - Dunlo Street.j10
Path: C:\Users\BrianMc\OneDrive\OneDrive - NRB Consulting Engineers Ltd\Documents\2023\23-021 Dunlo Hill\Calculations\PICADY
Report generation date: 21/03/2023 18:12:58

Summary of junction performance

	AM						PM					
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
	2041											
Stream B-C	D1	0.1	7.73	0.08	A	51 % [Stream B-A]	D2	0.5	12.01	0.32	B	4 % [Stream B-A]
Stream B-A		0.2	14.54	0.15	B			0.9	29.96	0.48	D	
Stream C-AB		0.1	8.27	0.07	A			0.4	10.83	0.28	B	

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	
Site number	
Date	20/03/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	Office-LT\BrianMc
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2041	AM	ONE HOUR	07:45	09:15	15
D2	2041	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2041, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	Two-way	Two-way		0.81	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	51	Stream B-A	0.81	A

Arms

Arms

Arm	Name	Description	Arm type
A	Dunlo Hill		Major
B	Dunlo Street		Minor
C	Dunlo Hill		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right-turn storage	Width for right-turn storage (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	8.20		✓	2.20	65.0	✓	3.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane Width (Left) (m)	Lane Width (Right) (m)	Visibility to left (m)	Visibility to right (m)
B	Two lanes	3.00	3.00	65	68

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	532	0.088	0.222	0.139	0.317
B-C	666	0.092	0.234	-	-
C-B	612	0.214	0.214	-	-

The slopes and intercepts shown above include custom intercept adjustments only.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2041	AM	ONE HOUR	07:45	09:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	608	100.000
B		✓	74	100.000
C		✓	654	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	88	520
	B	39	0	35
	C	624	30	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	4
	B	0	0	0
	C	5	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.08	7.73	0.1	A
B-A	0.15	14.54	0.2	B
C-AB	0.07	8.27	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	26	558	0.047	26	0.0	6.773	A
B-A	29	367	0.080	29	0.1	10.638	B
C-AB	23	514	0.044	22	0.0	7.328	A
C-A	470			470			
A-B	66			66			
A-C	391			391			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	31	535	0.059	31	0.1	7.142	A
B-A	35	335	0.105	35	0.1	11.994	B
C-AB	27	495	0.055	27	0.1	7.697	A
C-A	561			561			
A-B	79			79			
A-C	467			467			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	39	504	0.076	38	0.1	7.728	A
B-A	43	291	0.148	43	0.2	14.509	B
C-AB	33	468	0.071	33	0.1	8.267	A
C-A	687			687			
A-B	97			97			
A-C	573			573			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	39	504	0.076	39	0.1	7.731	A
B-A	43	291	0.148	43	0.2	14.536	B
C-AB	33	468	0.071	33	0.1	8.269	A
C-A	687			687			
A-B	97			97			
A-C	573			573			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	31	535	0.059	32	0.1	7.146	A
B-A	35	335	0.105	35	0.1	12.022	B
C-AB	27	495	0.055	27	0.1	7.702	A
C-A	561			561			
A-B	79			79			
A-C	467			467			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	26	557	0.047	26	0.1	6.780	A
B-A	29	367	0.080	29	0.1	10.671	B
C-AB	23	514	0.044	23	0.0	7.332	A
C-A	470			470			
A-B	66			66			
A-C	391			391			

2041, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	Two-way	Two-way		3.28	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	4	Stream B-A	3.28	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2041	PM	ONE HOUR	16:45	18:15	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	707	100.000
B		✓	228	100.000
C		✓	823	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	121	586
	B	99	0	129
	C	710	113	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	2
	B	0	0	0
	C	2	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.32	12.01	0.5	B
B-A	0.48	29.96	0.9	D
C-AB	0.28	10.83	0.4	B
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	97	523	0.186	96	0.2	8.414	A
B-A	75	325	0.229	73	0.3	14.238	B
C-AB	86	500	0.171	85	0.2	8.649	A
C-A	534			534			
A-B	91			91			
A-C	441			441			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	116	491	0.236	116	0.3	9.580	A
B-A	89	285	0.313	88	0.4	18.288	C
C-AB	103	482	0.214	103	0.3	9.494	A
C-A	637			637			
A-B	109			109			
A-C	527			527			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	142	443	0.321	141	0.5	11.928	B
B-A	109	229	0.476	107	0.9	29.212	D
C-AB	129	462	0.280	129	0.4	10.800	B
C-A	777			777			
A-B	133			133			
A-C	645			645			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	142	442	0.322	142	0.5	12.013	B
B-A	109	229	0.476	109	0.9	29.965	D
C-AB	129	462	0.280	129	0.4	10.829	B
C-A	777			777			
A-B	133			133			
A-C	645			645			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	116	490	0.237	117	0.3	9.656	A
B-A	89	284	0.313	91	0.5	18.736	C
C-AB	103	482	0.214	103	0.3	9.532	A
C-A	637			637			
A-B	109			109			
A-C	527			527			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	97	522	0.186	97	0.2	8.480	A
B-A	75	325	0.230	75	0.3	14.463	B
C-AB	86	500	0.171	86	0.2	8.693	A
C-A	534			534			
A-B	91			91			
A-C	441			441			