MWP

PROPOSED CLOONMORE REGENERATION LRD, CLOON MORE, TRALEE, COUNTY KERRY

Traffic and Transport Assessment

Tulfarris CG Ltd

August 2023

Contents

Appendices

Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
23824	6004	A	15/08/2021	S Quigley	S Quigley	I Brosnan	Planning
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1. Introduction

This Traffic and Transport Assessment has been prepared on behalf of Tulfarris GC Ltd., for their proposed Cloonmore Regeneration LRD (Large Residential Development) at Cloon More, Tralee, County Kerry.

This Traffic and Transport Assessment is required for submission to Kerry County Council as part of the planning application for the proposed residential development. The planning application has been prepared following pre planning consultation with Kerry Council and the provision of a LRD Opinion by Kerry County Council dated 15th June 2023.

2. Methodology

This Traffic and Transport Assessment has been prepared in the context of the following:

- The Transport Infrastructure Ireland (TII) Traffic and Transport Assessment Guidelines PE-PDV-02045 May 2014;
- Kerry County Council's Kerry County Development Plan 2022 – 2028;
- Kerry County Council's Tralee Municipal District Local Area Plan 2018 - 2024;
- Kerry County Council's permitted proposed Ballymullen Clash Link Relief Road Phase 2;
- The recently completed and opened Kerry Education Training Board (ETB) Gaelcholáiste Chiarraí 600 student post primary school (Kerry County Council planning reference: 19/272);
- TII's Project Appraisal Guidelines for National Roads Unit 5.3 Travel Demand Projections PE-PAG-02017 October 2021;
- The Chartered Institution of Highways and Transportation (CIHT) Trip Rate Information Computer System (TRICS);
- The UK Traffic Capacity of Urban Roads TA79/99;
- The Government's Design Manual for Urban Roads and Streets (DMURS) May 2019 (Version 1.1); and
- The Environmental Protection Agency (EPA) Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports May 2022 (EPA EIAR Guidelines).

Traffic volumes on the proposed development site existing local road network have been established on the basis of on-site traffic counts carried out by MWP, the CIHT TRICS database and reference to automatic traffic counter data provided by TII.

The Ballymullen Clash Link Relief Road Phase 1/Mitchels Road junction has been analysed using the computer software programme PICADY.

3. Forecasting Methods

PICADY (Priority Intersection Capacity and DelaY) is a computer software programme for calculating estimates of the capacity of major/minor roads junctions, where the minor road is controlled by a stop or yield sign. The geometric details of the junction are supplied to the programme, together with details of traffic flows and turning movements. The programme analyses the junction in relation to the various traffic flows and calculates the capacity of each approach. The programme also calculates the average queue length on each approach and the average delay per vehicle. The average queue length may be displayed in graphical form.

PICADY is issued by the UK company, TRL.

4. Description of Development

The proposed residential development site is located at Cloon More, Tralee, on the east side of the town centre, as shown on Figure 1. The existing site includes three dwelling houses, associated outhouses and sheds, and vehicle accesses at the north of the site, at Boherbee.

The proposed residential development comprises a total of 147 residential units, including 51 one-bedroom apartments, 78 two-bedroom apartments, 14 two-bedroom townhouses and four three-bedroom townhouses.

Access is proposed via Cloonmore Avenue, at the south west of the site. A pedestrian and cycle access is proposed at Boherbee at the north of the site. It is proposed to close the existing site vehicle accesses at Boherbee.

Subject to planning permission, it is proposed to develop the proposed residential development on a phased basis, commencing during Q1 2024, with full completion in 2029.

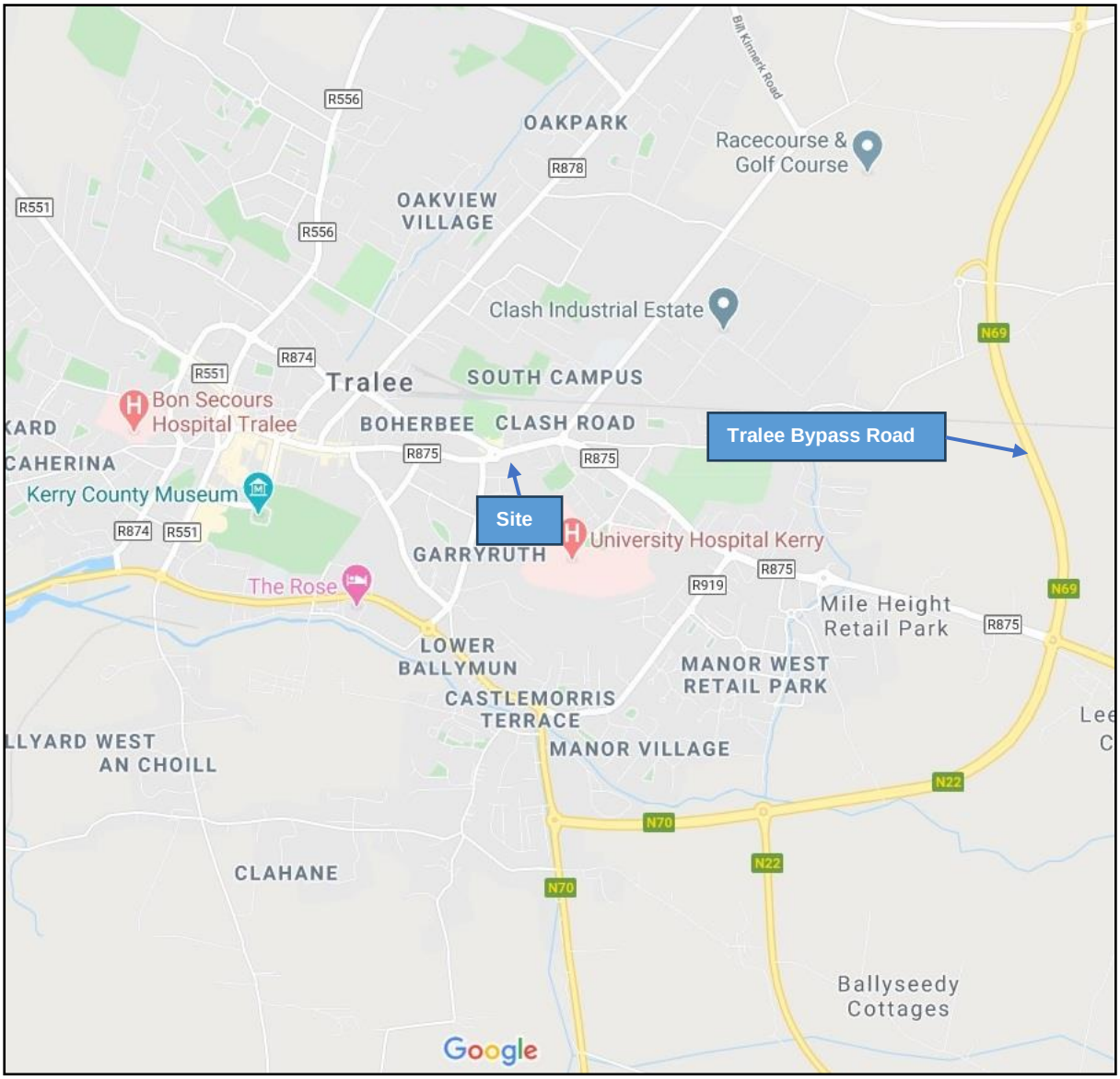

Figure 1: Site Location Map

5. Existing Conditions

5.1 Road Network

The proposed residential development site is located on the south side of the R875 Regional Road at Boherbee, as shown on the Local Road Network Map provided in Figure 2. Cloonmore Avenue extends along the south and south west (locally) of the site, as shown in the proposed site aerial view north provided in Figure 3.

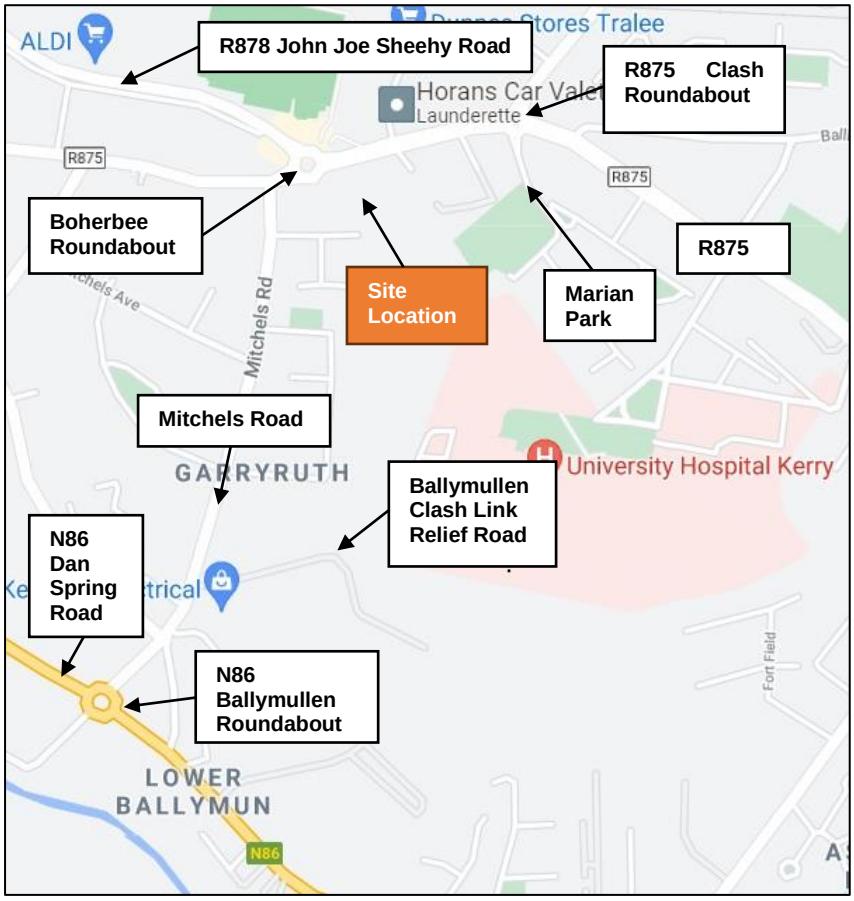

Figure 2: Local Road Network Map

The R875 is located adjacent to the north of the site and forms the Boherbee Roundabout junction with the R878 John Joe Sheehy Road, approximately 30 metres west of the site. Two entry lanes are provided on each of the three approaches to Boherbee Roundabout. Zebra controlled pedestrian crossings are provided on the R875 on both sides of Boherbee Roundabout with pedestrian refuge on the central traffic splitter islands. A pedestrian crossing facility is also provided on the R878 at the Boherbee Roundabout.

East of the proposed development site, the R875 forms the Clash Roundabout with Clash Road and Marian Park. As shown in Figure 1, the R875 urban road links with the N22/N69 Tralee Bypass Road in the east. The 2+2 lanes Tralee Bypass Road has significantly reduced traffic volumes on the R875, including through traffic.

West of Boherbee Roundabout, the R875 has a priority T-junction on its south side with Mitchels Road. Mitchels Road has a 30 km/hour Slow Zone speed limit with traffic calming measures. Mitchels Road links with the N86 Dan Spring Road at Ballymullen Roundabout in the south.

Mitchels Road has a priority T-junction with the Ballymullen Clash Relief Road Phase 1. The Ballymullen Clash Relief Road Phase 1 extends north to Cloonmore Avenue, which provides access to the recently completed and opened Gaelcholáiste Chiarraí, as shown in Figure 3, and both include footway and cycleway facilities. The vehicle access layout at Gaelcholáiste Chiarraí includes a one-way internal clockwise arrangement with separate entrance and exit junctions on Cloonmore Avenue. Ballymullen Clash Relief Road Phase 1 and Cloonmore Avenue are located within the 30 km/hour Slow Zone. Two Zebra Stripe road marking pedestrian crossing facilities are provided on Cloonmore Avenue.

Cloonmore Avenue has a 7.3 metres wide road carriageway between its Ballymullen Clash Relief Road Phase 1 junction and its Gaelcholáiste Chiarraí exit junction. North of its Gaelcholáiste Chiarraí exit junction, Cloonmore Avenue has a 6.0 metres wide road carriageway, with footways along both side, adjacent to the south west of the proposed site. The east side footway extends to the Zebra Stripe road marking pedestrian crossing.

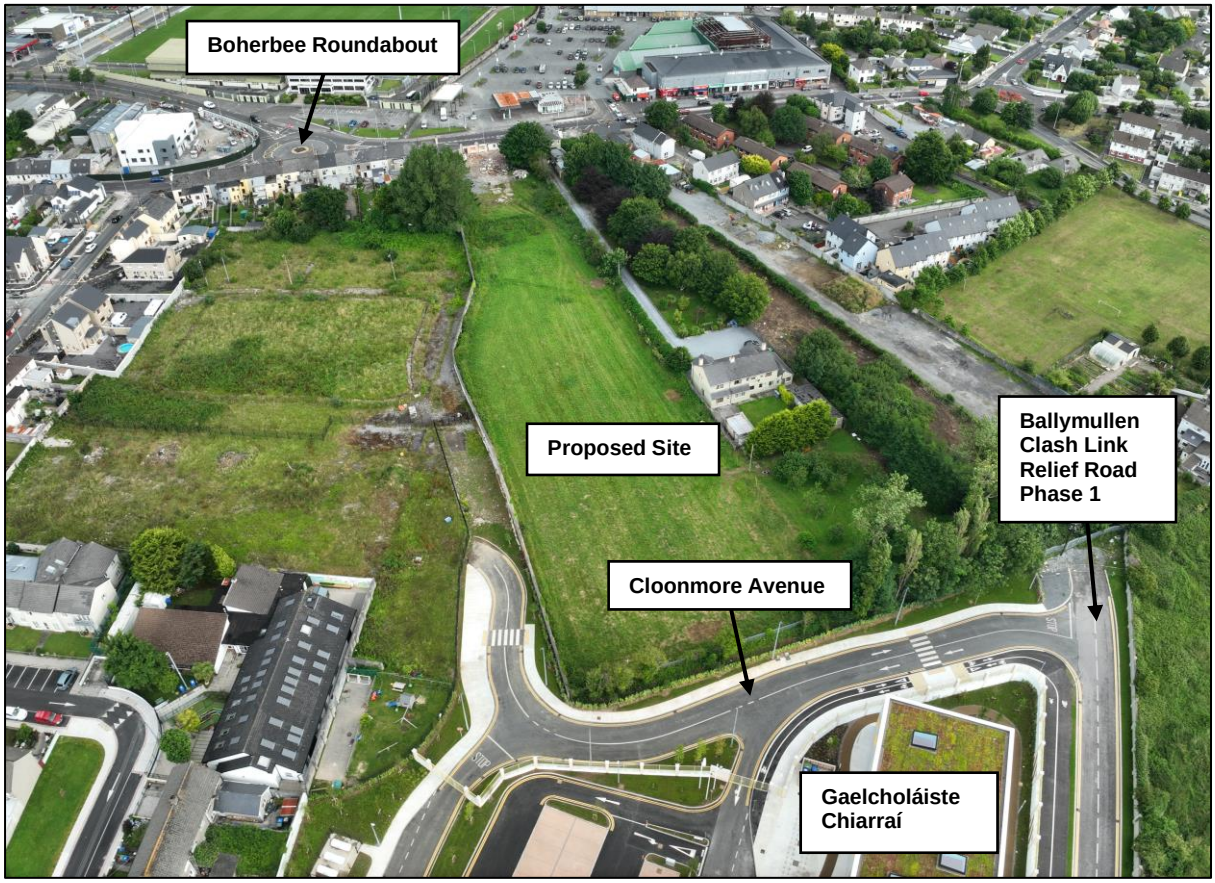

Figure 3: Proposed Site Aerial View North

5.2 Public Transport

The Bus Éireann Tralee Bus Station and Íarnród Éireann Tralee Casement Train Station are located circa 450 metres from the proposed residential site, at the north west end of John Joe Sheehy Road, as shown in Figure 4.

The proposed residential development surrounding local road network is served by the Tralee People's Bus Service 290A and 290B public transport bus services, from 8.00 a.m. to 6.00 p.m., Monday to Saturday.

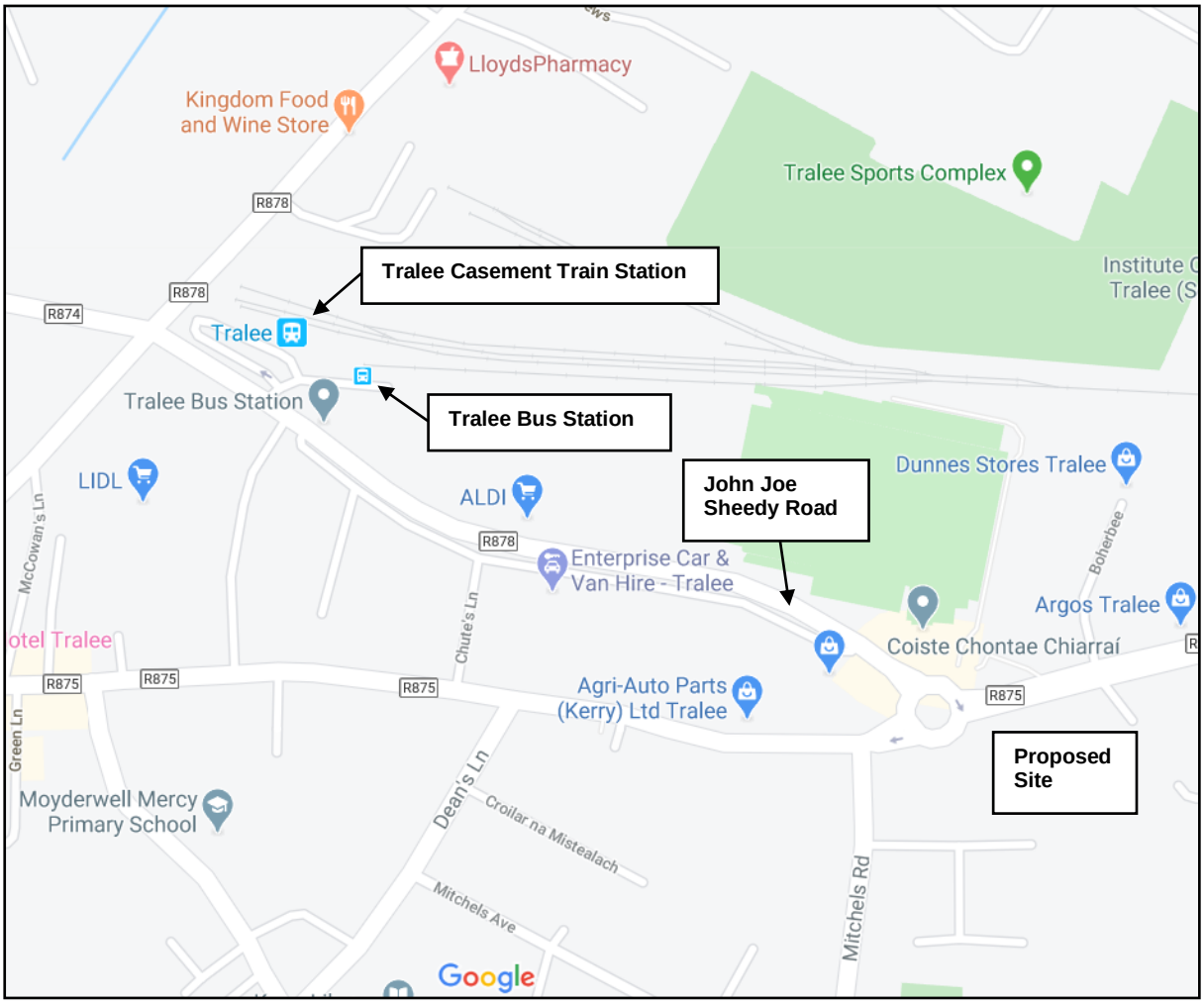

Figure 4: Local Public Transport Map

5.3 Pedestrians

The proposed residential development site is located within convenient walking distance of the town centre, local schools and facilities and the main Tralee public transport services.

5.4 Existing Traffic Volumes

Peak hour traffic volumes on the proposed development site existing local road network have been established on the basis of on-site traffic counts carried out by MWP, and reference to automatic traffic counter data provided by TII. The existing typical peak hour traffic volumes on the proposed development site existing local road network are provided in Table 1.

Road Link	Peak Hour Total Vehicles
Mitchels Road	500
R875 at Boherbee	950
R878 John Joe Sheehy Road	550
N86 at Ballymullen Roundabout	1,900

Table 1: Existing Typical Peak Hour Traffic Volumes

6. Future Conditions

The traffic and transport aims, policies and objectives of Kerry County Council for Tralee are set out in their Kerry County Council's Kerry County Development Plan 2022 – 2028 and Tralee Municipal District Local Area Plan 2018 – 2024, including in respect of connectivity, sustainable transport planning and sustainable mobility.

The Kerry County Development Plan (KCDP) roads and infrastructure objectives and public transport objectives for Tralee are provided in Figure 5.

Roads & Infrastructure Objectives It is an objective of the Council to:	
TR 109	Facilitate the enhancement of Tralee as a 10-minute town.
TR 110	Facilitate improvement of existing footpaths and road network and support future projects for footpaths and roads with the provision of amenity areas at appropriate locations.
TR 111	Facilitate the sustainable development of Northern Relief Road and Western Distributor Road and the upgrade of the Tralee to Fenit road (R558).
TR 112	Complete the Clash to Ballymullen link road.

1.11.4 Public Transport

Kerry County Council is committed to supporting improved public transport infrastructure consistent with the Tralee Transport Strategy 2011 and the Tralee Transport and Mobility Plan.

Public Transport Objectives It is an objective of the Council to:	
TR 113	Liaise with NTA, Bus Eireann and private Bus companies to provide bus set-down areas, bus shelters and bicycle parking at strategic locations in the town centre area.
TR 114	Promote the provision of a comprehensive local bus service within Tralee Town.

Figure 5: KCDP Tralee Objectives

6.1 Mitchels/Boherboy Regeneration Area

Kerry County Council's (KCC) Tralee Municipal District (MD) Local Area Plan (LAP) 2018 – 2024 includes the proposed Mitchels/Boherboy Regeneration Area, which includes the proposed residential development site. The KCC Tralee MD LAP Mitchels/Boherboy Regeneration Area Map is shown in Figure 6.

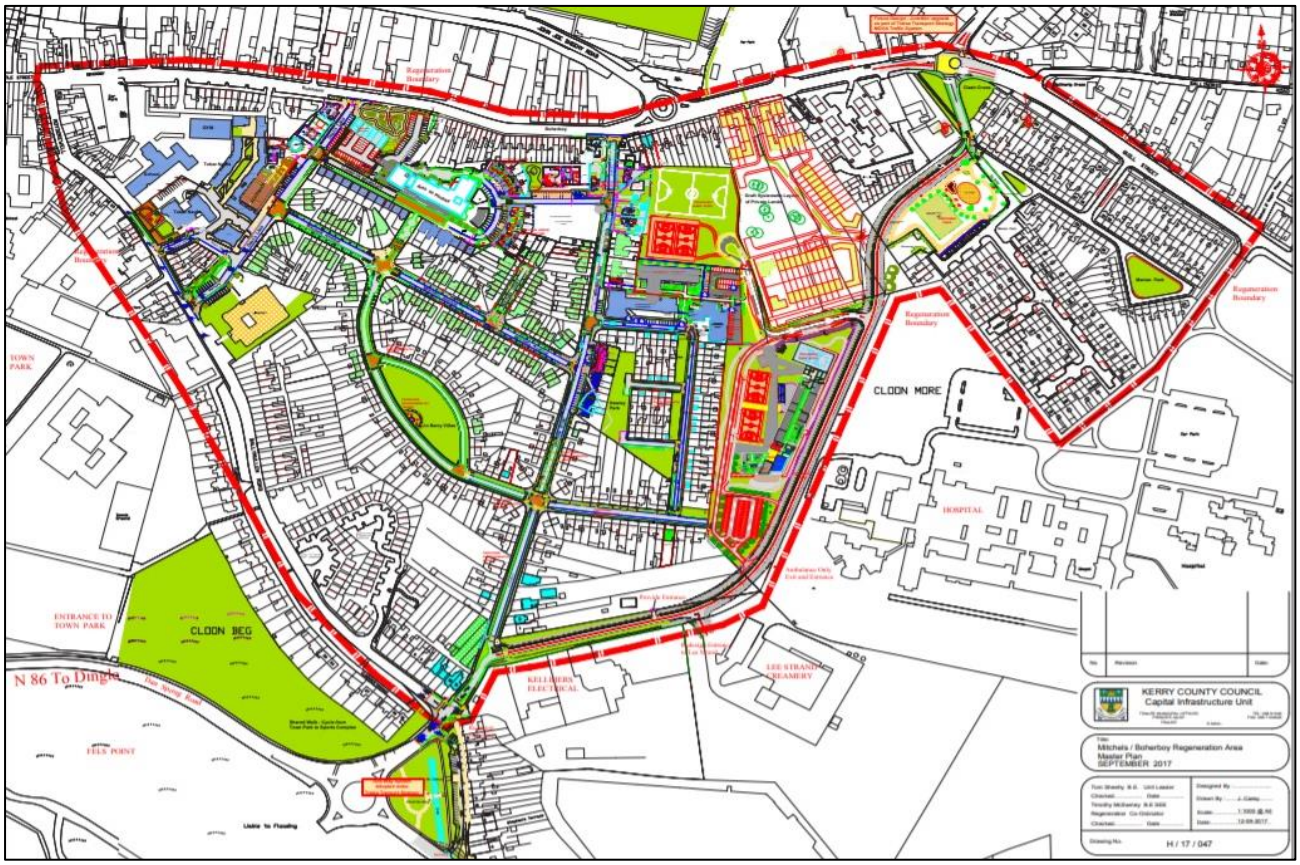

Figure 6: KCC Tralee MD LAP Mitchels/Boherboy Regeneration Area Map

6.1.1 Ballymullen Clash Link Relief Road

The KCC proposed Mitchels/Boherboy Regeneration Area includes the Part 8 planning approved proposed Ballymullen Clash Link Relief Road, shown in Figure 7, which extends from Mitchels Road to the R875 Clash Roundabout at Marian Park.

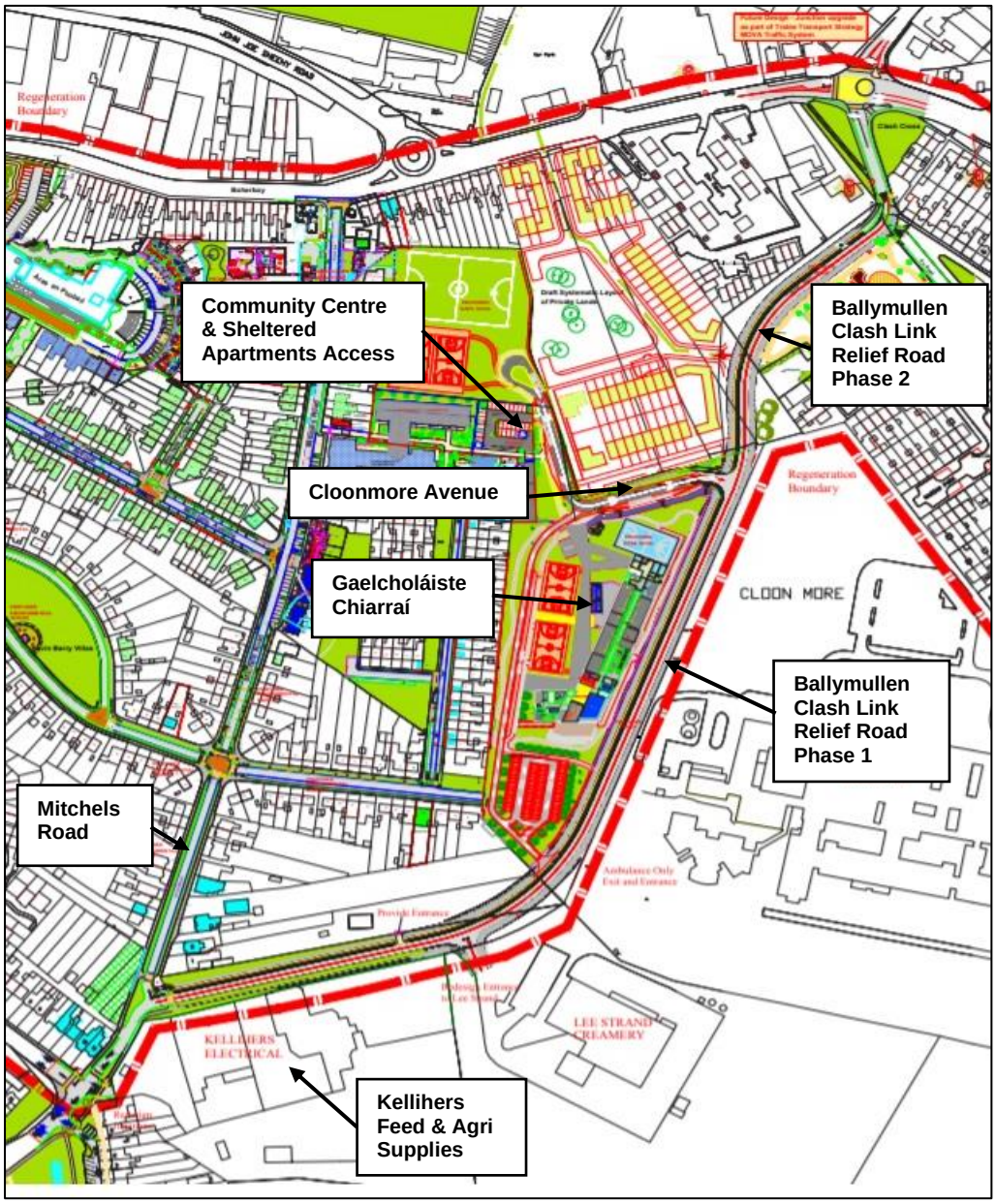

Figure 7: Mitchels/Boherboy Regeneration Area Ballymullen Clash Link Relief Road Map

6.1.2 Kerry Education Training Board Gaelcholáiste Chiarraí

The recently completed and opened Kerry Education Training Board (ETB) permitted Gaelcholáiste Chiarraí 600 student post primary school (Kerry County Council planning reference: 19/272) is shown in Figure 7 above. The Gaelcholáiste Chiarraí 600 student post primary school is part of the Mitchels/Boherboy Regeneration Area.

The permitted school includes 55 car parking spaces, set-down car parking, three bus set-down parking spaces, bicycle parking and footway and cycleway links with the Ballymullen Clash Link Relief Road. Access is via Cloonmore Avenue on the west side of the Link Road, and a separate southern pedestrian access on the Link Road.

The Atkins Engineering Planning Report, dated 15th March 2019, submitted to Kerry County Council as part of the planning application for the now permitted school stated *"Kerry County Council have confirmed at a preplanning meeting with the Design Team that the traffic associated with the new school has already been included in the traffic assessment undertaken as part of the Part 8 planning application for the road. It has been agreed with Kerry County Council that no further traffic assessment will be required to support the school planning application."*

Accordingly, the planning application for the Gaelcholáiste Chiarraí did not include a Traffic and Transport Assessment or Mobility Management Plan.

6.2 Future Background Traffic Volumes

Kerry County Council's planning permission for Gaelcholáiste Chiarraí, based on access via Phase 1 of the Ballymullen Clash Link Relief Road confirms that they envisage that the priority-controlled Link Road/Mitchels Road junction at Ballymullen will sustain the permitted school and existing Lee Strand Co-Operative Creamery, Kellihers Electrical, Kellihers Feed & Agri Supplies, St. Bridget's Community Centre and Kerry County Council Part 8 sheltered apartments, shown in Figure 7.

On the basis of the Chartered Institution of Highways and Transportation (CIHT) Trip Rate Information Computer System (TRICS), the estimated morning and evening peak hour two-way vehicle trips generated by the Link Relief Road at its Ballymullen junction would be of the order of 350 vehicles and 150 vehicles, respectively. Morning peak hour vehicle trips would be the daily highest, due to the impact of the student school start times at Gaelcholáiste Chiarraí.

TII, in their Project Appraisal Guidelines for National Roads Unit 5.3 Travel Demand Projections PE-PAG-02017 October 2021, envisage that light vehicle traffic would increase by an annual growth factor of 1.0111, during the period up to 2030, and heavy vehicle traffic by an annual factor of 1.0285, based on their central growth rates for

Subject to planning permission, it is proposed to develop the proposed residential development on a phased basis, commencing during Q1 2024, with full completion in 2029.

The predicted 2029 morning and evening peak hour link traffic volumes with Gaelcholáiste Chiarraí and the TII predicted traffic growth are provided in Table 2.

Road Link	2029 Peak Hour Total Vehicles	
	Morning	Evening
Ballymullen Clash Link Relief Road Phase 1 at Ballymullen	350	150
Mitchels Road	628	571
R875 at Boherbee	1,068	1,047
R878 John Joe Sheehy Road	630	609
N86 at Ballymullen Roundabout	2,125	2,104

Table 2: Predicted 2029 Peak Hour Link Traffic Volumes With Gaelcholáiste Chiarraí + TII Growth

The predicted 2029 peak hour junction traffic volumes with Gaelcholáiste Chiarraí and the TII predicted traffic growth are provided in Table 3.

Junction	2029 Peak Hour Total Vehicles	
	Morning	Evening
Ballymullen Clash Link Relief Road Phase 1/Mitchels Road	803	646
R875/Mitchels Road	961	908
Boherbee Roundabout	1,153	1,121
Ballymullen Roundabout	2,403	2,275

Table 3: Predicted 2029 Peak Hour Junction Traffic Volumes With Gaelcholáiste Chiarraí + TII Growth

The future provision of Phase 2 of the permitted Ballymullen Clash Link Relief Road would result in the diversion of traffic volumes from Mitchels Road and Boherbee to the Ballymullen Clash Link Road, and result in the directional diversion of traffic volumes generated by Cloonmore Avenue and Ballymullen Clash Link Road Phase 1; but would not change the overall total traffic volumes at the Ballymullen Clash Link Road/Mitchels Road and Clash Roundabout junctions.

7. Traffic Impacts

The proposed residential development comprises a total of 147 residential units, including 51 one-bedroom apartments, 78 two-bedroom apartments, 14 two-bedroom townhouses and four three-bedroom townhouses.

7.1 Access

Access is proposed via Cloonmore Avenue, at the south west of the site. A pedestrian and cycle access is proposed at Boherbee at the north of the site. It is proposed to close the existing site vehicle accesses at Boherbee. The proposed development layout plan is shown in Figure 8.

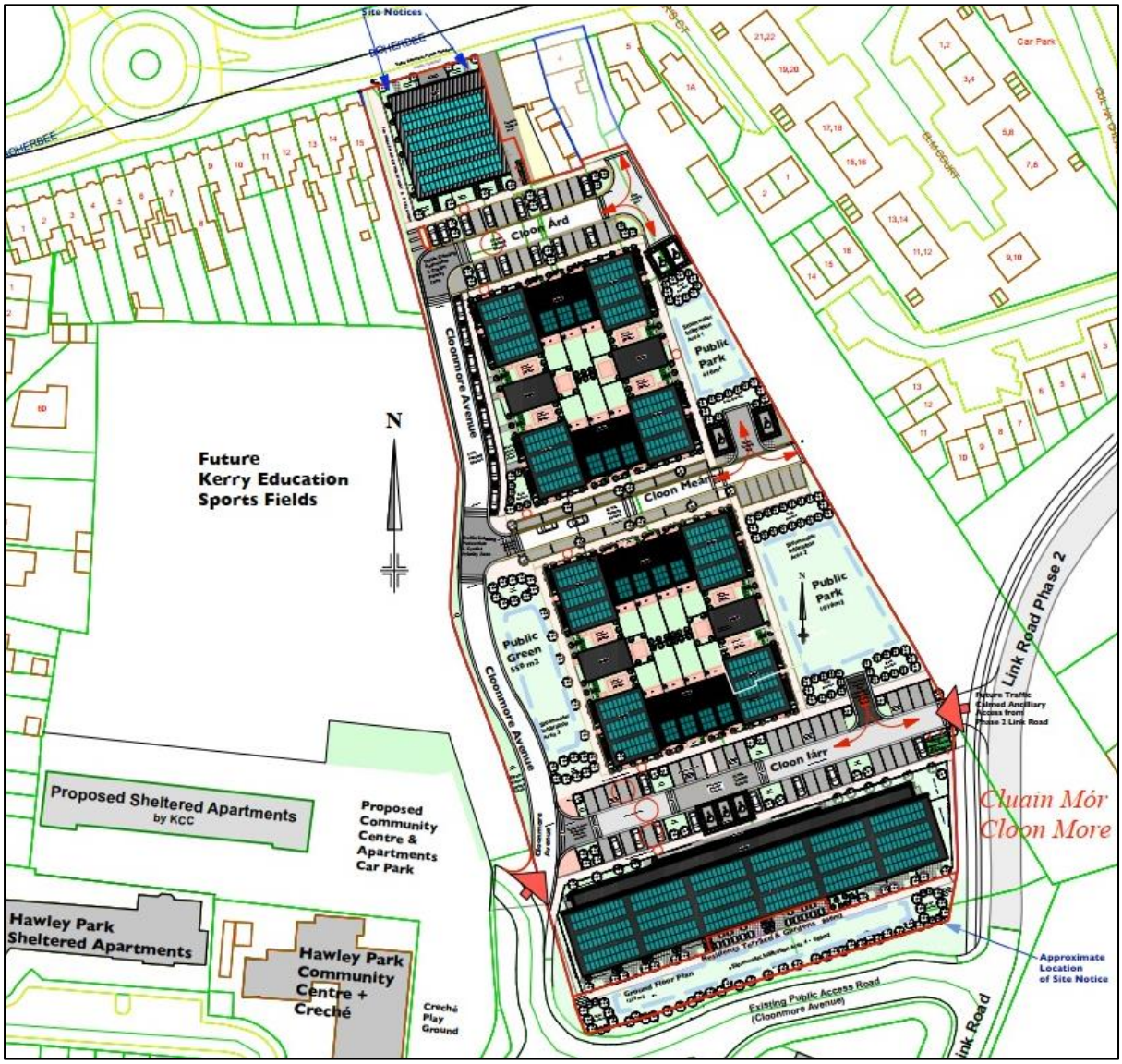

Figure 8: Proposed Cloonmore Regeneration LRD Layout Plan

7.2 Parking

The proposed residential development includes 102 car parking spaces, including seven disabled access spaces, and 303 cycle spaces.

7.3 TRICS Trip Rates

The Chartered Institution of Highways and Transportation (CIHT) Trip Rate Information Computer System (TRICS) database morning and evening peak hour persons travel mode shares, for privately owned residential apartments and mixed size private housing in urban centres, are provided in Table 4. The person travel modes are summarised for car driver and non-car driver (walk, cycle, car passenger and public transport) modes. Non-car driver travel modes represent 41% to 53% of person travel modes during the peak traffic hours.

Travel Mode	Morning Peak Hour		Evening Peak Hour	
	Arrivals	Departures	Arrivals	Departures
Car Driver	47%	55%	59%	57%
Walk/Cycle/Car Passenger/Public Transport	53%	45%	41%	43%

Table 4: TRICS Apartments and Mixed Housing Persons Travel Mode Shares

The CIHT TRICS database morning and evening peak hour trip generation rates, for privately owned residential apartments and mixed size private housing in urban centres, are provided in Table 5.

Residential Use	Morning Peak Hour Vehicles/Unit		Evening Peak Hour Vehicles/Unit	
	Arrivals	Departures	Arrivals	Departures
Apartments	0.070	0.288	0.276	0.200
Mixed Size Housing	0.156	0.404	0.372	0.238

Table 5: TRICS Residential Vehicle Trip Rates

7.4 Vehicle Trips

The predicted morning and evening peak hour vehicle trips, for the proposed residential development, on the basis of the CIHT TRICS database, are provided in Table 6.

Proposed Residential Development		Morning Peak Hour Vehicles		Evening Peak Hour Vehicles	
Use	Units	Arrivals	Departures	Arrivals	Departures
Apartments	129	9	37	36	26
Mixed Size Housing	18	3	7	7	4
Total	**145**	**12**	**44**	**43**	**30**

Table 6: Proposed Cloonmore Regeneration LRD Predicted Vehicle Trips

The proposed residential development would generate 56 two-way vehicle trips during the morning peak hour, and 73 two-way vehicle trips during the evening peak hour, on the basis of TRICS.

It is envisaged that the distribution of peak hour vehicle trips generated by the proposed residential development would be similar to existing on the local road network.

7.5 Additional Link Traffic Volumes

The predicted additional morning and evening peak hour link vehicle volumes generated by the proposed residential development are provided in Table 7. The additional volumes are two-way, with the predicted percentage increases in 2029.

Road Link	Additional Vehicles (% Change in 2023)	
	Morning Peak Hour	Evening Peak Hour
Ballymullen Clash Link Relief Road Phase 1 at Ballymullen	+56 (16.0%)	+73 (48.6%)
Mitchels Road	+28 (4.5%)	+36 (6.2%)
R875 at Boherbee	+15 (1.6%)	+18 (2.0%)
R878 John Joe Sheehy Road	+8 (0.7%)	+10 (0.9%)
N86 at Ballymullen Roundabout	+15 (0.6%)	+18 (0.8%)

Table 7: Predicted Additional Link Traffic Volumes With Proposed Cloonmore Regeneration LRD

The proposed residential development would increase morning and evening peak hour link traffic volumes by up to 4.5% and 6.2%, respectively, on Mitchels Road. The highest predicted increase of 36 vehicles two-way on Mitchels Road would equate to one additional vehicle every 1.7 minutes. The total vehicles on the Ballymullen Clash Relief Road Phase 1 would be relatively low, and significantly less than elsewhere on the surrounding local road network, hence the percentage increases are relatively high. Elsewhere, on the existing local road network, the predicted highest increases in link traffic volumes would be up to 2.0%.

7.6 Additional Junction Traffic Volumes

The predicted additional morning and evening peak hour junction vehicle volumes generated by the proposed residential development are provided in Table 8, together with the predicted percentage increase in 2029.

Junction	Additional Vehicles (% Change in 2023)	
	Morning Peak Hour	Evening Peak Hour
Ballymullen Clash Link Relief Road Phase 1/Mitchels Road	+56 (7.0%)	+73 (11.3%)
R875/Mitchels Road	+28 (2.9%)	+36 (3.9%)
Boherbee Roundabout	+15 (1.3%)	+18 (1.6%)
Ballymullen Roundabout	+15 (0.6%)	+36 (1.5%)

Table 8: Predicted Additional Junction Traffic Volumes With Proposed Cloonmore Regeneration LRD

The proposed residential development would increase morning and evening peak hour junction traffic volumes by up to 7.0% and 11.3%, respectively, at the Ballymullen Clash Link Relief Road Phase 1/Mitchels Road junction. The total vehicles on the Ballymullen Clash Relief Road Phase 1 would be relatively low, and significantly less than elsewhere on the surrounding local road network. Elsewhere, the predicted highest increases in junction traffic volumes would be up to 3.9%.

7.7 TII TTA Assessment Thresholds

The predicted highest increases in 2029 morning and evening peak hour link and junction traffic volumes, generated by the proposed residential development, on the local road network would be less than the volumetric threshold increases (5%) identified by TII in their TTA Assessment Guidelines for consideration of sensitive locations, at all locations with the exception of the Ballymullen Clash Link Relief Road Phase 1 and during the evening peak hour on Mitchels Road, due to their relatively low volumes.

7.8 Junction Capacity Analysis

The Ballymullen Clash Link Relief Road Phase 1/Mitchels Road junction has been analysed using the computer software programme PICADY, for the predicted 2029 morning and evening peak hour junction traffic volumes, with and without the proposed residential development. Full details of the PICADY junction capacity modelling analysis are provided in Appendix A. The results are summarised in Table 9.

Junction	Proposed Cloonmore Regeneration LRD Scenario	Highest Ratio of Flow to Capacity (RFC)	Highest Mean Maximum Queue Length (vehicles)	Highest Delay per Vehicle (minutes)
Ballymullen Clash Link Relief Road Phase 1/Mitchels Road	2029 AM Without	0.373	0.6	0.18
	2029 AM With	0.468	0.9	0.21
	2029 PM Without	0.156	0.2	0.15
	2029 PM With	0.220	0.3	0.15

Table 9: Summary of Peak Traffic Hour PICADY Junction Analysis

A Ratio of Flow to Capacity (RFC) of 0.900 is considered by PICADY to represent the typical practical capacity of a priority controlled junction, respectively. The PICADY analysis indicates that the Ballymullen Clash Link Relief Road Phase 1/Mitchels Road junction would operate well within practical capacity, without significant traffic queuing and delays, during the predicted 2029 morning and evening peak hours, both with and without the proposed residential development in place.

The Ballymullen Clash Link Relief Road Phase 1/Mitchels Road junction would operate with a highest RFC of 0.468 with the proposed residential development in place, compared to a highest RFC of 0.373 without the proposed development. The highest delays per vehicle would be 0.21 minutes.

7.9 Urban Road Link Capacities

On the basis of the UK Traffic Capacity of Urban Roads TA79/99, the Cloonmore Avenue and Ballymullen Link Relief Road Phase 1 urban road link capacities are provided in Table 10, based on their urban road carriageway widths. The urban road link capacities are for each direction per hour.

Urban Road	Urban Road Link		
	Type	Lanes	Capacity/Hour/Direction (Vehicles)
Cloonmore Avenue	UAP3	2	900
Ballymullen Link Relief Road Phase 1	UAP3	2	1,110

Table 10: Urban Road Link Capacities in Each Direction

The predicted 2029 morning and evening peak hour urban road link peak hour volume/capacity ratios for Cloonmore Avenue and Ballymullen Link Relief Road Phase 1, with the proposed residential development in place, are provided in Table 11, on the basis of the UK Traffic Capacity of Urban Roads TA 79/99.

Urban Road	Peak Hour	Peak Hour Vehicles/Highest Direction	Capacity/Hour/ Direction (Vehicles)	Volume/Capacity Ratio
Cloonmore Avenue	Morning	169	900	19%
	Evening	80		9%
Ballymullen Link Relief Road Phase 1	Morning	219	1,110	20%
	Evening	118		11%

Table 11: Predicted 2029 Road Link Volume/Capacity Ratios With Proposed Cloonmore Regeneration LRD

Cloonmore Avenue and Ballymullen Link Relief Road Phase 1 would operate well within their urban road link capacities, for the predicted 2029 peak hour traffic volumes with the proposed residential development in place, with highest volume/capacity ratios of up to 19% and 20%, respectively.

7.10 EPA EIAR Guidelines

On the basis of the EPA EIAR Guidelines, the traffic effects of the proposed residential development would be not significant to slight.

7.11 Construction Traffic

Subject to planning permission, it is proposed to develop the proposed residential development on a phased basis, commencing during Q1 2024, with full completion in 2029.

Peak construction employment is expected to be of the order of up to 30 staff. Demolition material would be removed off-site to a licensed recycling facility. Excavated material would be removed off-site by a licensed haulier to a licensed landfill. Construction staff start and finish times would be outside the main traffic peak periods.

It is expected that construction contractor staff would travel with a typical car/van occupancy of 1.5 construction staff/vehicle. This would generate up to 20 daily car/van trips both to and from site, on the basis that all staff travel by car/van.

Typical daily delivery vehicle volumes would be six vehicles. Peak daily construction delivery traffic volumes would be up to 10 vehicles.

All construction car parking and site compounds would be located within the existing site confines. All necessary construction signage and construction traffic management would be in accordance with the requirements of Kerry County Council.

8. Summary and Conclusions

Residential Units

The proposed Cloonmore Regeneration LRD comprises a total of 145 residential units, including 49 one-bedroom apartments, 78 two-bedroom apartments, 14 two-bedroom townhouses and four three-bedroom townhouses.

Access

Access is proposed via Cloonmore Avenue, at the south west of the site. The Ballymullen Clash Relief Road Phase 1 extends north to Cloonmore Avenue. A pedestrian and cycle access is proposed at Boherbee at the north of the site. It is proposed to close the existing site vehicle accesses at Boherbee.

The proposed residential development site is located within convenient walking distance of the town centre, local schools and facilities and the main Tralee public transport services.

TRICS Trip Rates

The CIHT TRICS database morning and evening peak hour persons travel mode shares, for privately owned residential apartments and mixed size private housing in urban centres, indicates that non-car driver (walk, cycle, car passenger and public transport) travel modes represent 41% to 53% of person travel modes during the morning and evening peak traffic hours.

The proposed residential development would generate 56 two-way vehicle trips during the morning peak hour, and 73 two-way vehicle trips during the evening peak hour, on the basis of TRICS.

Additional Traffic Volumes

The proposed residential development would increase morning and evening peak hour link traffic volumes by up to 4.5% and 6.2%, respectively, on Mitchels Road. The highest predicted increase of 36 vehicles two-way on Mitchels Road would equate to one additional vehicle every 1.7 minutes. The total vehicles on the Ballymullen Clash Relief Road Phase 1 would be relatively low. Elsewhere, on the existing local road network, the predicted highest increases in link traffic volumes would be up to 2.0%.

The proposed residential development would increase morning and evening peak hour junction traffic volumes by up to 7.0% and 11.3%, respectively, at the Ballymullen Clash Link Relief Road Phase 1/Mitchels Road junction. Elsewhere, the predicted highest increases in junction traffic volumes would be up to 3.9%.

TII TTA Assessment Thresholds

The predicted highest increases in 2029 morning and evening peak hour link and junction traffic volumes, generated by the proposed residential development, on the local road network would be less than the volumetric threshold increases (5%) identified by TII in their TTA Assessment Guidelines for consideration of sensitive locations, at all locations with the exception of the Ballymullen Clash Link Relief Road Phase 1 and during the evening peak hour on Mitchels Road, due to their relatively low volumes

Junction Capacity Analysis

The Ballymullen Clash Link Relief Road Phase 1/Mitchels Road junction would operate well within practical capacity, without significant traffic queuing and delays, during the predicted 2029 morning and evening peak hours, both with and without the proposed residential development in place.

The Ballymullen Clash Link Relief Road Phase 1/Mitchels Road junction would operate with a highest RFC of 0.468 with the proposed residential development in place, compared to a highest RFC of 0.373 without the proposed development. The highest delays per vehicle would be 0.21 minutes.

Urban Road Link Volume/Capacity Ratios

Cloonmore Avenue and Ballymullen Link Relief Road Phase 1 would operate well within their urban road link capacities, for the predicted 2029 peak hour traffic volumes with the proposed residential development in place, with highest volume/capacity ratios of up to 19% and 20%, respectively.

EPA EIAR Guidelines

On the basis of the EPA EIAR Guidelines, the traffic effects of the proposed residential development would be not significant to slight.

Ballymullen Clash Link Relief Road Phase 2

The future provision of Phase 2 of the permitted Ballymullen Clash Link Relief Road would result in the diversion of traffic volumes from Mitchels Road and Boherbee to the Ballymullen Clash Link Road, and result in the directional diversion of traffic volumes generated by Cloonmore Avenue and Ballymullen Clash Link Road Phase 1; but would not change the overall total traffic volumes at the Ballymullen Clash Link Road/Mitchels Road and Clash Roundabout junctions.

The proposed residential development would be sustainable on the basis of the existing Cloonmore Avenue and Ballymullen Clash Link Relief Road Phase 1. The future provision of Phase 2 of the Link Relief Road would not be warranted to sustain the proposed residential development, on the basis of the foregoing Assessment.

Appendix A

PICADY Junction Capacity Modelling Analysis

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 4.1 ANALYSIS PROGRAM
RELEASE 4.0 (NOV 2003)

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FOR SALES AND DISTRIBUTION INFORMATION,
PROGRAM ADVICE AND MAINTENANCE CONTACT:
TRL SOFTWARE BUREAU
TEL: CROWTHORNE (01344) 770758, FAX: 770864
EMAIL: SoftwareBureau@trl.co.uk

Run with file:- "e:\23824PY01.vpi" (drive-on-the-left) at 12:11:19 on Monday, 14 August 2023

RUN TITLE
****
Ballymullen Clash Link Relief Rd/Mitchels Road - 2029 AM Pk Hr Without Proposal

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

MAJOR ROAD (ARM C) ---------- MAJOR ROAD (ARM A)
I
I
I
I
I
I
MINOR ROAD (ARM B)

ARM A IS Mitchels Road North
ARM B IS Ballymullen Clash Link Relief Road
ARM C IS Mitchels Road South

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

.**GEOMETRIC DATA**

DATA ITEM		MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.30 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.
- VISIBILITY	(VC-B)	90.0 M.
- BLOCKS TRAFFIC		YES
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	70.0 M.
- VISIBILITY TO RIGHT	(VB-A)	70.0 M.
- LANE 1 WIDTH	(WB-C)	3.50 M.
- LANE 2 WIDTH	(WB-A)	0.00 M.

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.**TRAFFIC DEMAND DATA**

TIME PERIOD BEGINS 08.00 AND ENDS 09.00

LENGTH OF TIME PERIOD - 60 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE INPUT DIRECTLY.

.

		TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S)		
TIME	FROM/TO	ARM A	ARM B	ARM C
08.00 - 08.15				
	ARM A	0.000	0.277	0.723
		0.0	87.0	227.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.503	0.000	0.497
		88.0	0.0	87.0
		(0.0)	(0.0)	(4.0)
	ARM C	0.720	0.280	0.000
		226.0	88.0	0.0
		(0.0)	(4.0)	(0.0)

08.15 - 08.30					
	ARM A	0.000	0.277	0.723	
		0.0	87.0	227.0	
		(0.0)	(0.0)	(0.0)	
	ARM B	0.503	0.000	0.497	
		88.0	0.0	87.0	
		(0.0)	(0.0)	(4.0)	
	ARM C	0.720	0.280	0.000	
		226.0	88.0	0.0	
		(0.0)	(4.0)	(0.0)	
08.30 - 08.45					
	ARM A	0.000	0.277	0.723	
		0.0	87.0	227.0	
		(0.0)	(0.0)	(0.0)	
	ARM B	0.503	0.000	0.497	
		88.0	0.0	87.0	
		(0.0)	(0.0)	(4.0)	
	ARM C	0.720	0.280	0.000	
		226.0	88.0	0.0	
		(0.0)	(4.0)	(0.0)	

.

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
08.45 - 09.00				
	ARM A	0.000	0.277	0.723
		0.0	87.0	227.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.503	0.000	0.497
		88.0	0.0	87.0
		(0.0)	(0.0)	(4.0)
	ARM C	0.720	0.280	0.000
		226.0	88.0	0.0
		(0.0)	(4.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS

THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

I TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT) I
I 08.00-08.15								I
I B-AC	2.77	8.43	0.329		0.0	0.5	6.8	I
I C-AB	2.03	11.40	0.178		0.0	0.3	4.4	I
I C-A	2.94							I
I A-B	1.38							I
I A-C	3.59							I
I								I

I TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT) I
I 08.15-08.30								I
I B-AC	2.92	8.33	0.351		0.5	0.5	7.8	I
I C-AB	2.18	11.49	0.190		0.3	0.3	4.9	I
I C-A	3.05							I
I A-B	1.45							I
I A-C	3.78							I
I								I

I TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT) I
I 08.30-08.45								I
I B-AC	3.07	8.23	0.373		0.5	0.6	8.6	I
I C-AB	2.34	11.56	0.202		0.3	0.4	5.4	I
I C-A	3.15							I
I A-B	1.52							I
I A-C	3.97							I
I								I

I TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT) I
I 08.45-09.00								I
I B-AC	2.92	8.33	0.351		0.6	0.5	8.4	I
I C-AB	2.18	11.49	0.190		0.4	0.3	5.0	I
I C-A	3.05							I
I A-B	1.45							I
I A-C	3.78							I
I								I

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	0.5	
08.30	0.5	*
08.45	0.6	*
09.00	0.5	*

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.15	0.3
08.30	0.3
08.45	0.4
09.00	0.3

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	175.2	175.2	31.6	0.18	31.6	0.18
C-AB	130.9	130.9	19.7	0.15	19.7	0.15
C-A	182.9	182.9				
A-B	86.9	86.9				
A-C	226.9	226.9				
ALL	802.8	802.8	51.2	0.06	51.3	0.06

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 * DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE
END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE
END OF THE TIME PERIOD.


 END OF JOB

 ****** PICADY 4 run completed.
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TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

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EMAIL: SoftwareBureau@trl.co.uk

Run with file:- "e:\23824PY02.vpi" (drive-on-the-left) at 12:17:27 on Monday, 14 August 2023

RUN TITLE
****
Ballymullen Clash Link Relief Rd/Mitchels Road - 2029 AM Pk Hr With Proposal

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

MAJOR ROAD (ARM C) ---------- MAJOR ROAD (ARM A)
I
I
I
I
I
I
MINOR ROAD (ARM B)

ARM A IS Mitchels Road North
ARM B IS Ballymullen Clash Link Relief Road
ARM C IS Mitchels Road South

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B	
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.30 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.
- VISIBILITY	(VC-B)	90.0 M.
- BLOCKS TRAFFIC		YES
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	70.0 M.
- VISIBILITY TO RIGHT	(VB-A)	70.0 M.
- LANE 1 WIDTH	(WB-C)	3.50 M.
- LANE 2 WIDTH	(WB-A)	0.00 M.

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.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 08.00 AND ENDS 09.00

LENGTH OF TIME PERIOD - 60 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE INPUT DIRECTLY.

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TIME	FROM/TO	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
08.00 - 08.15				
	ARM A	0.000	0.291	0.709
		0.0	93.0	227.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.502	0.000	0.498
		110.0	0.0	109.0
		(0.0)	(0.0)	(4.0)
	ARM C	0.706	0.294	0.000
		226.0	94.0	0.0
		(0.0)	(4.0)	(0.0)

08.15 - 08.30					
	ARM A	0.000	0.291	0.709	
		0.0	93.0	227.0	
		(0.0)	(0.0)	(0.0)	
	ARM B	0.502	0.000	0.498	
		110.0	0.0	109.0	
		(0.0)	(0.0)	(4.0)	
	ARM C	0.706	0.294	0.000	
		226.0	94.0	0.0	
		(0.0)	(4.0)	(0.0)	
08.30 - 08.45					
	ARM A	0.000	0.291	0.709	
		0.0	93.0	227.0	
		(0.0)	(0.0)	(0.0)	
	ARM B	0.502	0.000	0.498	
		110.0	0.0	109.0	
		(0.0)	(0.0)	(4.0)	
	ARM C	0.706	0.294	0.000	
		226.0	94.0	0.0	
		(0.0)	(4.0)	(0.0)	

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TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
08.45 - 09.00				
	ARM A	0.000	0.291	0.709
		0.0	93.0	227.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.502	0.000	0.498
		110.0	0.0	109.0
		(0.0)	(0.0)	(4.0)
	ARM C	0.706	0.294	0.000
		226.0	94.0	0.0
		(0.0)	(4.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS

THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

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 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY     GEOMETRIC
DELAYI
 I        (VEH/MIN) (VEH/MIN) CAPACITY     FLOW    QUEUE  QUEUE    (VEH.MIN/     (VEH.MIN/
I
 I                                (RFC)     (PEDS/MIN) (VEHS) (VEHS)  TIME SEGMENT)  TIME
SEGMENT) I
 I 08.00-08.15                                                                          I
 I    B-AC        3.47        8.39     0.413                     0.0     0.7          9.7
I
 I    C-AB        2.17       11.38     0.190                     0.0     0.3          4.7
I
 I   C-A       2.90                                                                     I
 I   A-B       1.47                                                                     I
 I   A-C       3.60                                                                     I
 I                                                                                      I
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 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY     GEOMETRIC
DELAYI
 I        (VEH/MIN) (VEH/MIN) CAPACITY     FLOW    QUEUE  QUEUE    (VEH.MIN/     (VEH.MIN/
I
 I                                (RFC)     (PEDS/MIN) (VEHS) (VEHS)  TIME SEGMENT)  TIME
SEGMENT) I
 I 08.15-08.30                                                                          I
 I    B-AC        3.65        8.29     0.440                     0.7     0.8         11.3
I
 I    C-AB        2.33       11.47     0.203                     0.3     0.4          5.3
I
 I   C-A       3.00                                                                     I
 I   A-B       1.55                                                                     I
 I   A-C       3.78                                                                     I
 I                                                                                      I
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----------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY     GEOMETRIC
DELAYI
 I        (VEH/MIN) (VEH/MIN) CAPACITY     FLOW    QUEUE  QUEUE    (VEH.MIN/     (VEH.MIN/
I
 I                                (RFC)     (PEDS/MIN) (VEHS) (VEHS)  TIME SEGMENT)  TIME
SEGMENT) I
 I 08.30-08.45                                                                          I
 I    B-AC        3.83        8.19     0.468                     0.8     0.9         12.5
I
 I    C-AB        2.50       11.55     0.217                     0.4     0.4          5.8
I
 I   C-A       3.10                                                                     I
 I   A-B       1.63                                                                     I
 I   A-C       3.97                                                                     I
 I                                                                                      I
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I TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT) I
I 08.45-09.00								I
I B-AC	3.65	8.29	0.440		0.9	0.8	12.3	I
I C-AB	2.33	11.47	0.204		0.4	0.4	5.4	I
I C-A	3.00							I
I A-B	1.55							I
I A-C	3.78							I
I								I

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	0.7	*
08.30	0.8	*
08.45	0.9	*
09.00	0.8	*

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.15	0.3
08.30	0.4
08.45	0.4
09.00	0.4

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I STREAM I	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
I	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
I B-AC	219.0	219.0	45.8	0.21	45.8	0.21
I C-AB	140.1	140.1	21.3	0.15	21.3	0.15
I C-A	179.9	179.9				
I A-B	93.0	93.0				
I A-C	227.0	227.0				
I ALL	858.9	858.9	67.0	0.08	67.1	0.08

```
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 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE
END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE
END OF THE TIME PERIOD.


 END OF JOB

 ****** PICADY 4 run completed.
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TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

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RELEASE 4.0 (NOV 2003)

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EMAIL: SoftwareBureau@trl.co.uk

Run with file:- "e:\23824PY03.vpi" (drive-on-the-left) at 12:21:57 on Monday, 14 August 2023

RUN TITLE
****
Ballymullen Clash Link Relief Rd/Mitchels Road - 2029 PM Pk Hr Without Proposal

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

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I
MINOR ROAD (ARM B)

ARM A IS Mitchels Road North
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ETC.

.**GEOMETRIC DATA**

DATA ITEM		MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.30 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.
- VISIBILITY	(VC-B)	90.0 M.
- BLOCKS TRAFFIC		YES
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	70.0 M.
- VISIBILITY TO RIGHT	(VB-A)	70.0 M.
- LANE 1 WIDTH	(WB-C)	3.50 M.
- LANE 2 WIDTH	(WB-A)	0.00 M.

.

.**TRAFFIC DEMAND DATA**

TIME PERIOD BEGINS 17.00 AND ENDS 18.00

LENGTH OF TIME PERIOD - 60 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE INPUT DIRECTLY.

.

TIME	FROM/TO	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
17.00 - 17.15	ARM A	0.000	0.129	0.871
		0.0	37.0	249.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.507	0.000	0.493
		38.0	0.0	37.0
		(0.0)	(0.0)	(4.0)
	ARM C	0.867	0.133	0.000
		247.0	38.0	0.0
		(4.0)	(0.0)	(0.0)

17.15 - 17.30					
	ARM A	0.000	0.129	0.871	
		0.0	37.0	249.0	
		(0.0)	(0.0)	(0.0)	
	ARM B	0.507	0.000	0.493	
		38.0	0.0	37.0	
		(0.0)	(0.0)	(4.0)	
	ARM C	0.867	0.133	0.000	
		247.0	38.0	0.0	
		(4.0)	(0.0)	(0.0)	
17.30 - 17.45					
	ARM A	0.000	0.129	0.871	
		0.0	37.0	249.0	
		(0.0)	(0.0)	(0.0)	
	ARM B	0.507	0.000	0.493	
		38.0	0.0	37.0	
		(0.0)	(0.0)	(4.0)	
	ARM C	0.867	0.133	0.000	
		247.0	38.0	0.0	
		(4.0)	(0.0)	(0.0)	

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TURNING PROPORTIONS TURNING COUNTS (PERCENTAGE OF H.V.S)				
TIME	FROM/TO	ARM A	ARM B	ARM C
17.45 - 18.00				
	ARM A	0.000	0.129	0.871
		0.0	37.0	249.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.507	0.000	0.493
		38.0	0.0	37.0
		(0.0)	(0.0)	(4.0)
	ARM C	0.867	0.133	0.000
		247.0	38.0	0.0
		(4.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS

THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

I TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT) I
I 17.00-17.15								I
I B-AC	1.19	8.57	0.139		0.0	0.2	2.3	I
I C-AB	0.87	11.95	0.073		0.0	0.1	1.9	I
I C-A	3.64							I
I A-B	0.59							I
I A-C	3.94							I
I								I

I TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT) I
I 17.15-17.30								I
I B-AC	1.25	8.48	0.147		0.2	0.2	2.5	I
I C-AB	0.94	12.04	0.078		0.1	0.1	2.1	I
I C-A	3.81							I
I A-B	0.62							I
I A-C	4.14							I
I								I

I TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT) I
I 17.30-17.45								I
I B-AC	1.31	8.39	0.156		0.2	0.2	2.7	I
I C-AB	1.03	12.17	0.085		0.1	0.2	2.3	I
I C-A	3.96							I
I A-B	0.65							I
I A-C	4.35							I
I								I

I TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT) I
I 17.45-18.00								I
I B-AC	1.25	8.48	0.147		0.2	0.2	2.6	I
I C-AB	0.94	12.04	0.078		0.2	0.1	2.1	I
I C-A	3.81							I
I A-B	0.62							I
I A-C	4.14							I
I								I

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.15	0.2
17.30	0.2
17.45	0.2
18.00	0.2

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.15	0.1
17.30	0.1
17.45	0.2
18.00	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I STREAM I	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
I	(VEH)	(VEH/H) I	(MIN)	(MIN/VEH) I	(MIN)	(MIN/VEH) I
I B-AC I	75.0	75.0 I	10.2	0.14 I	10.2	0.14 I
I C-AB I	56.8	56.8 I	8.4	0.15 I	8.4	0.15 I
I C-A I	228.2	228.2 I		I		I
I A-B I	37.0	37.0 I		I		I
I A-C I	248.8	248.8 I		I		I
I ALL I	645.8	645.8 I	18.6	0.03 I	18.6	0.03 I

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 * DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE
END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE
END OF THE TIME PERIOD.


 END OF JOB

 ****** PICADY 4 run completed.
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TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 4.1 ANALYSIS PROGRAM
RELEASE 4.0 (NOV 2003)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
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FOR SALES AND DISTRIBUTION INFORMATION,
PROGRAM ADVICE AND MAINTENANCE CONTACT:
TRL SOFTWARE BUREAU
TEL: CROWTHORNE (01344) 770758, FAX: 770864
EMAIL: SoftwareBureau@trl.co.uk

Run with file:- "e:\23824PY04.vpi" (drive-on-the-left) at 12:28:07 on Monday, 14 August 2023

RUN TITLE
****
Ballymullen Clash Link Relief Rd/Mitchels Road - 2029 PM Pk Hr With Proposal

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

MAJOR ROAD (ARM C) ---------- MAJOR ROAD (ARM A)
I
I
I
I
I
I
MINOR ROAD (ARM B)

ARM A IS Mitchels Road North
ARM B IS Ballymullen Clash Link Relief Road
ARM C IS Mitchels Road South

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

.**GEOMETRIC DATA**

DATA ITEM		MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.30 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.
- VISIBILITY	(VC-B)	90.0 M.
- BLOCKS TRAFFIC		YES
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	70.0 M.
- VISIBILITY TO RIGHT	(VB-A)	70.0 M.
- LANE 1 WIDTH	(WB-C)	3.50 M.
- LANE 2 WIDTH	(WB-A)	0.00 M.

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.**TRAFFIC DEMAND DATA**

TIME PERIOD BEGINS 17.00 AND ENDS 18.00

LENGTH OF TIME PERIOD - 60 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE INPUT DIRECTLY.

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TIME	FROM/TO	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
17.00 - 17.15				
	ARM A	0.000	0.189	0.811
		0.0	58.0	249.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.500	0.000	0.500
		52.0	0.0	52.0
		(0.0)	(0.0)	(4.0)
	ARM C	0.807	0.193	0.000
		247.0	59.0	0.0
		(4.0)	(0.0)	(0.0)

17.15 - 17.30					
	ARM A	0.000	0.189	0.811	
		0.0	58.0	249.0	
		(0.0)	(0.0)	(0.0)	
	ARM B	0.500	0.000	0.500	
		52.0	0.0	52.0	
		(0.0)	(0.0)	(4.0)	
	ARM C	0.807	0.193	0.000	
		247.0	59.0	0.0	
		(4.0)	(0.0)	(0.0)	
17.30 - 17.45					
	ARM A	0.000	0.189	0.811	
		0.0	58.0	249.0	
		(0.0)	(0.0)	(0.0)	
	ARM B	0.500	0.000	0.500	
		52.0	0.0	52.0	
		(0.0)	(0.0)	(4.0)	
	ARM C	0.807	0.193	0.000	
		247.0	59.0	0.0	
		(4.0)	(0.0)	(0.0)	

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TURNING PROPORTIONS TURNING COUNTS (PERCENTAGE OF H.V.S)				
TIME	FROM/TO	ARM A	ARM B	ARM C
17.45 - 18.00				
	ARM A	0.000	0.189	0.811
		0.0	58.0	249.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.500	0.000	0.500
		52.0	0.0	52.0
		(0.0)	(0.0)	(4.0)
	ARM C	0.807	0.193	0.000
		247.0	59.0	0.0
		(4.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS

THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

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 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY     GEOMETRIC
DELAYI
 I        (VEH/MIN) (VEH/MIN) CAPACITY     FLOW    QUEUE  QUEUE    (VEH.MIN/     (VEH.MIN/
I
 I                                (RFC)     (PEDS/MIN) (VEHS) (VEHS)  TIME SEGMENT)  TIME
SEGMENT) I
 I 17.00-17.15                                                                          I
 I    B-AC        1.65        8.47     0.195                     0.0     0.2          3.4
I
 I    C-AB        1.39       11.92     0.116                     0.0     0.2          3.0
I
 I   C-A       3.46                                                                     I
 I   A-B       0.92                                                                     I
 I   A-C       3.94                                                                     I
 I                                                                                      I
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----------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY     GEOMETRIC
DELAYI
 I        (VEH/MIN) (VEH/MIN) CAPACITY     FLOW    QUEUE  QUEUE    (VEH.MIN/     (VEH.MIN/
I
 I                                (RFC)     (PEDS/MIN) (VEHS) (VEHS)  TIME SEGMENT)  TIME
SEGMENT) I
 I 17.15-17.30                                                                          I
 I    B-AC        1.73        8.37     0.207                     0.2     0.3          3.8
I
 I    C-AB        1.50       12.01     0.125                     0.2     0.2          3.3
I
 I   C-A       3.60                                                                     I
 I   A-B       0.97                                                                     I
 I   A-C       4.15                                                                     I
 I                                                                                      I
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----------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY     GEOMETRIC
DELAYI
 I        (VEH/MIN) (VEH/MIN) CAPACITY     FLOW    QUEUE  QUEUE    (VEH.MIN/     (VEH.MIN/
I
 I                                (RFC)     (PEDS/MIN) (VEHS) (VEHS)  TIME SEGMENT)  TIME
SEGMENT) I
 I 17.30-17.45                                                                          I
 I    B-AC        1.82        8.27     0.220                     0.3     0.3          4.1
I
 I    C-AB        1.61       12.10     0.133                     0.2     0.2          3.6
I
 I   C-A       3.75                                                                     I
 I   A-B       1.02                                                                     I
 I   A-C       4.36                                                                     I
 I                                                                                      I
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I TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT) I
I 17.45-18.00								I
I B-AC	1.73	8.37	0.207		0.3	0.3	4.0	I
I C-AB	1.50	12.01	0.125		0.2	0.2	3.3	I
I C-A	3.60							I
I A-B	0.97							I
I A-C	4.15							I
I								I

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.15	0.2
17.30	0.3
17.45	0.3
18.00	0.3

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.15	0.2
17.30	0.2
17.45	0.2
18.00	0.2

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-AC	103.9	103.9	15.4	0.15	15.4	0.15
C-AB	89.8	89.8	13.2	0.15	13.2	0.15
C-A	216.3	216.3				
A-B	58.0	58.0				
A-C	249.2	249.2				
ALL	717.3	717.3	28.5	0.04	28.5	0.04

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END OF THE TIME PERIOD.



 END OF JOB

 ****** PICADY 4 run completed.
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