

APPENDIX 13.1

Traffic and Transportation Assessment Punch Consulting Engineers

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Parkway Valley LRD

**Traffic and Transportation Assessment
231171-PUNCH-XX-XX-RP-C-0006**

May 2026

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1 Non-Technical Summary

1. The proposed development site is located at Singland Townland, Co. Limerick adjacent to the Parkway Retail Park. The proposed development consists of five blocks accommodating a total of 403 no. residential units, ranging in height from five to eight storeys. In addition, the scheme includes a creche at ground level within Block B, a medical centre located on the western edge of the site, and all associated site works and infrastructure.
2. Classified turning count traffic surveys were carried out at Parkway Roundabout, Dublin Road/Parkway Retail Park Signalised Intersection, Parkway Retail Park Roundabout and Groody Roundabout. The counts were undertaken by IDASO Ltd on Thursday the 13th March 2025.
3. For the purposes of our assessment, the TRICS database was consulted to provide an equivalent trip rate for the proposed development site.
4. It is planned to access the proposed development via a new site entrance off the Dublin Road (R445) and via the existing Parkway Retail Park Roundabout. The new entrance will operate as a Left-In/Left-Out (LILO) junction arrangement facilitating left-turn ingress and egress movements only.
5. Capacity analysis was carried out on all 4 no. surveyed junctions. The analysis shows that the development will have little comparable impact on the current operational capacity of the surrounding network of roads and junctions.
6. Parking spaces for the proposed development have been provided to meet the requirements set out in the Limerick Development Plan (2022-2028) as well as the Compact Settlement Guidelines and national policy relating to parking provision for residential developments located in sustainable transport locations.
7. Secure cycle parking facilities have been provided within the development to meet the requirements set out in the Limerick Development Plan (2022-2028) and the Compact Settlement Guidelines.

2 Introduction

PUNCH Consulting Engineers was commissioned by Kirkland Investments Ltd. to carry out a Traffic and Transportation Assessment (TTA) for a proposed Large-scale Residential Development on lands in Singland, Limerick.

The assessment has been carried out in accordance with the following guidelines:

1. TII's Traffic and Transport Assessment Guidelines PE-PDV-02045 (May 2014)
2. TII Project Appraisal Guidelines for National Roads Unit 5.3 - Travel Demand Projections (PE-PAG-02017 October 2021)
3. Design Manual for Urban Roads & Streets (DMURS).
4. Sections from the Limerick Development Plan (2022-2028)
5. Cycle Design Manual (September 2023)

The proposed development is designed to facilitate and encourage a positive modal shift at the development towards alternative sustainable modes of transport in the interest of compliance with the following National Policy Objectives:

1. The National Sustainable Mobility Policy
2. Climate Action Plan 2025
3. National Investment Framework for Transport in Ireland (NIFTI)
4. Sustainable and Compact Settlements Guidelines for Planning Authorities
5. Limerick Development Plan 2022-2028

The objective of our evaluation is to confirm that the existing road infrastructure can efficiently accommodate not only the traffic anticipated from the proposed development but also the projected increase in current traffic for the foreseeable future. Additionally, we have conducted a thorough analysis to assess the site's accessibility for cyclists, pedestrians and public transport users. This ensures a comprehensive understanding of the development's impact on all modes of transportation.

2.1 Scoping

Consultation was undertaken with Limerick City & County Council at a S247 meeting in September 2025 and at the S32B meeting in December 2025 to allow them to express their views/comments regarding the proposed development prior to the submission of the planning application. Comments received from the S247 and S32B meetings have been incorporated into the current design and documentation.

3 Existing Conditions

3.1 Site Location

The proposed development site is located at Singland, Limerick. The site is located on the south side of the Dublin Road, adjacent to Parkway Retail Park, approximately 4km from Limerick City Centre.

The site is primarily a brownfield site and is approximately 6.18 hectares in area. It is bounded by the Dublin Road to the north, greenfield sites to the east and south-east, residential properties to the south-west and Parkway Retail Park to the west. The site is surrounded by greenfield to the other boundaries. Construction works were carried out on the site previously but were never completed. The previous development was a proposed mixed-use development comprised of an RC and steel frame. A retaining wall has been retained along the western boundary, but the remainder of the previous construction works have been demolished, and the site has a gravel footprint as of now.

There is one existing entrance to the site which is via the Parkway Retail Park Roundabout to the west. Existing ground levels on the site are generally flat and range from 8.4 to 9.64mAOD. The site location is shown in Figure 3-1 below.



Figure 3-1: Site Location Plan

3.2 Existing Road Network

The site location in relation to the local road network is detailed in Figure 3-2 below.



Figure 3-2: Site Location and Surrounding Road Network

A brief description of the local road network and the major road junctions is provided below:

3.2.1 Dublin Road (R445)

The Dublin Road is a Regional Road (R445) which runs along the northern boundary of the proposed development site. It is a dual-carriageway road along the site boundary comprising two lanes in each direction with high volumes of daily traffic. In 2019 the AADT was estimated as 22,000 vehicles while in 2025 the AADT was estimated at 26,900 vehicles. There are bus stops located on either side of the Dublin Road adjacent to the development site but there are currently no dedicated bus lane facilities. Pedestrians are provided for by means of a footpath along both sides of the Dublin Road. There are no dedicated cycle facilities along the road within the vicinity of the site apart from waiting areas at the signalised junction entering the Parkway Retail Park.

The Dublin Road runs from Limerick City Centre up to Naas where it joins the M7 via the Dublin Road Roundabout. The R445 was the main road to Dublin before the M7 motorway opened. It passes through many large towns such as, Nenagh, Roscrea, Mountrath, Portlaoise, Monasterevin, Newbridge before linking up with the N7 just outside Naas.

Eastbound traffic on the Dublin Road can turn right into the existing junction to the Parkway Retail Park using the dedicated right turn lanes at the existing signalised junction.



Figure 3-3: Dublin Road approach to Signalised Junction looking West

3.2.2 Parkway Roundabout

The Parkway Roundabout is a 5-arm roundabout providing access to the Parkway Shopping Centre, Dublin Road (East/West), Childers Road (R509) and Bóthar Bhaile Átha Cliath as described below.

The entrance to the Parkway Shopping Centre services traffic entering and exiting the shopping centre. There is a pedestrian zebra crossing provided which is an uncontrolled crossing.

The Dublin Road (R445) towards the City Centre off the Parkway Roundabout is a two-way single carriageway with a footpath running on either side of the road. It continues west of the Parkway Roundabout and links up with the City Centre. There are several junctions along the road which link back to the Ballysimon Road to the south and the Pa Healy Road to the north. The Dublin Road to the east is discussed in more detail in Section 3.2.1.

Childers Road (R509) ends south of the Parkway Roundabout and is to the west of the proposed development site. It is a two-way single carriageway with a bus lane on the eastern side. There is a footpath running on either side of the road and a designated cycle lane on the west side of the road. It continues south of the Dublin Road before linking up to the Tipperary Roundabout. There is a junction off the Childers Road (Bloodmill Road) which links up to the Garryglass roundabout on the Groody Road.

Bóthar Bhaile Átha Cliath is located to the north-east of the Parkway Roundabout. It is a two-way carriageway with footpaths running down either side of the road. There is also a two-way designated cycle lane to the north of the road. It runs parallel to the R445 Dublin Road before linking back in with the Parkway Roundabout. Road users can also access the Rhebogue Road from this road.



Figure 3-4: Dublin Road approach to Parkway Roundabout looking West

3.2.3 Groody Roundabout

Groody Roundabout is a 4-arm roundabout providing access to the Dublin Road (East/West), Groody Road and Plassey Park Road as described below.

The Dublin Road (R445) towards the M7 motorway is to the east of the Groody Roundabout. It is a two-way carriageway with footpaths running down either side of the road. There are several junctions along this road which link up Monaleen and Annacotty to the east and University of Limerick to the north. The Dublin Road to the west is discussed in more detail in Section 3.2.1.

The Groody Road to the south of the Groody Roundabout is a two-way carriageway with a footpath running down the eastern side of the road and a designated cycle path adjacent to that. There are several junctions and roundabouts along the road with uncontrolled pedestrian crossings which serve housing estates and the City East Plaza at the end of the road. The Groody Road links to the Ballysimon Road (R527) to the south.

Plassey Park Road is to the north of the Groody Roundabout. It is a two-way carriageway with footpaths running down either side of the road and is the main road into the University of Limerick. There is also a two-way designated cycle lane on both sides of the road. There is an uncontrolled pedestrian crossing just off the roundabout. There are several junctions that feed back onto the Dublin Road (R445) heading towards the M7 motorway.



Figure 3-5: Dublin Road approach to Groody Roundabout looking East

3.3 Existing Traffic Flows

Classified turning count traffic surveys of various junctions in the vicinity of the site were carried out by IDASO Ltd on Thursday the 13th March 2025.

The traffic survey locations are shown in Figure 3-6. Analysis will be carried out for the junctions listed below:

- Site 1: Parkway Roundabout
- Site 2: Dublin Road/Parkway Retail Park Signalised Intersection
- Site 3: Parkway Retail Park Roundabout
- Site 4: Groody Roundabout



Figure 3-6: Junction Turning Count Locations

The traffic survey completed in March 2025 found that the AM & PM Peaks for each of the survey sites were varied as set out in Table 3-1.

Table 3-1: Traffic Survey AM/PM Peak Times

Development Type	AM Peak	PM Peak
Site 1: Parkway Roundabout	10:45 - 11:45	12:00 - 13:00
Site 2: Dublin Road/Parkway Retail Park Signalised Intersection	10:30 - 11:30	15:30 - 16:30
Site 3: Parkway Retail Park Roundabout	11:00 - 12:00	13:30 - 14:30
Site 4: Groody Roundabout	07:45 - 08:45	16:00 - 17:00

The survey recorded PCL (Pedal Cycles), MCL (2 Wheeled Motorcycles), Cars, LGV (Light Goods Vehicles), HGV (Heavy Goods Vehicles), Buses, Miscellaneous & Agricultural Vehicles. As set out in the TII's Manual for Roads and Bridges (DMRB) all surveyed vehicles were converted to PCUs (passenger car units, or the equivalent flow in cars) data as follows:

Table 3-2: PCU Conversion Factors Used

Vehicle Type Survey	PCU Conversion Factor Applied
PC (Pedal Cycles)	0.2
MC (2 Wheeled Motorcycles)	0.4
Cars & LGV (Light Goods Vehicles)	1.0
OGV1 (Other Goods Vehicles - Rigid Vehicles over 3.5 Tonnes with 2/3 axles)	1.5
OGV2 (Other Goods Vehicles - Rigid Vehicles with 4 or more axles & Articulated Lorries)	2.3
PSV (Public Service Vehicles)	2.0

Only converted PCU values are discussed in the following sections of this report.

Site 1 traffic surveys undertaken at the **Parkway Roundabout** found that the mean morning peak hour traffic flow occurred between 10:45 and 11:45 (AM). The evening peak hour traffic flow was found to be between 12:00 and 13:00 (PM). The surveyed peak hour turning PCUs are presented in Figure 3-7.

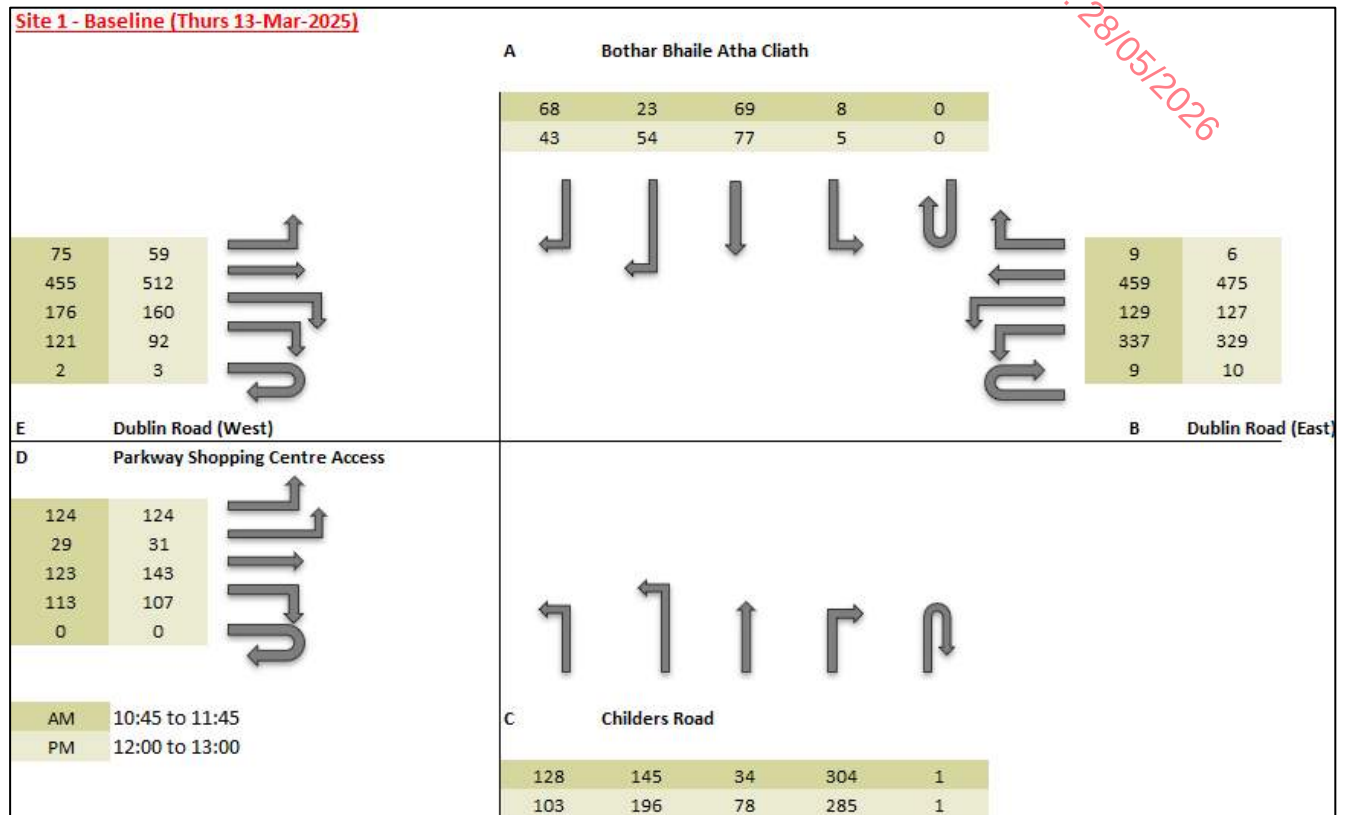


Figure 3-7: March 2025 Peak Hour Traffic Survey Results (PCUs) at Site 1 Parkway Roundabout

Site 2 traffic surveys undertaken at the **Dublin Road/Parkway Retail Park Signalised Intersection** found that the mean morning peak hour traffic flow occurred between 10:30 and 11:30 (AM). The evening peak hour traffic flow was found to be between 15:30 and 16:30 (PM). The surveyed peak hour turning PCUs are presented in Figure 3-8.

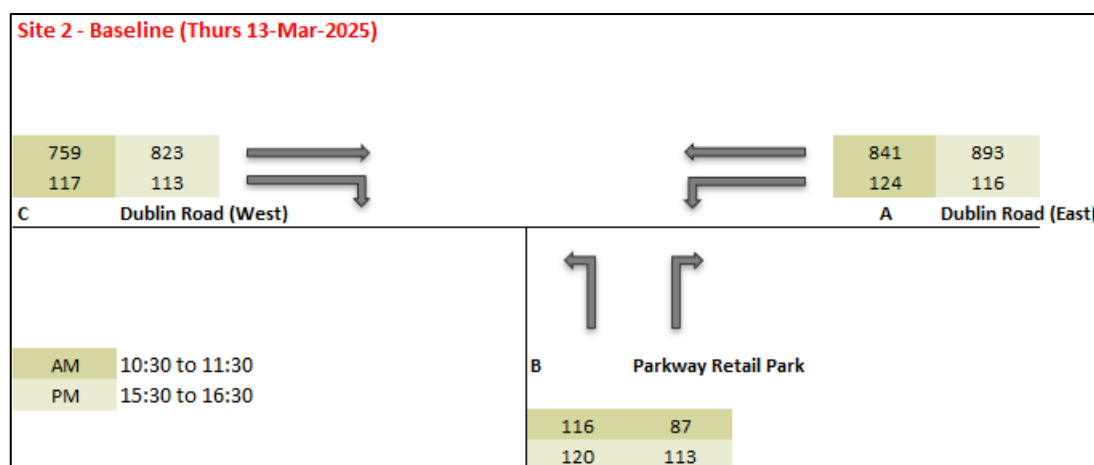


Figure 3-8: March 2025 Peak Hour Traffic Survey Results (PCUs) at Site 2 Signalised Intersection

Site 3 traffic surveys undertaken at **Parkway Retail Park Roundabout** found that the mean morning peak hour traffic flow occurred between 11:00 and 12:00 (AM). The evening peak hour traffic flow was found to be between 13:30 and 14:30 (PM). The surveyed peak hour turning PCUs are presented in Figure 3-9.

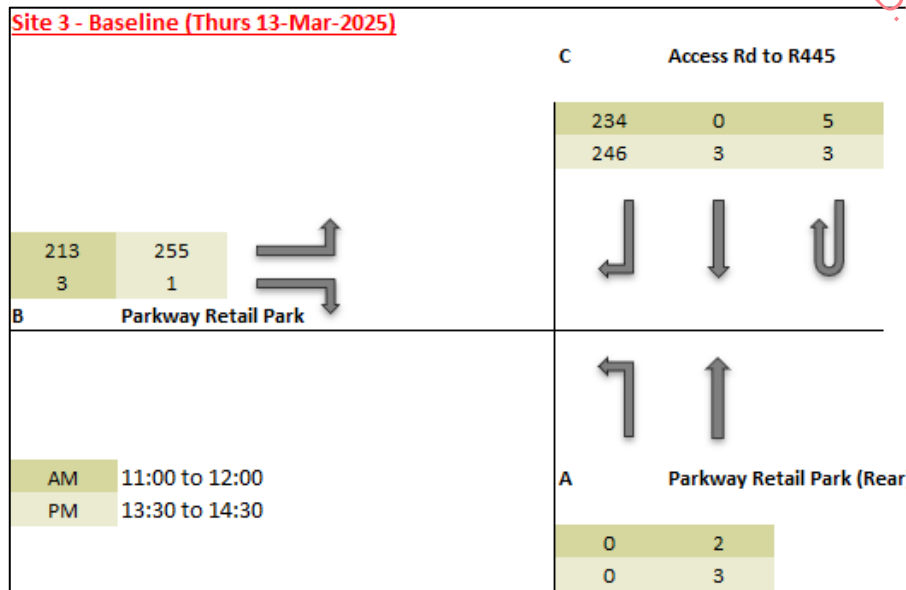


Figure 3-9: March 2025 Peak Hour Traffic Survey Results (PCUs) at Site 3 Parkway Retail Park Roundabout

Site 4 traffic surveys undertaken at the **Groody Roundabout** found that the mean morning peak hour traffic flow occurred between 07:45 and 08:45 (AM). The evening peak hour traffic flow was found to be between 16:00 and 17:00 (PM). The surveyed peak hour turning PCUs are presented in Figure 3-10.

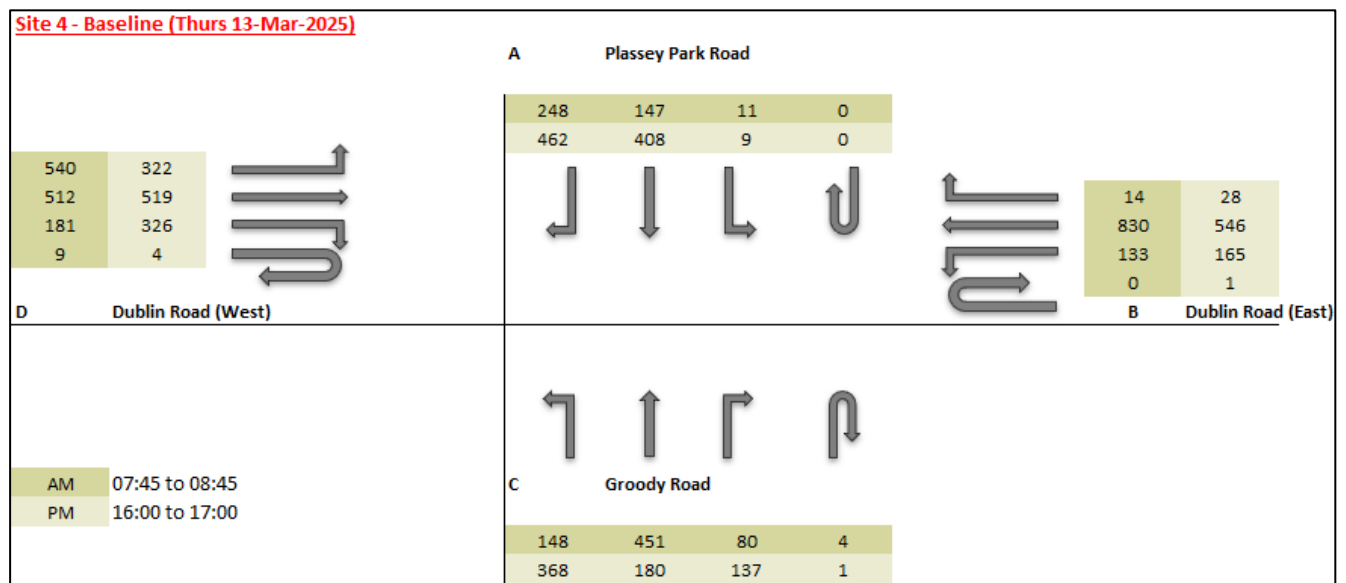


Figure 3-10: March 2025 Peak Hour Traffic Survey Results (PCUs) at Site 4 Groody Roundabout

A junction capacity analysis of the existing traffic flows was carried out. Table 3-4 to 3-7 below shows the results for each of the four surveyed junctions.

The Ratio of Flow to Capacity (RFC) provides a basis for judging the acceptability of junction designs. Table 3-3 outlines RFC ranges and their corresponding operational conditions: generally, an RFC below 0.85 indicates efficient or stable performance, while an RFC above 1.0 suggests the junction is oversaturated. For Signalised Intersections (Junction 2), the RFC output is replaced with DOS (Degree of Saturation), which has an equivalent meaning/definition.

Table 3-3: Ratio of Flow to Capacity Ranges

RFC < 0.85 - Efficient/Stable Condition
RFC > 0.85 & < 1.0 - Adequate Condition
RFC > 1.0 - Oversaturated Condition

Table 3-4: Junction 1 Capacity Analysis Results for Survey Year (2025)

	Without Development	
Peak Hour Flow	Maximum RFC	Queue (PCU)
AM 2025 Survey Year	0.84	4.9
PM 2025 Survey Year	0.91	8.0

Junction 1 (Parkway Roundabout) is shown to be operating currently at 0.84 and 0.91 of the junction capacity during the AM and PM peak period respectively during the survey year 2025. The Childers Road arm of the junction is where the most vehicle queueing is observed.

Table 3-5: Junction 2 Capacity Analysis Results for Survey Year (2025)

	Without Development	
Peak Hour Flow	Maximum DOS (%)	Queue (PCU)
AM 2025 Survey Year	53.1	12.0
PM 2025 Survey Year	56.4	12.8

Junction 2 (Dublin Road/Parkway Retail Park Signalised Intersection) is shown to be operating at a Maximum Degree of Saturation (DOS) of 53.1% and 56.4% during the AM and PM peak period respectively during the survey year 2025.

Table 3-6: Junction 3 Capacity Analysis Results for Survey Year (2025)

	Without Development	
Peak Hour Flow	Maximum RFC	Queue (PCU)
AM 2025 Survey Year	0.21	0.3
PM 2025 Survey Year	0.25	0.3

Junction 3 (Parkway Retail Park Roundabout) is shown to be operating at 0.21 and 0.25 of the junction capacity during the AM and PM peak period respectively during the survey year 2025. Minimal queuing is observed on each arm. There are no existing issues with capacity at this junction as it mostly serves for access in and out of the Parkway Retail Park with no conflicting movements.

Table 3-7: Junction 4 Capacity Analysis Results for Survey Year (2025)

	Without Development	
Peak Hour Flow	Maximum RFC	Queue (PCU)
AM 2025 Survey Year	0.93	10.2
PM 2025 Survey Year	0.87	6.1

Junction 4 (Groody Roundabout) is shown to be operating at 0.93 and 0.87 of the junction capacity during the AM and PM peak period respectively during the survey year 2025.

3.4 Existing Sustainable Transport Options

A detailed Mobility Management Plan (MMP) has been prepared by PUNCH Consulting Engineers and has been included in the submission package.

4 Future Transport Proposals

The following transport schemes will have a significant impact on traffic levels in the subject area, should they proceed:

4.1 BusConnects

Improving the bus network aligns with the National Development Plan 2018-2027, which envisions a greatly expanded BusConnects service for Limerick City from 2027. The National Transport Authority (NTA) published its final new bus network for Limerick in December 2023. The new network is intended to transform the public transport network across Limerick City. The network will involve the creation of new bus routes and improved bus frequencies to help transform the public transport network to meet anticipated growth and future demand in the region. BusConnects will provide an overall increase of 70% in bus services in Limerick City and its suburbs.

Route 4 comprising St Nessans Church - University of Limerick is a significant two-way route for the development site with regular 10-minute frequency services planned for weekdays and 15-minute frequency services planned for weekends.

Route 6 comprising Coonagh Shopping Centre - University of Limerick is a two-way route with daily 30-minute frequency services planned.

Both routes will run via Dublin Road passing directly outside the perimeter of the proposed development. The new network is scheduled to be delivered on a phased approach from 2027.

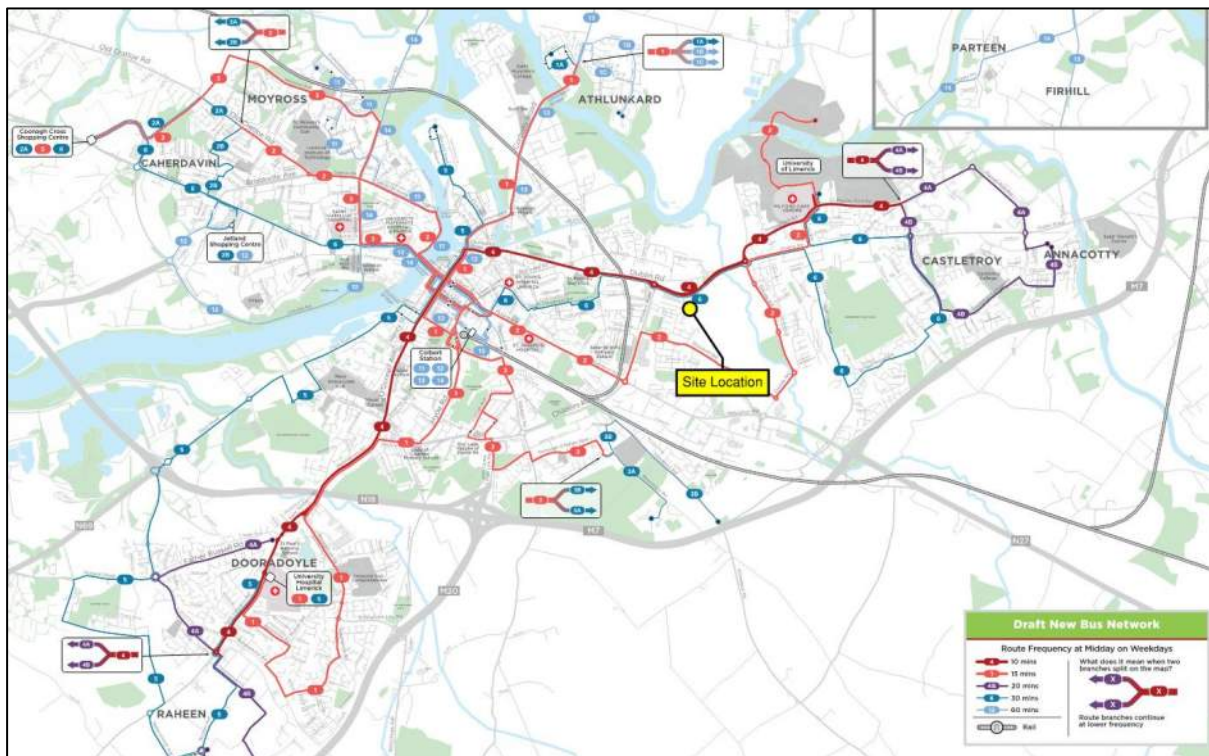


Figure 4-1: Limerick BusConnects Map

At the request of LCCC, an allowance for a 4m wide set back zone from the existing kerbline with the R445 has been provided to allow for possible future development of the BusConnects Project.

4.2 Fairgreen, Singland Active Travel Scheme

In 2024, St Brigid's National School, Singland was selected for inclusion in the Safe Routes to School programme. LCCC have been tasked with delivering the infrastructure to increase active travel in the form of walking and cycling to school. More details around the scheme have not yet been published.



Figure 4-2: St Brigid's National School Location

4.3 Limerick Shannon Metropolitan Area Transport Strategy

The Dublin Road (R445) has been identified for a Primary Radial Cycle Route within the Limerick Shannon Metropolitan Area Transport Strategy (LSMATS) linking the City Centre to the University of Limerick and National Technology Park. This Active Travel scheme will be implemented in tandem with the BusConnects routes discussed in Section 4.1.

5 Committed/Future Planned Developments

5.1 Adjacent Planning Approvals

A review of adjacent planning applications submitted or granted in the area, as recorded on the Limerick City & County Council Planning Register, identified none with the potential to significantly affect this traffic assessment. The following table details planning applications in the surrounding area that have reviewed.

Table 5-1: Adjacent Planning Applications Reviewed for Traffic Impact

Application details	Description	Decision & Date	Include/Exclude in TTA
Applicant: Bloodmill Road Estates Limited Reference: 201235 Location: Bloodmill Road, Singland, Co. Limerick	Alterations to previously approved Planning ref no. 18/434. The alterations consist of alteration to design of Creche to provide a reduced floor area, addition of 3 semi-detached houses together with associated site works.	Decision: Grant Permission (with Conditions) Date: 27/04/2021	Exclude: The Planning Report included as part of the planning submission stated that the proposed development will have minimal impact, and as such a Traffic Impact Assessment is not deemed necessary.
Applicant: McCarthy & Woulfe Ltd. Reference: 21142 Location: Brook Place, Rhebogue, Limerick	Construction of a single storey house and ancillary site works.	Decision: Grant Permission (with Conditions) Date: 02/06/2021	Exclude: Single dwelling house will have minimal impact on surrounding road network.
Applicant: Osprey Construction Limited Reference: 201074 Location: Brú na Gruadán, Castletroy, Co. Limerick	A residential development comprising 63 no. residential units.	Decision: Grant Permission (with Revised Conditions) Date: 06/05/2021	Exclude: The development will have a minor impact on Groody Road. It will have minimal impact compared with the normal traffic growth impact in the area covered by this TTA.
Applicant: McCarthy & Woulfe Ltd. Reference: 20827 Location: Anglers Walk, Rhebogue, Limerick	Construction of two no. dwelling houses and ancillary site works on an existing serviced road.	Decision: Grant Permission (with Conditions) Date: 23/07/2021	Exclude: 2 no. dwelling houses will have minimal impact on surrounding road network.
Applicant: Sharon Ryan Reference: 21823 Location: Castletroy View Childers Road, Co. Limerick	Removal of existing porch and construction of a new porch and bay window extension to the front of dwelling with lean-to roof over and removal of existing domestic store at the side of the dwelling	Decision: Grant Permission (with Conditions) Date: 03/08/2021	Exclude: Single dwelling house will have minimal impact on surrounding road network.

	and construction of an extension at the side and rear of dwelling and all associated site work		
Applicant: McCarthy & Woulfe Ltd. Reference: 211395 Location: Rhebogue Road, Rhebogue, Limerick	Construction of a residential development comprising 6 no. terrace units with site entrance.	Decision: Grant Permission (with Conditions) Date: 17/05/2022	Exclude: 6 no. dwelling houses will have minimal impact on surrounding road network.
Applicant: Granville Rangers AFC Reference: 2223 Location: Granville Rangers AFC, Glenbrook, Bloodmill Road, Singland, Limerick.	The installation of an all-weather training pitch with a 3.0-metre-high surrounding fence and floodlighting on masts with ancillary site works.	Decision: Grant Permission (with Conditions) Date: 20/09/2022	Exclude: No additional traffic generated due to nature of development.
Applicant: Kearock Investments Ltd. Reference: 221216 Location: Old Dublin Road, Rhebogue, Limerick City	Large-Scale Residential Development (LRD) on lands (0.53 Ha) at Old Dublin Road, Rhebogue, Limerick City. The proposed development comprises of the construction of a Purpose-Built Student Accommodation (PBSA) scheme consisting of 26 no. apartments with a total of 202 no. student bedspaces.	Decision: Grant Permission (with Conditions) Date: 17/01/2023	Exclude: Traffic Assessment Report included as part of the planning submission stated that the proposed development will have minimal impact on traffic flows on the local road network due to low parking provision.
Applicant: John Conroy Reference: 23240 Location: Groody Toll House, Old Dublin Road, Singland, Limerick	Renovation of the protected structure No. 1628, known as the 'Groody' Toll House and the construction of a new extension. Connect to public services and carry out all ancillary site works at the above address. Previous permission granted under Planning Ref. No.18/774	Decision: Grant Permission (with Conditions) Date: 05/05/2023	Exclude: No additional traffic generated due to nature of development.
Applicant: Aldi Stores(Ireland) Limited Reference: 23205 Location: Aldi, Dublin Road, Limerick, Co. Limerick	The development will consist of the construction of a single store Deposit Return Scheme(DRS) Kiosk (Gross Floor Area: 17 sq. m), including 2 no.	Decision: Grant Permission (with Conditions) Date: 06/06/2023	Exclude: The development will have a minor impact on Groody Road. It will have minimal impact compared with the normal traffic growth impact in the area covered by this TTA.

	signage panel areas for branding on the side elevation of the DRS Kiosk (1.0m x 2.0m), and all associated site development works. The development will result in the removal of 3 no. existing car parking spaces in the car park that serves the existing Aldi store		RECEIVED: 28/05/2026
Applicant: Aileen & John McCarthy Reference: 221208 Location: Rhebogue Meadows, Dublin Road, Limerick	Construction of a new detached dwelling house with connection to existing services and all ancillary site works	Decision: Grant Permission (with Conditions) Date: 21/08/2023	Exclude: Single dwelling house will have minimal impact on surrounding road network.
Applicant: Targeted Investment Opportunities ICAV Reference: 2360940 Location: Unit 3, Parkway Retail Park, Dublin Road, Co. Limerick, V94 TX68	The development that will consist of a proposed mezzanine level to provide for additional trading floorspace, proposed internal alterations to facilitate the development, proposed new signages to the front elevation, and all associated site works necessary to facilitate the development	Decision: Grant Permission (with Conditions) Date: 15/02/2024	Exclude: The development will have a minor impact on Groody Road. It will have minimal impact compared with the normal traffic growth impact in the area covered by this TTA.
Applicant: Limerick City and County Council Reference: JP91.317686 Location: Ballysimon, Co. Limerick	Proposed development of the Bloodmill Road Extension Scheme.	Decision: Grant Permission (with Conditions) Date: 22/02/2024	Exclude: Road extension scheme will have positive impact on traffic flows.
Applicant: Louise Ryan Reference: 2438 Location: Villa Nova, Dublin Road, Limerick, V94YOET	The demolition & removal of front wall, associated groundworks, internal surface water system and creation of off-road parking	Decision: Grant Permission (with Conditions) Date: 02/05/2024	Exclude: Single dwelling house will have minimal impact on surrounding road network.
Applicant: Singland Leasing Ltd. Reference: 24232	The installation of a cold store to the south side of the petrol	Decision: Grant Permission (with Conditions)	Exclude: No additional traffic generated due to nature of development.

Location: Dublin Road, Castletroy, Co. Limerick	station and all ancillary site works	Date: 02/05/2024	
Applicant: Dermot Coffey Reference: 23605 Location: Bloodmill Road, and Oakwood, Singland, Limerick	Construction of 7 no. two storey, 3-bedroom, terraced dwelling houses, all with off street car parking.	Decision: Grant Permission (with Conditions) Date: 23/10/2024	Exclude: 7 no. dwelling houses will have minimal impact on surrounding road network.
Applicant: Silvergrove Developments Limited Reference: 2460713 Location: Rhebogue Road, Drominbeg Road, Rhebogue, Limerick City.	Provision of 25 No. apartments in a two and three-storey height block on a site of 0.243 hectare.	Decision: Grant Permission (with Conditions) Date: Due 06/11/2024	Exclude: The TTA included as part of the planning submission stated that with the minimal provision of 17 no. car parking spaces, the proposed development will generate negligible traffic flows in the order of less than 10 no. private car trips during peak hours and will therefore have a near zero (negligible) impact on the local road network.
Applicant: Board of Management of St. Brigid's National School Reference: 2460575 Location: St. Brigid's National School, Singland, Limerick City, Limerick.	Construction of a new two-storey school building extension of 622.3m ² at the ground floor and 613.3m ² at the first floor, together with a single storey link connecting to the existing building.	Decision: Grant Permission (with Conditions) Date: 07/11/2024	Exclude: Will have minimal impact on traffic flows due to emphasis on public transport use.
Applicant: Cathal Glynn Reference: 2460178 Location: Groody Student Park, Castletroy, Co. Limerick	Construction of 6 No. student accommodation, duplex type units over three floors.	Decision: Grant Permission (with Revised Conditions) Date: 02/04/2025	Exclude: 6 no. duplex units will have minimal impact on surrounding road network.
Applicant: Groody Developments Limited Reference: 2560113 Location: Groody Road, Newcastle, Castletroy, Limerick	A Large-Scale Residential Development (LRD) - development of a Purpose-Built Student Accommodation (PBSA) scheme on land fronting the Groody Road and Dublin Road.	Decision: Grant Permission (with Conditions) Date: 25/09/2025	Exclude: The TTA included as part of the planning submission stated that with the minimal provision of 32 no. car parking spaces, the proposed development will generate negligible traffic flows in the order of less than 10 no. private car trips during peak hours and will therefore have a near zero (negligible) impact on the local road network.

Applicant: Ann Hannan Reference: 2560151 Location: Sandybrook House, Bloodmill Road, Limerick	A residential development comprising 31 no. residential units.	Decision: Grant Permission (with Conditions) Date: 23/10/2025	Exclude: The TTA included as part of the planning submission stated that with the minimal provision of 32 no. car parking spaces, the proposed development will generate negligible traffic flows in the order of less than 10 no. private car trips during peak hours and will therefore have a near zero (negligible) impact on the local road network.
Applicant: The Estate of the late Dermot Coffey Reference: 25220 Location: Oakwood, Singland, Limerick.	1 no. two storey 3 bedroom detached dwelling house with off street car parking, connection to main sewer and associated site works	Decision: Grant Permission (with Conditions) Date: 25/02/2026	Exclude: Single dwelling house will have minimal impact on surrounding road network.

5.2 Parkway Valley Masterplan Development

In assessing the traffic impacts of the subject development, consideration was also given to the overall Masterplan for the remaining zoned area of the subject site. Refer to Parkway Valley Masterplan document prepared by Reddy Architecture included in this planning application.

In addition to the residential apartments, creche and medical centre included in this submission, the Masterplan provides for two potential options for the future building out of the remainder of the site.

- The first option, based on the current provisions of Objective PV01 of the Limerick Development Plan 2022 - 2028, provides for primarily employment and commercial uses on the remainder of the masterplan site.
 - A Hotel
 - 3 no. Office Buildings
 - A Life Sciences Building
- The second option, based on the revised Objective PV01 proposed under Proposed Variation No. 3 of the Limerick Development Plan 2022 - 2028, provides for primarily residential use on the remainder of the masterplan site.
 - A Hotel
 - 500 Residential Units

The traffic modelling presented in Section 10 of this report examines the worst-case peak hourly scenarios for both the AM and PM weekday peak periods for the proposed development subject to this planning submission. However, supplementary modelling has also been conducted to account for the additional Masterplan elements.

6 Proposed Development

The proposed development consists of five blocks accommodating a total of 403 no. residential units, ranging in height from five to eight storeys. In addition, the scheme includes a creche at ground level within Block B, a four-storey over podium level medical centre located on the western edge of the site, and all associated site works and infrastructure.

The development extends to the Dublin Road (R445) to provide a new site access. This new access will provide left in and left out access only to the proposed development via the Dublin Road.

A nature-based surface water drainage system is proposed within the neighbouring Groody Valley green wedge.

Proposed Uses:

- **Residential Development:** A total of 403 no. units comprising 246 one-bedroom units, 29 two-bedroom (3-person) units, and 128 two-bedroom (4-person) units.
- **Creche:** Approximately 306 sq.m, located at the lower ground floor of Block B.
- **Medical Centre:** Approximately 3,082 sq.m, four storeys in height, positioned at the western boundary of the site.

The proposed works are outlined in a series of architectural drawings prepared by Reddy Architecture and engineering drawings prepared by PUNCH Consulting Engineers and supplied as part of the planning documentation.

An extract from the site layout is included in Figure 6-1.



Figure 6-1: Proposed Site Layout

6.1 Car Parking

The Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities published in January 2024 (the “Guidelines”) set out policy and guidance in relation to the planning and development of urban and rural settlements, with a focus on sustainable residential development and the creation of compact settlements. The Guidelines are accompanied by a companion non-statutory Design Manual that illustrates best practice examples of how the policies and objectives of the Guidelines can be applied. It outlines the evolution of wider policy since the publication of the Section 28 Guidelines (the Planning Design Standards for Apartments Guidelines for Planning Authorities), including:

- National Planning Framework (2018)
- Housing for All (2021)
- Housing for All Action Plan Update (2022)
- National Sustainable Mobility Policy (2022)
- Climate Action Plan (2025)

It provides a summary of the emerging policy approach in relation to density and development standards for housing. The approach is aligned to NPF priorities for compact growth and to Action 9 of Housing for All priorities to provide a greater range of high-quality housing options. It also addresses a number of transport specific issues, including:

- *“The availability of car parking has a critical impact on travel choices for all journeys, including local trips. With ongoing investment in active travel and public transport across all urban areas and particularly in our cities and larger towns, the number of locations with access to everyday needs and employment within a short walk or cycle or via a regular public transport connection is increasing all the time. In areas where car-parking levels are reduced studies show that people are more likely to walk, cycle, or choose public transport for daily travel. In order to meet the targets set out in the National Sustainable Mobility Policy 2022 and in the Climate Action Plan 2023 for reduced private car travel it will be necessary to apply a graduated approach to the management of car parking within new residential development.”*
- *“The approach should take account of proximity to urban centres and sustainable transport options, in order to promote more sustainable travel choices. Car parking ratios should be reduced at all urban locations, and should be minimised, substantially reduced or wholly eliminated at locations that have good access to urban services and to public transport.”*

In accordance with the definitions outlined in the ‘Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities’ (specifically Table 3.8), the proposed Parkway Valley Development is located within a ‘High-Capacity Public Transport Node’ given its proximity to a ‘Planned high frequency urban bus service’ (there is a planned route No.4 with a 10-minute frequency along the Dublin Road, adjacent the development site, refer to Section 4.1 of this report.).

“High-Capacity Public Transport Node or Interchange

Lands within 1,000 metres (1km) walking distance of an existing or planned high-capacity urban public transport node or interchange, namely an interchange or node that includes DART, high frequency Commuter Rail, light rail or MetroLink services; or locations within 500 metres walking distance of an existing or planned BusConnects ‘Core Bus Corridor’ stop...”

“Accessible Location

Lands within 500 metres (i.e. up to 5-6 minute walk) of existing or planned high frequency (i.e. 10 minute peak hour frequency) urban bus services.”

As a result, the default position per specific planning policy requirements (SPPR) 3 of the Sustainable Residential Development and Compact Settlements Guidelines is that car-parking provision should be substantially reduced.

Similarly, the Planning Design Standards for Apartments Guidelines for Planning Authorities guidelines contain several transport-related issues relevant to the proposed development including:

- *A default policy for car parking provision to be minimised, substantially reduced or wholly eliminated in highly accessible areas such as in larger scale and higher density developments, comprising wholly of apartments in more central locations that are well served by public transport, the default policy is for car parking provision to be minimised, substantially reduced or wholly eliminated in certain circumstances. The policies above would be particularly applicable in highly accessible areas such as in or adjoining city cores or at a confluence of public transport systems such rail and bus stations located in close proximity;*
- *These locations are most likely to be in cities, especially in or adjacent to (i.e. within 15 minutes walking distance of) city centres or centrally located employment locations. This includes within 5 minutes walking distance of high frequency (min 10 minute peak hour frequency) bus services.*

The conclusion that the site can be defined as a highly accessible sustainable location is evident through various factors. Firstly, its location towards the edge of the city enhances accessibility and promotes the feasibility of cycling and walking as viable transportation alternatives. Additionally, the abundance of existing bus services in the vicinity of the proposed development also underscores the sites accessibility. Finally, the BusConnects development (planned routes 4 & 6 along Dublin Road) is set to significantly bolster high frequency transportation systems, once delivered.

Car parking serving the development is provided in accordance with Density Zone 2 figures outlined in the Limerick Development Plan 2022-2028 'Table DM 9(a)' and SPPR 3 of the *Sustainable Residential Development and Compact Settlements Guidelines for Planning Authorities* as appropriate. The applicable car parking standards are noted in Table 6-1 below:

Table 6-1: Limerick Development Plan Car Maximum Parking Allowance

Development Type	No. Units/Staff Gross Floor Area	Maximum Allowance	Total Maximum Allowance	Provided
Residential	403 (1-2 Bed Apartments)	1 space per unit	403 (Resident)	101
Creche	306m ²	1 space per 60m ² + set down	5 + 3 set down	5 + 3 set down
Medical Centre	18 treatment rooms 30 staff	1 space per treatment room 1 space per 2 staff	33	18 (Patient) 11 (Staff)

It is proposed to provide 138 no. car parking spaces on the development site. The lower provision is aimed at reducing the additional traffic loading in the area due to the good public transport connectivity available in the area and the proximity to local amenities. The parking provision must be viewed in relation to 'Planning Design Standards for Apartments Guidelines for Planning Authorities, 2025' and the 'Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities'

(January 2024). Therefore, the proposed provision of parking facilities is considered sustainable and balanced in terms of adequate provision of parking and promotion of more sustainable transport options.

7 parking spaces (5% of the total number of spaces) will be designated motorcycle user parking spaces.

The 'standard' parking spaces will be demarcated with white lines. All car parking spaces will be 2.5m by 5.0m, with accessible spaces providing an additional width and length of 1.2m.

Accessible Parking Provision

12 parking spaces (9% of the total number of spaces) will be designated accessible car-parking spaces in accordance with the Limerick Development Plan. The accessible spaces are to be demarcated with yellow lines, a protected hatched area and appropriate road markings to identify these spaces. The proposed location of the disabled parking spaces are in close proximity to the building entrances.

Electric Vehicle Charging Points (EVCP)

A minimum 1 no. EV charge point per five car parking spaces will be EVCP as per the Limerick Development Plan standards. All spaces will be cabled for future EV use. This is in accordance with the Statutory Instrument No. 393/2021 - European Union (Energy Performance of Buildings) Regulations 2021 requirements.

27 EV parking spaces are proposed throughout the development. 2 are located adjacent to the creche with 4 provided at the medical centre. The remaining 21 EV spaces are located within residential development to the south of Blocks C and D.

Car Sharing Facilities

Car clubs are being widely used as a way of reducing the need for private car ownership. Communal cars are currently available at various locations throughout Limerick City. Motorists can book slots using an online phone application. Cars are rented per hour with fuel, tax and insurance all included in the hire price. GoCar and YUKO currently offer Car Club services in Limerick City. Each Car Club vehicle has the potential to replace the journeys of up to 15 private cars. This is based on European research for the car share market.

Go Car Facilities will be provided within the development to facilitate short term and or occasional car users. (Go Car enables the hire of a vehicle for varying length of time with a minimum of one hour.) 5 no. parking spaces will be dedicated for car club use only in this car space provision. As an example, applying this rationale for 5 no. GoCar spaces results in an 'equivalent residential parking provision' of $96 + (5 \times 15) = 171$ no. private car spaces which equates to 0.42 car parking spaces per residential unit (i.e. $176/403$).

At this time, it is proposed to use the scheme operated by GoCar but an equivalent shared car scheme could be used. A letter of intent from GoCar is provided in Appendix C.

6.2 Cycle Parking

Cycle parking serving the proposed development is provided in accordance with Density Zone 2 figures outlined in the Limerick Development Plan 2022-2028 'Table DM 9(a)', the Apartment Design Guidelines 2025 and the Sustainable Residential Development and Compact Settlements Guidelines. The applicable cycle parking standards are noted in Table 6-2 below:

Table 6-2: Cycle Parking Standards and Requirements

Development Type	No. Units/Staff	Requirement	Total Requirement	Provided
Residential	403 units (1-2 Bed Apartments)	1 space per bedroom* 1 visitor space per 2 units	560 (Resident) 202 (Visitor)	570 (Resident) 214 (Visitor)
Creche	9 staff	1 space per 3 staff	3	9
Medical Centre	18 treatment rooms 30 staff	1 space per 2 treatment rooms 1 space per 5 staff	20	19 (Patient) 6 (Staff)

*Residential bike parking number are based on the SPUR 4 of Sustainable Residential Development and Compact Settlements Guidelines and visitor parking associated with residential use is based on Limerick Development Plan.

There are a number of cargo bike parking spaces throughout the site as well as locations for parking EV bikes and scooters.

End of journey cycle facilities including showers and changing rooms are to be provided within the creche and medical centre in accordance with the Limerick Development Plan 2022-2028.

6.3 Internal Layout

The layout of the proposed development is detailed in the architect and landscape architect's drawings submitted as part of this application.

6.3.1 DMURS

The roads layout together with pedestrian and cycle facilities for the site have been developed considering the design principles set out in the Design Manual for Roads and Streets (2019). The hierarchy of the streets on the site are all local in nature which reflects the end destination typology of the site.

A circuitous roadway is provided around the perimeter of the site which allows the central area to be a safe environment for pedestrians and cyclists who can access the central area via a shorter segregated route.

Dedicated footpaths have been provided throughout the development which provide pedestrian connectivity to the central area as well as the surrounding site boundaries of existing residential development, Parkway Retail Park and Dublin Road. A raised pedestrian crossing is proposed at the entrance from the Dublin Road to indicate pedestrian priority.

In accordance with the Cycle Design Manual (CDM), Cyclists will share the roadway with vehicles due to the low traffic volumes that are predicted due to the low car parking provision at the proposed

development as well as the low design speed of 20km/hr. Appropriate speed restriction signs will be set out on the road throughout the site. In accordance with Table 2.1 of the Cycle Design Manual, a Mixed Traffic cycle provision is acceptable for the internal roads. If cycle lanes were to be provided for a short section of the internal road, the transition details would be far more complicated than necessary. There is a clear distinction between the busy Dublin Rd where cyclists will be accommodated for in segregated cycle tracks in the future and the quieter internal development road. Additional line marking has been added to the proposed carriageway to identify the cyclist on the shared road surface.

At the request of LCCC, an allowance for a 4m wide set back zone from the existing kerbline with the R445 has been provided to allow for possible future development of the BusConnects Project.

A DMURS Compliance statement has been prepared by PUNCH Consulting Engineers and has been included in the submission package.

6.3.2 Visibility Splays

The site layout has been developed to provide adequate turning provision and fire tender access. Forward visibility and visibility splays have been provided on the basis of the requirements of Sections 4.4.4 and 4.4.5 of the DMURS manual. Compliance with the requirements is set out on the relevant Engineering drawings which accompany this planning application under separate cover.

6.3.3 Vehicle Manoeuvring

Autotrack analysis has been undertaken to ensure there are no issues with swept paths and manoeuvrability of fire appliances, refuse vehicles, and other heavy goods vehicles as indicated in drawings included in the planning documentation.

6.3.4 Road Safety and Quality Audit

A Road Safety Audit and Quality Audit for the development has been undertaken and is supplied as a separate report as part of the planning application. The recommendations of the Audit have been reviewed and incorporated, as appropriate, into the current site layout design.

7 Person Trip Generation

7.1 Generated Vehicle Trips

The purpose of this section is to determine the overall number of trips that will be generated by the proposed development.

In order to estimate the likely volumes of traffic that will be generated by the proposed development and overall masterplan, trip rates recommended by TRICS (Trip Rate Information Computer System) were extracted from the database and applied pro-rata to the relevant number of residential apartments and gross floor area of commercial units within the development.

Full details of the TRICS analysis are included in Appendix A.

Table 7-1: Estimated AM and PM peak hour traffic (PCUs) generated by the Proposed Development using TRICS

Land Use	Calculation		Trip rate				Additional Number of Trips			
	Factor		AM Peak		PM Peak		AM Peak		PM Peak	
	No. of Units	GFA (m ²)	AM Arrive	AM Depart	PM Arrive	PM Depart	AM Arrive	AM Depart	PM Arrive	PM Depart
Residential Units	403		0.048	0.138	0.116	0.067	19	56	47	27
Creche		306	2.562	2.194	1.894	2.450	8	7	6	7
Medical Centre		3,082	0.486	0.581	0.571	0.624	15	18	18	19
Total							42	80	70	54

As noted in Section 5.2 of this report, the Masterplan for the overall Parkway Valley site provides for two future scenarios for the full build out of the site. The first scenario (Option 1) based on the current provisions of the Limerick Development Plan provide for primarily employment / commercial uses on the remainder of the site as provided for in Table 7.2. The second scenario (Option 2), based on the revised provisions of Proposed Variation No. 3 of the Limerick Development Plan, provides primarily for residential uses on the remainder of the site as provided for in Table 7.3.

Table 7-2: Estimated AM and PM peak hour traffic (PCUs) generated by Option 1 of the Masterplan with Primarily Employment / Commercial Further Development using TRICS

Land Use	Calculation		Trip rate				Additional Number of Trips			
	Factor		AM Peak		PM Peak		AM Peak		PM Peak	
	No. of Units	GFA (m ²)	AM Arrive	AM Depart	PM Arrive	PM Depart	AM Arrive	AM Depart	PM Arrive	PM Depart
Proposed Development							42	80	70	54
Masterplan - Offices		23,736	0.839	0.100	0.080	0.850	199	24	19	202
Masterplan - Hotel		6,326	0.313	0.272	0.286	0.256	20	17	18	16
Total							261	121	107	272

Table 7-3: Estimated AM and PM peak hour traffic (PCUs) generated by Option 2 of the Masterplan with Primarily Employment / Commercial Further Development using TRICS

Land Use	Calculation		Trip rate				Additional Number of Trips			
	Factor		AM Peak		PM Peak		AM Peak		PM Peak	
	No. of Units	GFA (m ²)	AM Arrive	AM Depart	PM Arrive	PM Depart	AM Arrive	AM Depart	PM Arrive	PM Depart
Proposed Development							42	80	70	54
Residential Units	500		0.048	0.138	0.116	0.067	26	76	64	37
Masterplan - Hotel		6,326	0.313	0.272	0.286	0.256	20	17	18	16
Total							88	173	152	107

From a traffic volume perspective, office developments are generally associated with higher traffic generation and more pronounced peak-hour movements due to commuter travel patterns, whereas residential developments typically result in lower overall trip volumes with trips distributed more evenly throughout the day.

As a result, the estimated overall masterplan peaks presented in Table 7-2 for Option 1 above portray the worst case scenario. These figures have been used in the analysis presented later in this report.

7.2 Modal Split Discussion

The proposed development is located within convenient walking and cycling distance of Limerick City and suburbs, which provides a range of residential, retail, commercial, and recreational facilities.

Cycle facilities are continually improving; therefore, cycle parking facilities will be provided within the scheme to encourage cycling as a genuine mode of transport. Pedestrians are catered for with footpaths in all directions.

Given the nature and location of the development, trips to and from the site by public transport are considered likely, while both walking and cycling represent realistic alternatives for residents commuting to work/school/college.

National Census data was examined to determine the modal split and prevailing commuting patterns of the Limerick population travelling to work or educational facilities. Private car/van use accounted for 59.2% of trips in 2016 and 49.9% in 2022. Although this indicates a decline in private car dependency over the period, both active travel and public transport shares also decreased. A notable increase in the “Not Stated” category in the 2022 Census for Limerick City and Suburbs suggests that the reported modal split may not fully reflect actual traffic conditions.

Despite this limitation, the Census-based modal split for active and public transport modes commuting to work or educational facilities is shown in Table 7-3 below.

Table 7-3: Modal Split Commuting to Work/Educational Facilities as Assessed by National Census 2016 & 2022

(Source: Central Statistics Office <https://visual.cso.ie/?body=entity/ima/cop/2022&boundary=C04166V04937>)

Year	% On Foot	% Bicycle	% Public Transport
2016	22.3	2.8	7.5
2022	18.9	2.6	7.2

Table 7.3 of the Limerick Development Plan 2022-2028 outlines mode share targets for Limerick City and Suburbs for commuting to work/educational facilities.

Table 7-4: Mode Share Targets 2028

(Source: Table 7.3 of Limerick Development Plan 2022-2028)

Year	% On Foot	% Bicycle	% Public Transport
2028 Target	30	10	14

Refer to the Public Transport Capacity Assessment report also included within the planning submission for further information on public transport availability in the area.

8 Trip Assignment and Distribution

It is assumed that all additional traffic generated by the proposed development will be apportioned across the local road network in accordance with the existing traffic distribution patterns currently observed at each junction/roundabout. This methodology ensures that future traffic forecasts are representative of established vehicular movement characteristics within the study area.

Two access arrangements are proposed for the development. The anticipated traffic distributions associated with each access point are detailed below:

1. Parkway Retail Park Roundabout Access Point

It is anticipated that this access will primarily serve traffic undertaking right-turn movements to and from Dublin Road via the Dublin Road/Parkway Retail Park Signalised Junction (Junction 2).

2. New Direct Access Point on Dublin Road (R445)

A new direct access is proposed on Dublin Road, designed to operate as a Left-In/Left-Out (LILO) junction arrangement. This access will facilitate left-turn ingress and egress movements only, thereby restricting any right-turn manoeuvres across opposing traffic flows. The LILO arrangement is expected to primarily serve local traffic travelling westbound along Dublin Road, providing a convenient and safe means of access while minimising potential impacts on the operational efficiency and safety of the surrounding road network.

Figure 8-1 highlights the development generated traffic flow movements travelling to/from the proposed development.



Figure 8-1: Development Generated Traffic Flow Movements

Distribution for the masterplan will be similar to the proposed development.

9 Traffic Forecasting

In the absence of any specific local traffic growth information, it was assumed that baseline traffic will continue to grow at the levels recommended by the TII in the Project Appraisal Guidelines (PAG) - Unit 5.3 - Travel Demand Projections publication by the TII (October 2021). The Project Appraisal Guidelines describe three levels of transport model functionality. The static model, which reflects traffic volumes on the basis of link flows, is best suited to the proposed development. Such models do not attempt any route assignment, and hence are applicable for networks where no change in traffic flows will result from a proposed scheme. We have used figures from Table 6.1 'Link-Based Growth Rates' for the Limerick Metropolitan Area.

The year of opening of the scheme was assumed to be 2028. A 15-year analysis period for the scheme would give a design year of 2043. The central growth factors from the Project Appraisal Guidelines - Unit 5.3 publication are appropriate and are detailed below:

- TII Link Based Growth Rates: Annual Growth Factor for 2016-2030 = 1.0174 (LVs) and 1.0329 (HVs).
- TII Link Based Growth Rates: Annual Growth Factor for 2030-2040 = 1.0070 (LVs) and 1.0134 (HVs).
- TII Link Based Growth Rates: Annual Growth Factor for 2040-2050 = 1.0069 (LVs) and 1.0177 (HVs).

With regards to the volume of traffic using the road, generally the passenger car is adopted as the standard unit and other vehicles are assessed in terms of PCU's. Cars and Light Goods Vehicles are grouped together as Light Vehicles (LV). All other Goods Vehicles, Buses and Coaches are defined as Heavy Vehicles (HV).

Estimated future baseline traffic flows on the road network in the vicinity of the proposed development were calculated by applying these factors to the 2025 surveyed flows.

10 Assessment and Road Impact

The impact on the local external road network has been assessed in this TTA. This involved examining the projected traffic flows on the local road network both 'with' and 'without' the proposed development in place. The morning and evening peak periods have been examined in order to assess the busiest case in terms of local traffic on the road network and traffic generated by the proposed development.

10.1 Junction Analysis

The junctions as detailed in previous sections, were each assessed for the proportion of generated development traffic against the existing background traffic. Given the urban environment of the proposed development, it is assumed the congested threshold of the TII document PE-PDV-02045 applies.

Where development-generated traffic represents less than 5% of existing background traffic, it is considered to have no significant impact on junction performance. For the current development proposals, traffic volumes equate to less than 5% of background traffic at Junction 1 (Parkway Roundabout) and Junction 4 (Groody Roundabout). Accordingly, detailed junction capacity modelling is not required, as the anticipated development trips would have minimal effect on these junctions.

However, when assessed in the context of the worst case scenario Overall Masterplan, the traffic generated exceeds the 5% threshold at all four junctions. On this basis, junction capacity modelling was undertaken.

See Tables 10-1 and 10-2 below for the calculated percentage of development trips from the proposed development and overall masterplan development against the existing traffic.

Table 10-1: Proposed Development Traffic versus Existing Background Traffic

Site	Junction	Trips Generated		Background Traffic	Percentage	Modelling Required
Site 1	Parkway Roundabout	AM	66	2,938	2.3%	No
		PM	62	3,020	2.1%	
Site 2	Dublin Road/Parkway Retail Park (Signal-Controlled)	AM	123	2,042	6.0%	Yes
		PM	124	2,178	5.7%	
Site 3	Parkway Retail Park Roundabout	AM	123	457	26.9%	Yes
		PM	124	510	24.3%	
Site 4	Groody Roundabout	AM	56	3,308	1.7%	No
		PM	62	3,477	1.8%	

Table 10-2: Overall Masterplan (Option1) Traffic versus Existing Background Traffic

Site	Junction	Trips Generated		Background Traffic	Percentage	Modelling Required
Site 1	Parkway Roundabout	AM	196	2,938	6.7%	Yes
		PM	193	3,020	6.4%	
Site 2	Dublin Road/Parkway Retail Park (Signal-Controlled)	AM	382	2,042	18.7%	Yes
		PM	379	2,178	17.4%	
Site 3	Parkway Retail Park Roundabout	AM	382	457	83.7%	Yes
		PM	379	510	74.3%	
Site 4	Groody Roundabout	AM	187	3,308	5.6%	Yes
		PM	186	3,477	5.3%	

The masterplan traffic assessment is provided for information purposes only; it is not the subject of this proposed development assessment.

The following development scenarios were analysed with and without both the proposed development and overall masterplan development for the proposed junctions:

1. Survey year: 2025
2. Opening year: 2028
3. Design year: Opening year + 5 years: 2033
4. Design year: Opening year + 15 years: 2043

Junctions 10 software was used for the roundabouts and priority junction analysis. The design threshold for roundabouts and priority-controlled junctions is a Ratio of Flow to Capacity (RFC) of 0.85.

Linsig software was used for the analysis of the signal-controlled junctions. The design threshold for signal-controlled junctions is 90% Degree of Saturation (DOS).

Analysis Note:

The RFC is an indicator of the likely performance of a junction under design year loading. Due to site-to-site variation, there may be a standard error of prediction of the entry capacity by the formulae of + or - 15% for any site. Thus, queuing should not occur in the various turning movements in the chosen design year peak hour in 5 out of 6 peak hour periods or sites if a maximum RFC of about 85% is used. Once the RFC is at 1.0 the Junctions 10 modelling software produces results regarding queues and delays that is unrepresentative of the actual or likely effects.

10.1.2 Signal Controlled Junction Analysis

10.1.2.1 Site 2: Dublin Road/Parkway Retail Park (Signal-Controlled)

The Linsig output is summarised in the table and text following with the full detailed output included in Appendix B. The results shown in Table 10-5 demonstrate the relative performance of the junction when both the proposed development traffic and overall masterplan traffic is compared to the base background traffic analysis.

Table 10-5: Summary of Linsig Analysis Results for the Dublin Road/Parkway Retail Park Signal-Controlled Junction

	Without Development		With Proposed Development		With Overall Masterplan Development	
Peak Hour Flow	Max DOS (%)	Mean Maximum Queue (PCU)	Max DOS (%)	Mean Maximum Queue (PCU)	Max DOS (%)	Mean Maximum Queue (PCU)
AM 2028 Opening Year	55.8	12.8	58.7	13.7	74.0	20.9
AM 2033 Design Year	59.1	13.9	72.9	20.6	78.1	22.8
AM 2043 Design Year	64.4	15.7	81.4	25.8	82.6	26.5
PM 2028 Opening Year	59.1	13.8	62.9	14.7	89.4	29.7
PM 2033 Design Year	62.4	14.9	83.0	26.5	93.5	33.9
PM 2043 Design Year	67.8	17.8	88.4	31.4	99.6	47.2

The design results presented are based on a cycle time of 120 seconds and calling pedestrians every cycle during the peak times. The existing junction can cater for the proposed development and the existing traffic growth up to the Design Year of 2043 where it would reach a Maximum Degree of Saturation (DOS) of approximately 88.4% (90% is the desired capacity for a signalised junction) in the PM Peak. The masterplan development brings the DOS above the design threshold by Design Year 2033 for the PM Peak but this is also considered within the norms of an urban development.

10.1.3 Priority Controlled Junction Analysis

10.1.3.1 Site 1: Parkway Roundabout

The Junctions 10 model was run with a capacity adjustment on each of the roundabout arms to mimic the queuing observed as best possible across the roundabout during peak times. The output for this analysis is summarised below, and the full output is included in greater detail in Appendix B.

Table 10-4: Summary of Junctions 10 Analysis Results for the Parkway Roundabout with Capacity Adjustment

	Without Development		With Proposed Development		With Overall Masterplan Development	
Peak Hour Flow	Max RFC	Mean Maximum Queue (PCU)	Max RFC	Mean Maximum Queue (PCU)	Max RFC	Mean Maximum Queue (PCU)
AM 2028 Opening Year	0.90	7.3	0.92	8.6	0.97	14.7
AM 2033 Design Year	0.97	14.0	0.99	17.2	1.05	30.1
AM 2043 Design Year	1.06	34.8	1.08	40.0	1.14	58.6
PM 2028 Opening Year	0.97	14.5	0.99	17.9	1.03	25.4
PM 2033 Design Year	1.05	30.8	1.07	36.9	1.10	47.2
PM 2043 Design Year	1.15	64.1	1.17	71.2	1.19	80.0

As discussed at the beginning of this section, results shown above an RFC of 1.0 should be read with caution. The results should be viewed more for a comparative assessment of with and without proposed development which is deemed to be low in this case (maximum difference with the proposed development in place of 2% across the AM and PM peak periods for the opening year and design years).

The existing Parkway Roundabout is performing above the applicable threshold in the survey year 2025 (RFC: 0.91 in the PM Peak) without any developed traffic included. It is considered that in urban areas a certain level of congestion is to be expected during peak times.

10.1.3.2 Site 3: Parkway Retail Park Roundabout

The Parkway Retail Park Roundabout output is summarised below, and the full detailed output is included in greater detail in Appendix B.

Table 10-6: Summary of Junctions 10 Analysis Results for the Parkway Retail Park Roundabout

Peak Hour Flow	Without Development		With Proposed Development		With Overall Masterplan Development	
	Max RFC	Mean Maximum Queue (PCU)	Max RFC	Mean Maximum Queue (PCU)	Max RFC	Mean Maximum Queue (PCU)
AM 2028 Opening Year	0.22	0.3	0.23	0.3	0.23	0.3
AM 2033 Design Year	0.24	0.3	0.24	0.3	0.24	0.3
AM 2043 Design Year	0.25	0.3	0.26	0.3	0.26	0.4
PM 2028 Opening Year	0.26	0.4	0.27	0.4	0.28	0.4
PM 2033 Design Year	0.28	0.4	0.28	0.4	0.30	0.4
PM 2043 Design Year	0.30	0.4	0.30	0.4	0.32	0.5

The above analysis predicts that the junction would be operating well within the design threshold with the proposed development in operation during both the AM and PM peak hours across the opening year and design years.

10.1.3.3 Site 4: Groody Roundabout

The Junctions 10 model was run with a capacity adjustment on each of the roundabout arms to mimic the queuing observed as best possible across the roundabout during peak times. The output for this analysis is summarised below, and the full output is included in greater detail in Appendix B.

Table 10-8: Summary of Junctions 10 Analysis Results for the Groody Roundabout with Capacity Adjustment

	Without Development		With Proposed Development		With Overall Masterplan Development	
Peak Hour Flow	Max RFC	Mean Maximum Queue (PCU)	Max RFC	Mean Maximum Queue (PCU)	Max RFC	Mean Maximum Queue (PCU)
AM 2028 Opening Year	0.98	21.1	1.01	30.2	1.02	35.3
AM 2033 Design Year	1.05	49.6	1.08	66.0	1.08	71.9
AM 2043 Design Year	1.13	103.8	1.16	122.6	1.16	127.5
PM 2028 Opening Year	0.94	10.8	0.96	13.3	0.99	20.0
PM 2033 Design Year	1.01	26.1	1.03	32.9	1.07	44.0
PM 2043 Design Year	1.12	67.9	1.13	76.1	1.15	83.7

As discussed at the beginning of this section, results shown above an RFC of 1.0 should be read with caution. The results should be viewed more for a comparative assessment of with and without proposed development which is deemed to be low in this case (maximum difference with the proposed development in place of 3% across the AM and PM peak periods for the opening year and design years).

The existing Groody Roundabout is performing above the applicable threshold in the survey year 2025 (RFC: 0.93 in the AM Peak) without any developed traffic included. It is considered that in urban areas a certain level of congestion is to be expected during peak times.

10.1.4 Analysis Summary

As noted previously the worst-case scenario is presented in the results above by adding the development traffic to the existing peak hour traffic selected from the traffic count survey.

Table 10-9: Summary Results of all Surrounding Junctions

Junction	2043 Without Development RFC/DOS	2043 With Development RFC/DOS
Parkway Roundabout	115%	117%
Dublin Road/Parkway Retail Park (Signal-Controlled)	67%	88%
Parkway Retail Park Roundabout	30%	30%
Groody Roundabout	113%	116%

From the above modelling results we conclude that the surrounding road network and adjacent existing junctions/roundabouts will have little comparable impact on the current operational capacity of the surrounding network of roads and junctions.

11 Construction Stage Traffic

11.1 Construction Phase

The volumes of traffic that will be generated during the construction phase of the proposed development will be small in comparison to the existing traffic volumes.

The construction stage therefore does not require quantitative traffic analysis, however in order to minimise disruption due to construction, wheel washing facilities will be installed at the site access during the construction stage to reduce the amount of dirt and debris carried on to the public roadway during the excavation operations, etc.

11.2 Construction Traffic Management Plan

The successful contractor will be required to prepare a Construction Transport Management Plan (CTMP) prior to the commencement of development and implement the plan for the duration of the works. This will involve consultation with the local authority and/or the Gardaí, and once agreed will be adhered to for all aspects of construction that involves movement of vehicles in and out of the site.

Construction traffic travelling to the site will use either the Parkway Retail Park Roundabout Access Point or the New Direct Access Point on the Dublin Road (R445). The dominant traffic route will be via the Dublin Road. All deliveries shall be provided with instructions/directions on accessing the site from the Dublin Road, and deliveries shall be scheduled outside of peak commuting hours.

Vehicle parking for construction personnel will be accommodated within the development site. To the extent possible, personnel will also be encouraged to use public transport, and information on local transportation will be published on site.

Construction operations on site and deliveries to the site will be in accordance with the Construction and Environmental Management Plan (CEMP).

The preparation of the CTMP will entail an assessment of existing nearby employment, educational, recreational and commercial facilities to establish the peak times for vehicles, cyclists and pedestrians. This information would be used by the contractor to develop the optimum start/finish/delivery times to minimise impact on these existing facilities.

Construction vehicle movements will be minimised through:

- a. Consolidation of delivery loads to/from the site and manage large deliveries on site to occur outside of peak traffic periods;
- b. Use of precast/prefabricated materials where possible;
- c. 'Cut' material generated by the construction works will be re-used on site where possible, through various accommodation works;
- d. Adequate storage space on site will be provided;
- e. A strategy will be developed to minimize construction material quantities as much as possible;

Construction staff vehicle movements will also be minimised by promoting the use of public transport, shared use of vehicles, cycling and walking.

12 Summary and Conclusion

1. The proposed development site is located at Singland Townland, Co. Limerick adjacent to the Parkway Retail Park. The proposed development consists of five blocks accommodating a total of 403 no. residential units, ranging in height from five to eight storeys. In addition, the scheme includes a creche at ground level within Block B, a four-storey medical centre located on the western edge of the site, and all associated site works and infrastructure.
2. Classified turning count traffic surveys were carried out at Parkway Roundabout, Dublin Road/Parkway Retail Park Signalised Intersection, Parkway Retail Park Roundabout and Groody Roundabout. The counts were undertaken by IDASO Ltd on Thursday the 13th March 2025.
3. For the purposes of our assessment, the TRICS database was consulted to provide an equivalent trip rate for the proposed development site.
4. It is planned to access the proposed development via a new site entrance off the Dublin Road (R445) and via the existing Parkway Retail Park Roundabout. The new entrance will operate as a Left-In/Left-Out (LILO) junction arrangement facilitating left-turn ingress and egress movements only.
5. Capacity analysis was carried out on all 4 no. surveyed junctions. The analysis shows that the development will have little comparable impact on the current operational capacity of the surrounding network of roads and junctions.
6. Parking spaces for the proposed development have been provided to meet the requirements set out in the Limerick Development Plan (2022-2028) as well as the Compact Settlement Guidelines and national policy relating to parking provision for residential developments located in sustainable transport locations.
7. Secure cycle parking facilities have been provided within the development to meet the requirements set out in the Limerick Development Plan (2022-2028) and the Compact Settlement Guidelines.

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Appendix A TRICS Data

TRICS 8.25.6

Trip Rate Parameter: DWELLS

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED

Calculation Factor: 1 DWELLS

Count Type: Total Vehicles

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Period	No.Days	Ave.DWELLS	Arrivals	Departures	Totals
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	1	22	0	0	0
07:00-08:00	39	91	0.03	0.108	0.138
08:00-09:00	39	91	0.048	0.138	0.186
09:00-10:00	39	91	0.064	0.069	0.133
10:00-11:00	39	91	0.053	0.066	0.119
11:00-12:00	39	91	0.059	0.068	0.127
12:00-13:00	39	91	0.063	0.071	0.134
13:00-14:00	39	91	0.064	0.069	0.133
14:00-15:00	39	91	0.067	0.061	0.128
15:00-16:00	39	91	0.088	0.064	0.152
16:00-17:00	39	91	0.089	0.06	0.149
17:00-18:00	39	91	0.116	0.067	0.183
18:00-19:00	39	91	0.094	0.064	0.158
19:00-20:00	15	112	0.079	0.043	0.122
20:00-21:00	15	112	0.048	0.029	0.077
21:00-22:00					
22:00-23:00					
23:00-00:00					
Daily Trip Rates:			0.962	0.977	1.939

TRICS 7.11.4

Trip Rate Parameter: Gross floor area

TRIP RATE for Land Use 04 - EDUCATION/D - NURSERY

Calculation Factor: 100 sqm

Count Type: TOTAL VEHICLES

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Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	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	1	450	0.444	1	450	0	1	450	0.444
07:00-08:00	13	691	2.072	13	691	1.036	13	691	3.108
08:00-09:00	13	691	2.562	13	691	2.194	13	691	4.756
09:00-10:00	13	691	0.735	13	691	0.624	13	691	1.359
10:00-11:00	13	691	0.267	13	691	0.167	13	691	0.434
11:00-12:00	13	691	0.245	13	691	0.245	13	691	0.49
12:00-13:00	13	691	1.281	13	691	1.147	13	691	2.428
13:00-14:00	13	691	0.813	13	691	1.17	13	691	1.983
14:00-15:00	13	691	0.234	13	691	0.278	13	691	0.512
15:00-16:00	13	691	0.546	13	691	0.624	13	691	1.17
16:00-17:00	13	691	1.125	13	691	1.303	13	691	2.428
17:00-18:00	13	691	1.894	13	691	2.45	13	691	4.344
18:00-19:00	13	691	0.123	13	691	0.501	13	691	0.624
19:00-20:00	1	450	0.222	1	450	2.222	1	450	2.444
20:00-21:00	1	450	0	1	450	0	1	450	0
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			12.563			13.961			26.524

TRICS 7.11.4

Trip Rate Parameter: Gross floor area

TRIP RATE for Land Use 05 - HEALTH/K - NHS WALK-IN CENTRE

Calculation Factor: 100 sqm

Count Type: TOTAL VEHICLES

RECEIVED: 28/05/2026

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	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	2	4731	0.201	2	4731	0.106	2	4731	0.307
08:00-09:00	2	4731	0.666	2	4731	0.275	2	4731	0.941
09:00-10:00	2	4731	0.613	2	4731	0.38	2	4731	0.993
10:00-11:00	2	4731	0.423	2	4731	0.56	2	4731	0.983
11:00-12:00	2	4731	0.486	2	4731	0.581	2	4731	1.067
12:00-13:00	2	4731	0.518	2	4731	0.465	2	4731	0.983
13:00-14:00	2	4731	0.666	2	4731	0.497	2	4731	1.163
14:00-15:00	2	4731	0.56	2	4731	0.55	2	4731	1.11
15:00-16:00	2	4731	0.412	2	4731	0.528	2	4731	0.94
16:00-17:00	2	4731	0.571	2	4731	0.624	2	4731	1.195
17:00-18:00	2	4731	0.285	2	4731	0.571	2	4731	0.856
18:00-19:00	2	4731	0.201	2	4731	0.264	2	4731	0.465
19:00-20:00	1	2350	0.468	1	2350	0.681	1	2350	1.149
20:00-21:00	1	2350	0.34	1	2350	0.213	1	2350	0.553
21:00-22:00									
22:00-23:00									
23:00-24:00									
Daily Trip Rates:			6.41			6.295			12.705

TRICS 7.11.4

Trip Rate Parameter: Gross floor area

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE

Calculation Factor: 100 sqm

Count Type: TOTAL VEHICLES

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Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-00:30									
00:30-01:00									
01:00-01:30									
01:30-02:00									
02:00-02:30									
02:30-03:00									
03:00-03:30									
03:30-04:00									
04:00-04:30									
04:30-05:00									
05:00-05:30									
05:30-06:00									
06:00-06:30	1	114000	0.145	1	114000	0.02	1	114000	0.165
06:30-07:00	1	114000	0.216	1	114000	0.035	1	114000	0.251
07:00-07:30	7	20694	0.195	7	20694	0.035	7	20694	0.23
07:30-08:00	7	20694	0.341	7	20694	0.036	7	20694	0.377
08:00-08:30	7	20694	0.372	7	20694	0.041	7	20694	0.413
08:30-09:00	8	18851	0.467	8	18851	0.059	8	18851	0.526
09:00-09:30	8	18851	0.332	8	18851	0.056	8	18851	0.388
09:30-10:00	8	18851	0.243	8	18851	0.055	8	18851	0.298
10:00-10:30	8	18851	0.107	8	18851	0.05	8	18851	0.157
10:30-11:00	8	18851	0.076	8	18851	0.042	8	18851	0.118
11:00-11:30	8	18851	0.057	8	18851	0.032	8	18851	0.089
11:30-12:00	8	18851	0.066	8	18851	0.042	8	18851	0.108
12:00-12:30	8	18851	0.068	8	18851	0.101	8	18851	0.169
12:30-13:00	8	18851	0.078	8	18851	0.068	8	18851	0.146
13:00-13:30	8	18851	0.068	8	18851	0.076	8	18851	0.144
13:30-14:00	8	18851	0.073	8	18851	0.068	8	18851	0.141
14:00-14:30	8	18851	0.044	8	18851	0.064	8	18851	0.108
14:30-15:00	8	18851	0.047	8	18851	0.069	8	18851	0.116
15:00-15:30	8	18851	0.036	8	18851	0.107	8	18851	0.143
15:30-16:00	8	18851	0.037	8	18851	0.114	8	18851	0.151
16:00-16:30	8	18851	0.044	8	18851	0.261	8	18851	0.305
16:30-17:00	8	18851	0.046	8	18851	0.259	8	18851	0.305
17:00-17:30	8	18851	0.04	8	18851	0.428	8	18851	0.468
17:30-18:00	8	18851	0.04	8	18851	0.422	8	18851	0.462
18:00-18:30	8	18851	0.03	8	18851	0.263	8	18851	0.293
18:30-19:00	8	18851	0.037	8	18851	0.156	8	18851	0.193
19:00-19:30	1	114000	0.028	1	114000	0.123	1	114000	0.151
19:30-20:00	1	114000	0.021	1	114000	0.116	1	114000	0.137
20:00-20:30	1	114000	0.022	1	114000	0.061	1	114000	0.083
20:30-21:00	1	114000	0.016	1	114000	0.032	1	114000	0.048
21:00-21:30	1	114000	0.032	1	114000	0.041	1	114000	0.073
21:30-22:00	1	114000	0.018	1	114000	0.034	1	114000	0.052
22:00-22:30									
22:30-23:00									
23:00-23:30									
23:30-24:00									
Daily Trip Rates:			3.442			3.366			6.808

TRICS 7.11.4

Trip Rate Parameter:

Gross floor area

TRIP RATE for Land Use 06 - HOTEL FOOD & DRINK/A - HOTELS

Calculation Factor: 100 sqm

Count Type: TOTAL VEHICLES

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	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	9	9155	0.12	9	9155	0.215	9	9155	0.335
08:00-09:00	9	9155	0.248	9	9155	0.283	9	9155	0.531
09:00-10:00	9	9155	0.313	9	9155	0.272	9	9155	0.585
10:00-11:00	9	9155	0.231	9	9155	0.238	9	9155	0.469
11:00-12:00	9	9155	0.165	9	9155	0.237	9	9155	0.402
12:00-13:00	9	9155	0.208	9	9155	0.197	9	9155	0.405
13:00-14:00	9	9155	0.252	9	9155	0.182	9	9155	0.434
14:00-15:00	9	9155	0.286	9	9155	0.256	9	9155	0.542
15:00-16:00	9	9155	0.25	9	9155	0.205	9	9155	0.455
16:00-17:00	9	9155	0.218	9	9155	0.237	9	9155	0.455
17:00-18:00	9	9155	0.235	9	9155	0.227	9	9155	0.462
18:00-19:00	9	9155	0.235	9	9155	0.217	9	9155	0.452
19:00-20:00	9	9155	0.141	9	9155	0.148	9	9155	0.289
20:00-21:00	9	9155	0.13	9	9155	0.113	9	9155	0.243
21:00-22:00	9	9155	0.129	9	9155	0.11	9	9155	0.239
22:00-23:00	2	8211	0.018	2	8211	0.024	2	8211	0.042
23:00-24:00	1	7244	0.014	1	7244	0	1	7244	0.014
Daily Trip Rates:			3.193			3.161			6.354

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Appendix B Modelling Results

Junctions 10
ARCADY 10 - Roundabout Module
Version: 10.1.1.1905 © Copyright TRL Software Limited, 2023
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Filename: Junction Site 1 - Existing Parkway Roundabout with Capacity Adjustment (Do Nothing & Development Scenarios).j10
Path: I:\DWGS\231\151-200\231171\3.0 Calculations\1. Civils\231171-PUNCH-XX-XX-CA-C-0001_TTA\Junction Modelling
Report generation date: 03/11/2025 21:42:09

- »Parkway Roundabout - 2025 'Do Nothing' Baseline, AM
- »Parkway Roundabout - 2025 'Do Nothing' Baseline, PM
- »Parkway Roundabout - 2028 'Do Nothing', AM
- »Parkway Roundabout - 2028 'Do Nothing', PM
- »Parkway Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), AM
- »Parkway Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), PM
- »Parkway Roundabout - 2028 Opening Year (Overall Masterplan Development), AM
- »Parkway Roundabout - 2028 Opening Year (Overall Masterplan Development), PM
- »Parkway Roundabout - 2033 'Do Nothing', AM
- »Parkway Roundabout - 2033 'Do Nothing', PM
- »Parkway Roundabout - 2033 Opening Year (Residential, Creche & Medical Centre), AM
- »Parkway Roundabout - 2033 Opening Year (Residential, Creche & Medical Centre), PM
- »Parkway Roundabout - 2033 Opening Year (Overall Masterplan Development), AM
- »Parkway Roundabout - 2033 Opening Year (Overall Masterplan Development), PM
- »Parkway Roundabout - 2043 'Do Nothing', AM
- »Parkway Roundabout - 2043 'Do Nothing', PM
- »Parkway Roundabout - 2043 Opening Year (Residential, Creche & Medical Centre), AM
- »Parkway Roundabout - 2043 Opening Year (Residential, Creche & Medical Centre), PM
- »Parkway Roundabout - 2043 Opening Year (Overall Masterplan Development), AM
- »Parkway Roundabout - 2043 Opening Year (Overall Masterplan Development), PM

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Summary of junction performance

AM										PM								
	Set ID	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Set ID	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
	Parkway Roundabout - 2025 'Do Nothing' Baseline																	
Arm 1	D1	0.2	0.6	4.63	0.19	A	17.56	C	3 % [Arm 3]	D2	0.3	1.0	4.72	0.21	A	21.36	C	-2 % [Arm 3]
Arm 2		3.1	15.0	17.27	0.76	C					3.2	15.6	17.42	0.77	C			
Arm 3		4.9	25.1	27.56	0.84	D					8.0	43.3	42.41	0.91	E			
Arm 4		0.6	2.9	5.47	0.39	A					0.7	3.0	5.91	0.42	A			
Arm 5		4.6	23.5	18.79	0.83	C					4.9	24.8	20.14	0.84	C			
	Parkway Roundabout - 2028 'Do Nothing'																	
Arm 1	D3	0.3	1.1	4.89	0.21	A	23.86	C	-2 % [Arm 3]	D4	0.3	1.2	5.00	0.22	A	31.57	D	-7 % [Arm 3]
Arm 2		4.0	20.7	21.63	0.81	C					4.2	21.6	22.06	0.82	C			
Arm 3		7.3	39.8	39.85	0.90	E					14.5	60.9	70.76	0.97	F			
Arm 4		0.7	3.0	5.90	0.43	A					0.8	3.0	6.42	0.46	A			
Arm 5		6.8	36.5	26.90	0.88	D					7.3	40.0	29.19	0.89	D			
	Parkway Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre)																	
Arm 1	D5	0.3	1.1	4.96	0.21	A	27.57	D	-3 % [Arm 3]	D6	0.3	1.2	5.10	0.23	A	36.98	E	-9 % [Arm 3]
Arm 2		5.1	25.5	26.19	0.85	D					4.8	24.2	24.71	0.84	C			
Arm 3		8.6	45.2	46.42	0.92	E					17.9	65.7	84.13	0.99	F			
Arm 4		0.8	3.0	6.06	0.43	A					0.9	3.0	6.60	0.47	A			
Arm 5		7.6	41.7	29.92	0.90	D					8.9	48.7	35.15	0.92	E			
	Parkway Roundabout - 2028 Opening Year (Overall Masterplan Development)																	
Arm 1	D7	0.3	1.2	5.28	0.22	A	42.29	E	-8 % [Arm 3]	D8	0.3	1.3	5.14	0.23	A	51.15	F	-11 % [Arm 3]
Arm 2		5.8	30.9	29.37	0.87	D					9.9	51.2	46.55	0.93	E			
Arm 3		14.7	60.8	72.95	0.97	F					25.4	73.6	113.18	1.03	F			
Arm 4		0.8	3.0	6.45	0.46	A					0.9	3.0	6.94	0.48	A			
Arm 5		15.9	70.0	57.82	0.97	F					10.0	53.3	38.82	0.93	E			
	Parkway Roundabout - 2033 'Do Nothing'																	
Arm 1	D9	0.3	1.3	5.20	0.23	A	38.01	E	-7 % [Arm 3]	D10	0.3	1.3	5.30	0.24	A	53.11	F	-12 % [Arm 3]
Arm 2		5.8	31.2	29.94	0.87	D					6.1	33.2	30.87	0.87	D			
Arm 3		14.0	59.4	70.17	0.97	F					30.8	79.5	130.23	1.05	F			
Arm 4		0.8	3.0	6.43	0.46	A					1.0	2.9	7.00	0.49	A			
Arm 5		11.9	60.3	44.94	0.95	E					13.2	64.0	49.83	0.96	E			
	Parkway Roundabout - 2033 Opening Year (Residential, Creche & Medical Centre)																	
Arm 1	D11	0.3	1.3	5.26	0.23	A	45.28	E	-9 % [Arm 3]	D12	0.3	1.4	5.39	0.25	A	62.48	F	-14 % [Arm 3]
Arm 2		7.7	42.3	38.62	0.90	E					7.2	39.4	35.64	0.89	E			
Arm 3		17.2	64.2	83.49	0.99	F					36.9	85.4	151.25	1.07	F			
Arm 4		0.9	3.0	6.61	0.47	A					1.0	2.8	7.16	0.50	A			
Arm 5		13.8	65.3	50.99	0.96	F					17.1	72.1	61.80	0.98	F			
	Parkway Roundabout - 2033 Opening Year (Overall Masterplan Development)																	
Arm 1	D13	0.3	1.3	5.51	0.24	A	71.34	F	-12 % [Arm 3]	D14	0.3	1.4	5.42	0.25	A	85.73	F	-16 % [Arm 3]
Arm 2		8.9	47.3	43.45	0.92	E					18.0	68.4	77.29	0.99	F			
Arm 3		30.1	78.2	129.74	1.05	F					47.2	95.1	189.81	1.10	F			
Arm 4		1.0	2.9	7.00	0.49	A					1.0	2.7	7.45	0.51	A			
Arm 5		32.1	89.7	102.05	1.03	F					19.4	75.7	68.45	0.99	F			
	Parkway Roundabout - 2043 'Do Nothing'																	
Arm 1	D15	0.3	1.4	5.55	0.25	A	76.53	F	-13 % [Arm 3]	D16	0.4	1.0	5.63	0.27	A	102.64	F	-18 % [Arm 3]
Arm 2		10.9	54.1	52.88	0.94	F					11.7	56.6	55.27	0.95	F			
Arm 3		34.8	82.7	146.75	1.06	F					64.1	112.6	252.78	1.15	F			
Arm 4		1.0	2.8	7.19	0.51	A					1.1	2.5	7.76	0.53	A			
Arm 5		30.9	88.9	98.65	1.03	F					32.8	90.5	104.32	1.03	F			
	Parkway Roundabout - 2043 Opening Year (Residential, Creche & Medical Centre)																	
Arm 1	D17	0.3	1.4	5.58	0.26	A	89.98	F	-15 % [Arm 3]	D18	0.4	1.1	5.69	0.27	A	120.96	F	-19 % [Arm 3]
Arm 2		16.1	65.1	72.47	0.98	F					14.3	62.4	65.04	0.97	F			
Arm 3		40.0	87.7	165.82	1.08	F					71.2	119.9	294.83	1.17	F			
Arm 4		1.0	2.7	7.35	0.51	A					1.2	2.4	7.93	0.54	A			
Arm 5		35.5	93.3	110.26	1.04	F					41.6	99.1	126.54	1.05	F			
	Parkway Roundabout - 2043 Opening Year (Overall Masterplan Development)																	
Arm 1	D19	0.4	1.5	5.73	0.26	A	130.45	F	-18 % [Arm 3]	D20	0.4	1.2	5.71	0.27	A	165.25	F	-21 % [Arm 3]
Arm 2		18.3	68.6	80.10	0.99	F					38.1	89.8	141.67	1.06	F			
Arm 3		58.6	106.7	236.37	1.14	F					80.0	129.7	374.20	1.19	F			
Arm 4		1.1	2.5	7.74	0.53	A					1.2	2.2	8.16	0.55	A			
Arm 5		66.9	124.3	190.00	1.11	F					46.5	104.0	138.71	1.06	F			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

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

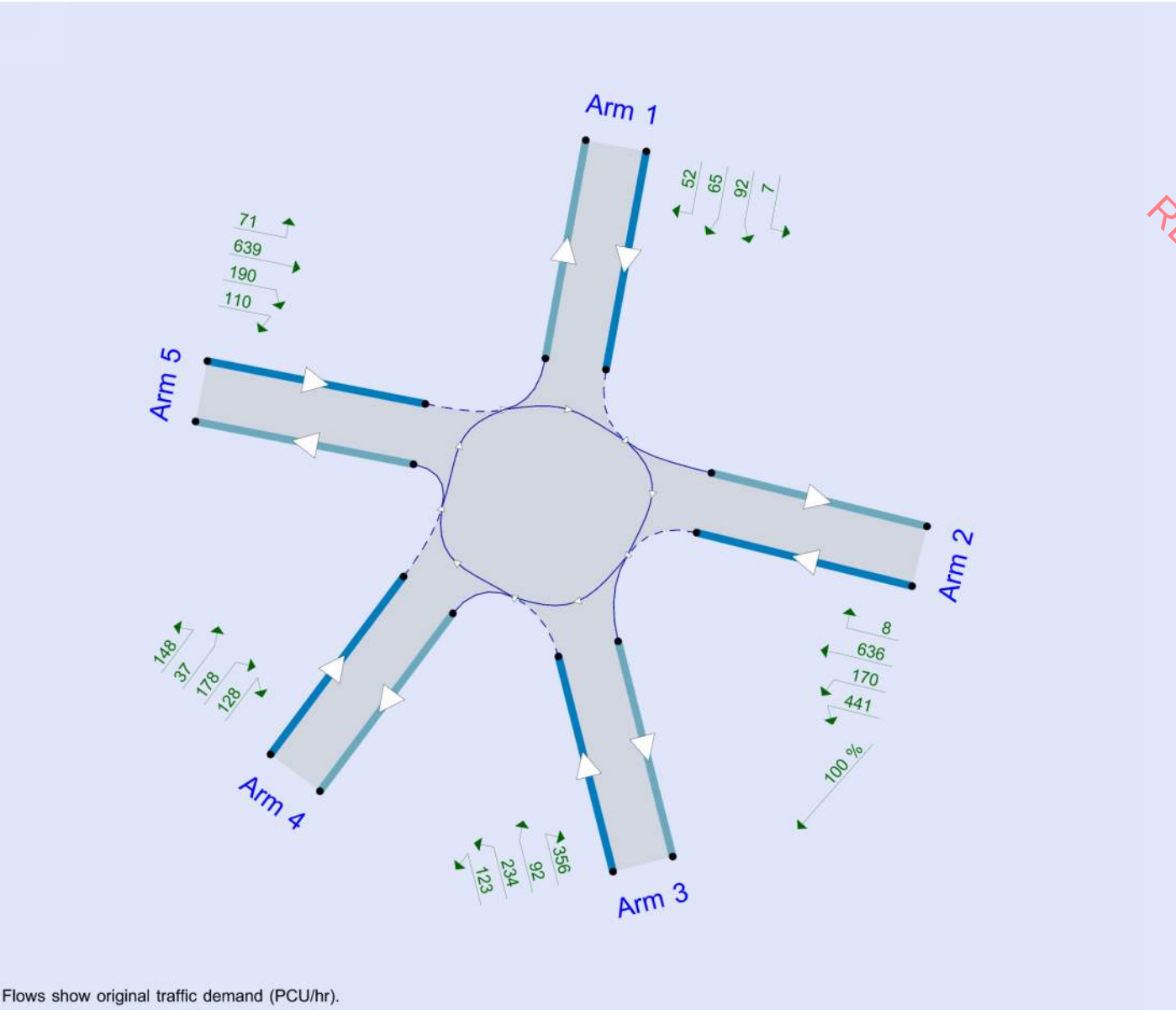
File summary

File Description

Title	Parkway Roundabout with Capacity Adjustment
Location	Limerick
Site number	01
Date	07/10/2025
Version	
Status	
Identifier	
Client	
Jobnumber	231171
Enumerator	MPPNETAMcCarthy
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

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use simulation for HCM roundabouts	Use iterations for HCM roundabouts
5.75	✓				✓	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)	Run automatically
D1	2025 'Do Nothing' Baseline	AM	ONE HOUR	10:45	12:15	15	✓
D2	2025 'Do Nothing' Baseline	PM	ONE HOUR	12:00	13:30	15	✓
D3	2028 'Do Nothing'	AM	ONE HOUR	10:45	12:15	15	✓
D4	2028 'Do Nothing'	PM	ONE HOUR	12:00	13:30	15	✓
D5	2028 Opening Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	10:45	12:15	15	✓
D6	2028 Opening Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	12:00	13:30	15	✓
D7	2028 Opening Year (Overall Masterplan Development)	AM	ONE HOUR	10:45	12:15	15	✓
D8	2028 Opening Year (Overall Masterplan Development)	PM	ONE HOUR	12:00	13:30	15	✓
D9	2033 'Do Nothing'	AM	ONE HOUR	10:45	12:15	15	✓
D10	2033 'Do Nothing'	PM	ONE HOUR	12:00	13:30	15	✓
D11	2033 Opening Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	10:45	12:15	15	✓
D12	2033 Opening Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	12:00	13:30	15	✓
D13	2033 Opening Year (Overall Masterplan Development)	AM	ONE HOUR	10:45	12:15	15	✓
D14	2033 Opening Year (Overall Masterplan Development)	PM	ONE HOUR	12:00	13:30	15	✓
D15	2043 'Do Nothing'	AM	ONE HOUR	10:45	12:15	15	✓
D16	2043 'Do Nothing'	PM	ONE HOUR	12:00	13:30	15	✓
D17	2043 Opening Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	10:45	12:15	15	✓
D18	2043 Opening Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	12:00	13:30	15	✓
D19	2043 Opening Year (Overall Masterplan Development)	AM	ONE HOUR	10:45	12:15	15	✓
D20	2043 Opening Year (Overall Masterplan Development)	PM	ONE HOUR	12:00	13:30	15	✓

Analysis Set Details

ID	Name	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	Parkway Roundabout	✓	100.000	100.000

Parkway Roundabout - 2025 'Do Nothing' Baseline, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	17.56	C

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	3	Arm 3	17.56	C

Arms

Arms

Arm	Name	Description	No give-way line
1	Bothar Bhaile Atha Cliath		
2	Dublin Road (East)		
3	Childers Road		
4	Parkway Shopping Centre		
5	Dublin Road (West)		

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Entry only	Exit only
1	8.40	8.40	0.0	9.0	60.0	0.0		
2	7.80	9.00	30.0	31.0	60.0	0.0		
3	7.70	9.20	24.0	25.0	60.0	0.0		
4	7.10	8.40	13.0	14.0	60.0	0.0		
5	5.60	7.50	25.0	11.0	60.0	0.0		

Bypass

Arm	Arm has bypass	Bypass utilisation (%)
1		
2	✓	100
3		
4		
5		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.735	2658
2	0.816	3012
3	0.816	3021
4	0.744	2653
5	0.678	2298

The slope and intercept shown above include any corrections and adjustments.

Arm Capacity Adjustments

Arm	Type	Reason	Percentage capacity adjustment (%)
1	Percentage	Observed queuing on arm	60.00
2	Percentage	Observed queuing on arm	35.00
3	Percentage	Observed queuing on arm	35.00
4	Percentage	Observed queuing on arm	60.00
5	Percentage	Observed queuing on arm	60.00

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)	Run automatically
D1	2025 'Do Nothing' Baseline	AM	ONE HOUR	10:45	12:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	168	100.000
2		ONE HOUR	✓	943	100.000
3		ONE HOUR	✓	612	100.000
4		ONE HOUR	✓	389	100.000
5		ONE HOUR	✓	829	100.000

Origin-Destination Data

Demand (PCU/hr)

		To					
From		1	2	3	4	5	
	1	0	8	69	23	68	
	2	9	9	337	129	459	
	3	34	304	1	128	145	
	4	29	123	113	0	124	
	5	75	455	176	121	2	

Proportions

		To					
From		1	2	3	4	5	
	1	0.00	0.05	0.41	0.14	0.40	
	2	0.01	0.01	0.36	0.14	0.49	
	3	0.06	0.50	0.00	0.21	0.24	
	4	0.07	0.32	0.29	0.00	0.32	
	5	0.09	0.55	0.21	0.15	0.00	

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

	To					
		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh

	To					
		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
10:45-11:00	1	126	126
	2	710	710
	3	461	461
	4	293	293
	5	624	624
11:00-11:15	1	151	151
	2	848	848
	3	550	550
	4	350	350
	5	745	745
11:15-11:30	1	185	185
	2	1038	1038
	3	674	674
	4	428	428
	5	913	913
11:30-11:45	1	185	185
	2	1038	1038
	3	674	674
	4	428	428
	5	913	913
11:45-12:00	1	151	151
	2	848	848
	3	550	550
	4	350	350
	5	745	745
12:00-12:15	1	126	126
	2	710	710
	3	461	461
	4	293	293
	5	624	624

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.19	4.63	0.2	0.6	A	154	231
2	0.76	17.27	3.1	15.0	C	865	834
3	0.84	27.56	4.9	25.1	D	562	842
4	0.39	5.47	0.6	2.9	A	357	535
5	0.83	18.79	4.6	23.5	C	761	1141

Main Results for each time segment

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	126	126	32	0	0	975	1165	0.109	126	110	0.0	0.1	3.462	A
2	710	456	114	254	0	429	932	0.490	452	672	0.0	0.9	7.456	A
3	461	461	115	0	254	613	882	0.522	456	269	0.0	1.1	8.372	A
4	293	293	73	0	0	770	1248	0.235	292	299	0.0	0.3	3.757	A
5	624	624	156	0	0	465	1190	0.524	620	596	0.0	1.1	6.266	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1168	1080	0.140	151	132	0.1	0.2	3.875	A
2	848	545	136	303	0	514	907	0.600	543	805	0.9	1.5	9.813	A
3	550	550	138	0	303	735	847	0.649	547	322	1.1	1.8	11.878	B
4	350	350	87	0	0	923	1180	0.296	349	359	0.3	0.4	4.331	A
5	745	745	186	0	0	557	1152	0.647	742	715	1.1	1.8	8.721	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	185	185	46	0	0	1420	969	0.191	185	160	0.2	0.2	4.591	A
2	1038	667	167	371	0	627	875	0.762	661	978	1.5	3.0	16.361	C
3	674	674	168	0	371	895	802	0.841	663	393	1.8	4.5	24.211	C
4	428	428	107	0	0	1122	1091	0.392	427	436	0.4	0.6	5.416	A
5	913	913	228	0	0	678	1103	0.827	903	871	1.8	4.3	17.116	C

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11:30 - 11:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	185	185	46	0	0	1434	963	0.192	185	162	0.2	0.2	4.628	A
2	1038	667	167	371	0	631	874	0.763	667	989	3.0	3.1	17.269	C
3	674	674	168	0	371	902	800	0.843	672	395	4.5	4.9	27.564	D
4	428	428	107	0	0	1134	1086	0.394	428	441	0.6	0.6	5.473	A
5	913	913	228	0	0	684	1101	0.829	912	878	4.3	4.6	18.792	C

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1188	1071	0.141	151	134	0.2	0.2	3.917	A
2	848	545	136	303	0	520	906	0.601	551	820	3.1	1.5	10.318	B
3	550	550	138	0	303	745	844	0.651	562	325	4.9	1.9	13.232	B
4	350	350	87	0	0	941	1172	0.298	351	366	0.6	0.4	4.387	A
5	745	745	186	0	0	566	1149	0.649	756	725	4.6	1.9	9.401	A

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	126	126	32	0	0	986	1160	0.109	127	111	0.2	0.1	3.483	A
2	710	456	114	254	0	433	931	0.490	459	680	1.5	1.0	7.662	A
3	461	461	115	0	254	620	880	0.523	464	271	1.9	1.1	8.719	A
4	293	293	73	0	0	781	1244	0.236	293	304	0.4	0.3	3.789	A
5	624	624	156	0	0	470	1188	0.525	627	604	1.9	1.1	6.457	A

Queue Variation Results for each time segment

10:45 - 11:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.12	0.00	0.00	0.12	0.12			N/A	N/A
2	0.94	0.55	1.00	1.40	1.45			N/A	N/A
3	1.07	0.55	1.00	1.40	1.45			N/A	N/A
4	0.30	0.00	0.00	0.30	0.30			N/A	N/A
5	1.09	0.55	1.00	1.40	1.45			N/A	N/A

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.16	0.00	0.00	0.16	0.16			N/A	N/A
2	1.46	0.07	0.96	3.19	4.50			N/A	N/A
3	1.79	0.06	0.95	4.30	6.22			N/A	N/A
4	0.42	0.00	0.00	0.42	0.42			N/A	N/A
5	1.78	0.06	0.73	4.52	6.79			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.23	0.03	0.25	0.46	0.48			N/A	N/A
2	2.99	0.03	0.31	4.45	15.01			N/A	N/A
3	4.52	0.04	0.40	11.92	24.27			N/A	N/A
4	0.64	0.03	0.25	0.64	0.64			N/A	N/A
5	4.32	0.03	0.35	9.22	23.45			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.24	0.03	0.26	0.48	0.60			N/A	N/A
2	3.10	0.03	0.29	3.10	10.14			N/A	N/A
3	4.89	0.03	0.32	7.75	25.06			N/A	N/A
4	0.65	0.03	0.29	1.26	2.92			N/A	N/A
5	4.57	0.03	0.30	4.57	19.11			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.17	0.00	0.00	0.17	0.17			N/A	N/A
2	1.55	0.05	0.55	3.89	5.95			N/A	N/A
3	1.94	0.04	0.43	5.26	8.93			N/A	N/A
4	0.43	0.00	0.00	0.43	0.43			N/A	N/A
5	1.90	0.05	0.47	5.07	8.27			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.12	0.00	0.00	0.12	0.12			N/A	N/A
2	0.98	0.04	0.37	2.43	4.31			N/A	N/A
3	1.12	0.03	0.33	2.47	5.65			N/A	N/A
4	0.31	0.00	0.00	0.31	0.31			N/A	N/A
5	1.12	0.03	0.34	2.67	5.57			N/A	N/A

Parkway Roundabout - 2025 'Do Nothing' Baseline, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	21.36	C

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-2	Arm 3	21.36	C

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)	Run automatically
D2	2025 'Do Nothing' Baseline	PM	ONE HOUR	12:00	13:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	179	100.000
2		ONE HOUR	✓	947	100.000
3		ONE HOUR	✓	663	100.000
4		ONE HOUR	✓	405	100.000
5		ONE HOUR	✓	826	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
		1	2	3	4	5
	1	0	5	77	54	43
	2	6	10	329	127	475
	3	78	285	1	103	196
	4	31	143	107	0	124
	5	59	512	160	92	3

Proportions

	To					
		1	2	3	4	5
	1	0.00	0.03	0.43	0.30	0.24
	2	0.01	0.01	0.35	0.13	0.50
	3	0.12	0.43	0.00	0.16	0.30
	4	0.08	0.35	0.26	0.00	0.31
	5	0.07	0.62	0.19	0.11	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

	To					
		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh

	To					
		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
12:00-12:15	1	135	135
	2	713	713
	3	499	499
	4	305	305
	5	622	622
12:15-12:30	1	161	161
	2	851	851
	3	596	596
	4	364	364
	5	743	743
12:30-12:45	1	197	197
	2	1043	1043
	3	730	730
	4	446	446
	5	909	909
12:45-13:00	1	197	197
	2	1043	1043
	3	730	730
	4	446	446
	5	909	909
13:00-13:15	1	161	161
	2	851	851
	3	596	596
	4	364	364
	5	743	743
13:15-13:30	1	135	135
	2	713	713
	3	499	499
	4	305	305
	5	622	622

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.21	4.72	0.3	1.0	A	164	246
2	0.77	17.42	3.2	15.6	C	869	851
3	0.91	42.41	8.0	43.3	E	608	913
4	0.42	5.91	0.7	3.0	A	372	557
5	0.84	20.14	4.9	24.8	C	758	1137

Main Results for each time segment

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	135	135	34	0	0	981	1162	0.116	134	130	0.0	0.1	3.500	A
2	713	465	116	248	0	402	939	0.495	461	714	0.0	1.0	7.474	A
3	499	499	125	0	248	605	884	0.564	494	258	0.0	1.3	9.109	A
4	305	305	76	0	0	818	1227	0.249	304	281	0.0	0.3	3.894	A
5	622	622	155	0	0	494	1178	0.528	617	628	0.0	1.1	6.371	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	161	161	40	0	0	1176	1077	0.149	161	156	0.1	0.2	3.931	A
2	851	556	139	296	0	482	917	0.606	553	855	1.0	1.5	9.854	A
3	596	596	149	0	296	726	850	0.701	592	309	1.3	2.2	13.746	B
4	364	364	91	0	0	981	1154	0.316	364	337	0.3	0.5	4.551	A
5	743	743	186	0	0	592	1138	0.652	740	753	1.1	1.8	8.961	A

12:30 - 12:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	197	197	49	0	0	1427	966	0.204	197	188	0.2	0.3	4.678	A
2	1043	680	170	362	0	587	886	0.768	674	1036	1.5	3.1	16.481	C
3	730	730	182	0	362	884	805	0.907	711	377	2.2	6.9	33.224	D
4	446	446	111	0	0	1187	1062	0.420	445	408	0.5	0.7	5.822	A
5	909	909	227	0	0	717	1088	0.836	899	915	1.8	4.6	18.061	C

12:45 - 13:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	197	197	49	0	0	1443	959	0.206	197	191	0.3	0.3	4.725	A
2	1043	680	170	362	0	591	885	0.769	680	1049	3.1	3.2	17.420	C
3	730	730	182	0	362	891	803	0.909	726	380	6.9	8.0	42.414	E
4	446	446	111	0	0	1204	1055	0.423	446	413	0.7	0.7	5.913	A
5	909	909	227	0	0	725	1084	0.839	908	924	4.6	4.9	20.140	C

13:00 - 13:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	161	161	40	0	0	1201	1065	0.151	161	160	0.3	0.2	3.984	A
2	851	556	139	296	0	487	915	0.607	562	876	3.2	1.6	10.373	B
3	596	596	149	0	296	736	847	0.704	618	313	8.0	2.5	17.063	C
4	364	364	91	0	0	1010	1141	0.319	365	344	0.7	0.5	4.644	A
5	743	743	186	0	0	607	1132	0.656	754	768	4.9	2.0	9.799	A

13:15 - 13:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	135	135	34	0	0	994	1157	0.117	135	132	0.2	0.1	3.525	A
2	713	465	116	248	0	406	938	0.496	468	723	1.6	1.0	7.687	A
3	499	499	125	0	248	613	882	0.566	504	261	2.5	1.3	9.624	A
4	305	305	76	0	0	832	1221	0.250	305	285	0.5	0.3	3.935	A
5	622	622	155	0	0	501	1175	0.529	625	637	2.0	1.1	6.581	A

Queue Variation Results for each time segment

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.13	0.00	0.00	0.13	0.13			N/A	N/A
2	0.97	0.55	1.00	1.40	1.45			N/A	N/A
3	1.27	0.56	1.13	1.53	1.77			N/A	N/A
4	0.33	0.00	0.00	0.33	0.33			N/A	N/A
5	1.10	0.55	1.00	1.40	1.45			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.17	0.00	0.00	0.17	0.17			N/A	N/A
2	1.50	0.07	0.96	3.32	4.67			N/A	N/A
3	2.24	0.06	1.00	5.70	8.43			N/A	N/A
4	0.46	0.00	0.00	0.46	0.46			N/A	N/A
5	1.83	0.06	0.73	4.65	6.98			N/A	N/A

12:30 - 12:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.25	0.03	0.25	0.46	0.48			N/A	N/A
2	3.07	0.03	0.32	4.75	15.59			N/A	N/A
3	6.95	0.06	1.23	20.08	32.67			N/A	N/A
4	0.72	0.03	0.25	0.72	0.72			N/A	N/A
5	4.55	0.04	0.36	10.40	24.80			N/A	N/A

12:45 - 13:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.26	0.03	0.28	0.56	1.03			N/A	N/A
2	3.19	0.03	0.29	3.19	10.61			N/A	N/A
3	8.02	0.04	0.43	21.91	43.33			N/A	N/A
4	0.73	0.03	0.29	1.08	3.02			N/A	N/A
5	4.86	0.03	0.30	4.86	21.76			N/A	N/A

13:00 - 13:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.18	0.00	0.00	0.18	0.18			N/A	N/A
2	1.59	0.05	0.53	4.00	6.21			N/A	N/A
3	2.50	0.04	0.41	6.81	12.49			N/A	N/A
4	0.47	0.00	0.00	0.47	0.47			N/A	N/A
5	1.96	0.05	0.46	5.29	8.68			N/A	N/A

13:15 - 13:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.13	0.00	0.00	0.13	0.13			N/A	N/A
2	1.00	0.04	0.37	2.49	4.46			N/A	N/A
3	1.33	0.03	0.31	2.30	6.79			N/A	N/A
4	0.33	0.00	0.00	0.33	0.33			N/A	N/A
5	1.14	0.03	0.34	2.65	5.72			N/A	N/A

Parkway Roundabout - 2028 'Do Nothing', AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	23.86	C

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-2	Arm 3	23.86	C

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)	Run automatically
D3	2028 'Do Nothing'	AM	ONE HOUR	10:45	12:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	177	100.000
2		ONE HOUR	✓	991	100.000
3		ONE HOUR	✓	642	100.000
4		ONE HOUR	✓	410	100.000
5		ONE HOUR	✓	873	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
		1	2	3	4	5
	1	0	9	73	24	71
	2	9	9	354	136	483
	3	35	320	1	134	152
	4	31	130	119	0	130
	5	79	479	185	128	2

Proportions

	To					
		1	2	3	4	5
	1	0.00	0.05	0.41	0.14	0.40
	2	0.01	0.01	0.36	0.14	0.49
	3	0.05	0.50	0.00	0.21	0.24
	4	0.08	0.32	0.29	0.00	0.32
	5	0.09	0.55	0.21	0.15	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

	To					
		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh

	To					
		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
10:45-11:00	1	133	133
	2	746	746
	3	483	483
	4	309	309
	5	657	657
11:00-11:15	1	159	159
	2	891	891
	3	577	577
	4	369	369
	5	785	785
11:15-11:30	1	195	195
	2	1091	1091
	3	707	707
	4	451	451
	5	961	961
11:30-11:45	1	195	195
	2	1091	1091
	3	707	707
	4	451	451
	5	961	961
11:45-12:00	1	159	159
	2	891	891
	3	577	577
	4	369	369
	5	785	785
12:00-12:15	1	133	133
	2	746	746
	3	483	483
	4	309	309
	5	657	657

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.21	4.89	0.3	1.1	A	162	244
2	0.81	21.63	4.0	20.7	C	909	877
3	0.90	39.85	7.3	39.8	E	589	884
4	0.43	5.90	0.7	3.0	A	376	564
5	0.88	26.90	6.8	36.5	D	801	1202

Main Results for each time segment

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	133	133	33	0	0	1026	1143	0.117	133	115	0.0	0.1	3.562	A
2	746	480	120	267	0	451	925	0.518	475	707	0.0	1.1	7.930	A
3	483	483	121	0	267	644	873	0.553	478	283	0.0	1.2	9.009	A
4	309	309	77	0	0	807	1232	0.251	307	315	0.0	0.3	3.889	A
5	657	657	164	0	0	489	1180	0.557	652	626	0.0	1.2	6.757	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	159	159	40	0	0	1229	1053	0.151	159	138	0.1	0.2	4.024	A
2	891	573	143	318	0	540	900	0.636	570	847	1.1	1.7	10.832	B
3	577	577	144	0	318	772	837	0.690	573	339	1.2	2.1	13.477	B
4	369	369	92	0	0	968	1160	0.318	368	378	0.3	0.5	4.543	A
5	785	785	196	0	0	585	1141	0.688	781	750	1.2	2.1	9.907	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	195	195	49	0	0	1488	939	0.208	195	167	0.2	0.3	4.834	A
2	1091	701	175	390	0	657	866	0.810	693	1025	1.7	3.8	19.827	C
3	707	707	177	0	390	938	789	0.895	690	412	2.1	6.4	31.773	D
4	451	451	113	0	0	1171	1069	0.422	450	457	0.5	0.7	5.807	A
5	961	961	240	0	0	710	1090	0.881	945	912	2.1	6.1	22.630	C

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	195	195	49	0	0	1508	930	0.209	195	169	0.3	0.3	4.894	A
2	1091	701	175	390	0	663	865	0.811	700	1039	3.8	4.0	21.632	C
3	707	707	177	0	390	948	787	0.899	703	416	6.4	7.3	39.853	E
4	451	451	113	0	0	1188	1062	0.425	451	463	0.7	0.7	5.897	A
5	961	961	240	0	0	718	1087	0.884	959	921	6.1	6.8	26.897	D

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	159	159	40	0	0	1261	1039	0.153	159	141	0.3	0.2	4.096	A
2	891	573	143	318	0	549	897	0.638	582	871	4.0	1.8	11.700	B
3	577	577	144	0	318	787	833	0.693	597	344	7.3	2.4	16.407	C
4	369	369	92	0	0	995	1148	0.321	370	388	0.7	0.5	4.634	A
5	785	785	196	0	0	600	1135	0.691	803	765	6.8	2.3	11.361	B

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	133	133	33	0	0	1040	1136	0.117	133	117	0.2	0.1	3.592	A
2	746	480	120	267	0	456	924	0.519	482	718	1.8	1.1	8.206	A
3	483	483	121	0	267	653	871	0.555	488	286	2.4	1.3	9.500	A
4	309	309	77	0	0	820	1226	0.252	309	320	0.5	0.3	3.929	A
5	657	657	164	0	0	495	1178	0.558	661	634	2.3	1.3	7.027	A

Queue Variation Results for each time segment

10:45 - 11:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.13	0.00	0.00	0.13	0.13			N/A	N/A
2	1.06	0.55	1.00	1.40	1.45			N/A	N/A
3	1.21	0.56	1.08	1.28	1.64			N/A	N/A
4	0.33	0.00	0.00	0.33	0.33			N/A	N/A
5	1.24	0.56	1.10	1.41	1.71			N/A	N/A

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.18	0.00	0.00	0.18	0.18			N/A	N/A
2	1.70	0.07	0.96	3.96	5.73			N/A	N/A
3	2.12	0.06	0.98	5.36	7.88			N/A	N/A
4	0.46	0.00	0.00	0.46	0.46			N/A	N/A
5	2.13	0.05	0.72	5.61	8.63			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.26	0.03	0.25	0.46	0.48			N/A	N/A
2	3.82	0.03	0.35	8.46	20.72			N/A	N/A
3	6.39	0.06	0.90	18.49	30.98			N/A	N/A
4	0.72	0.03	0.25	0.72	0.72			N/A	N/A
5	6.13	0.04	0.44	17.02	32.32			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.26	0.03	0.28	0.67	1.09			N/A	N/A
2	4.04	0.03	0.30	4.04	17.62			N/A	N/A
3	7.31	0.04	0.40	19.01	39.83			N/A	N/A
4	0.73	0.03	0.29	1.05	3.01			N/A	N/A
5	6.77	0.03	0.34	13.22	36.49			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.18	0.00	0.00	0.18	0.18			N/A	N/A
2	1.82	0.05	0.46	4.86	7.90			N/A	N/A
3	2.37	0.04	0.41	6.48	11.71			N/A	N/A
4	0.48	0.00	0.00	0.48	0.48			N/A	N/A
5	2.32	0.04	0.43	6.36	11.07			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.13	0.00	0.00	0.13	0.13			N/A	N/A
2	1.10	0.03	0.35	2.66	5.35			N/A	N/A
3	1.27	0.03	0.31	2.29	6.52			N/A	N/A
4	0.34	0.00	0.00	0.34	0.34			N/A	N/A
5	1.28	0.03	0.32	2.57	6.61			N/A	N/A

Parkway Roundabout - 2028 'Do Nothing', PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	31.57	D

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-7	Arm 3	31.57	D

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)	Run automatically
D4	2028 'Do Nothing'	PM	ONE HOUR	12:00	13:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	189	100.000
2		ONE HOUR	✓	998	100.000
3		ONE HOUR	✓	697	100.000
4		ONE HOUR	✓	427	100.000
5		ONE HOUR	✓	869	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
		1	2	3	4	5
	1	0	6	81	57	45
	2	6	11	347	134	500
	3	82	300	1	108	206
	4	33	150	113	0	131
	5	62	539	168	97	3

Proportions

	To					
		1	2	3	4	5
	1	0.00	0.03	0.43	0.30	0.24
	2	0.01	0.01	0.35	0.13	0.50
	3	0.12	0.43	0.00	0.15	0.30
	4	0.08	0.35	0.26	0.00	0.31
	5	0.07	0.62	0.19	0.11	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

	To					
		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh

	To					
		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
12:00-12:15	1	142	142
	2	751	751
	3	525	525
	4	321	321
	5	654	654
12:15-12:30	1	170	170
	2	897	897
	3	627	627
	4	384	384
	5	781	781
12:30-12:45	1	208	208
	2	1099	1099
	3	767	767
	4	470	470
	5	957	957
12:45-13:00	1	208	208
	2	1099	1099
	3	767	767
	4	470	470
	5	957	957
13:00-13:15	1	170	170
	2	897	897
	3	627	627
	4	384	384
	5	781	781
13:15-13:30	1	142	142
	2	751	751
	3	525	525
	4	321	321
	5	654	654

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.22	5.00	0.3	1.2	A	173	260
2	0.82	22.06	4.2	21.6	C	916	896
3	0.97	70.76	14.5	60.9	F	640	959
4	0.46	6.42	0.8	3.0	A	392	588
5	0.89	29.19	7.3	40.0	D	797	1196

Main Results for each time segment

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	142	142	36	0	0	1032	1140	0.125	142	137	0.0	0.1	3.605	A
2	751	490	123	261	0	423	933	0.525	486	751	0.0	1.1	7.969	A
3	525	525	131	0	261	637	875	0.599	519	272	0.0	1.5	9.945	A
4	321	321	80	0	0	860	1208	0.266	320	296	0.0	0.4	4.047	A
5	654	654	164	0	0	520	1168	0.560	649	661	0.0	1.3	6.878	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	170	170	42	0	0	1236	1050	0.162	170	164	0.1	0.2	4.089	A
2	897	585	146	312	0	506	909	0.643	583	900	1.1	1.7	10.921	B
3	627	627	157	0	312	764	839	0.747	621	325	1.5	2.8	16.139	C
4	384	384	96	0	0	1031	1132	0.339	383	354	0.4	0.5	4.805	A
5	781	781	195	0	0	622	1126	0.694	777	792	1.3	2.2	10.218	B

12:30 - 12:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	208	208	52	0	0	1491	938	0.222	208	196	0.2	0.3	4.929	A
2	1099	717	179	382	0	616	878	0.816	708	1082	1.7	4.0	20.141	C
3	767	767	192	0	382	928	792	0.969	735	396	2.8	11.0	46.735	E
4	470	470	118	0	0	1236	1040	0.452	469	427	0.5	0.8	6.287	A
5	957	957	239	0	0	747	1075	0.890	940	957	2.2	6.5	23.968	C

12:45 - 13:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	208	208	52	0	0	1513	928	0.224	208	200	0.3	0.3	4.999	A
2	1099	717	179	382	0	621	877	0.818	716	1100	4.0	4.2	22.059	C
3	767	767	192	0	382	938	789	0.972	753	399	11.0	14.5	70.765	F
4	470	470	118	0	0	1258	1030	0.456	470	433	0.8	0.8	6.424	A
5	957	957	239	0	0	759	1071	0.894	954	970	6.5	7.3	29.193	D

13:00 - 13:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	170	170	42	0	0	1281	1030	0.165	170	171	0.3	0.2	4.187	A
2	897	585	146	312	0	515	907	0.645	595	936	4.2	1.9	11.835	B
3	627	627	157	0	312	779	835	0.750	671	331	14.5	3.3	26.804	D
4	384	384	96	0	0	1083	1109	0.346	385	367	0.8	0.5	4.985	A
5	781	781	195	0	0	651	1114	0.701	801	817	7.3	2.4	12.132	B

13:15 - 13:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	142	142	36	0	0	1048	1133	0.126	143	139	0.2	0.1	3.635	A
2	751	490	123	261	0	427	932	0.526	493	763	1.9	1.1	8.256	A
3	525	525	131	0	261	646	873	0.601	532	274	3.3	1.5	10.750	B
4	321	321	80	0	0	877	1200	0.268	322	300	0.5	0.4	4.101	A
5	654	654	164	0	0	528	1164	0.562	659	671	2.4	1.3	7.183	A

Queue Variation Results for each time segment

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.14	0.00	0.00	0.14	0.14			N/A	N/A
2	1.09	0.55	1.00	1.40	1.45			N/A	N/A
3	1.46	0.57	1.36	1.86	1.99			N/A	N/A
4	0.36	0.00	0.00	0.36	0.36			N/A	N/A
5	1.25	0.56	1.12	1.50	1.75			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.19	0.00	0.00	0.19	0.19			N/A	N/A
2	1.75	0.07	0.96	4.14	5.96			N/A	N/A
3	2.76	0.07	1.14	7.21	10.73			N/A	N/A
4	0.51	0.51	1.00	1.40	1.45			N/A	N/A
5	2.19	0.05	0.73	5.77	8.87			N/A	N/A

12:30 - 12:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.28	0.03	0.25	0.46	0.48			N/A	N/A
2	3.97	0.04	0.35	9.05	21.55			N/A	N/A
3	10.96	0.17	4.84	28.66	40.42			N/A	N/A
4	0.81	0.03	0.26	0.81	0.81			N/A	N/A
5	6.50	0.05	0.47	18.43	33.65			N/A	N/A

12:45 - 13:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.29	0.03	0.30	0.92	1.22			N/A	N/A
2	4.20	0.03	0.30	4.20	18.76			N/A	N/A
3	14.47	0.11	4.32	40.76	60.87			N/A	N/A
4	0.83	0.03	0.28	0.83	3.03			N/A	N/A
5	7.29	0.04	0.36	15.95	39.97			N/A	N/A

13:00 - 13:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.20	0.00	0.00	0.20	0.20			N/A	N/A
2	1.88	0.05	0.46	5.02	8.27			N/A	N/A
3	3.26	0.04	0.41	8.86	16.73			N/A	N/A
4	0.53	0.53	1.00	1.40	1.45			N/A	N/A
5	2.44	0.04	0.43	6.71	11.68			N/A	N/A

13:15 - 13:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.14	0.00	0.00	0.14	0.14			N/A	N/A
2	1.13	0.03	0.34	2.72	5.56			N/A	N/A
3	1.55	0.03	0.30	1.87	7.34			N/A	N/A
4	0.37	0.03	0.26	0.46	0.49			N/A	N/A
5	1.31	0.03	0.32	2.49	6.72			N/A	N/A

Parkway Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	27.57	D

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-3	Arm 3	27.57	D

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)	Run automatically
D5	2028 Opening Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	10:45	12:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	177	100.000
2		ONE HOUR	✓	1035	100.000
3		ONE HOUR	✓	649	100.000
4		ONE HOUR	✓	413	100.000
5		ONE HOUR	✓	883	100.000

Origin-Destination Data

Demand (PCU/hr)						
	To					
From		1	2	3	4	5
	1	0	9	73	24	71
	2	10	9	370	142	504
	3	35	327	1	134	152
	4	31	133	119	0	130
	5	79	489	185	128	2

Proportions

	To					
From		1	2	3	4	5
	1	0.00	0.05	0.41	0.14	0.40
	2	0.01	0.01	0.36	0.14	0.49
	3	0.05	0.50	0.00	0.21	0.23
	4	0.08	0.32	0.29	0.00	0.31
	5	0.09	0.55	0.21	0.14	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						
	To					
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh						
	To					
From		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
10:45-11:00	1	133	133
	2	779	779
	3	489	489
	4	311	311
	5	665	665
11:00-11:15	1	159	159
	2	930	930
	3	583	583
	4	371	371
	5	794	794
11:15-11:30	1	195	195
	2	1140	1140
	3	715	715
	4	455	455
	5	972	972
11:30-11:45	1	195	195
	2	1140	1140
	3	715	715
	4	455	455
	5	972	972
11:45-12:00	1	159	159
	2	930	930
	3	583	583
	4	371	371
	5	794	794
12:00-12:15	1	133	133
	2	779	779
	3	489	489
	4	311	311
	5	665	665

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.21	4.96	0.3	1.1	A	162	244
2	0.85	26.19	5.1	25.5	D	950	915
3	0.92	46.42	8.6	45.2	E	596	893
4	0.43	6.06	0.8	3.0	A	379	568
5	0.90	29.92	7.6	41.7	D	810	1215

Main Results for each time segment

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	133	133	33	0	0	1041	1136	0.117	133	116	0.0	0.1	3.586	A
2	779	501	125	279	0	451	925	0.541	496	722	0.0	1.2	8.300	A
3	489	489	122	0	279	664	868	0.563	484	283	0.0	1.3	9.260	A
4	311	311	78	0	0	829	1222	0.254	310	319	0.0	0.3	3.939	A
5	665	665	166	0	0	497	1177	0.565	660	641	0.0	1.3	6.892	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	159	159	40	0	0	1246	1045	0.152	159	139	0.1	0.2	4.060	A
2	930	598	149	333	0	540	900	0.664	595	865	1.2	1.9	11.685	B
3	583	583	146	0	333	796	830	0.703	579	339	1.3	2.3	14.149	B
4	371	371	93	0	0	993	1149	0.323	371	383	0.3	0.5	4.625	A
5	794	794	198	0	0	595	1137	0.698	790	769	1.3	2.2	10.258	B

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	195	195	49	0	0	1506	931	0.209	195	168	0.2	0.3	4.887	A
2	1140	732	183	407	0	657	867	0.845	721	1044	1.9	4.7	23.132	C
3	715	715	179	0	407	966	781	0.914	695	412	2.3	7.3	35.265	E
4	455	455	114	0	0	1198	1057	0.430	454	462	0.5	0.7	5.955	A
5	972	972	243	0	0	720	1086	0.895	954	932	2.2	6.8	24.443	C

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	195	195	49	0	0	1528	921	0.212	195	170	0.3	0.3	4.955	A
2	1140	732	183	407	0	663	865	0.847	731	1060	4.7	5.1	26.187	D
3	715	715	179	0	407	978	778	0.918	709	415	7.3	8.6	46.419	E
4	455	455	114	0	0	1218	1048	0.434	455	469	0.7	0.8	6.064	A
5	972	972	243	0	0	729	1083	0.898	969	943	6.8	7.6	29.921	D

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	159	159	40	0	0	1284	1029	0.155	159	143	0.3	0.2	4.143	A
2	930	598	149	333	0	550	897	0.666	610	893	5.1	2.1	13.010	B
3	583	583	146	0	333	815	824	0.708	608	345	8.6	2.6	18.214	C
4	371	371	93	0	0	1027	1133	0.328	372	395	0.8	0.5	4.738	A
5	794	794	198	0	0	612	1130	0.702	814	787	7.6	2.5	12.083	B

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	133	133	33	0	0	1056	1129	0.118	133	117	0.2	0.1	3.614	A
2	779	501	125	279	0	456	924	0.542	504	733	2.1	1.2	8.646	A
3	489	489	122	0	279	674	865	0.565	494	286	2.6	1.3	9.823	A
4	311	311	78	0	0	843	1216	0.256	312	325	0.5	0.3	3.985	A
5	665	665	166	0	0	504	1174	0.566	669	651	2.5	1.3	7.191	A

Queue Variation Results for each time segment

10:45 - 11:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.13	0.00	0.00	0.13	0.13			N/A	N/A
2	1.16	0.55	1.00	1.40	1.45			N/A	N/A
3	1.26	0.56	1.14	1.54	1.77			N/A	N/A
4	0.34	0.00	0.00	0.34	0.34			N/A	N/A
5	1.28	0.56	1.15	1.57	1.79			N/A	N/A

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.18	0.00	0.00	0.18	0.18			N/A	N/A
2	1.91	0.06	0.97	4.68	6.80			N/A	N/A
3	2.25	0.06	1.01	5.74	8.50			N/A	N/A
4	0.47	0.00	0.00	0.47	0.47			N/A	N/A
5	2.23	0.05	0.73	5.90	9.13			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.26	0.03	0.25	0.46	0.48			N/A	N/A
2	4.69	0.04	0.39	12.27	25.26			N/A	N/A
3	7.27	0.07	1.49	20.94	33.28			N/A	N/A
4	0.75	0.03	0.25	0.75	0.75			N/A	N/A
5	6.75	0.05	0.48	19.33	34.72			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.27	0.03	0.29	0.72	1.11			N/A	N/A
2	5.05	0.03	0.32	7.58	25.52			N/A	N/A
3	8.59	0.05	0.47	24.24	45.18			N/A	N/A
4	0.76	0.03	0.28	0.99	3.05			N/A	N/A
5	7.58	0.04	0.37	17.23	41.71			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.18	0.00	0.00	0.18	0.18			N/A	N/A
2	2.08	0.04	0.44	5.66	9.63			N/A	N/A
3	2.56	0.04	0.41	6.96	12.80			N/A	N/A
4	0.49	0.00	0.00	0.49	0.49			N/A	N/A
5	2.45	0.04	0.43	6.75	11.93			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.13	0.00	0.00	0.13	0.13			N/A	N/A
2	1.21	0.03	0.33	2.72	6.10			N/A	N/A
3	1.33	0.03	0.31	2.15	6.71			N/A	N/A
4	0.35	0.00	0.00	0.35	0.35			N/A	N/A
5	1.33	0.03	0.32	2.49	6.83			N/A	N/A

Parkway Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	36.98	E

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-9	Arm 3	36.98	E

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)	Run automatically
D6	2028 Opening Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	12:00	13:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	189	100.000
2		ONE HOUR	✓	1024	100.000
3		ONE HOUR	✓	707	100.000
4		ONE HOUR	✓	432	100.000
5		ONE HOUR	✓	887	100.000

Origin-Destination Data

Demand (PCU/hr)						
	To					
From		1	2	3	4	5
	1	0	6	81	57	45
	2	6	11	356	137	514
	3	82	310	1	108	206
	4	33	155	113	0	131
	5	62	557	168	97	3

Proportions						
	To					
From		1	2	3	4	5
	1	0.00	0.03	0.43	0.30	0.24
	2	0.01	0.01	0.35	0.13	0.50
	3	0.12	0.44	0.00	0.15	0.29
	4	0.08	0.36	0.26	0.00	0.30
	5	0.07	0.63	0.19	0.11	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						
	To					
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh						
	To					
From		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
12:00-12:15	1	142	142
	2	771	771
	3	532	532
	4	325	325
	5	668	668
12:15-12:30	1	170	170
	2	921	921
	3	636	636
	4	388	388
	5	797	797
12:30-12:45	1	208	208
	2	1127	1127
	3	778	778
	4	476	476
	5	977	977
12:45-13:00	1	208	208
	2	1127	1127
	3	778	778
	4	476	476
	5	977	977
13:00-13:15	1	170	170
	2	921	921
	3	636	636
	4	388	388
	5	797	797
13:15-13:30	1	142	142
	2	771	771
	3	532	532
	4	325	325
	5	668	668

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.23	5.10	0.3	1.2	A	173	260
2	0.84	24.71	4.8	24.2	C	940	919
3	0.99	84.13	17.9	65.7	F	649	973
4	0.47	6.60	0.9	3.0	A	396	595
5	0.92	35.15	8.9	48.7	E	814	1221

Main Results for each time segment

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	142	142	36	0	0	1057	1129	0.126	142	137	0.0	0.1	3.644	A
2	771	503	126	268	0	423	933	0.539	498	776	0.0	1.1	8.192	A
3	532	532	133	0	268	649	872	0.611	526	272	0.0	1.5	10.246	B
4	325	325	81	0	0	878	1200	0.271	324	298	0.0	0.4	4.101	A
5	668	668	167	0	0	531	1163	0.574	662	671	0.0	1.3	7.117	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	170	170	42	0	0	1265	1037	0.164	170	163	0.1	0.2	4.149	A
2	921	601	150	320	0	506	910	0.660	598	929	1.1	1.9	11.430	B
3	636	636	159	0	320	779	835	0.761	630	325	1.5	3.0	17.074	C
4	388	388	97	0	0	1052	1122	0.346	388	357	0.4	0.5	4.895	A
5	797	797	199	0	0	635	1121	0.712	793	804	1.3	2.4	10.853	B

12:30 - 12:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	208	208	52	0	0	1520	925	0.225	208	195	0.2	0.3	5.018	A
2	1127	735	184	392	0	615	879	0.837	725	1113	1.9	4.5	22.072	C
3	778	778	195	0	392	945	787	0.989	739	395	3.0	12.8	52.302	F
4	476	476	119	0	0	1255	1032	0.461	474	429	0.5	0.8	6.446	A
5	977	977	244	0	0	760	1070	0.913	955	970	2.4	7.7	27.361	D

12:45 - 13:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	208	208	52	0	0	1544	914	0.228	208	199	0.3	0.3	5.099	A
2	1127	735	184	392	0	621	877	0.839	734	1132	4.5	4.8	24.710	C
3	778	778	195	0	392	956	784	0.993	758	399	12.8	17.9	84.129	F
4	476	476	119	0	0	1279	1021	0.466	476	435	0.8	0.9	6.595	A
5	977	977	244	0	0	771	1065	0.917	972	983	7.7	8.9	35.152	E

13:00 - 13:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	170	170	42	0	0	1321	1012	0.168	170	173	0.3	0.2	4.276	A
2	921	601	150	320	0	516	907	0.662	612	975	4.8	2.0	12.623	B
3	636	636	159	0	320	796	830	0.766	693	332	17.9	3.6	33.959	D
4	388	388	97	0	0	1116	1094	0.355	390	373	0.9	0.6	5.121	A
5	797	797	199	0	0	672	1106	0.721	822	834	8.9	2.7	13.701	B

13:15 - 13:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	142	142	36	0	0	1074	1121	0.127	143	139	0.2	0.1	3.677	A
2	771	503	126	268	0	427	932	0.540	506	789	2.0	1.2	8.521	A
3	532	532	133	0	268	659	869	0.612	540	275	3.6	1.6	11.197	B
4	325	325	81	0	0	896	1192	0.273	326	303	0.6	0.4	4.160	A
5	668	668	167	0	0	540	1159	0.576	673	682	2.7	1.4	7.483	A

Queue Variation Results for each time segment

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.14	0.00	0.00	0.14	0.14			N/A	N/A
2	1.15	0.55	1.00	1.40	1.45			N/A	N/A
3	1.52	0.55	1.42	1.96	2.45			N/A	N/A
4	0.37	0.00	0.00	0.37	0.37			N/A	N/A
5	1.32	0.57	1.21	1.68	1.85			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.19	0.00	0.00	0.19	0.19			N/A	N/A
2	1.88	0.06	0.97	4.58	6.65			N/A	N/A
3	2.96	0.07	1.21	7.78	11.56			N/A	N/A
4	0.52	0.52	1.00	1.40	1.45			N/A	N/A
5	2.37	0.06	0.76	6.34	9.79			N/A	N/A

12:30 - 12:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.29	0.03	0.25	0.46	0.48			N/A	N/A
2	4.48	0.04	0.38	11.31	24.22			N/A	N/A
3	12.78	0.29	6.99	31.51	42.84			N/A	N/A
4	0.84	0.03	0.26	0.84	0.84			N/A	N/A
5	7.70	0.06	1.04	22.40	37.60			N/A	N/A

12:45 - 13:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.29	0.03	0.30	0.96	1.24			N/A	N/A
2	4.80	0.03	0.31	6.30	23.37			N/A	N/A
3	17.87	0.22	8.34	46.80	65.68			N/A	N/A
4	0.86	0.03	0.28	0.86	3.01			N/A	N/A
5	8.92	0.04	0.42	23.50	48.75			N/A	N/A

13:00 - 13:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.20	0.00	0.00	0.20	0.20			N/A	N/A
2	2.03	0.04	0.44	5.54	9.31			N/A	N/A
3	3.61	0.04	0.42	9.87	18.54			N/A	N/A
4	0.56	0.55	1.00	1.40	1.45			N/A	N/A
5	2.71	0.04	0.43	7.49	13.29			N/A	N/A

13:15 - 13:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.15	0.00	0.00	0.15	0.15			N/A	N/A
2	1.19	0.03	0.34	2.76	6.01			N/A	N/A
3	1.63	0.03	0.30	1.76	7.50			N/A	N/A
4	0.38	0.03	0.27	0.48	0.67			N/A	N/A
5	1.38	0.03	0.31	2.34	7.02			N/A	N/A

Parkway Roundabout - 2028 Opening Year (Overall Masterplan Development), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	42.29	E

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-8	Arm 3	42.29	E

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)	Run automatically
D7	2028 Opening Year (Overall Masterplan Development)	AM	ONE HOUR	10:45	12:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	178	100.000
2		ONE HOUR	✓	1059	100.000
3		ONE HOUR	✓	685	100.000
4		ONE HOUR	✓	427	100.000
5		ONE HOUR	✓	937	100.000

Origin-Destination Data

Demand (PCU/hr)

		To				
From		1	2	3	4	5
	1	0	10	73	24	71
	2	10	10	378	145	516
	3	35	363	1	134	152
	4	31	147	119	0	130
	5	79	543	185	128	2

Proportions

		To				
From		1	2	3	4	5
	1	0.00	0.06	0.41	0.13	0.40
	2	0.01	0.01	0.36	0.14	0.49
	3	0.05	0.53	0.00	0.20	0.22
	4	0.07	0.34	0.28	0.00	0.30
	5	0.08	0.58	0.20	0.14	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

		To				
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh

		To				
From		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
10:45-11:00	1	134	134
	2	797	797
	3	516	516
	4	321	321
	5	705	705
11:00-11:15	1	160	160
	2	952	952
	3	616	616
	4	384	384
	5	842	842
11:15-11:30	1	196	196
	2	1166	1166
	3	754	754
	4	470	470
	5	1032	1032
11:30-11:45	1	196	196
	2	1166	1166
	3	754	754
	4	470	470
	5	1032	1032
11:45-12:00	1	160	160
	2	952	952
	3	616	616
	4	384	384
	5	842	842
12:00-12:15	1	134	134
	2	797	797
	3	516	516
	4	321	321
	5	705	705

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.22	5.28	0.3	1.2	A	163	245
2	0.87	29.37	5.8	30.9	D	972	937
3	0.97	72.95	14.7	60.8	F	629	943
4	0.46	6.45	0.8	3.0	A	392	588
5	0.97	57.82	15.9	70.0	F	860	1290

Main Results for each time segment

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	134	134	34	0	0	1118	1102	0.122	133	116	0.0	0.1	3.715	A
2	797	513	128	285	0	451	925	0.554	508	801	0.0	1.2	8.528	A
3	516	516	129	0	285	676	864	0.597	510	283	0.0	1.4	10.008	B
4	321	321	80	0	0	865	1206	0.267	320	321	0.0	0.4	4.056	A
5	705	705	176	0	0	535	1162	0.607	699	650	0.0	1.5	7.691	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	160	160	40	0	0	1338	1005	0.159	160	139	0.1	0.2	4.259	A
2	952	612	153	340	0	540	900	0.680	609	958	1.2	2.0	12.227	B
3	616	616	154	0	340	810	826	0.746	611	338	1.4	2.7	16.326	C
4	384	384	96	0	0	1036	1130	0.340	383	385	0.4	0.5	4.819	A
5	842	842	211	0	0	640	1119	0.753	837	779	1.5	2.9	12.524	B

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	196	196	49	0	0	1597	891	0.220	196	166	0.2	0.3	5.176	A
2	1166	750	187	416	0	651	868	0.864	737	1142	2.0	5.3	25.219	D
3	754	754	189	0	416	979	778	0.970	721	408	2.7	11.0	47.569	E
4	470	470	118	0	0	1240	1038	0.453	469	460	0.5	0.8	6.308	A
5	1032	1032	258	0	0	768	1067	0.967	995	941	2.9	12.1	38.129	E

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	196	196	49	0	0	1627	877	0.223	196	169	0.3	0.3	5.282	A
2	1166	750	187	416	0	659	866	0.866	748	1165	5.3	5.8	29.372	D
3	754	754	189	0	416	993	774	0.975	739	413	11.0	14.7	72.953	F
4	470	470	118	0	0	1264	1028	0.457	470	469	0.8	0.8	6.453	A
5	1032	1032	258	0	0	780	1062	0.971	1017	954	12.1	15.9	57.821	F

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	160	160	40	0	0	1418	970	0.165	160	146	0.3	0.2	4.448	A
2	952	612	153	340	0	560	894	0.685	626	1018	5.8	2.3	14.068	B
3	616	616	154	0	340	836	819	0.752	661	350	14.7	3.3	28.079	D
4	384	384	96	0	0	1091	1105	0.347	385	406	0.8	0.5	5.009	A
5	842	842	211	0	0	672	1106	0.762	892	804	15.9	3.4	20.201	C

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	134	134	34	0	0	1139	1093	0.123	134	118	0.2	0.1	3.758	A
2	797	513	128	285	0	457	924	0.555	517	816	2.3	1.3	8.930	A
3	516	516	129	0	285	687	861	0.599	523	286	3.3	1.5	10.853	B
4	321	321	80	0	0	882	1198	0.268	322	328	0.5	0.4	4.112	A
5	705	705	176	0	0	544	1158	0.609	713	661	3.4	1.6	8.212	A

Queue Variation Results for each time segment

10:45 - 11:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.14	0.00	0.00	0.14	0.14			N/A	N/A
2	1.22	0.55	1.00	1.40	1.45			N/A	N/A
3	1.44	0.56	1.34	1.85	1.98			N/A	N/A
4	0.36	0.00	0.00	0.36	0.36			N/A	N/A
5	1.51	0.55	1.40	1.95	2.44			N/A	N/A

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.19	0.00	0.00	0.19	0.19			N/A	N/A
2	2.04	0.06	0.99	5.07	7.48			N/A	N/A
3	2.74	0.07	1.14	7.16	10.65			N/A	N/A
4	0.51	0.51	1.00	1.40	1.45			N/A	N/A
5	2.89	0.06	0.89	7.86	12.21			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.28	0.03	0.25	0.46	0.48			N/A	N/A
2	5.27	0.04	0.43	14.53	27.71			N/A	N/A
3	10.98	0.17	4.94	28.56	40.14			N/A	N/A
4	0.82	0.03	0.26	0.82	0.82			N/A	N/A
5	12.11	0.14	4.73	32.65	46.97			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.29	0.03	0.30	0.91	1.22			N/A	N/A
2	5.77	0.03	0.34	10.94	30.88			N/A	N/A
3	14.71	0.12	4.72	41.07	60.75			N/A	N/A
4	0.84	0.03	0.28	0.84	3.04			N/A	N/A
5	15.89	0.10	3.82	45.71	70.03			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.20	0.00	0.00	0.20	0.20			N/A	N/A
2	2.26	0.04	0.43	6.20	10.71			N/A	N/A
3	3.30	0.04	0.41	9.02	16.87			N/A	N/A
4	0.54	0.54	1.00	1.40	1.45			N/A	N/A
5	3.42	0.04	0.42	9.42	17.42			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.14	0.00	0.00	0.14	0.14			N/A	N/A
2	1.27	0.03	0.33	2.72	6.52			N/A	N/A
3	1.53	0.03	0.30	1.82	7.22			N/A	N/A
4	0.37	0.03	0.26	0.46	0.49			N/A	N/A
5	1.59	0.03	0.30	1.86	7.48			N/A	N/A

Parkway Roundabout - 2028 Opening Year (Overall Masterplan Development), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	51.15	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-11	Arm 3	51.15	F

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)	Run automatically
D8	2028 Opening Year (Overall Masterplan Development)	PM	ONE HOUR	12:00	13:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	189	100.000
2		ONE HOUR	✓	1136	100.000
3		ONE HOUR	✓	713	100.000
4		ONE HOUR	✓	435	100.000
5		ONE HOUR	✓	897	100.000

Origin-Destination Data

Demand (PCU/hr)	
From	To
	12345
	106815745
	2712395152570
	3823161108206
	4331581130131
	562567168973

Proportions	
From	To
	12345
	10.000.030.430.300.24
	20.010.010.350.130.50
	30.120.440.000.150.29
	40.080.360.260.000.30
	50.070.630.190.110.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %	
From	To
	12345
	1000000
	2000000
	3000000
	4000000
	5000000

Average PCU Per Veh	
From	To
	12345
	11.0001.0001.0001.0001.000
	21.0001.0001.0001.0001.000
	31.0001.0001.0001.0001.000
	41.0001.0001.0001.0001.000
	51.0001.0001.0001.0001.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
12:00-12:15	1	142	142
	2	855	855
	3	537	537
	4	327	327
	5	675	675
12:15-12:30	1	170	170
	2	1021	1021
	3	641	641
	4	391	391
	5	806	806
12:30-12:45	1	208	208
	2	1251	1251
	3	785	785
	4	479	479
	5	988	988
12:45-13:00	1	208	208
	2	1251	1251
	3	785	785
	4	479	479
	5	988	988
13:00-13:15	1	170	170
	2	1021	1021
	3	641	641
	4	391	391
	5	806	806
13:15-13:30	1	142	142
	2	855	855
	3	537	537
	4	327	327
	5	675	675

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.23	5.14	0.3	1.3	A	173	260
2	0.93	46.55	9.9	51.2	E	1042	1020
3	1.03	113.18	25.4	73.6	F	654	981
4	0.48	6.94	0.9	3.0	A	399	599
5	0.93	38.82	10.0	53.3	E	823	1235

Main Results for each time segment

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	142	142	36	0	0	1071	1123	0.127	142	137	0.0	0.1	3.668	A
2	855	558	139	297	0	423	933	0.598	552	790	0.0	1.4	9.306	A
3	537	537	134	0	297	703	856	0.627	530	272	0.0	1.6	10.834	B
4	327	327	82	0	0	925	1179	0.278	326	309	0.0	0.4	4.211	A
5	675	675	169	0	0	539	1160	0.582	670	712	0.0	1.4	7.267	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	170	170	42	0	0	1282	1030	0.165	170	164	0.1	0.2	4.185	A
2	1021	666	167	355	0	506	910	0.732	662	946	1.4	2.6	14.251	B
3	641	641	160	0	355	843	817	0.785	634	325	1.6	3.3	19.026	C
4	391	391	98	0	0	1107	1098	0.356	390	370	0.4	0.5	5.085	A
5	806	806	202	0	0	645	1117	0.722	802	853	1.4	2.5	11.266	B

12:30 - 12:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	208	208	52	0	0	1533	919	0.226	208	195	0.2	0.3	5.060	A
2	1251	816	204	435	0	614	879	0.928	793	1127	2.6	8.3	35.076	E
3	785	785	196	0	435	1013	768	1.022	733	395	3.3	16.3	63.472	F
4	479	479	120	0	0	1305	1009	0.474	478	441	0.5	0.9	6.750	A
5	988	988	247	0	0	764	1068	0.924	964	1018	2.5	8.5	29.383	D

12:45 - 13:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	208	208	52	0	0	1558	908	0.229	208	198	0.3	0.3	5.142	A
2	1251	816	204	435	0	620	877	0.930	810	1146	8.3	9.9	46.550	E
3	785	785	196	0	435	1031	763	1.029	749	398	16.3	25.4	113.176	F
4	479	479	120	0	0	1332	997	0.480	479	448	0.9	0.9	6.939	A
5	988	988	247	0	0	774	1064	0.928	982	1036	8.5	10.0	38.818	E

13:00 - 13:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	170	170	42	0	0	1355	998	0.170	170	177	0.3	0.2	4.352	A
2	1021	666	167	355	0	517	906	0.735	694	1008	9.9	2.9	18.815	C
3	641	641	160	0	355	879	806	0.795	724	332	25.4	4.6	59.430	F
4	391	391	98	0	0	1209	1052	0.372	392	394	0.9	0.6	5.468	A
5	806	806	202	0	0	697	1095	0.736	834	904	10.0	2.9	15.110	C

13:15 - 13:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	142	142	36	0	0	1092	1114	0.128	143	140	0.2	0.1	3.709	A
2	855	558	139	297	0	428	932	0.599	564	806	2.9	1.5	9.913	A
3	537	537	134	0	297	716	853	0.630	548	275	4.6	1.8	12.219	B
4	327	327	82	0	0	949	1168	0.280	328	315	0.6	0.4	4.291	A
5	675	675	169	0	0	551	1155	0.585	681	727	2.9	1.4	7.691	A

Queue Variation Results for each time segment

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.14	0.00	0.00	0.14	0.14			N/A	N/A
2	1.45	0.58	1.35	1.80	1.92			N/A	N/A
3	1.63	0.51	1.48	2.41	2.85			N/A	N/A
4	0.38	0.00	0.00	0.38	0.38			N/A	N/A
5	1.37	0.57	1.26	1.74	1.90			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.20	0.00	0.00	0.20	0.20			N/A	N/A
2	2.59	0.07	1.09	6.73	9.98			N/A	N/A
3	3.33	0.07	1.36	8.77	12.93			N/A	N/A
4	0.55	0.07	0.74	1.35	1.42			N/A	N/A
5	2.49	0.06	0.80	6.68	10.33			N/A	N/A

12:30 - 12:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.29	0.03	0.25	0.46	0.48			N/A	N/A
2	8.32	0.07	1.56	23.78	36.97			N/A	N/A
3	16.34	1.06	11.28	36.24	46.81			N/A	N/A
4	0.89	0.03	0.26	0.89	0.89			N/A	N/A
5	8.45	0.07	1.48	24.50	39.53			N/A	N/A

12:45 - 13:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.30	0.03	0.31	0.97	1.26			N/A	N/A
2	9.86	0.05	0.59	28.41	51.18			N/A	N/A
3	25.41	1.09	17.69	56.91	73.61			N/A	N/A
4	0.91	0.03	0.28	0.91	2.99			N/A	N/A
5	9.96	0.05	0.46	27.83	53.34			N/A	N/A

13:00 - 13:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.21	0.00	0.00	0.21	0.21			N/A	N/A
2	2.95	0.04	0.41	8.06	14.90			N/A	N/A
3	4.56	0.05	0.46	12.93	22.95			N/A	N/A
4	0.60	0.55	1.00	1.40	1.45			N/A	N/A
5	2.94	0.04	0.44	8.16	14.43			N/A	N/A

13:15 - 13:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.15	0.00	0.00	0.15	0.15			N/A	N/A
2	1.53	0.03	0.31	2.58	7.80			N/A	N/A
3	1.76	0.03	0.29	1.76	7.71			N/A	N/A
4	0.39	0.03	0.29	0.70	1.10			N/A	N/A
5	1.43	0.03	0.31	2.26	7.21			N/A	N/A

Parkway Roundabout - 2033 'Do Nothing', AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	38.01	E

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-7	Arm 3	38.01	E

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)	Run automatically
D9	2033 'Do Nothing'	AM	ONE HOUR	10:45	12:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	187	100.000
2		ONE HOUR	✓	1048	100.000
3		ONE HOUR	✓	680	100.000
4		ONE HOUR	✓	432	100.000
5		ONE HOUR	✓	921	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
		1	2	3	4	5
	1	0	9	77	26	75
	2	10	9	375	144	510
	3	38	338	1	142	161
	4	32	137	126	0	137
	5	83	506	195	135	2

Proportions

	To					
		1	2	3	4	5
	1	0.00	0.05	0.41	0.14	0.40
	2	0.01	0.01	0.36	0.14	0.49
	3	0.06	0.50	0.00	0.21	0.24
	4	0.07	0.32	0.29	0.00	0.32
	5	0.09	0.55	0.21	0.15	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

	To					
		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh

	To					
		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
10:45-11:00	1	141	141
	2	789	789
	3	512	512
	4	325	325
	5	693	693
11:00-11:15	1	168	168
	2	942	942
	3	611	611
	4	388	388
	5	828	828
11:15-11:30	1	206	206
	2	1154	1154
	3	749	749
	4	476	476
	5	1014	1014
11:30-11:45	1	206	206
	2	1154	1154
	3	749	749
	4	476	476
	5	1014	1014
11:45-12:00	1	168	168
	2	942	942
	3	611	611
	4	388	388
	5	828	828
12:00-12:15	1	141	141
	2	789	789
	3	512	512
	4	325	325
	5	693	693

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.23	5.20	0.3	1.3	A	172	257
2	0.87	29.94	5.8	31.2	D	962	926
3	0.97	70.17	14.0	59.4	F	624	936
4	0.46	6.43	0.8	3.0	A	396	595
5	0.95	44.94	11.9	60.3	E	845	1268

Main Results for each time segment

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	141	141	35	0	0	1082	1118	0.126	140	122	0.0	0.1	3.680	A
2	789	507	127	282	0	477	918	0.552	502	746	0.0	1.2	8.554	A
3	512	512	128	0	282	680	863	0.593	506	299	0.0	1.4	9.938	A
4	325	325	81	0	0	853	1211	0.268	324	333	0.0	0.4	4.049	A
5	693	693	173	0	0	516	1169	0.593	688	661	0.0	1.4	7.392	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	168	168	42	0	0	1295	1024	0.164	168	146	0.1	0.2	4.204	A
2	942	605	151	337	0	571	891	0.679	602	893	1.2	2.0	12.291	B
3	611	611	153	0	337	815	825	0.741	606	357	1.4	2.7	16.111	C
4	388	388	97	0	0	1022	1136	0.342	388	399	0.4	0.5	4.807	A
5	828	828	207	0	0	618	1128	0.734	823	792	1.4	2.6	11.630	B

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	206	206	51	0	0	1553	910	0.226	206	175	0.2	0.3	5.106	A
2	1154	741	185	413	0	690	857	0.865	728	1068	2.0	5.3	25.622	D
3	749	749	187	0	413	986	776	0.965	717	433	2.7	10.6	46.386	E
4	476	476	119	0	0	1224	1046	0.455	474	479	0.5	0.8	6.289	A
5	1014	1014	254	0	0	742	1077	0.941	986	956	2.6	9.7	32.297	D

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	206	206	51	0	0	1581	898	0.229	206	178	0.3	0.3	5.200	A
2	1154	741	185	413	0	698	855	0.867	739	1088	5.3	5.8	29.939	D
3	749	749	187	0	413	1000	772	0.970	735	437	10.6	14.0	70.167	F
4	476	476	119	0	0	1247	1035	0.459	476	488	0.8	0.8	6.432	A
5	1014	1014	254	0	0	753	1073	0.945	1005	970	9.7	11.9	44.936	E

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	168	168	42	0	0	1357	997	0.169	168	152	0.3	0.2	4.350	A
2	942	605	151	337	0	586	887	0.682	619	940	5.8	2.2	14.116	B
3	611	611	153	0	337	839	818	0.748	654	367	14.0	3.2	26.657	D
4	388	388	97	0	0	1074	1113	0.349	390	419	0.8	0.5	4.988	A
5	828	828	207	0	0	646	1116	0.742	863	817	11.9	3.0	16.007	C

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	141	141	35	0	0	1100	1110	0.127	141	124	0.2	0.1	3.718	A
2	789	507	127	282	0	482	916	0.553	511	759	2.2	1.3	8.953	A
3	512	512	128	0	282	691	860	0.595	519	302	3.2	1.5	10.750	B
4	325	325	81	0	0	870	1204	0.270	326	340	0.5	0.4	4.105	A
5	693	693	173	0	0	525	1166	0.595	700	671	3.0	1.5	7.819	A

Queue Variation Results for each time segment

10:45 - 11:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.14	0.00	0.00	0.14	0.14			N/A	N/A
2	1.21	0.55	1.00	1.40	1.45			N/A	N/A
3	1.42	0.56	1.32	1.82	1.96			N/A	N/A
4	0.36	0.00	0.00	0.36	0.36			N/A	N/A
5	1.43	0.57	1.33	1.83	1.96			N/A	N/A

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.20	0.00	0.00	0.20	0.20			N/A	N/A
2	2.03	0.06	0.98	5.03	7.43			N/A	N/A
3	2.69	0.07	1.12	6.99	10.42			N/A	N/A
4	0.52	0.52	1.00	1.40	1.45			N/A	N/A
5	2.64	0.06	0.81	7.13	11.07			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.29	0.03	0.25	0.46	0.48			N/A	N/A
2	5.29	0.04	0.43	14.66	27.72			N/A	N/A
3	10.57	0.15	4.48	27.86	39.54			N/A	N/A
4	0.82	0.03	0.26	0.82	0.82			N/A	N/A
5	9.72	0.08	2.09	27.79	42.76			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.30	0.03	0.31	0.97	1.25			N/A	N/A
2	5.81	0.03	0.34	11.29	31.23			N/A	N/A
3	13.98	0.11	3.92	39.55	59.43			N/A	N/A
4	0.84	0.03	0.28	0.84	3.01			N/A	N/A
5	11.89	0.06	1.11	34.76	60.29			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.20	0.00	0.00	0.20	0.20			N/A	N/A
2	2.24	0.04	0.43	6.11	10.63			N/A	N/A
3	3.21	0.04	0.41	8.75	16.39			N/A	N/A
4	0.54	0.54	1.00	1.40	1.45			N/A	N/A
5	3.03	0.04	0.42	8.35	15.30			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.15	0.00	0.00	0.15	0.15			N/A	N/A
2	1.26	0.03	0.32	2.68	6.47			N/A	N/A
3	1.51	0.03	0.30	1.83	7.15			N/A	N/A
4	0.37	0.03	0.26	0.47	0.49			N/A	N/A
5	1.50	0.03	0.30	2.11	7.38			N/A	N/A

Parkway Roundabout - 2033 'Do Nothing', PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	53.11	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-12	Arm 3	53.11	F

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)	Run automatically
D10	2033 'Do Nothing'	PM	ONE HOUR	12:00	13:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	200	100.000
2		ONE HOUR	✓	1055	100.000
3		ONE HOUR	✓	737	100.000
4		ONE HOUR	✓	451	100.000
5		ONE HOUR	✓	920	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
		1	2	3	4	5
	1	0	6	86	60	48
	2	7	11	367	141	529
	3	86	317	1	115	218
	4	35	159	119	0	138
	5	66	570	178	103	3

Proportions

	To					
		1	2	3	4	5
	1	0.00	0.03	0.43	0.30	0.24
	2	0.01	0.01	0.35	0.13	0.50
	3	0.12	0.43	0.00	0.16	0.30
	4	0.08	0.35	0.26	0.00	0.31
	5	0.07	0.62	0.19	0.11	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

	To					
		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh

	To					
		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
12:00-12:15	1	151	151
	2	794	794
	3	555	555
	4	340	340
	5	693	693
12:15-12:30	1	180	180
	2	948	948
	3	663	663
	4	405	405
	5	827	827
12:30-12:45	1	220	220
	2	1162	1162
	3	811	811
	4	497	497
	5	1013	1013
12:45-13:00	1	220	220
	2	1162	1162
	3	811	811
	4	497	497
	5	1013	1013
13:00-13:15	1	180	180
	2	948	948
	3	663	663
	4	405	405
	5	827	827
13:15-13:30	1	151	151
	2	794	794
	3	555	555
	4	340	340
	5	693	693

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.24	5.30	0.3	1.3	A	184	275
2	0.87	30.87	6.1	33.2	D	968	947
3	1.05	130.23	30.8	79.5	F	676	1014
4	0.49	7.00	1.0	2.9	A	414	621
5	0.96	49.83	13.2	64.0	E	844	1266

Main Results for each time segment

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1090	1114	0.135	150	145	0.0	0.2	3.732	A
2	794	518	129	276	0	447	926	0.559	513	793	0.0	1.2	8.609	A
3	555	555	139	0	276	673	865	0.641	548	287	0.0	1.7	11.126	B
4	340	340	85	0	0	909	1186	0.286	338	313	0.0	0.4	4.235	A
5	693	693	173	0	0	548	1156	0.599	687	698	0.0	1.5	7.580	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	180	180	45	0	0	1305	1020	0.176	180	173	0.2	0.2	4.284	A
2	948	618	155	330	0	536	901	0.686	615	949	1.2	2.1	12.428	B
3	663	663	166	0	330	807	827	0.801	655	344	1.7	3.6	20.066	C
4	405	405	101	0	0	1087	1107	0.366	405	374	0.4	0.6	5.124	A
5	827	827	207	0	0	656	1112	0.744	822	836	1.5	2.8	12.178	B

12:30 - 12:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	220	220	55	0	0	1552	911	0.242	220	204	0.2	0.3	5.206	A
2	1162	758	189	404	0	648	869	0.872	744	1124	2.1	5.5	26.202	D
3	811	811	203	0	404	975	779	1.042	749	416	3.6	19.1	70.090	F
4	497	497	124	0	0	1280	1021	0.486	495	445	0.6	0.9	6.829	A
5	1013	1013	253	0	0	774	1064	0.952	982	1001	2.8	10.6	34.758	D

12:45 - 13:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	220	220	55	0	0	1579	899	0.245	220	207	0.3	0.3	5.303	A
2	1162	758	189	404	0	655	867	0.874	755	1144	5.5	6.1	30.868	D
3	811	811	203	0	404	990	775	1.047	765	421	19.1	30.8	130.234	F
4	497	497	124	0	0	1302	1011	0.491	496	452	0.9	1.0	6.997	A
5	1013	1013	253	0	0	784	1060	0.955	1002	1015	10.6	13.2	49.826	E

13:00 - 13:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	180	180	45	0	0	1395	980	0.184	180	189	0.3	0.2	4.503	A
2	948	618	155	330	0	551	897	0.690	634	1025	6.1	2.3	14.391	B
3	663	663	166	0	330	831	820	0.808	765	353	30.8	5.3	78.492	F
4	405	405	101	0	0	1195	1058	0.383	407	400	1.0	0.6	5.535	A
5	827	827	207	0	0	718	1087	0.761	866	884	13.2	3.4	18.797	C

13:15 - 13:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1113	1104	0.136	151	148	0.2	0.2	3.779	A
2	794	518	129	276	0	453	925	0.560	522	811	2.3	1.3	9.028	A
3	555	555	139	0	276	684	862	0.644	568	291	5.3	1.9	12.787	B
4	340	340	85	0	0	933	1175	0.289	340	319	0.6	0.4	4.315	A
5	693	693	173	0	0	561	1151	0.602	700	712	3.4	1.5	8.114	A

Queue Variation Results for each time segment

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.16	0.00	0.00	0.16	0.16			N/A	N/A
2	1.24	0.56	1.08	1.26	1.63			N/A	N/A
3	1.73	0.42	1.05	2.70	3.23			N/A	N/A
4	0.40	0.00	0.00	0.40	0.40			N/A	N/A
5	1.46	0.56	1.36	1.88	2.08			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.21	0.00	0.00	0.21	0.21			N/A	N/A
2	2.10	0.06	0.99	5.27	7.75			N/A	N/A
3	3.64	0.08	1.47	9.58	14.05			N/A	N/A
4	0.57	0.08	0.79	1.36	1.43			N/A	N/A
5	2.76	0.06	0.87	7.48	11.56			N/A	N/A

12:30 - 12:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.32	0.03	0.25	0.46	0.48			N/A	N/A
2	5.55	0.04	0.45	15.55	28.76			N/A	N/A
3	19.14	1.55	14.42	39.91	50.27			N/A	N/A
4	0.93	0.03	0.26	0.93	0.93			N/A	N/A
5	10.59	0.10	3.02	29.66	44.33			N/A	N/A

12:45 - 13:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.32	0.03	0.32	1.09	1.34			N/A	N/A
2	6.11	0.03	0.35	12.58	33.20			N/A	N/A
3	30.83	3.21	23.93	63.54	79.47			N/A	N/A
4	0.96	0.03	0.28	0.96	2.86			N/A	N/A
5	13.23	0.07	1.46	38.93	64.02			N/A	N/A

13:00 - 13:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.23	0.00	0.00	0.23	0.23			N/A	N/A
2	2.32	0.04	0.43	6.36	11.11			N/A	N/A
3	5.25	0.05	0.50	15.04	25.97			N/A	N/A
4	0.63	0.18	0.92	1.38	1.44			N/A	N/A
5	3.39	0.04	0.44	9.51	16.87			N/A	N/A

13:15 - 13:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.16	0.00	0.00	0.16	0.16			N/A	N/A
2	1.30	0.03	0.32	2.72	6.69			N/A	N/A
3	1.87	0.03	0.29	1.87	8.03			N/A	N/A
4	0.41	0.03	0.31	0.98	1.24			N/A	N/A
5	1.54	0.03	0.30	2.00	7.48			N/A	N/A

Parkway Roundabout - 2033 Opening Year (Residential, Creche & Medical Centre), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	45.28	E

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-9	Arm 3	45.28	E

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)	Run automatically
D11	2033 Opening Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	10:45	12:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	187	100.000
2		ONE HOUR	✓	1092	100.000
3		ONE HOUR	✓	687	100.000
4		ONE HOUR	✓	435	100.000
5		ONE HOUR	✓	931	100.000

Origin-Destination Data

Demand (PCU/hr)						
	To					
From		1	2	3	4	5
	1	0	9	77	26	75
	2	10	10	390	150	532
	3	38	345	1	142	161
	4	32	140	126	0	137
	5	83	516	195	135	2

Proportions						
	To					
From		1	2	3	4	5
	1	0.00	0.05	0.41	0.14	0.40
	2	0.01	0.01	0.36	0.14	0.49
	3	0.06	0.50	0.00	0.21	0.23
	4	0.07	0.32	0.29	0.00	0.31
	5	0.09	0.55	0.21	0.15	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						
	To					
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh						
	To					
From		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
10:45-11:00	1	141	141
	2	822	822
	3	517	517
	4	327	327
	5	701	701
11:00-11:15	1	168	168
	2	982	982
	3	618	618
	4	391	391
	5	837	837
11:15-11:30	1	206	206
	2	1202	1202
	3	756	756
	4	479	479
	5	1025	1025
11:30-11:45	1	206	206
	2	1202	1202
	3	756	756
	4	479	479
	5	1025	1025
11:45-12:00	1	168	168
	2	982	982
	3	618	618
	4	391	391
	5	837	837
12:00-12:15	1	141	141
	2	822	822
	3	517	517
	4	327	327
	5	701	701

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.23	5.26	0.3	1.3	A	172	257
2	0.90	38.62	7.7	42.3	E	1002	966
3	0.99	83.49	17.2	64.2	F	630	946
4	0.47	6.61	0.9	3.0	A	399	599
5	0.96	50.99	13.8	65.3	F	854	1281

Main Results for each time segment

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	141	141	35	0	0	1097	1111	0.127	140	122	0.0	0.1	3.706	A
2	822	529	132	294	0	476	918	0.576	523	761	0.0	1.3	9.002	A
3	517	517	129	0	294	701	857	0.603	511	298	0.0	1.5	10.247	B
4	327	327	82	0	0	875	1202	0.273	326	338	0.0	0.4	4.105	A
5	701	701	175	0	0	524	1166	0.601	695	677	0.0	1.5	7.553	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	168	168	42	0	0	1314	1016	0.165	168	146	0.1	0.2	4.244	A
2	982	631	158	351	0	570	891	0.708	627	911	1.3	2.3	13.427	B
3	618	618	154	0	351	840	817	0.756	612	357	1.5	2.9	17.069	C
4	391	391	98	0	0	1048	1124	0.348	390	404	0.4	0.5	4.901	A
5	837	837	209	0	0	627	1124	0.745	832	811	1.5	2.8	12.105	B

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	206	206	51	0	0	1569	903	0.228	206	174	0.2	0.3	5.158	A
2	1202	773	193	429	0	689	857	0.902	755	1086	2.3	6.8	30.851	D
3	756	756	189	0	429	1012	768	0.985	719	432	2.9	12.2	51.890	F
4	479	479	120	0	0	1249	1035	0.463	478	482	0.5	0.9	6.450	A
5	1025	1025	256	0	0	751	1074	0.955	993	976	2.8	10.9	35.139	E

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	206	206	51	0	0	1598	890	0.231	206	177	0.3	0.3	5.258	A
2	1202	773	193	429	0	697	855	0.904	769	1107	6.8	7.7	38.621	E
3	756	756	189	0	429	1029	763	0.991	737	437	12.2	17.2	83.493	F
4	479	479	120	0	0	1274	1023	0.468	479	492	0.9	0.9	6.609	A
5	1025	1025	256	0	0	762	1069	0.959	1014	991	10.9	13.8	50.995	F

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	168	168	42	0	0	1388	983	0.171	168	154	0.3	0.2	4.423	A
2	982	631	158	351	0	588	886	0.712	652	968	7.7	2.6	16.543	C
3	618	618	154	0	351	872	808	0.764	672	368	17.2	3.6	33.960	D
4	391	391	98	0	0	1115	1094	0.357	392	429	0.9	0.6	5.139	A
5	837	837	209	0	0	663	1109	0.754	879	844	13.8	3.3	18.084	C

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	141	141	35	0	0	1117	1102	0.128	141	124	0.2	0.1	3.748	A
2	822	529	132	294	0	482	916	0.577	533	776	2.6	1.4	9.514	A
3	517	517	129	0	294	714	853	0.606	525	302	3.6	1.6	11.219	B
4	327	327	82	0	0	894	1193	0.275	328	345	0.6	0.4	4.166	A
5	701	701	175	0	0	534	1162	0.603	708	689	3.3	1.6	8.040	A

Queue Variation Results for each time segment

10:45 - 11:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.14	0.00	0.00	0.14	0.14			N/A	N/A
2	1.33	0.57	1.19	1.64	1.82			N/A	N/A
3	1.48	0.55	1.37	1.91	2.28			N/A	N/A
4	0.37	0.00	0.00	0.37	0.37			N/A	N/A
5	1.48	0.56	1.37	1.89	2.18			N/A	N/A

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.20	0.00	0.00	0.20	0.20			N/A	N/A
2	2.31	0.06	1.03	5.90	8.74			N/A	N/A
3	2.88	0.07	1.19	7.54	11.18			N/A	N/A
4	0.53	0.53	1.00	1.40	1.45			N/A	N/A
5	2.78	0.06	0.86	7.54	11.69			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.29	0.03	0.25	0.46	0.48			N/A	N/A
2	6.78	0.06	0.97	19.67	32.88			N/A	N/A
3	12.25	0.26	6.49	30.53	41.78			N/A	N/A
4	0.85	0.03	0.26	0.85	0.85			N/A	N/A
5	10.88	0.11	3.31	30.30	44.97			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.30	0.03	0.31	0.99	1.26			N/A	N/A
2	7.75	0.04	0.41	20.22	42.27			N/A	N/A
3	17.21	0.20	7.74	45.49	64.25			N/A	N/A
4	0.87	0.03	0.28	0.87	3.00			N/A	N/A
5	13.75	0.07	1.81	40.33	65.32			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.21	0.00	0.00	0.21	0.21			N/A	N/A
2	2.61	0.04	0.42	7.16	12.91			N/A	N/A
3	3.58	0.04	0.42	9.86	18.26			N/A	N/A
4	0.56	0.55	1.00	1.40	1.45			N/A	N/A
5	3.26	0.04	0.42	9.01	16.54			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.15	0.00	0.00	0.15	0.15			N/A	N/A
2	1.39	0.03	0.32	2.60	7.18			N/A	N/A
3	1.58	0.03	0.30	1.71	7.29			N/A	N/A
4	0.38	0.03	0.27	0.48	0.78			N/A	N/A
5	1.55	0.03	0.30	1.98	7.48			N/A	N/A

Parkway Roundabout - 2033 Opening Year (Residential, Creche & Medical Centre), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	62.48	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-14	Arm 3	62.48	F

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)	Run automatically
D12	2033 Opening Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	12:00	13:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	200	100.000
2		ONE HOUR	✓	1081	100.000
3		ONE HOUR	✓	747	100.000
4		ONE HOUR	✓	456	100.000
5		ONE HOUR	✓	938	100.000

Origin-Destination Data

Demand (PCU/hr)						
	To					
From		1	2	3	4	5
	1	0	6	86	60	48
	2	7	11	376	145	542
	3	86	327	1	115	218
	4	35	164	119	0	138
	5	66	588	178	103	3

Proportions						
	To					
From		1	2	3	4	5
	1	0.00	0.03	0.43	0.30	0.24
	2	0.01	0.01	0.35	0.13	0.50
	3	0.12	0.44	0.00	0.15	0.29
	4	0.08	0.36	0.26	0.00	0.30
	5	0.07	0.63	0.19	0.11	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						
	To					
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh						
	To					
From		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
12:00-12:15	1	151	151
	2	814	814
	3	562	562
	4	343	343
	5	706	706
12:15-12:30	1	180	180
	2	972	972
	3	672	672
	4	410	410
	5	843	843
12:30-12:45	1	220	220
	2	1190	1190
	3	822	822
	4	502	502
	5	1033	1033
12:45-13:00	1	220	220
	2	1190	1190
	3	822	822
	4	502	502
	5	1033	1033
13:00-13:15	1	180	180
	2	972	972
	3	672	672
	4	410	410
	5	843	843
13:15-13:30	1	151	151
	2	814	814
	3	562	562
	4	343	343
	5	706	706

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.25	5.39	0.3	1.4	A	184	275
2	0.89	35.64	7.2	39.4	E	992	970
3	1.07	151.25	36.9	85.4	F	685	1028
4	0.50	7.16	1.0	2.8	A	418	628
5	0.98	61.80	17.1	72.1	F	861	1291

Main Results for each time segment

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1115	1103	0.136	150	145	0.0	0.2	3.774	A
2	814	531	133	283	0	447	926	0.573	526	817	0.0	1.3	8.869	A
3	562	562	141	0	283	686	861	0.653	555	287	0.0	1.8	11.496	B
4	343	343	86	0	0	925	1179	0.291	342	315	0.0	0.4	4.292	A
5	706	706	177	0	0	559	1152	0.613	700	708	0.0	1.5	7.868	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	180	180	45	0	0	1333	1007	0.179	180	173	0.2	0.2	4.349	A
2	972	634	158	338	0	535	901	0.703	630	978	1.3	2.3	13.084	B
3	672	672	168	0	338	822	823	0.816	663	344	1.8	4.0	21.450	C
4	410	410	102	0	0	1107	1098	0.373	409	377	0.4	0.6	5.222	A
5	843	843	211	0	0	669	1107	0.762	837	847	1.5	3.0	13.063	B

12:30 - 12:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	220	220	55	0	0	1575	900	0.245	220	202	0.2	0.3	5.286	A
2	1190	776	194	414	0	646	870	0.892	760	1150	2.3	6.4	29.110	D
3	822	822	206	0	414	991	774	1.062	750	415	4.0	22.0	77.876	F
4	502	502	126	0	0	1294	1014	0.495	501	447	0.6	1.0	6.986	A
5	1033	1033	258	0	0	784	1060	0.974	993	1010	3.0	12.9	40.110	E

12:45 - 13:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	220	220	55	0	0	1603	888	0.248	220	206	0.3	0.3	5.388	A
2	1190	776	194	414	0	653	868	0.895	773	1170	6.4	7.2	35.643	E
3	822	822	206	0	414	1007	770	1.068	763	419	22.0	36.9	151.245	F
4	502	502	126	0	0	1316	1005	0.500	502	454	1.0	1.0	7.158	A
5	1033	1033	258	0	0	793	1057	0.977	1016	1025	12.9	17.1	61.795	F

13:00 - 13:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	180	180	45	0	0	1446	958	0.188	180	192	0.3	0.2	4.632	A
2	972	634	158	338	0	554	896	0.708	652	1071	7.2	2.5	15.795	C
3	672	672	168	0	338	851	814	0.825	791	356	36.9	7.1	107.159	F
4	410	410	102	0	0	1233	1041	0.394	411	408	1.0	0.7	5.724	A
5	843	843	211	0	0	742	1077	0.783	896	903	17.1	3.9	24.361	C

13:15 - 13:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1143	1091	0.138	151	149	0.2	0.2	3.832	A
2	814	531	133	283	0	453	925	0.574	535	840	2.5	1.4	9.358	A
3	562	562	141	0	283	698	858	0.655	583	291	7.1	2.0	13.968	B
4	343	343	86	0	0	957	1165	0.295	344	324	0.7	0.4	4.391	A
5	706	706	177	0	0	577	1145	0.617	715	724	3.9	1.6	8.554	A

Queue Variation Results for each time segment

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.16	0.00	0.00	0.16	0.16			N/A	N/A
2	1.31	0.57	1.16	1.60	1.80			N/A	N/A
3	1.81	0.32	1.09	2.91	3.67			N/A	N/A
4	0.41	0.00	0.00	0.41	0.41			N/A	N/A
5	1.55	0.54	1.43	2.02	2.59			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.22	0.00	0.00	0.22	0.22			N/A	N/A
2	2.26	0.06	1.02	5.76	8.51			N/A	N/A
3	3.95	0.08	1.17	10.36	15.09			N/A	N/A
4	0.59	0.09	0.81	1.36	1.43			N/A	N/A
5	3.02	0.06	0.96	8.21	12.66			N/A	N/A

12:30 - 12:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.32	0.03	0.25	0.46	0.48			N/A	N/A
2	6.38	0.05	0.65	18.41	31.71			N/A	N/A
3	22.01	2.95	17.65	43.32	53.39			N/A	N/A
4	0.97	0.03	0.26	0.97	0.97			N/A	N/A
5	12.88	0.17	5.64	33.95	48.05			N/A	N/A

12:45 - 13:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.33	0.03	0.32	1.10	1.36			N/A	N/A
2	7.19	0.04	0.38	17.58	39.37			N/A	N/A
3	36.90	6.58	30.83	70.27	85.43			N/A	N/A
4	0.99	0.03	0.28	0.99	2.81			N/A	N/A
5	17.09	0.12	5.14	48.28	72.13			N/A	N/A

13:00 - 13:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.23	0.00	0.00	0.23	0.23			N/A	N/A
2	2.54	0.04	0.42	6.98	12.48			N/A	N/A
3	7.06	0.07	1.19	20.16	31.50			N/A	N/A
4	0.66	0.21	0.93	1.39	1.44			N/A	N/A
5	3.91	0.05	0.46	11.05	19.41			N/A	N/A

13:15 - 13:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.16	0.00	0.00	0.16	0.16			N/A	N/A
2	1.38	0.03	0.32	2.69	7.12			N/A	N/A
3	1.98	0.03	0.29	1.98	8.29			N/A	N/A
4	0.42	0.03	0.33	1.09	1.29			N/A	N/A
5	1.65	0.03	0.30	1.87	7.69			N/A	N/A

Parkway Roundabout - 2033 Opening Year (Overall Masterplan Development), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	71.34	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-12	Arm 3	71.34	F

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)	Run automatically
D13	2033 Opening Year (Overall Masterplan Development)	AM	ONE HOUR	10:45	12:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	188	100.000
2		ONE HOUR	✓	1116	100.000
3		ONE HOUR	✓	723	100.000
4		ONE HOUR	✓	450	100.000
5		ONE HOUR	✓	985	100.000

Origin-Destination Data

Demand (PCU/hr)						
	To					
From		1	2	3	4	5
	1	0	10	77	26	75
	2	11	10	399	153	543
	3	38	381	1	142	161
	4	32	155	126	0	137
	5	83	570	195	135	2

Proportions						
	To					
From		1	2	3	4	5
	1	0.00	0.05	0.41	0.14	0.40
	2	0.01	0.01	0.36	0.14	0.49
	3	0.05	0.53	0.00	0.20	0.22
	4	0.07	0.34	0.28	0.00	0.30
	5	0.08	0.58	0.20	0.14	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						
	To					
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh						
	To					
From		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
10:45-11:00	1	142	142
	2	840	840
	3	544	544
	4	339	339
	5	742	742
11:00-11:15	1	169	169
	2	1003	1003
	3	650	650
	4	405	405
	5	885	885
11:15-11:30	1	207	207
	2	1229	1229
	3	796	796
	4	495	495
	5	1085	1085
11:30-11:45	1	207	207
	2	1229	1229
	3	796	796
	4	495	495
	5	1085	1085
11:45-12:00	1	169	169
	2	1003	1003
	3	650	650
	4	405	405
	5	885	885
12:00-12:15	1	142	142
	2	840	840
	3	544	544
	4	339	339
	5	742	742

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.24	5.51	0.3	1.3	A	173	259
2	0.92	43.45	8.9	47.3	E	1024	987
3	1.05	129.74	30.1	78.2	F	663	995
4	0.49	7.00	1.0	2.9	A	413	619
5	1.03	102.05	32.1	89.7	F	904	1356

Main Results for each time segment

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	142	142	35	0	0	1175	1077	0.131	141	122	0.0	0.2	3.843	A
2	840	540	135	300	0	476	918	0.588	534	839	0.0	1.4	9.248	A
3	544	544	136	0	300	712	854	0.637	538	298	0.0	1.7	11.154	B
4	339	339	85	0	0	910	1186	0.286	337	340	0.0	0.4	4.234	A
5	742	742	185	0	0	562	1150	0.645	734	685	0.0	1.8	8.520	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	169	169	42	0	0	1404	976	0.173	169	146	0.2	0.2	4.459	A
2	1003	645	161	359	0	570	891	0.723	640	1003	1.4	2.5	14.082	B
3	650	650	162	0	359	853	814	0.799	642	357	1.7	3.6	20.162	C
4	405	405	101	0	0	1089	1106	0.366	404	406	0.4	0.6	5.122	A
5	885	885	221	0	0	673	1105	0.801	878	820	1.8	3.7	15.293	C

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	207	207	52	0	0	1640	872	0.237	207	171	0.2	0.3	5.406	A
2	1229	789	197	439	0	678	861	0.917	769	1168	2.5	7.6	33.529	D
3	796	796	199	0	439	1021	766	1.040	736	425	3.6	18.6	69.812	F
4	495	495	124	0	0	1281	1020	0.486	494	477	0.6	0.9	6.820	A
5	1085	1085	271	0	0	794	1056	1.027	1017	981	3.7	20.5	55.650	F

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	207	207	52	0	0	1667	860	0.241	207	174	0.3	0.3	5.513	A
2	1229	789	197	439	0	686	858	0.920	784	1189	7.6	8.9	43.450	E
3	796	796	199	0	439	1040	760	1.047	750	430	18.6	30.1	129.736	F
4	495	495	124	0	0	1304	1010	0.491	495	486	0.9	1.0	6.997	A
5	1085	1085	271	0	0	803	1052	1.030	1038	997	20.5	32.1	102.046	F

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	169	169	42	0	0	1567	904	0.187	169	162	0.3	0.2	4.903	A
2	1003	645	161	359	0	609	880	0.732	669	1127	8.9	2.9	18.666	C
3	650	650	162	0	359	897	801	0.811	749	380	30.1	5.4	80.132	F
4	405	405	101	0	0	1197	1058	0.383	406	449	1.0	0.6	5.533	A
5	885	885	221	0	0	737	1079	0.820	992	866	32.1	5.4	56.223	F

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	142	142	35	0	0	1207	1063	0.133	142	126	0.2	0.2	3.909	A
2	840	540	135	300	0	485	916	0.590	546	864	2.9	1.5	9.873	A
3	544	544	136	0	300	727	850	0.641	559	304	5.4	1.8	12.932	B
4	339	339	85	0	0	936	1174	0.289	340	349	0.6	0.4	4.318	A
5	742	742	185	0	0	577	1145	0.648	756	699	5.4	1.9	9.572	A

Queue Variation Results for each time segment

10:45 - 11:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.15	0.00	0.00	0.15	0.15			N/A	N/A
2	1.39	0.58	1.28	1.74	1.88			N/A	N/A
3	1.70	0.42	1.02	2.65	3.11			N/A	N/A
4	0.40	0.00	0.00	0.40	0.40			N/A	N/A
5	1.77	0.35	1.06	2.82	3.49			N/A	N/A

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.21	0.00	0.00	0.21	0.21			N/A	N/A
2	2.48	0.07	1.08	6.39	9.45			N/A	N/A
3	3.59	0.08	1.46	9.42	13.81			N/A	N/A
4	0.57	0.08	0.78	1.36	1.43			N/A	N/A
5	3.72	0.07	1.22	10.14	15.44			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.31	0.03	0.25	0.46	0.48			N/A	N/A
2	7.61	0.07	1.48	21.99	35.16			N/A	N/A
3	18.62	1.39	13.89	39.10	49.39			N/A	N/A
4	0.93	0.03	0.26	0.93	0.93			N/A	N/A
5	20.48	1.07	14.63	44.69	57.27			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.32	0.03	0.32	1.06	1.32			N/A	N/A
2	8.89	0.05	0.46	24.90	47.32			N/A	N/A
3	30.09	2.98	23.19	62.38	78.20			N/A	N/A
4	0.95	0.03	0.28	0.95	2.88			N/A	N/A
5	32.10	2.00	23.28	70.15	89.70			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.23	0.00	0.00	0.23	0.23			N/A	N/A
2	2.91	0.04	0.43	8.05	14.43			N/A	N/A
3	5.43	0.05	0.73	15.62	26.29			N/A	N/A
4	0.63	0.18	0.92	1.38	1.44			N/A	N/A
5	5.41	0.05	0.68	15.55	26.32			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.15	0.00	0.00	0.15	0.15			N/A	N/A
2	1.47	0.03	0.31	2.59	7.55			N/A	N/A
3	1.85	0.03	0.29	1.85	7.92			N/A	N/A
4	0.41	0.03	0.31	0.97	1.24			N/A	N/A
5	1.89	0.03	0.29	1.89	8.05			N/A	N/A

Parkway Roundabout - 2033 Opening Year (Overall Masterplan Development), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	85.73	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-16	Arm 3	85.73	F

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)	Run automatically
D14	2033 Opening Year (Overall Masterplan Development)	PM	ONE HOUR	12:00	13:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	200	100.000
2		ONE HOUR	✓	1194	100.000
3		ONE HOUR	✓	753	100.000
4		ONE HOUR	✓	458	100.000
5		ONE HOUR	✓	948	100.000

Origin-Destination Data

Demand (PCU/hr)						
	To					
From		1	2	3	4	5
	1	0	6	86	60	48
	2	8	13	415	160	598
	3	86	333	1	115	218
	4	35	166	119	0	138
	5	66	598	178	103	3

Proportions						
	To					
From		1	2	3	4	5
	1	0.00	0.03	0.43	0.30	0.24
	2	0.01	0.01	0.35	0.13	0.50
	3	0.11	0.44	0.00	0.15	0.29
	4	0.08	0.36	0.26	0.00	0.30
	5	0.07	0.63	0.19	0.11	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						
	To					
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh						
	To					
From		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
12:00-12:15	1	151	151
	2	899	899
	3	567	567
	4	345	345
	5	714	714
12:15-12:30	1	180	180
	2	1073	1073
	3	677	677
	4	412	412
	5	852	852
12:30-12:45	1	220	220
	2	1315	1315
	3	829	829
	4	504	504
	5	1044	1044
12:45-13:00	1	220	220
	2	1315	1315
	3	829	829
	4	504	504
	5	1044	1044
13:00-13:15	1	180	180
	2	1073	1073
	3	677	677
	4	412	412
	5	852	852
13:15-13:30	1	151	151
	2	899	899
	3	567	567
	4	345	345
	5	714	714

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.25	5.42	0.3	1.4	A	184	275
2	0.99	77.29	18.0	68.4	F	1096	1072
3	1.10	189.81	47.2	95.1	F	691	1036
4	0.51	7.45	1.0	2.7	A	420	630
5	0.99	68.45	19.4	75.7	F	870	1305

Main Results for each time segment

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1129	1097	0.137	150	145	0.0	0.2	3.799	A
2	899	586	147	312	0	447	926	0.633	580	832	0.0	1.7	10.200	B
3	567	567	142	0	312	740	846	0.670	559	287	0.0	1.9	12.240	B
4	345	345	86	0	0	973	1158	0.298	343	326	0.0	0.4	4.410	A
5	714	714	178	0	0	567	1148	0.621	707	749	0.0	1.6	8.050	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	180	180	45	0	0	1350	1000	0.180	180	174	0.2	0.2	4.388	A
2	1073	700	175	373	0	535	901	0.777	694	994	1.7	3.2	16.872	C
3	677	677	169	0	373	886	804	0.842	666	344	1.9	4.6	24.411	C
4	412	412	103	0	0	1162	1073	0.384	411	390	0.4	0.6	5.428	A
5	852	852	213	0	0	678	1104	0.772	846	895	1.6	3.2	13.642	B

12:30 - 12:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	220	220	55	0	0	1585	896	0.246	220	201	0.2	0.3	5.318	A
2	1315	858	214	457	0	644	870	0.986	818	1160	3.2	13.1	49.037	E
3	829	829	207	0	457	1049	758	1.094	740	414	4.6	26.8	92.026	F
4	504	504	126	0	0	1333	997	0.506	503	456	0.6	1.0	7.261	A
5	1044	1044	261	0	0	786	1059	0.985	1000	1050	3.2	14.2	43.083	E

12:45 - 13:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	220	220	55	0	0	1611	885	0.249	220	204	0.3	0.3	5.417	A
2	1315	858	214	457	0	652	868	0.988	838	1179	13.1	18.0	77.287	F
3	829	829	207	0	457	1072	751	1.104	747	419	26.8	47.2	189.814	F
4	504	504	126	0	0	1355	987	0.511	504	464	1.0	1.0	7.455	A
5	1044	1044	261	0	0	792	1057	0.987	1023	1068	14.2	19.4	68.451	F

13:00 - 13:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	180	180	45	0	0	1460	951	0.189	180	191	0.3	0.2	4.671	A
2	1073	700	175	373	0	557	895	0.782	756	1084	18.0	4.0	33.085	D
3	677	677	169	0	373	956	784	0.863	768	357	47.2	24.4	171.052	F
4	412	412	103	0	0	1298	1013	0.407	413	426	1.0	0.7	6.017	A
5	852	852	213	0	0	737	1079	0.790	913	974	19.4	4.1	27.648	D

13:15 - 13:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1189	1071	0.141	151	158	0.2	0.2	3.915	A
2	899	586	147	312	0	454	925	0.634	595	886	4.0	1.8	11.208	B
3	567	567	142	0	312	758	841	0.674	656	291	24.4	2.2	28.874	D
4	345	345	86	0	0	1067	1116	0.309	346	346	0.7	0.5	4.683	A
5	714	714	178	0	0	623	1126	0.634	723	789	4.1	1.8	9.141	A

Queue Variation Results for each time segment

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.16	0.00	0.00	0.16	0.16			N/A	N/A
2	1.67	0.57	1.09	2.30	2.74			N/A	N/A
3	1.95	0.23	1.13	3.46	4.33			N/A	N/A
4	0.42	0.00	0.00	0.42	0.42			N/A	N/A
5	1.60	0.53	1.47	2.29	2.77			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.22	0.00	0.00	0.22	0.22			N/A	N/A
2	3.23	0.07	1.31	8.50	12.57			N/A	N/A
3	4.56	0.10	1.64	11.78	16.87			N/A	N/A
4	0.62	0.10	0.83	1.37	1.43			N/A	N/A
5	3.19	0.06	1.04	8.67	13.31			N/A	N/A

12:30 - 12:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.32	0.03	0.25	0.46	0.48			N/A	N/A
2	13.12	0.26	6.91	32.85	45.04			N/A	N/A
3	26.79	5.80	22.91	48.71	58.39			N/A	N/A
4	1.01	0.03	0.26	1.01	1.01			N/A	N/A
5	14.22	0.25	7.22	36.14	49.92			N/A	N/A

12:45 - 13:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.33	0.03	0.32	1.11	1.37			N/A	N/A
2	17.98	0.19	7.67	48.08	68.43			N/A	N/A
3	47.20	13.82	42.19	81.01	95.12			N/A	N/A
4	1.03	0.03	0.28	1.03	2.72			N/A	N/A
5	19.38	0.17	7.78	52.65	75.74			N/A	N/A

13:00 - 13:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.23	0.00	0.00	0.23	0.23			N/A	N/A
2	3.99	0.04	0.43	11.09	20.38			N/A	N/A
3	24.41	5.54	20.99	43.81	52.31			N/A	N/A
4	0.69	0.23	0.94	1.39	1.44			N/A	N/A
5	4.12	0.05	0.45	11.62	20.74			N/A	N/A

13:15 - 13:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.16	0.00	0.00	0.16	0.16			N/A	N/A
2	1.79	0.03	0.30	2.27	8.59			N/A	N/A
3	2.19	0.03	0.29	2.19	9.11			N/A	N/A
4	0.45	0.04	0.37	1.20	1.35			N/A	N/A
5	1.78	0.03	0.30	2.13	8.42			N/A	N/A

Parkway Roundabout - 2043 'Do Nothing', AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	76.53	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-13	Arm 3	76.53	F

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)	Run automatically
D15	2043 'Do Nothing'	AM	ONE HOUR	10:45	12:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	201	100.000
2		ONE HOUR	✓	1124	100.000
3		ONE HOUR	✓	729	100.000
4		ONE HOUR	✓	464	100.000
5		ONE HOUR	✓	988	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
		1	2	3	4	5
	1	0	10	83	27	81
	2	11	10	402	154	547
	3	40	363	1	152	173
	4	35	147	135	0	147
	5	89	542	210	145	2

Proportions

	To					
		1	2	3	4	5
	1	0.00	0.05	0.41	0.13	0.40
	2	0.01	0.01	0.36	0.14	0.49
	3	0.05	0.50	0.00	0.21	0.24
	4	0.08	0.32	0.29	0.00	0.32
	5	0.09	0.55	0.21	0.15	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

	To					
		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh

	To					
		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
10:45-11:00	1	151	151
	2	846	846
	3	549	549
	4	349	349
	5	744	744
11:00-11:15	1	181	181
	2	1010	1010
	3	655	655
	4	417	417
	5	888	888
11:15-11:30	1	221	221
	2	1238	1238
	3	803	803
	4	511	511
	5	1088	1088
11:30-11:45	1	221	221
	2	1238	1238
	3	803	803
	4	511	511
	5	1088	1088
11:45-12:00	1	181	181
	2	1010	1010
	3	655	655
	4	417	417
	5	888	888
12:00-12:15	1	151	151
	2	846	846
	3	549	549
	4	349	349
	5	744	744

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.25	5.55	0.3	1.4	A	184	277
2	0.94	52.88	10.9	54.1	F	1031	994
3	1.06	146.75	34.8	82.7	F	669	1003
4	0.51	7.19	1.0	2.8	A	426	639
5	1.03	98.65	30.9	88.9	F	907	1360

Main Results for each time segment

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1160	1084	0.140	151	131	0.0	0.2	3.856	A
2	846	544	136	303	0	511	908	0.599	538	799	0.0	1.5	9.577	A
3	549	549	137	0	303	728	849	0.646	542	321	0.0	1.8	11.461	B
4	349	349	87	0	0	914	1184	0.295	348	356	0.0	0.4	4.296	A
5	744	744	186	0	0	553	1154	0.645	737	708	0.0	1.8	8.491	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	181	181	45	0	0	1386	984	0.184	180	156	0.2	0.2	4.480	A
2	1010	649	162	361	0	612	879	0.738	644	955	1.5	2.7	14.996	B
3	655	655	164	0	361	872	808	0.811	647	384	1.8	3.8	21.300	C
4	417	417	104	0	0	1094	1104	0.378	416	426	0.4	0.6	5.231	A
5	888	888	222	0	0	662	1110	0.800	880	848	1.8	3.7	15.185	C

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	221	221	55	0	0	1618	882	0.251	221	183	0.2	0.3	5.443	A
2	1238	795	199	443	0	729	846	0.940	770	1110	2.7	9.0	38.335	E
3	803	803	201	0	443	1041	760	1.056	735	458	3.8	20.8	76.098	F
4	511	511	128	0	0	1278	1021	0.500	509	497	0.6	1.0	7.008	A
5	1088	1088	272	0	0	778	1063	1.023	1023	1010	3.7	20.0	54.469	F

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	221	221	55	0	0	1644	870	0.254	221	186	0.3	0.3	5.548	A
2	1238	795	199	443	0	737	844	0.942	787	1128	9.0	10.9	52.876	F
3	803	803	201	0	443	1061	754	1.064	747	463	20.8	34.8	146.745	F
4	511	511	128	0	0	1301	1011	0.505	511	506	1.0	1.0	7.194	A
5	1088	1088	272	0	0	786	1060	1.027	1044	1027	20.0	30.9	98.649	F

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	181	181	45	0	0	1548	913	0.198	181	173	0.3	0.2	4.923	A
2	1010	649	162	361	0	653	868	0.748	680	1076	10.9	3.2	21.806	C
3	655	655	164	0	361	925	793	0.826	767	408	34.8	6.9	103.860	F
4	417	417	104	0	0	1217	1049	0.398	418	475	1.0	0.7	5.726	A
5	888	888	222	0	0	731	1082	0.821	990	905	30.9	5.4	53.636	F

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1194	1068	0.142	152	134	0.2	0.2	3.929	A
2	846	544	136	303	0	521	905	0.600	550	825	3.2	1.5	10.313	B
3	549	549	137	0	303	744	845	0.650	569	326	6.9	1.9	13.918	B
4	349	349	87	0	0	946	1170	0.299	350	368	0.7	0.4	4.398	A
5	744	744	186	0	0	571	1147	0.648	758	725	5.4	1.9	9.565	A

Queue Variation Results for each time segment

10:45 - 11:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.16	0.00	0.00	0.16	0.16			N/A	N/A
2	1.45	0.58	1.36	1.81	1.94			N/A	N/A
3	1.76	0.34	1.05	2.82	3.50			N/A	N/A
4	0.42	0.00	0.00	0.42	0.42			N/A	N/A
5	1.77	0.37	1.07	2.80	3.45			N/A	N/A

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.22	0.00	0.00	0.22	0.22			N/A	N/A
2	2.66	0.07	1.13	6.89	10.22			N/A	N/A
3	3.83	0.08	1.11	10.01	14.62			N/A	N/A
4	0.60	0.09	0.81	1.36	1.43			N/A	N/A
5	3.70	0.07	1.22	10.09	15.37			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.33	0.03	0.25	0.46	0.48			N/A	N/A
2	8.96	0.09	2.32	25.16	37.93			N/A	N/A
3	20.82	2.41	16.39	41.71	51.74			N/A	N/A
4	0.99	0.03	0.26	0.99	0.99			N/A	N/A
5	20.00	1.38	14.04	44.19	56.92			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.34	0.03	0.32	1.14	1.40			N/A	N/A
2	10.95	0.06	1.31	32.06	54.07			N/A	N/A
3	34.80	5.50	28.59	67.56	82.67			N/A	N/A
4	1.01	0.03	0.28	1.01	2.77			N/A	N/A
5	30.95	1.55	21.86	68.97	88.94			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.25	0.00	0.00	0.25	0.25			N/A	N/A
2	3.19	0.04	0.43	8.85	16.00			N/A	N/A
3	6.91	0.07	1.23	19.67	30.58			N/A	N/A
4	0.67	0.22	0.94	1.39	1.44			N/A	N/A
5	5.40	0.05	0.70	15.54	26.22			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.17	0.00	0.00	0.17	0.17			N/A	N/A
2	1.54	0.03	0.31	2.41	7.75			N/A	N/A
3	1.93	0.03	0.29	1.93	8.10			N/A	N/A
4	0.43	0.03	0.34	1.13	1.31			N/A	N/A
5	1.90	0.03	0.29	1.90	8.19			N/A	N/A

Parkway Roundabout - 2043 'Do Nothing', PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	102.64	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-18	Arm 3	102.64	F

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)	Run automatically
D16	2043 'Do Nothing'	PM	ONE HOUR	12:00	13:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	215	100.000
2		ONE HOUR	✓	1131	100.000
3		ONE HOUR	✓	790	100.000
4		ONE HOUR	✓	483	100.000
5		ONE HOUR	✓	986	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
		1	2	3	4	5
	1	0	6	92	65	52
	2	7	12	393	152	567
	3	92	340	1	123	234
	4	37	170	128	0	148
	5	71	611	190	110	4

Proportions

	To					
		1	2	3	4	5
	1	0.00	0.03	0.43	0.30	0.24
	2	0.01	0.01	0.35	0.13	0.50
	3	0.12	0.43	0.00	0.16	0.30
	4	0.08	0.35	0.27	0.00	0.31
	5	0.07	0.62	0.19	0.11	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

	To					
		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh

	To					
		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
12:00-12:15	1	162	162
	2	851	851
	3	595	595
	4	364	364
	5	742	742
12:15-12:30	1	193	193
	2	1017	1017
	3	710	710
	4	434	434
	5	886	886
12:30-12:45	1	237	237
	2	1245	1245
	3	870	870
	4	532	532
	5	1086	1086
12:45-13:00	1	237	237
	2	1245	1245
	3	870	870
	4	532	532
	5	1086	1086
13:00-13:15	1	193	193
	2	1017	1017
	3	710	710
	4	434	434
	5	886	886
13:15-13:30	1	162	162
	2	851	851
	3	595	595
	4	364	364
	5	742	742

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.27	5.63	0.4	1.0	A	197	296
2	0.95	55.27	11.7	56.6	F	1038	1016
3	1.15	252.78	64.1	112.6	F	725	1087
4	0.53	7.76	1.1	2.5	A	443	665
5	1.03	104.32	32.8	90.5	F	905	1357

Main Results for each time segment

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	162	162	40	0	0	1167	1080	0.150	161	154	0.0	0.2	3.914	A
2	851	556	139	296	0	480	917	0.606	550	848	0.0	1.5	9.617	A
3	595	595	149	0	296	722	851	0.699	586	307	0.0	2.2	13.178	B
4	364	364	91	0	0	973	1158	0.314	362	335	0.0	0.5	4.514	A
5	742	742	186	0	0	586	1141	0.651	735	749	0.0	1.8	8.727	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	193	193	48	0	0	1393	981	0.197	193	184	0.2	0.2	4.570	A
2	1017	663	166	353	0	574	890	0.745	658	1012	1.5	2.8	15.201	C
3	710	710	178	0	353	865	810	0.876	696	368	2.2	5.7	28.597	D
4	434	434	109	0	0	1161	1074	0.404	433	400	0.5	0.7	5.613	A
5	886	886	222	0	0	699	1095	0.810	878	895	1.8	3.9	16.014	C

12:30 - 12:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	237	237	59	0	0	1608	886	0.267	236	209	0.2	0.4	5.536	A
2	1245	813	203	433	0	685	859	0.946	786	1159	2.8	9.5	39.439	E
3	870	870	217	0	433	1032	763	1.141	751	438	5.7	35.3	113.550	F
4	532	532	133	0	0	1319	1003	0.530	530	464	0.7	1.1	7.581	A
5	1086	1086	271	0	0	800	1054	1.030	1017	1050	3.9	21.1	57.164	F

12:45 - 13:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	237	237	59	0	0	1631	876	0.270	237	211	0.4	0.4	5.631	A
2	1245	813	203	433	0	692	856	0.949	804	1175	9.5	11.7	55.267	F
3	870	870	217	0	433	1052	757	1.149	755	443	35.3	64.1	246.282	F
4	532	532	133	0	0	1337	995	0.534	532	470	1.1	1.1	7.763	A
5	1086	1086	271	0	0	803	1052	1.031	1039	1065	21.1	32.8	104.323	F

13:00 - 13:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	193	193	48	0	0	1542	915	0.211	194	203	0.4	0.3	4.991	A
2	1017	663	166	353	0	612	879	0.754	697	1124	11.7	3.3	22.707	C
3	710	710	178	0	353	918	795	0.893	783	391	64.1	45.9	252.783	F
4	434	434	109	0	0	1266	1027	0.423	436	435	1.1	0.7	6.106	A
5	886	886	222	0	0	749	1074	0.825	995	952	32.8	5.7	59.863	F

13:15 - 13:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	162	162	40	0	0	1267	1036	0.156	162	177	0.3	0.2	4.121	A
2	851	556	139	296	0	488	915	0.607	562	941	3.3	1.6	10.414	B
3	595	595	149	0	296	738	846	0.703	767	313	45.9	2.7	87.376	F
4	364	364	91	0	0	1137	1084	0.335	365	369	0.7	0.5	5.006	A
5	742	742	186	0	0	688	1099	0.675	756	813	5.7	2.1	10.899	B

Queue Variation Results for each time segment

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.18	0.00	0.00	0.18	0.18			N/A	N/A
2	1.50	0.58	1.41	1.86	1.98			N/A	N/A
3	2.21	0.17	1.21	4.32	5.61			N/A	N/A
4	0.45	0.00	0.00	0.45	0.45			N/A	N/A
5	1.81	0.32	1.09	2.92	3.67			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.24	0.00	0.00	0.24	0.24			N/A	N/A
2	2.75	0.07	1.15	7.17	10.64			N/A	N/A
3	5.67	0.13	2.48	14.30	20.01			N/A	N/A
4	0.67	0.10	0.84	1.37	1.44			N/A	N/A
5	3.90	0.07	1.33	10.62	16.02			N/A	N/A

12:30 - 12:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.36	0.03	0.25	0.46	0.48			N/A	N/A
2	9.49	0.10	2.81	26.38	39.21			N/A	N/A
3	35.32	11.56	31.93	58.51	67.99			N/A	N/A
4	1.11	0.03	0.26	1.11	1.11			N/A	N/A
5	21.10	1.29	15.34	45.46	57.94			N/A	N/A

12:45 - 13:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.37	0.03	0.33	1.01	1.01			N/A	N/A
2	11.73	0.07	1.25	34.43	56.57			N/A	N/A
3	64.07	27.01	59.95	99.06	112.55			N/A	N/A
4	1.13	0.03	0.27	1.13	2.46			N/A	N/A
5	32.84	2.27	24.12	71.06	90.51			N/A	N/A

13:00 - 13:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.27	0.00	0.00	0.27	0.27			N/A	N/A
2	3.31	0.04	0.43	9.19	16.69			N/A	N/A
3	45.86	20.40	43.07	69.26	78.20			N/A	N/A
4	0.74	0.19	0.92	1.39	1.45			N/A	N/A
5	5.67	0.05	0.58	16.28	27.96			N/A	N/A

13:15 - 13:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.19	0.00	0.00	0.19	0.19			N/A	N/A
2	1.59	0.03	0.31	2.44	7.95			N/A	N/A
3	2.69	0.03	0.30	2.69	11.88			N/A	N/A
4	0.51	0.05	0.47	1.28	1.39			N/A	N/A
5	2.15	0.03	0.30	2.47	10.07			N/A	N/A

Parkway Roundabout - 2043 Opening Year (Residential, Creche & Medical Centre), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	89.98	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-15	Arm 3	89.98	F

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)	Run automatically
D17	2043 Opening Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	10:45	12:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	201	100.000
2		ONE HOUR	✓	1168	100.000
3		ONE HOUR	✓	735	100.000
4		ONE HOUR	✓	467	100.000
5		ONE HOUR	✓	998	100.000

Origin-Destination Data

Demand (PCU/hr)						
	To					
From		1	2	3	4	5
	1	0	10	83	27	81
	2	11	11	417	160	569
	3	40	369	1	152	173
	4	35	150	135	0	147
	5	89	552	210	145	2

Proportions						
	To					
From		1	2	3	4	5
	1	0.00	0.05	0.41	0.13	0.40
	2	0.01	0.01	0.36	0.14	0.49
	3	0.05	0.50	0.00	0.21	0.24
	4	0.07	0.32	0.29	0.00	0.31
	5	0.09	0.55	0.21	0.15	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						
	To					
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh						
	To					
From		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
10:45-11:00	1	151	151
	2	879	879
	3	553	553
	4	352	352
	5	751	751
11:00-11:15	1	181	181
	2	1050	1050
	3	661	661
	4	420	420
	5	897	897
11:15-11:30	1	221	221
	2	1286	1286
	3	809	809
	4	514	514
	5	1099	1099
11:30-11:45	1	221	221
	2	1286	1286
	3	809	809
	4	514	514
	5	1099	1099
11:45-12:00	1	181	181
	2	1050	1050
	3	661	661
	4	420	420
	5	897	897
12:00-12:15	1	151	151
	2	879	879
	3	553	553
	4	352	352
	5	751	751

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.26	5.58	0.3	1.4	A	184	277
2	0.98	72.47	16.1	65.1	F	1072	1034
3	1.08	165.82	40.0	87.7	F	674	1012
4	0.51	7.35	1.0	2.7	A	429	643
5	1.04	110.26	35.5	93.3	F	916	1374

Main Results for each time segment

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1174	1077	0.140	151	130	0.0	0.2	3.883	A
2	879	565	141	314	0	511	908	0.623	559	814	0.0	1.6	10.136	B
3	553	553	138	0	314	750	843	0.656	546	321	0.0	1.8	11.840	B
4	352	352	88	0	0	935	1175	0.299	350	360	0.0	0.4	4.357	A
5	751	751	188	0	0	561	1151	0.653	744	724	0.0	1.8	8.696	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	181	181	45	0	0	1403	976	0.185	180	156	0.2	0.2	4.522	A
2	1050	675	169	375	0	611	880	0.768	669	972	1.6	3.1	16.658	C
3	661	661	165	0	375	897	801	0.825	652	384	1.8	4.1	22.759	C
4	420	420	105	0	0	1118	1093	0.384	419	431	0.4	0.6	5.337	A
5	897	897	224	0	0	670	1107	0.811	889	867	1.8	3.9	15.936	C

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	221	221	55	0	0	1627	877	0.252	221	181	0.2	0.3	5.479	A
2	1286	827	207	459	0	726	847	0.976	791	1122	3.1	12.0	47.225	E
3	809	809	202	0	459	1061	754	1.073	733	456	4.1	23.3	83.158	F
4	514	514	129	0	0	1295	1014	0.507	513	499	0.6	1.0	7.157	A
5	1099	1099	275	0	0	783	1061	1.036	1026	1024	3.9	22.3	58.895	F

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	221	221	55	0	0	1652	867	0.255	221	184	0.3	0.3	5.577	A
2	1286	827	207	459	0	734	844	0.979	811	1139	12.0	16.1	72.469	F
3	809	809	202	0	459	1084	748	1.082	742	461	23.3	40.0	165.822	F
4	514	514	129	0	0	1318	1004	0.512	514	508	1.0	1.0	7.351	A
5	1099	1099	275	0	0	790	1058	1.039	1046	1042	22.3	35.5	110.265	F

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	181	181	45	0	0	1575	900	0.201	181	174	0.3	0.3	5.008	A
2	1050	675	169	375	0	658	866	0.779	724	1098	16.1	3.9	31.341	D
3	661	661	165	0	375	971	780	0.847	761	411	40.0	14.9	135.382	F
4	420	420	105	0	0	1248	1035	0.406	421	483	1.0	0.7	5.880	A
5	897	897	224	0	0	734	1080	0.830	1015	935	35.5	6.1	67.522	F

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	151	151	38	0	0	1227	1054	0.144	152	136	0.3	0.2	3.992	A
2	879	565	141	314	0	521	905	0.625	574	857	3.9	1.7	11.146	B
3	553	553	138	0	314	769	838	0.661	605	327	14.9	2.0	18.748	C
4	352	352	88	0	0	994	1148	0.306	353	379	0.7	0.4	4.531	A
5	751	751	188	0	0	596	1137	0.661	768	751	6.1	2.0	10.154	B

Queue Variation Results for each time segment

10:45 - 11:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.16	0.00	0.00	0.16	0.16			N/A	N/A
2	1.60	0.57	1.01	2.00	2.56			N/A	N/A
3	1.84	0.28	1.09	3.00	3.81			N/A	N/A
4	0.42	0.00	0.00	0.42	0.42			N/A	N/A
5	1.83	0.31	1.10	2.95	3.73			N/A	N/A

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.23	0.00	0.00	0.23	0.23			N/A	N/A
2	3.07	0.07	1.27	8.03	11.90			N/A	N/A
3	4.13	0.09	1.35	10.77	15.58			N/A	N/A
4	0.62	0.10	0.82	1.37	1.43			N/A	N/A
5	3.93	0.07	1.32	10.72	16.21			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.33	0.03	0.25	0.46	0.48			N/A	N/A
2	12.02	0.20	5.74	30.90	43.07			N/A	N/A
3	23.26	3.73	19.10	44.55	54.37			N/A	N/A
4	1.01	0.03	0.26	1.01	1.01			N/A	N/A
5	22.26	1.72	16.65	46.96	59.37			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.34	0.03	0.32	1.15	1.41			N/A	N/A
2	16.07	0.14	5.63	44.45	65.09			N/A	N/A
3	40.00	8.81	34.40	73.15	87.70			N/A	N/A
4	1.04	0.03	0.28	1.04	2.71			N/A	N/A
5	35.51	3.39	27.23	74.25	93.32			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.25	0.00	0.00	0.25	0.25			N/A	N/A
2	3.90	0.04	0.45	10.96	19.70			N/A	N/A
3	14.91	1.17	10.59	32.28	41.33			N/A	N/A
4	0.69	0.23	0.94	1.39	1.44			N/A	N/A
5	6.06	0.06	0.99	17.51	28.90			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.17	0.00	0.00	0.17	0.17			N/A	N/A
2	1.71	0.03	0.30	2.22	8.28			N/A	N/A
3	2.04	0.03	0.29	2.04	8.50			N/A	N/A
4	0.44	0.04	0.37	1.19	1.34			N/A	N/A
5	2.01	0.03	0.29	2.01	8.69			N/A	N/A

Parkway Roundabout - 2043 Opening Year (Residential, Creche & Medical Centre), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	120.96	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-19	Arm 3	120.96	F

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)	Run automatically
D18	2043 Opening Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	12:00	13:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	216	100.000
2		ONE HOUR	✓	1156	100.000
3		ONE HOUR	✓	800	100.000
4		ONE HOUR	✓	488	100.000
5		ONE HOUR	✓	1004	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
From		1	2	3	4	5
	1	0	7	92	65	52
	2	7	12	402	155	580
	3	92	350	1	123	234
	4	37	175	128	0	148
	5	71	629	190	110	4

Proportions

	To					
From		1	2	3	4	5
	1	0.00	0.03	0.43	0.30	0.24
	2	0.01	0.01	0.35	0.13	0.50
	3	0.12	0.44	0.00	0.15	0.29
	4	0.08	0.36	0.26	0.00	0.30
	5	0.07	0.63	0.19	0.11	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

	To					
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh

	To					
From		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
12:00-12:15	1	163	163
	2	870	870
	3	602	602
	4	367	367
	5	756	756
12:15-12:30	1	194	194
	2	1039	1039
	3	719	719
	4	439	439
	5	903	903
12:30-12:45	1	238	238
	2	1273	1273
	3	881	881
	4	537	537
	5	1105	1105
12:45-13:00	1	238	238
	2	1273	1273
	3	881	881
	4	537	537
	5	1105	1105
13:00-13:15	1	194	194
	2	1039	1039
	3	719	719
	4	439	439
	5	903	903
13:15-13:30	1	163	163
	2	870	870
	3	602	602
	4	367	367
	5	756	756

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.27	5.69	0.4	1.1	A	198	297
2	0.97	65.04	14.3	62.4	F	1061	1038
3	1.17	294.83	71.2	119.9	F	734	1101
4	0.54	7.93	1.2	2.4	A	448	672
5	1.05	126.54	41.6	99.1	F	921	1382

Main Results for each time segment

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	163	163	41	0	0	1191	1070	0.152	162	154	0.0	0.2	3.966	A
2	870	568	142	303	0	480	917	0.619	561	873	0.0	1.6	9.953	A
3	602	602	151	0	303	734	848	0.711	593	307	0.0	2.3	13.681	B
4	367	367	92	0	0	990	1150	0.319	366	337	0.0	0.5	4.576	A
5	756	756	189	0	0	597	1136	0.665	748	758	0.0	1.9	9.105	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	194	194	49	0	0	1421	968	0.201	194	183	0.2	0.2	4.647	A
2	1039	678	169	361	0	574	890	0.761	672	1041	1.6	3.0	16.095	C
3	719	719	180	0	361	879	806	0.892	703	367	2.3	6.3	31.004	D
4	439	439	110	0	0	1180	1065	0.412	438	403	0.5	0.7	5.727	A
5	903	903	226	0	0	711	1090	0.828	893	906	1.9	4.3	17.470	C

12:30 - 12:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	238	238	59	0	0	1623	879	0.270	237	206	0.2	0.4	5.605	A
2	1273	830	208	443	0	680	860	0.966	798	1180	3.0	11.1	43.976	E
3	881	881	220	0	443	1042	760	1.160	750	436	6.3	39.0	123.683	F
4	537	537	134	0	0	1330	998	0.538	535	463	0.7	1.1	7.746	A
5	1105	1105	276	0	0	809	1050	1.053	1021	1057	4.3	25.4	65.505	F

12:45 - 13:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	238	238	59	0	0	1643	870	0.273	238	208	0.4	0.4	5.690	A
2	1273	830	208	443	0	687	858	0.968	817	1194	11.1	14.3	65.040	F
3	881	881	220	0	443	1064	753	1.169	752	440	39.0	71.2	272.271	F
4	537	537	134	0	0	1347	991	0.542	537	469	1.1	1.2	7.934	A
5	1105	1105	276	0	0	811	1049	1.054	1041	1073	25.4	41.6	126.545	F

13:00 - 13:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	194	194	49	0	0	1591	893	0.217	195	203	0.4	0.3	5.153	A
2	1039	678	169	361	0	619	877	0.773	720	1166	14.3	3.7	27.549	D
3	719	719	180	0	361	944	788	0.913	777	396	71.2	56.7	294.829	F
4	439	439	110	0	0	1281	1020	0.430	440	440	1.2	0.8	6.223	A
5	903	903	226	0	0	755	1072	0.842	1039	966	41.6	7.5	88.912	F

13:15 - 13:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	163	163	41	0	0	1317	1014	0.160	163	182	0.3	0.2	4.230	A
2	870	568	142	303	0	490	914	0.621	576	990	3.7	1.7	10.882	B
3	602	602	151	0	303	752	842	0.715	816	314	56.7	3.4	132.908	F
4	367	367	92	0	0	1190	1061	0.346	368	378	0.8	0.5	5.207	A
5	756	756	189	0	0	723	1085	0.697	776	836	7.5	2.4	12.369	B

Queue Variation Results for each time segment

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.18	0.00	0.00	0.18	0.18			N/A	N/A
2	1.58	0.58	1.50	1.96	2.42			N/A	N/A
3	2.33	0.15	1.22	4.75	6.23			N/A	N/A
4	0.47	0.00	0.00	0.47	0.47			N/A	N/A
5	1.93	0.25	1.13	3.37	4.19			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.25	0.00	0.00	0.25	0.25			N/A	N/A
2	2.98	0.07	1.23	7.80	11.55			N/A	N/A
3	6.27	0.16	2.98	15.55	21.48			N/A	N/A
4	0.69	0.10	0.84	1.38	1.44			N/A	N/A
5	4.35	0.08	1.04	11.76	17.54			N/A	N/A

12:30 - 12:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.37	0.03	0.25	0.46	0.48			N/A	N/A
2	11.07	0.15	4.56	29.37	41.85			N/A	N/A
3	38.95	14.25	35.72	62.58	72.02			N/A	N/A
4	1.14	0.03	0.26	1.14	1.14			N/A	N/A
5	25.38	3.21	20.21	50.62	62.62			N/A	N/A

12:45 - 13:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.37	0.03	0.32	1.12	1.12			N/A	N/A
2	14.31	0.10	3.58	40.93	62.39			N/A	N/A
3	71.17	32.99	67.35	106.56	119.90			N/A	N/A
4	1.17	0.03	0.27	1.17	2.38			N/A	N/A
5	41.59	6.61	34.22	80.98	99.14			N/A	N/A

13:00 - 13:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.28	0.00	0.00	0.28	0.28			N/A	N/A
2	3.72	0.04	0.44	10.42	18.76			N/A	N/A
3	56.74	28.50	54.05	82.10	91.48			N/A	N/A
4	0.76	0.18	0.92	1.39	1.45			N/A	N/A
5	7.50	0.07	1.48	21.66	34.56			N/A	N/A

13:15 - 13:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.19	0.00	0.00	0.19	0.19			N/A	N/A
2	1.69	0.03	0.31	2.37	8.30			N/A	N/A
3	3.38	0.03	0.32	5.21	17.14			N/A	N/A
4	0.53	0.05	0.51	1.30	1.40			N/A	N/A
5	2.39	0.03	0.30	2.81	11.28			N/A	N/A

Parkway Roundabout - 2043 Opening Year (Overall Masterplan Development), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	130.45	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-18	Arm 3	130.45	F

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)	Run automatically
D19	2043 Opening Year (Overall Masterplan Development)	AM	ONE HOUR	10:45	12:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	202	100.000
2		ONE HOUR	✓	1191	100.000
3		ONE HOUR	✓	771	100.000
4		ONE HOUR	✓	482	100.000
5		ONE HOUR	✓	1052	100.000

Origin-Destination Data

Demand (PCU/hr)

	To					
From		1	2	3	4	5
	1	0	11	83	27	81
	2	11	11	426	163	580
	3	40	405	1	152	173
	4	35	165	135	0	147
	5	89	606	210	145	2

Proportions

	To					
From		1	2	3	4	5
	1	0.00	0.05	0.41	0.13	0.40
	2	0.01	0.01	0.36	0.14	0.49
	3	0.05	0.53	0.00	0.20	0.22
	4	0.07	0.34	0.28	0.00	0.30
	5	0.08	0.58	0.20	0.14	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

	To					
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh

	To					
From		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
10:45-11:00	1	152	152
	2	897	897
	3	580	580
	4	363	363
	5	792	792
11:00-11:15	1	182	182
	2	1071	1071
	3	693	693
	4	433	433
	5	946	946
11:15-11:30	1	222	222
	2	1311	1311
	3	849	849
	4	531	531
	5	1158	1158
11:30-11:45	1	222	222
	2	1311	1311
	3	849	849
	4	531	531
	5	1158	1158
11:45-12:00	1	182	182
	2	1071	1071
	3	693	693
	4	433	433
	5	946	946
12:00-12:15	1	152	152
	2	897	897
	3	580	580
	4	363	363
	5	792	792

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.26	5.73	0.4	1.5	A	185	278
2	0.99	80.10	18.3	68.6	F	1093	1053
3	1.14	236.37	58.6	106.7	F	707	1061
4	0.53	7.74	1.1	2.5	A	442	663
5	1.11	190.00	66.9	124.3	F	965	1448

Main Results for each time segment

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	152	152	38	0	0	1251	1043	0.146	151	130	0.0	0.2	4.033	A
2	897	576	144	321	0	511	908	0.634	569	892	0.0	1.7	10.424	B
3	580	580	145	0	321	760	840	0.691	572	320	0.0	2.1	13.033	B
4	363	363	91	0	0	969	1159	0.313	361	362	0.0	0.5	4.500	A
5	792	792	198	0	0	598	1136	0.697	783	732	0.0	2.2	9.973	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	182	182	45	0	0	1490	938	0.194	181	155	0.2	0.2	4.758	A
2	1071	688	172	383	0	610	880	0.782	681	1062	1.7	3.3	17.549	C
3	693	693	173	0	383	908	798	0.869	680	383	2.1	5.4	27.880	D
4	433	433	108	0	0	1157	1076	0.403	432	432	0.5	0.7	5.590	A
5	946	946	236	0	0	714	1089	0.869	932	875	2.2	5.6	21.306	C

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	222	222	56	0	0	1673	857	0.259	222	175	0.2	0.3	5.664	A
2	1311	842	211	469	0	708	852	0.989	802	1187	3.3	13.3	50.680	F
3	849	849	212	0	469	1065	753	1.127	740	446	5.4	32.5	107.720	F
4	531	531	133	0	0	1317	1004	0.528	529	488	0.7	1.1	7.547	A
5	1158	1158	290	0	0	819	1046	1.107	1030	1027	5.6	37.7	88.552	F

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	222	222	56	0	0	1687	851	0.261	222	177	0.3	0.4	5.726	A
2	1311	842	211	469	0	713	850	0.990	822	1197	13.3	18.3	80.101	F
3	849	849	212	0	469	1087	747	1.136	745	449	32.5	58.6	230.694	F
4	531	531	133	0	0	1336	996	0.533	531	495	1.1	1.1	7.739	A
5	1158	1158	290	0	0	823	1044	1.109	1041	1044	37.7	66.9	190.002	F

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	182	182	45	0	0	1646	869	0.209	182	171	0.4	0.3	5.240	A
2	1071	688	172	383	0	652	868	0.792	744	1176	18.3	4.3	37.077	E
3	693	693	173	0	383	988	775	0.894	762	408	58.6	41.3	236.374	F
4	433	433	108	0	0	1272	1024	0.423	435	478	1.1	0.7	6.127	A
5	946	946	236	0	0	764	1068	0.885	1052	943	66.9	40.2	185.188	F

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	152	152	38	0	0	1484	941	0.162	152	153	0.3	0.2	4.568	A
2	897	576	144	321	0	566	892	0.645	586	1070	4.3	1.9	12.080	B
3	580	580	145	0	321	799	829	0.700	735	353	41.3	2.6	74.878	F
4	363	363	91	0	0	1114	1095	0.331	364	420	0.7	0.5	4.933	A
5	792	792	198	0	0	695	1096	0.722	942	783	40.2	2.8	44.021	E

Queue Variation Results for each time segment

10:45 - 11:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.17	0.00	0.00	0.17	0.17			N/A	N/A
2	1.68	0.57	1.09	2.35	2.78			N/A	N/A
3	2.13	0.18	1.18	4.02	5.22			N/A	N/A
4	0.45	0.00	0.00	0.45	0.45			N/A	N/A
5	2.22	0.16	1.19	4.40	5.72			N/A	N/A

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.24	0.00	0.00	0.24	0.24			N/A	N/A
2	3.30	0.07	1.36	8.64	12.71			N/A	N/A
3	5.38	0.12	2.27	13.63	19.14			N/A	N/A
4	0.67	0.10	0.84	1.37	1.44			N/A	N/A
5	5.61	0.10	1.92	14.85	21.49			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.35	0.03	0.25	0.46	0.48			N/A	N/A
2	13.34	0.29	7.27	33.00	44.92			N/A	N/A
3	32.50	9.63	29.00	55.20	64.69			N/A	N/A
4	1.10	0.03	0.26	1.10	1.10			N/A	N/A
5	37.71	10.92	33.59	64.63	75.89			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.35	0.03	0.32	1.19	1.46			N/A	N/A
2	18.33	0.21	8.24	48.54	68.59			N/A	N/A
3	58.57	22.67	54.26	93.09	106.69			N/A	N/A
4	1.13	0.03	0.27	1.13	2.50			N/A	N/A
5	66.93	24.78	61.72	107.98	124.27			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.27	0.00	0.00	0.27	0.27			N/A	N/A
2	4.29	0.05	0.45	12.09	21.73			N/A	N/A
3	41.33	17.16	38.49	63.83	72.59			N/A	N/A
4	0.74	0.20	0.93	1.39	1.45			N/A	N/A
5	40.24	15.04	37.00	64.27	73.84			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.19	0.00	0.00	0.19	0.19			N/A	N/A
2	1.88	0.03	0.31	2.66	9.29			N/A	N/A
3	2.61	0.03	0.30	2.61	11.68			N/A	N/A
4	0.50	0.05	0.45	1.28	1.39			N/A	N/A
5	2.82	0.03	0.30	2.90	12.89			N/A	N/A

Parkway Roundabout - 2043 Opening Year (Overall Masterplan Development), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	Parkway Roundabout	Standard Roundabout		1, 2, 3, 4, 5	165.25	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-21	Arm 3	165.25	F

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)	Run automatically
D20	2043 Opening Year (Overall Masterplan Development)	PM	ONE HOUR	12:00	13:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	216	100.000
2		ONE HOUR	✓	1268	100.000
3		ONE HOUR	✓	806	100.000
4		ONE HOUR	✓	491	100.000
5		ONE HOUR	✓	1014	100.000

Origin-Destination Data

Demand (PCU/hr)						
	To					
From		1	2	3	4	5
	1	0	7	92	65	52
	2	8	13	441	170	636
	3	92	356	1	123	234
	4	37	178	128	0	148
	5	71	639	190	110	4

Proportions						
	To					
From		1	2	3	4	5
	1	0.00	0.03	0.43	0.30	0.24
	2	0.01	0.01	0.35	0.13	0.50
	3	0.11	0.44	0.00	0.15	0.29
	4	0.08	0.36	0.26	0.00	0.30
	5	0.07	0.63	0.19	0.11	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						
	To					
From		1	2	3	4	5
	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0

Average PCU Per Veh						
	To					
From		1	2	3	4	5
	1	1.000	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000	1.000
	5	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demant for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
12:00-12:15	1	163	163
	2	955	955
	3	607	607
	4	370	370
	5	763	763
12:15-12:30	1	194	194
	2	1140	1140
	3	725	725
	4	441	441
	5	912	912
12:30-12:45	1	238	238
	2	1396	1396
	3	887	887
	4	541	541
	5	1116	1116
12:45-13:00	1	238	238
	2	1396	1396
	3	887	887
	4	541	541
	5	1116	1116
13:00-13:15	1	194	194
	2	1140	1140
	3	725	725
	4	441	441
	5	912	912
13:15-13:30	1	163	163
	2	955	955
	3	607	607
	4	370	370
	5	763	763

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.27	5.71	0.4	1.2	A	198	297
2	1.06	141.67	38.1	89.8	F	1164	1138
3	1.19	374.20	80.0	129.7	F	740	1109
4	0.55	8.16	1.2	2.2	A	451	676
5	1.06	138.71	46.5	104.0	F	930	1396

Main Results for each time segment

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	163	163	41	0	0	1206	1063	0.153	162	155	0.0	0.2	3.990	A
2	955	623	156	332	0	480	917	0.679	614	888	0.0	2.0	11.606	B
3	607	607	152	0	332	787	832	0.729	597	307	0.0	2.5	14.700	B
4	370	370	92	0	0	1036	1130	0.327	368	348	0.0	0.5	4.714	A
5	763	763	191	0	0	605	1133	0.674	755	799	0.0	2.0	9.345	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	194	194	49	0	0	1436	962	0.202	194	184	0.2	0.3	4.687	A
2	1140	743	186	396	0	573	890	0.835	734	1057	2.0	4.4	21.732	C
3	725	725	181	0	396	940	789	0.919	705	367	2.5	7.5	36.203	E
4	441	441	110	0	0	1230	1043	0.423	440	414	0.5	0.7	5.966	A
5	912	912	228	0	0	719	1087	0.839	901	952	2.0	4.6	18.402	C

12:30 - 12:45

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	238	238	59	0	0	1630	876	0.271	237	205	0.3	0.4	5.629	A
2	1396	911	228	486	0	678	860	1.058	835	1189	4.4	23.2	74.289	F
3	887	887	222	0	486	1079	749	1.185	742	434	7.5	43.9	139.695	F
4	541	541	135	0	0	1354	988	0.547	539	467	0.7	1.2	7.984	A
5	1116	1116	279	0	0	811	1049	1.064	1024	1081	4.6	27.8	70.119	F

12:45 - 13:00

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	238	238	59	0	0	1648	868	0.274	238	207	0.4	0.4	5.708	A
2	1396	911	228	486	0	684	859	1.060	851	1202	23.2	38.1	141.674	F
3	887	887	222	0	486	1097	744	1.193	743	438	43.9	80.0	310.548	F
4	541	541	135	0	0	1367	982	0.551	541	473	1.2	1.2	8.155	A
5	1116	1116	279	0	0	813	1048	1.065	1042	1094	27.8	46.5	138.712	F

13:00 - 13:15

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	194	194	49	0	0	1599	890	0.218	195	200	0.4	0.3	5.181	A
2	1140	743	186	396	0	621	877	0.848	857	1172	38.1	9.7	108.989	F
3	725	725	181	0	396	1081	748	0.968	739	397	80.0	76.3	374.204	F
4	441	441	110	0	0	1358	986	0.448	443	462	1.2	0.8	6.652	A
5	912	912	228	0	0	743	1077	0.846	1056	1058	46.5	10.3	104.073	F

13:15 - 13:30

Arm	Total Demand (PCU/hr)	Junction demand (PCU/hr)	Junction Arrivals (PCU)	Bypass demand (PCU/hr)	Bypass exit flow (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	163	163	41	0	0	1339	1005	0.162	163	182	0.3	0.2	4.278	A
2	955	623	156	332	0	494	913	0.682	652	1008	9.7	2.2	15.239	C
3	607	607	152	0	332	830	820	0.740	810	316	76.3	25.6	230.902	F
4	370	370	92	0	0	1247	1035	0.357	371	393	0.8	0.6	5.425	A
5	763	763	191	0	0	727	1084	0.704	795	891	10.3	2.5	13.707	B

Queue Variation Results for each time segment

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.18	0.00	0.00	0.18	0.18			N/A	N/A
2	2.03	0.40	1.30	3.37	4.08			N/A	N/A
3	2.53	0.08	1.36	6.11	8.68			N/A	N/A
4	0.48	0.00	0.00	0.48	0.48			N/A	N/A
5	2.00	0.22	1.16	3.61	4.56			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.25	0.00	0.00	0.25	0.25			N/A	N/A
2	4.44	0.09	1.52	11.55	16.64			N/A	N/A
3	7.53	0.18	3.74	18.67	25.69			N/A	N/A
4	0.73	0.11	0.86	1.39	1.45			N/A	N/A
5	4.63	0.08	1.27	12.47	18.44			N/A	N/A

12:30 - 12:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.37	0.03	0.25	0.46	0.48			N/A	N/A
2	23.22	3.06	18.58	45.88	56.61			N/A	N/A
3	43.90	17.66	40.75	68.57	78.20			N/A	N/A
4	1.19	0.03	0.26	1.19	1.19			N/A	N/A
5	27.78	4.49	22.88	53.48	65.34			N/A	N/A

12:45 - 13:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.37	0.03	0.32	1.15	1.15			N/A	N/A
2	38.09	6.35	31.54	73.52	89.80			N/A	N/A
3	80.02	40.16	76.39	116.32	129.72			N/A	N/A
4	1.21	0.03	0.27	1.21	2.21			N/A	N/A
5	46.48	9.63	39.68	86.35	104.00			N/A	N/A

13:00 - 13:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.28	0.00	0.00	0.28	0.28			N/A	N/A
2	9.65	0.13	3.60	25.98	37.52			N/A	N/A
3	76.35	36.46	72.49	113.05	126.75			N/A	N/A
4	0.82	0.20	0.94	1.41	1.47			N/A	N/A
5	10.33	0.12	3.75	27.96	40.54			N/A	N/A

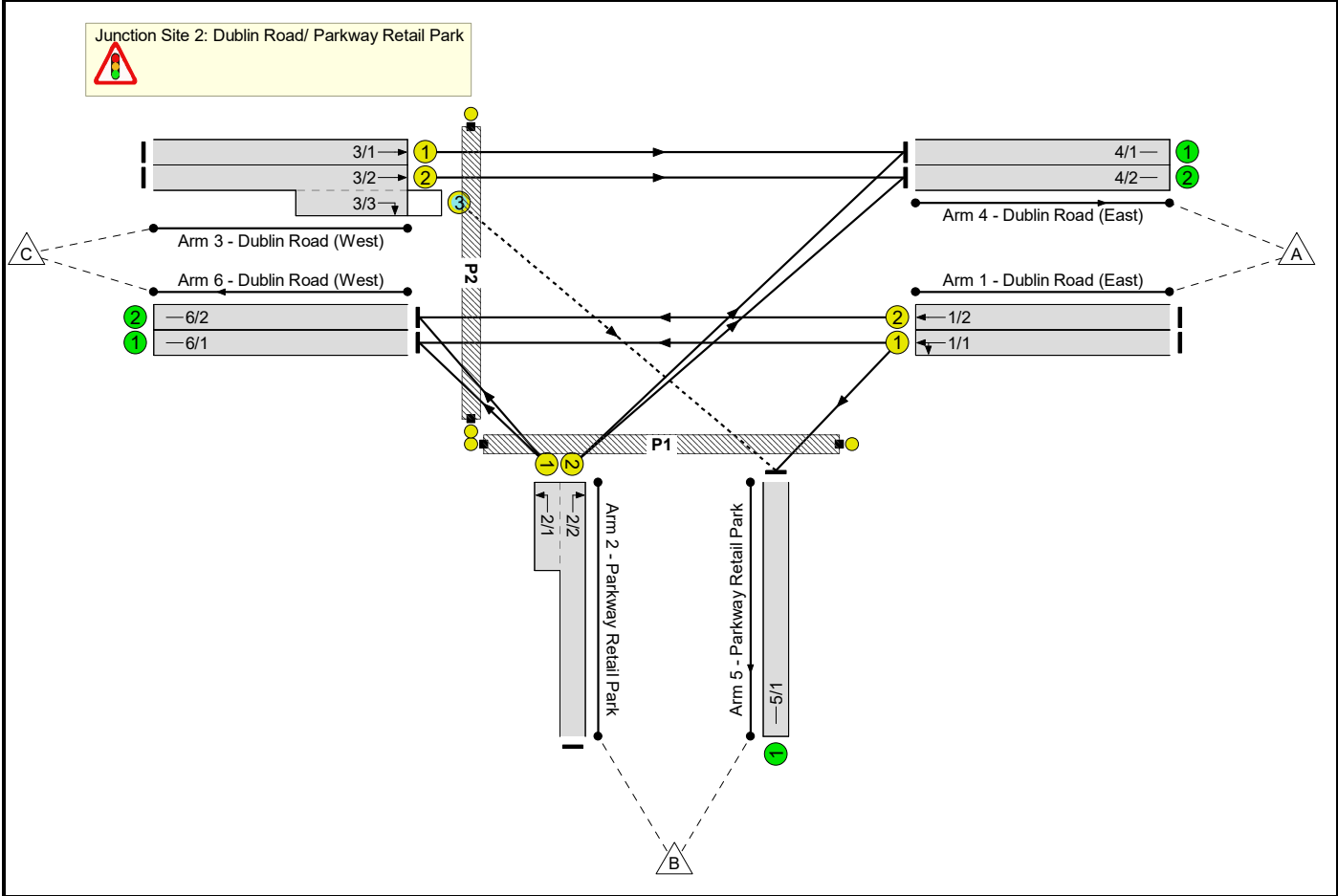
13:15 - 13:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.19	0.00	0.00	0.19	0.19			N/A	N/A
2	2.24	0.03	0.30	2.24	10.14			N/A	N/A
3	25.63	5.47	21.87	46.64	55.91			N/A	N/A
4	0.56	0.05	0.56	1.32	1.41			N/A	N/A
5	2.49	0.03	0.30	2.86	11.69			N/A	N/A

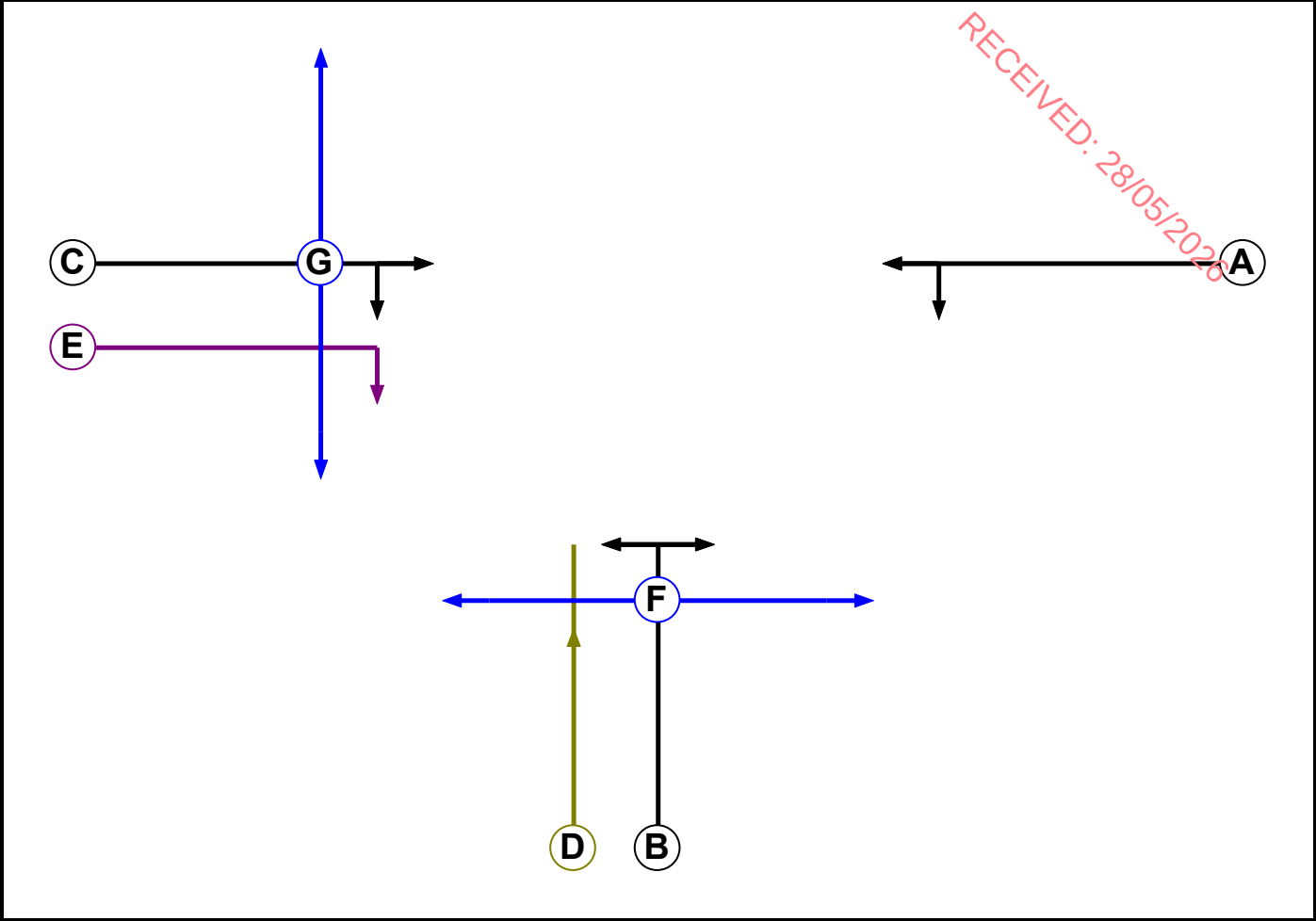
User and Project Details

Project:	
Title:	
Location:	
Additional detail:	
File name:	Junction Site 2 - Dublin Road-Parkway Retail Park Signalised Junction (with Arrows).lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Filter	B	4	0
E	Ind. Arrow	C	4	4
F	Pedestrian		7	7
G	Pedestrian		7	7

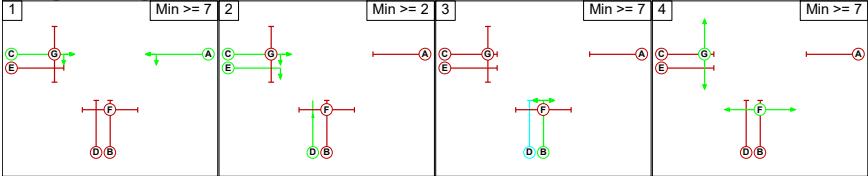
Phase Intergreens Matrix

Terminating Phase	Starting Phase							
		A	B	C	D	E	F	G
	A		7	-	7	5	8	10
	B	5		5	-	5	5	7
	C	-	5		-	-	10	6
	D	5	-	-		-	5	7
	E	6	5	-	-		10	6
	F	17	17	17	17	17		-
	G	20	20	20	20	20	-	

Phases in Stage

Stage No.	Phases in Stage
1	A C
2	C D E
3	B
4	F G

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

From Stage	To Stage				
	1	2	3	4	
	1	7	7	10	
	2	X	5	X	
	3	5	5	7	
	4	20	20	20	

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Full Input Data And Results

Give-Way Lane Input Data

Junction: Junction Site 2: Dublin Road/ Parkway Retail Park											
Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Min Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
3/3 (Dublin Road (West))	5/1 (Right)	1439	0	1/1	1.09	All	2.00	-	0.50	2	2.00
				1/2	1.09	All					

Lane Input Data

Junction: Junction Site 2: Dublin Road/ Parkway Retail Park												
Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (Dublin Road (East))	U	A	2	3	56.2	Geom	-	3.16	0.00	Y	Arm 5 Left	16.00
											Arm 6 Ahead	Inf
1/2 (Dublin Road (East))	U	A	2	3	56.2	Geom	-	3.35	0.00	Y	Arm 6 Ahead	Inf
2/1 (Parkway Retail Park)	U	B	2	3	5.2	Geom	-	4.02	0.00	Y	Arm 6 Left	15.40
2/2 (Parkway Retail Park)	U	B	2	3	8.3	Geom	-	4.18	0.00	Y	Arm 4 Right	Inf
3/1 (Dublin Road (West))	U	C	2	3	46.4	Geom	-	2.63	0.00	Y	Arm 4 Ahead	Inf
3/2 (Dublin Road (West))	U	C	2	3	46.4	Geom	-	3.30	0.00	Y	Arm 4 Ahead	Inf
3/3 (Dublin Road (West))	O	C E	2	3	6.6	Geom	-	3.22	0.00	Y	Arm 5 Right	22.00
4/1 (Dublin Road (East))	U		2	3	56.2	Geom	-	3.69	0.00	Y		
4/2 (Dublin Road (East))	U		2	3	56.2	Geom	-	3.58	0.00	Y		
5/1 (Parkway Retail Park)	U		2	3	8.4	Geom	-	4.40	0.00	Y		
6/1 (Dublin Road (West))	U		2	3	46.4	Geom	-	3.61	0.00	Y		
6/2 (Dublin Road (West))	U		2	3	46.4	Geom	-	3.19	0.00	Y		

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2025 Do Nothing Baseline (AM)'	10:30	11:30	01:00	
2: '2025 Do Nothing Baseline (PM)'	15:30	16:30	01:00	
3: 'Do Nothing Year 2028 (AM)'	10:30	11:30	01:00	
4: 'Do Nothing Year 2028 (PM)'	15:30	16:30	01:00	
5: 'Opening Year 2028 (AM) - Residential, Creche & Medical Centre'	10:30	11:30	01:00	
6: 'Opening Year 2028 (PM) - Residential, Creche & Medical Centre'	15:30	16:30	01:00	
7: 'Opening Year 2028 (AM) - Overall Masterplan Development'	10:30	11:30	01:00	
8: 'Opening Year 2028 (PM) - Overall Masterplan Development'	15:30	16:30	01:00	
9: 'Do Nothing Year 2033 (AM)'	10:30	11:30	01:00	
10: 'Do Nothing Year 2033 (PM)'	15:30	16:30	01:00	
11: 'Design Year 2033 (AM) - Residential, Creche & Medical Centre'	10:30	11:30	01:00	
12: 'Design Year 2033 (PM) - Residential, Creche & Medical Centre'	15:30	16:30	01:00	
13: 'Design Year 2033 (AM) - Overall Masterplan Development'	10:30	11:30	01:00	
14: 'Design Year 2033 (PM) - Overall Masterplan Development'	15:30	16:30	01:00	
15: 'Do Nothing Year 2043 (AM)'	10:30	11:30	01:00	
16: 'Do Nothing Year 2043 (PM)'	15:30	16:30	01:00	
17: 'Design Year 2043 (AM) - Residential, Creche & Medical Centre'	10:30	11:30	01:00	
18: 'Design Year 2043 (PM) - Residential, Creche & Medical Centre'	15:30	16:30	01:00	
19: 'Design Year 2043 (AM) - Overall Masterplan Development'	10:30	11:30	01:00	
20: 'Design Year 2043 (PM) - Overall Masterplan Development'	15:30	16:30	01:00	

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Traffic Flows, Desired**Scenario 1: '2025 Do Nothing Baseline (AM)'** (FG1: '2025 Do Nothing Baseline (AM)', Plan 1: 'Network Control Plan 1')**Desired Flow :**

	Destination				
		A	B	C	Tot.
Origin	A	0	124	841	965
	B	87	0	116	203
	C	759	117	0	876
	Tot.	846	241	957	2044

Scenario 2: '2025 Do Nothing Baseline (PM)' (FG2: '2025 Do Nothing Baseline (PM)', Plan 1: 'Network Control Plan 1')**Desired Flow :**

	Destination				
		A	B	C	Tot.
Origin	A	0	116	893	1009
	B	113	0	120	233
	C	823	113	0	936
	Tot.	936	229	1013	2178

Scenario 3: 'Do Nothing Year 2028 (AM)' (FG3: 'Do Nothing Year 2028 (AM)', Plan 1: 'Network Control Plan 1')**Desired Flow :**

	Destination				
		A	B	C	Tot.
Origin	A	0	130	885	1015
	B	92	0	122	214
	C	799	123	0	922
	Tot.	891	253	1007	2151

Full Input Data And Results

Scenario 4: 'Do Nothing Year 2028 (PM)' (FG4: 'Do Nothing Year 2028 (PM)', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	122	941	1063
	B	118	0	126	244
	C	867	119	0	986
	Tot.	985	241	1067	2293

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Scenario 5: 'Opening Year 2028 (AM) - Residential, Creche & Medical Centre' (FG5: 'Opening Year 2028 (AM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	130	930	1060
	B	125	0	122	247
	C	799	142	0	941
	Tot.	924	272	1052	2248

Scenario 6: 'Opening Year 2028 (PM) - Residential, Creche & Medical Centre' (FG6: 'Opening Year 2028 (PM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	122	967	1089
	B	143	0	126	269
	C	867	152	0	1019
	Tot.	1010	274	1093	2377

Scenario 7: 'Opening Year 2028 (AM) - Overall Masterplan Development' (FG7: 'Opening Year 2028 (AM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	130	953	1083
	B	142	0	122	264
	C	799	248	0	1047
	Tot.	941	378	1075	2394

Full Input Data And Results

Scenario 8: 'Opening Year 2028 (PM) - Overall Masterplan Development' (FG8: 'Opening Year 2028 (PM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	122	1079	1201
	B	248	0	126	374
	C	867	171	0	1038
	Tot.	1115	293	1205	2613

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Scenario 9: 'Do Nothing Year 2033 (AM)' (FG9: 'Do Nothing Year 2033 (AM)', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	138	936	1074
	B	97	0	129	226
	C	844	130	0	974
	Tot.	941	268	1065	2274

Scenario 10: 'Do Nothing Year 2033 (PM)' (FG10: 'Do Nothing Year 2033 (PM)', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	129	994	1123
	B	125	0	133	258
	C	916	126	0	1042
	Tot.	1041	255	1127	2423

Scenario 11: 'Design Year 2033 (AM) - Residential, Creche & Medical Centre' (FG11: 'Design Year 2033 (AM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	138	980	1118
	B	130	0	129	259
	C	844	149	0	993
	Tot.	974	287	1109	2370

Full Input Data And Results

Scenario 12: 'Design Year 2033 (PM) - Residential, Creche & Medical Centre' (FG12: 'Design Year 2033 (PM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	129	1021	1150
	B	150	0	133	283
	C	916	159	0	1075
	Tot.	1066	288	1154	2508

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Scenario 13: 'Design Year 2033 (AM) - Overall Masterplan Development' (FG13: 'Design Year 2033 (AM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	138	1003	1141
	B	148	0	129	277
	C	844	255	0	1099
	Tot.	992	393	1132	2517

Scenario 14: 'Design Year 2033 (PM) - Overall Masterplan Development' (FG14: 'Design Year 2033 (PM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	129	1133	1262
	B	255	0	133	388
	C	916	178	0	1094
	Tot.	1171	307	1266	2744

Scenario 15: 'Do Nothing Year 2043 (AM)' (FG15: 'Do Nothing Year 2043 (AM)', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	148	1003	1151
	B	104	0	138	242
	C	905	139	0	1044
	Tot.	1009	287	1141	2437

Full Input Data And Results

Scenario 16: 'Do Nothing Year 2043 (PM)' (FG16: 'Do Nothing Year 2043 (PM)', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	139	1066	1205
	B	134	0	143	277
	C	982	135	0	1117
	Tot.	1116	274	1209	2599

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Scenario 17: 'Design Year 2043 (AM) - Residential, Creche & Medical Centre' (FG17: 'Design Year 2043 (AM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	148	1047	1195
	B	137	0	138	275
	C	905	158	0	1063
	Tot.	1042	306	1185	2533

Scenario 18: 'Design Year 2043 (PM) - Residential, Creche & Medical Centre' (FG18: 'Design Year 2043 (PM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	139	1092	1231
	B	159	0	143	302
	C	982	168	0	1150
	Tot.	1141	307	1235	2683

Scenario 19: 'Design Year 2043 (AM) - Overall Masterplan Development' (FG19: 'Design Year 2043 (AM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
		A	B	C	Tot.
Origin	A	0	148	1071	1219
	B	155	0	138	293
	C	905	264	0	1169
	Tot.	1060	412	1209	2681

Scenario 20: 'Design Year 2043 (PM) - Overall Masterplan Development' (FG20: 'Design Year 2043 (PM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	139	1205	1344
	B	264	0	143	407
	C	982	187	0	1169
	Tot.	1246	326	1348	2920

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Full Input Data And Results

Network Results

Scenario 1: '2025 Do Nothing Baseline (AM)' (FG1: '2025 Do Nothing Baseline (AM)', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	53.1%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	53.1%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	56	-	473	1885	895	52.8%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	56	-	492	1950	926	53.1%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	16	-	203	2033:1838	164+219	53.0 : 53.0%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	65	-	376	1878	1033	36.4%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	65	4	500	1945:1813	863+264	44.4 : 44.4%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	453	1984	1984	22.8%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	393	1973	1973	19.9%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	241	2055	2055	11.7%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	465	1976	1976	23.5%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	492	1934	1934	25.4%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 2: '2025 Do Nothing Baseline (PM)' (FG2: '2025 Do Nothing Baseline (PM)', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	56.4%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	56.4%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	56	-	495	1890	898	55.1%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	56	-	514	1950	926	55.5%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	16	-	233	2033:1838	201+213	56.4 : 56.4%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	65	-	408	1878	1033	39.5%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	65	4	528	1945:1813	881+240	47.1 : 47.1%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	504	1984	1984	25.4%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	432	1973	1973	21.9%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	229	2055	2055	11.1%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	499	1976	1976	25.3%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	514	1934	1934	26.6%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 3: 'Do Nothing Year 2028 (AM)' (FG3: 'Do Nothing Year 2028 (AM)', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	55.8%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	55.8%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	56	-	498	1885	895	55.6%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	56	-	517	1950	926	55.8%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	16	-	214	2033:1838	165+219	55.8 : 55.8%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	65	-	397	1878	1033	38.4%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	65	4	525	1945:1813	863+260	46.6 : 47.3%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	479	1984	1984	24.1%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	412	1973	1973	20.9%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	253	2055	2055	12.3%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	490	1976	1976	24.8%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	517	1934	1934	26.7%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 4: 'Do Nothing Year 2028 (PM)' (FG4: 'Do Nothing Year 2028 (PM)', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	59.1%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	59.1%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	56	-	522	1890	898	58.1%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	56	-	541	1950	926	58.4%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	16	-	244	2033:1838	200+213	59.1 : 59.1%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	65	-	430	1878	1033	41.6%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	65	4	556	1945:1813	881+240	49.6 : 49.6%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	531	1984	1984	26.8%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	454	1973	1973	23.0%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	241	2055	2055	11.7%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	526	1976	1976	26.6%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	541	1934	1934	28.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 5: 'Opening Year 2028 (AM) - Residential, Creche & Medical Centre' (FG5: 'Opening Year 2028 (AM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	58.7%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	58.7%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	56	-	520	1887	896	58.0%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	56	-	540	1950	926	58.3%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	16	-	247	2033:1838	216+211	57.9 : 57.9%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	65	-	503	1878	1033	48.7%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	65	4	438	1945:1813	505+242	58.7 : 58.7%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	584	1984	1984	29.4%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	340	1973	1973	17.2%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	272	2055	2055	13.2%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	512	1976	1976	25.9%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	540	1934	1934	27.9%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Avg. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	76	63	2	14.3	4.0	0.9	19.2	-	-	-	-
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	76	63	2	14.3	4.0	0.9	19.2	-	-	-	-
1/1	520	520	-	-	-	3.3	0.7	-	4.0	27.6	12.4	0.7	13.1
1/2	540	540	-	-	-	3.4	0.7	-	4.1	27.5	13.1	0.7	13.7
2/2+2/1	247	247	-	-	-	3.2	0.7	-	3.9	57.2	3.8	0.7	4.5
3/1	503	503	-	-	-	2.3	0.5	-	2.8	20.0	10.2	0.5	10.7
3/2+3/3	438	438	76	63	2	2.0	0.7	0.9	3.6	29.6	5.2	0.7	5.9
4/1	584	584	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
4/2	340	340	-	-	-	0.0	0.1	-	0.1	1.1	0.0	0.1	0.1
5/1	272	272	-	-	-	0.0	0.1	-	0.1	1.0	0.0	0.1	0.1
6/1	512	512	-	-	-	0.0	0.2	-	0.2	1.2	0.0	0.2	0.2
6/2	540	540	-	-	-	0.0	0.2	-	0.2	1.3	8.7	0.2	8.9
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
C1			PRC for Signalled Lanes (%):		53.4	Total Delay for Signalled Lanes (pcuHr):			18.43	Cycle Time (s): 120			
			PRC Over All Lanes (%):		53.4	Total Delay Over All Lanes(pcuHr):			19.19				

Full Input Data And Results

Scenario 6: 'Opening Year 2028 (PM) - Residential, Creche & Medical Centre' (FG6: 'Opening Year 2028 (PM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	62.9%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	62.9%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	54	-	535	1891	867	61.7%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	54	-	554	1950	894	62.0%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	17	-	269	2033:1838	232+205	61.6 : 61.6%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	64	-	599	1878	1017	58.9%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	64	5	420	1945:1813	426+242	62.9 : 62.9%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	682	1984	1984	34.4%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	328	1973	1973	16.6%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	274	2055	2055	13.3%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	539	1976	1976	27.3%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	554	1934	1934	28.6%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 7: 'Opening Year 2028 (AM) - Overall Masterplan Development' (FG7: 'Opening Year 2028 (AM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	74.0%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	74.0%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	51	-	532	1888	818	65.0%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	51	-	551	1950	845	65.2%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	13	-	264	2033:1838	198+170	71.6 : 71.6%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	68	-	799	1878	1080	74.0%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	68	12	248	1945:1813	0+340	0.0 : 72.8%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	870	1984	1984	43.9%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	71	1973	1973	3.6%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	378	2055	2055	18.4%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	524	1976	1976	26.5%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	551	1934	1934	28.5%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 8: 'Opening Year 2028 (PM) - Overall Masterplan Development' (FG8: 'Opening Year 2028 (PM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	89.4%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	89.4%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	50	-	591	1895	805	73.4%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	50	-	610	1950	829	73.6%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	20	-	374	2033:1838	285+145	87.1 : 87.1%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	61	-	867	1878	970	89.4%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	61	6	171	1945:1813	0+217	0.0 : 79.0%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	1027	1984	1984	51.8%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	88	1973	1973	4.5%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	293	2055	2055	14.3%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	595	1976	1976	30.1%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	610	1934	1934	31.5%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 9: 'Do Nothing Year 2033 (AM)' (FG9: 'Do Nothing Year 2033 (AM)', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	59.1%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	59.1%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	56	-	527	1885	895	58.9%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	56	-	547	1950	926	59.1%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	16	-	226	2033:1838	164+219	59.0 : 59.0%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	65	-	466	1878	1033	45.1%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	65	4	508	1945:1813	692+237	54.6 : 54.8%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	541	1984	1984	27.3%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	400	1973	1973	20.3%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	268	2055	2055	13.0%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	518	1976	1976	26.2%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	547	1934	1934	28.3%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 10: 'Do Nothing Year 2033 (PM)' (FG10: 'Do Nothing Year 2033 (PM)', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	62.4%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	62.4%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	56	-	552	1890	898	61.5%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	56	-	571	1950	926	61.6%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	16	-	258	2033:1838	200+213	62.4 : 62.4%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	65	-	461	1878	1033	44.6%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	65	4	581	1945:1813	879+220	51.8 : 57.2%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	568	1984	1984	28.6%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	473	1973	1973	24.0%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	255	2055	2055	12.4%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	556	1976	1976	28.1%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	571	1934	1934	29.5%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 11: 'Design Year 2033 (AM) - Residential, Creche & Medical Centre' (FG11: 'Design Year 2033 (AM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	72.9%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	72.9%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	60	-	549	1887	959	57.2%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	60	-	569	1950	991	57.4%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	12	-	259	2033:1838	181+179	72.0 : 72.0%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	69	-	799	1878	1096	72.9%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	69	4	194	1945:1813	70+232	64.3 : 64.3%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	911	1984	1984	45.9%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	63	1973	1973	3.2%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	287	2055	2055	14.0%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	540	1976	1976	27.3%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	569	1934	1934	29.4%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 12: 'Design Year 2033 (PM) - Residential, Creche & Medical Centre' (FG12: 'Design Year 2033 (PM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	83.0%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	83.0%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	61	-	565	1891	977	57.8%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	61	-	585	1950	1007	58.1%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	11	-	283	2033:1838	181+160	83.0 : 83.0%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	70	-	916	1878	1111	82.4%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	70	4	159	1945:1813	0+223	0.0 : 71.3%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	959	1984	1984	48.3%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	107	1973	1973	5.4%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	288	2055	2055	14.0%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	569	1976	1976	28.8%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	585	1934	1934	30.2%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 13: 'Design Year 2033 (AM) - Overall Masterplan Development' (FG13: 'Design Year 2033 (AM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	78.1%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	78.1%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	51	-	561	1888	818	68.6%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	51	-	580	1950	845	68.6%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	12	-	277	2033:1838	190+165	78.1 : 78.1%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	69	-	844	1878	1096	77.0%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	69	13	255	1945:1813	0+339	0.0 : 75.2%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	924	1984	1984	46.6%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	68	1973	1973	3.4%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	393	2055	2055	19.1%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	552	1976	1976	27.9%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	580	1934	1934	30.0%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 14: 'Design Year 2033 (PM) - Overall Masterplan Development' (FG14: 'Design Year 2033 (PM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	93.5%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	93.5%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	50	-	621	1894	805	77.1%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	50	-	641	1950	829	77.3%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	19	-	388	2033:1838	273+142	93.5 : 93.5%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	62	-	916	1878	986	92.9%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	62	7	178	1945:1813	0+220	0.0 : 80.9%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	1080	1984	1984	54.4%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	91	1973	1973	4.6%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	307	2055	2055	14.9%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	625	1976	1976	31.6%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	641	1934	1934	33.1%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 15: 'Do Nothing Year 2043 (AM)' (FG15: 'Do Nothing Year 2043 (AM)', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	64.4%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	64.4%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	55	-	565	1885	880	64.2%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	55	-	586	1950	910	64.4%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	16	-	242	2033:1838	165+219	63.1 : 63.1%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	65	-	627	1878	1033	60.7%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	65	5	417	1945:1813	448+224	62.1 : 62.1%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	698	1984	1984	35.2%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	311	1973	1973	15.8%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	287	2055	2055	14.0%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	555	1976	1976	28.1%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	586	1934	1934	30.3%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 16: 'Do Nothing Year 2043 (PM)' (FG16: 'Do Nothing Year 2043 (PM)', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	67.8%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	67.8%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	55	-	592	1890	882	67.1%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	55	-	613	1950	910	67.4%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	16	-	277	2033:1838	200+213	67.1 : 67.1%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	65	-	700	1878	1033	67.8%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	65	5	417	1945:1813	435+208	64.9 : 64.9%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	788	1984	1984	39.7%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	328	1973	1973	16.6%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	274	2055	2055	13.3%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	596	1976	1976	30.2%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	613	1934	1934	31.7%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 17: 'Design Year 2043 (AM) - Residential, Creche & Medical Centre' (FG17: 'Design Year 2043 (AM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	81.4%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	81.4%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	60	-	587	1887	959	61.2%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	60	-	608	1950	991	61.3%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	11	-	275	2033:1838	170+171	80.6 : 80.6%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	70	-	905	1878	1111	81.4%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	70	5	158	1945:1813	0+220	0.0 : 72.0%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	939	1984	1984	47.3%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	103	1973	1973	5.2%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	306	2055	2055	14.9%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	577	1976	1976	29.2%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	608	1934	1934	31.4%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

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Full Input Data And Results

Scenario 18: 'Design Year 2043 (PM) - Residential, Creche & Medical Centre' (FG18: 'Design Year 2043 (PM) - Residential, Creche & Medical Centre', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	88.4%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	88.4%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	59	-	605	1891	946	64.0%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	59	-	626	1950	975	64.2%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	11	-	302	2033:1838	181+162	88.1 : 88.1%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	70	-	982	1878	1111	88.4%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	70	6	168	1945:1813	0+221	0.0 : 76.0%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	1059	1984	1984	53.4%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	82	1973	1973	4.2%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	307	2055	2055	14.9%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	609	1976	1976	30.8%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	626	1934	1934	32.4%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Avg. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	25	136	7	19.0	11.2	1.0	31.3	-	-	-	-
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	25	136	7	19.0	11.2	1.0	31.3	-	-	-	-
1/1	605	605	-	-	-	3.7	0.9	-	4.6	27.3	14.8	0.9	15.7
1/2	626	626	-	-	-	3.8	0.9	-	4.7	27.2	15.3	0.9	16.2
2/2+2/1	302	302	-	-	-	4.4	3.2	-	7.6	90.8	5.2	3.2	8.4
3/1	982	982	-	-	-	5.7	3.6	-	9.3	34.2	27.8	3.6	31.4
3/2+3/3	168	168	25	136	7	1.3	1.5	1.0	3.9	82.8	5.4	1.5	6.9
4/1	1059	1059	-	-	-	0.0	0.6	-	0.6	1.9	0.0	0.6	0.6
4/2	82	82	-	-	-	0.0	0.0	-	0.0	1.0	0.0	0.0	0.0
5/1	307	307	-	-	-	0.0	0.1	-	0.1	1.0	0.0	0.1	0.1
6/1	609	609	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
6/2	626	626	-	-	-	0.0	0.2	-	0.2	1.4	10.8	0.2	11.1
Ped Link: P1	0	0	-	-	-	-	-	-	-	-	-	-	-
Ped Link: P2	0	0	-	-	-	-	-	-	-	-	-	-	-
C1 PRC for Signalled Lanes (%): 1.8 PRC Over All Lanes (%): 1.8					Total Delay for Signalled Lanes (pcuHr): 30.13 Total Delay Over All Lanes(pcuHr): 31.28				Cycle Time (s): 120				

Full Input Data And Results

Scenario 19: 'Design Year 2043 (AM) - Overall Masterplan Development' (FG19: 'Design Year 2043 (AM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	82.6%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	82.6%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	51	-	599	1888	818	73.2%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	51	-	620	1950	845	73.4%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	12	-	293	2033:1838	189+168	81.9 : 81.9%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	69	-	905	1878	1096	82.6%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	69	13	264	1945:1813	0+320	0.0 : 82.5%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	992	1984	1984	50.0%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	68	1973	1973	3.4%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	412	2055	2055	20.0%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	589	1976	1976	29.8%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	620	1934	1934	32.1%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

[illegible]

Full Input Data And Results

Scenario 20: 'Design Year 2043 (PM) - Overall Masterplan Development' (FG20: 'Design Year 2043 (PM) - Overall Masterplan Development', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	99.6%
Junction Site 2: Dublin Road/ Parkway Retail Park	-	-	N/A	-	-		-	-	-	-	-	-	99.6%
1/1	Dublin Road (East) Left Ahead	U	N/A	N/A	A		1	48	-	662	1894	773	85.6%
1/2	Dublin Road (East) Ahead	U	N/A	N/A	A		1	48	-	682	1950	796	85.7%
2/2+2/1	Parkway Retail Park Right Left	U	N/A	N/A	B		1	19	-	407	2033:1838	271+147	97.4 : 97.4%
3/1	Dublin Road (West) Ahead	U	N/A	N/A	C		1	62	-	982	1878	986	99.6%
3/2+3/3	Dublin Road (West) Ahead Right	U+O	N/A	N/A	C	E	1	62	9	187	1945:1813	0+211	0.0 : 88.6%
4/1	Dublin Road (East)	U	N/A	N/A	-		-	-	-	1159	1984	1984	58.4%
4/2	Dublin Road (East)	U	N/A	N/A	-		-	-	-	87	1973	1973	4.4%
5/1	Parkway Retail Park	U	N/A	N/A	-		-	-	-	326	2055	2055	15.9%
6/1	Dublin Road (West)	U	N/A	N/A	-		-	-	-	665	1976	1976	33.7%
6/2	Dublin Road (West)	U	N/A	N/A	-		-	-	-	683	1934	1934	35.3%
Ped Link: P1	Unnamed Ped Link	-	N/A	-	F		1	9	-	0	-	0	0.0%
Ped Link: P2	Unnamed Ped Link	-	N/A	-	G		1	7	-	0	-	0	0.0%

Full Input Data And Results

[illegible]

Junctions 10
ARCADY 10 - Roundabout Module
Version: 10.1.1.1905 © Copyright TRL Software Limited, 2023
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Filename: Junction Site 3 - Parkway Retail Park Roundabout (Do Nothing & Development Scenarios).j10
Path: I:\DWGS\231\151-200\231171\3.0 Calculations\1. Civils\231171-PUNCH-XX-XX-CA-C-0001_TTA\Junction Modelling
Report generation date: 03/11/2025 21:46:27

- »Parkway Retail Park Roundabout - 2025 'Do Nothing' Baseline, AM
- »Parkway Retail Park Roundabout - 2025 'Do Nothing' Baseline, PM
- »Parkway Retail Park Roundabout - 2028 'Do Nothing', AM
- »Parkway Retail Park Roundabout - 2028 'Do Nothing', PM
- »Parkway Retail Park Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), AM
- »Parkway Retail Park Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), PM
- »Parkway Retail Park Roundabout - 2028 Opening Year (Overall Masterplan Development), AM
- »Parkway Retail Park Roundabout - 2028 Opening Year (Overall Masterplan Development), PM
- »Parkway Retail Park Roundabout - 2033 'Do Nothing', AM
- »Parkway Retail Park Roundabout - 2033 'Do Nothing', PM
- »Parkway Retail Park Roundabout - 2033 Design Year (Residential, Creche & Medical Centre), AM
- »Parkway Retail Park Roundabout - 2033 Design Year (Residential, Creche & Medical Centre), PM
- »Parkway Retail Park Roundabout - 2033 Design Year (Overall Masterplan Development), AM
- »Parkway Retail Park Roundabout - 2033 Design Year (Overall Masterplan Development), PM
- »Parkway Retail Park Roundabout - 2043 'Do Nothing', AM
- »Parkway Retail Park Roundabout - 2043 'Do Nothing', PM
- »Parkway Retail Park Roundabout - 2043 Design Year (Residential, Creche & Medical Centre), AM
- »Parkway Retail Park Roundabout - 2043 Design Year (Residential, Creche & Medical Centre), PM
- »Parkway Retail Park Roundabout - 2043 Design Year (Overall Masterplan Development), AM
- »Parkway Retail Park Roundabout - 2043 Design Year (Overall Masterplan Development), PM

Summary of junction performance

AM										PM								
	Set ID	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Set ID	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
	Parkway Retail Park Roundabout - 2025 'Do Nothing' Baseline																	
Arm 1	D1	0.0	~1	0.00	0.00	A	2.98	A	330 % [Arm 2]	D2	0.0	~1	0.00	0.00	A	3.15	A	265 % [Arm 2]
Arm 2		0.3	1.2	4.08	0.21	A					0.3	1.4	4.28	0.25	A			
Arm 3		0.1	0.5	1.99	0.13	A					0.2	0.5	2.00	0.13	A			
Arm 4		0.0	~1	0.00	0.00	A					0.0	~1	0.00	0.00	A			
	Parkway Retail Park Roundabout - 2028 'Do Nothing'																	
Arm 1	D3	0.0	~1	0.00	0.00	A	3.01	A	310 % [Arm 2]	D4	0.0	~1	0.00	0.00	A	3.20	A	248 % [Arm 2]
Arm 2		0.3	1.3	4.13	0.22	A					0.4	1.1	4.36	0.26	A			
Arm 3		0.2	0.5	2.00	0.13	A					0.2	0.5	2.02	0.14	A			
Arm 4		0.0	~1	0.00	0.00	A					0.0	~1	0.00	0.00	A			
	Parkway Retail Park Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre)																	
Arm 1	D5	0.0	~1	0.00	0.00	A	3.22	A	278 % [Arm 2]	D6	0.0	~1	0.00	0.00	A	3.30	A	231 % [Arm 2]
Arm 2		0.3	1.3	4.23	0.23	A					0.4	1.2	4.44	0.27	A			
Arm 3		0.2	0.5	2.02	0.14	A					0.2	0.5	2.06	0.16	A			
Arm 4		0.1	0.5	6.01	0.06	A					0.0	0.5	5.96	0.04	A			
	Parkway Retail Park Roundabout - 2028 Opening Year (Overall Masterplan Development)																	
Arm 1	D7	0.0	~1	0.00	0.00	A	3.22	A	263 % [Arm 2]	D8	0.0	~1	0.00	0.00	A	4.08	A	147 % [Arm 4]
Arm 2		0.3	1.3	4.29	0.23	A					0.4	1.5	4.83	0.28	A			
Arm 3		0.2	0.5	2.17	0.20	A					0.2	0.5	2.08	0.17	A			
Arm 4		0.1	0.5	6.21	0.09	A					0.3	1.3	7.39	0.23	A			
	Parkway Retail Park Roundabout - 2033 'Do Nothing'																	
Arm 1	D9	0.0	~1	0.00	0.00	A	3.06	A	287 % [Arm 2]	D10	0.0	~1	0.00	0.00	A	3.25	A	229 % [Arm 2]
Arm 2		0.3	1.3	4.20	0.24	A					0.4	1.4	4.45	0.28	A			
Arm 3		0.2	0.5	2.02	0.14	A					0.2	0.5	2.03	0.15	A			
Arm 4		0.0	~1	0.00	0.00	A					0.0	~1	0.00	0.00	A			
	Parkway Retail Park Roundabout - 2033 Design Year (Residential, Creche & Medical Centre)																	
Arm 1	D11	0.0	~1	0.00	0.00	A	3.26	A	259 % [Arm 2]	D12	0.0	~1	0.00	0.00	A	3.35	A	214 % [Arm 2]
Arm 2		0.3	1.4	4.31	0.24	A					0.4	1.5	4.53	0.28	A			
Arm 3		0.2	0.5	2.04	0.15	A					0.2	0.5	2.08	0.17	A			
Arm 4		0.1	0.5	6.08	0.06	A					0.0	0.5	6.03	0.04	A			
	Parkway Retail Park Roundabout - 2033 Design Year (Overall Masterplan Development)																	
Arm 1	D13	0.0	~1	0.00	0.00	A	3.26	A	245 % [Arm 2]	D14	0.0	~1	0.00	0.00	A	4.12	A	140 % [Arm 4]
Arm 2		0.3	1.4	4.37	0.24	A					0.4	1.8	4.94	0.30	A			
Arm 3		0.3	0.8	2.19	0.21	A					0.2	0.5	2.10	0.18	A			
Arm 4		0.1	0.5	6.29	0.09	A					0.3	1.3	7.50	0.23	A			
	Parkway Retail Park Roundabout - 2043 'Do Nothing'																	
Arm 1	D15	0.0	~1	0.00	0.00	A	3.12	A	260 % [Arm 2]	D16	0.0	~1	0.00	0.00	A	3.33	A	206 % [Arm 2]
Arm 2		0.3	1.4	4.30	0.25	A					0.4	1.8	4.58	0.30	A			
Arm 3		0.2	0.5	2.04	0.15	A					0.2	0.5	2.06	0.16	A			
Arm 4		0.0	~1	0.00	0.00	A					0.0	~1	0.00	0.00	A			
	Parkway Retail Park Roundabout - 2043 Design Year (Residential, Creche & Medical Centre)																	
Arm 1	D17	0.0	~1	0.00	0.00	A	3.31	A	236 % [Arm 2]	D18	0.0	~1	0.00	0.00	A	3.43	A	193 % [Arm 2]
Arm 2		0.3	1.5	4.41	0.26	A					0.4	1.8	4.67	0.30	A			
Arm 3		0.2	0.5	2.07	0.16	A					0.2	0.5	2.11	0.18	A			
Arm 4		0.1	0.5	6.17	0.06	A					0.0	0.5	6.13	0.04	A			
	Parkway Retail Park Roundabout - 2043 Design Year (Overall Masterplan Development)																	
Arm 1	D19	0.0	~1	0.00	0.00	A	3.32	A	224 % [Arm 2]	D20	0.0	~1	0.00	0.00	A	4.19	A	132 % [Arm 4]
Arm 2		0.4	1.5	4.47	0.26	A					0.5	2.1	5.11	0.32	A			
Arm 3		0.3	1.1	2.22	0.22	A					0.2	0.5	2.13	0.19	A			
Arm 4		0.1	0.5	6.39	0.09	A					0.3	1.4	7.65	0.23	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

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

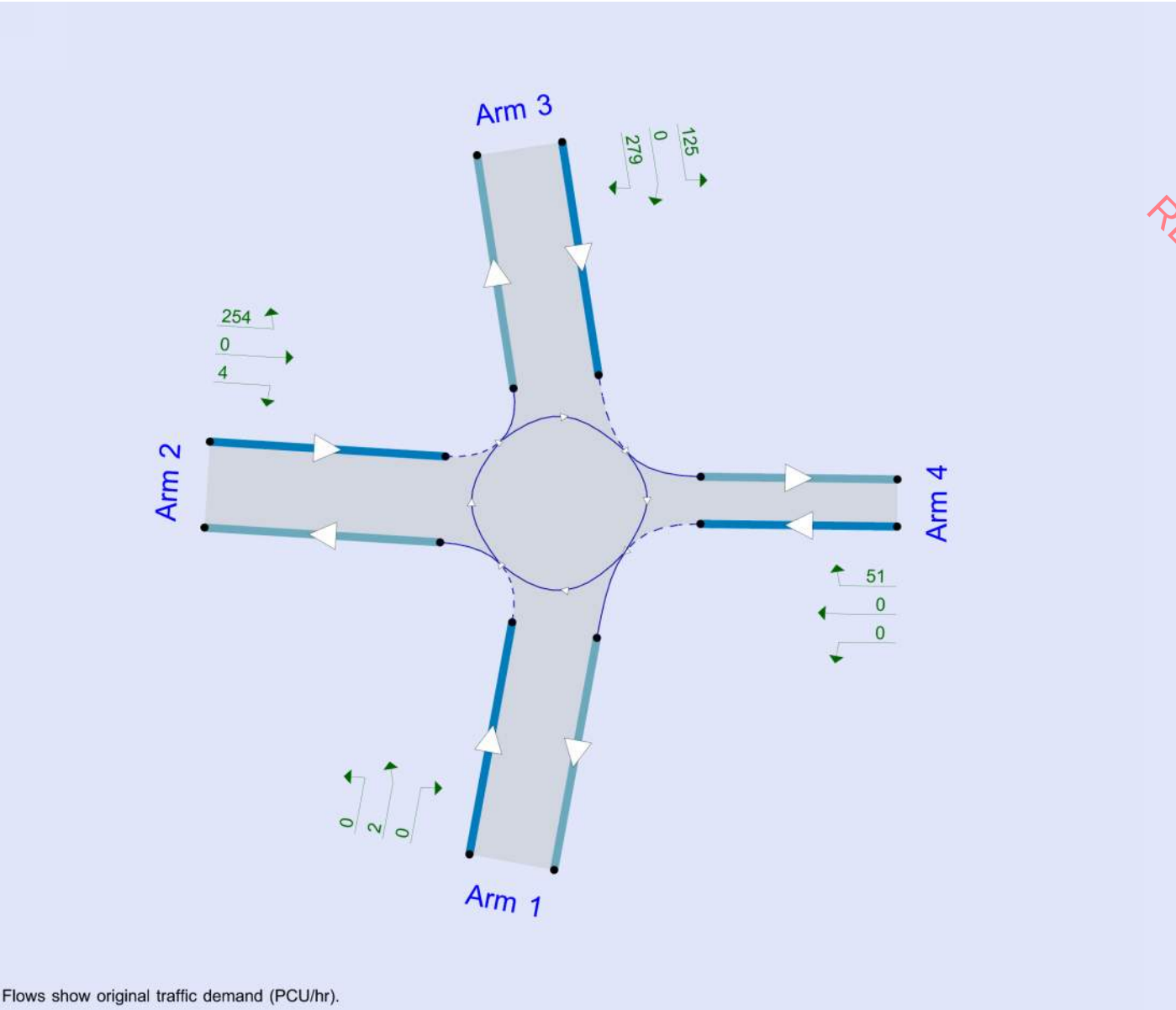
File summary

File Description

Title	Parkway Retail Park Roundabout
Location	Limerick
Site number	03
Date	07/10/2025
Version	
Status	
Identifier	
Client	
Jobnumber	231171
Enumerator	MPPNET\AMcCarthy
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	2025 'Do Nothing' Baseline	AM	ONE HOUR	11:00	12:30	15
D2	2025 'Do Nothing' Baseline	PM	ONE HOUR	13:30	15:00	15
D3	2028 'Do Nothing'	AM	ONE HOUR	11:00	12:30	15
D4	2028 'Do Nothing'	PM	ONE HOUR	13:30	15:00	15
D5	2028 Opening Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	11:00	12:30	15
D6	2028 Opening Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	13:30	15:00	15
D7	2028 Opening Year (Overall Masterplan Development)	AM	ONE HOUR	11:00	12:30	15
D8	2028 Opening Year (Overall Masterplan Development)	PM	ONE HOUR	13:30	15:00	15
D9	2033 'Do Nothing'	AM	ONE HOUR	11:00	12:30	15
D10	2033 'Do Nothing'	PM	ONE HOUR	13:30	15:00	15
D11	2033 Design Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	11:00	12:30	15
D12	2033 Design Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	13:30	15:00	15
D13	2033 Design Year (Overall Masterplan Development)	AM	ONE HOUR	11:00	12:30	15
D14	2033 Design Year (Overall Masterplan Development)	PM	ONE HOUR	13:30	15:00	15
D15	2043 'Do Nothing'	AM	ONE HOUR	11:00	12:30	15
D16	2043 'Do Nothing'	PM	ONE HOUR	13:30	15:00	15
D17	2043 Design Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	11:00	12:30	15
D18	2043 Design Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	13:30	15:00	15
D19	2043 Design Year (Overall Masterplan Development)	AM	ONE HOUR	11:00	12:30	15
D20	2043 Design Year (Overall Masterplan Development)	PM	ONE HOUR	13:30	15:00	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Parkway Retail Park Roundabout	100.000

Parkway Retail Park Roundabout - 2025 'Do Nothing' Baseline, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	2.98	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	330	Arm 2	2.98	A

Arms

Arms

Arm	Name	Description	No give-way line
1	Rear Access to Parkway Retail Park		
2	Access to Parkway Retail Park		
3	Access to R445		
4	Proposed Development Entrance		

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Entry only	Exit only
1	3.50	3.50	0.0	8.0	18.0	0.0		
2	3.50	3.50	0.0	10.5	18.0	0.0		
3	4.30	6.70	30.0	20.0	18.0	0.0		
4	3.00	3.00	0.0	3.0	13.0	0.0		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.549	1093
2	0.565	1124
3	0.776	2078
4	0.416	752

The slope and intercept shown above include any corrections and adjustments.

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	2025 'Do Nothing' Baseline	AM	ONE HOUR	11:00	12:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	2	100.000
2		✓	216	100.000
3		✓	239	100.000
4		✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
From		1	2	3	4
	1	0	0	2	0
	2	3	0	213	0
	3	0	234	5	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle %

	To				
From		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
11:00-11:15	1	0	0
	2	163	163
	3	180	180
	4	0	0
11:15-11:30	1	0	0
	2	194	194
	3	215	215
	4	0	0
11:30-11:45	1	0	0
	2	238	238
	3	263	263
	4	0	0
11:45-12:00	1	0	0
	2	238	238
	3	263	263
	4	0	0
12:00-12:15	1	0	0
	2	194	194
	3	215	215
	4	0	0
12:15-12:30	1	0	0
	2	163	163
	3	180	180
	4	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.21	4.08	0.3	1.2	A
3	0.13	1.99	0.1	0.5	A
4	0.00	0.00	0.0	~1	A

Main Results for each time segment

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	180	994	0.000	0	0.0	0.000	A
2	163	4	1122	0.145	162	0.2	3.749	A
3	180	2	2076	0.087	180	0.1	1.897	A
4	0	182	676	0.000	0	0.0	0.000	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	215	975	0.000	0	0.0	0.000	A
2	194	4	1121	0.173	194	0.2	3.882	A
3	215	3	2076	0.104	215	0.1	1.934	A
4	0	217	661	0.000	0	0.0	0.000	A

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	263	949	0.000	0	0.0	0.000	A
2	238	6	1121	0.212	238	0.3	4.074	A
3	263	3	2075	0.127	263	0.1	1.986	A
4	0	266	641	0.000	0	0.0	0.000	A

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	263	949	0.000	0	0.0	0.000	A
2	238	6	1121	0.212	238	0.3	4.076	A
3	263	3	2075	0.127	263	0.1	1.986	A
4	0	266	641	0.000	0	0.0	0.000	A

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	215	975	0.000	0	0.0	0.000	A
2	194	4	1121	0.173	194	0.2	3.885	A
3	215	3	2076	0.104	215	0.1	1.936	A
4	0	218	661	0.000	0	0.0	0.000	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	180	994	0.000	0	0.0	0.000	A
2	163	4	1122	0.145	163	0.2	3.756	A
3	180	2	2076	0.087	180	0.1	1.900	A
4	0	182	676	0.000	0	0.0	0.000	A

Queue Variation Results for each time segment

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.17	0.00	0.00	0.17	0.17			N/A	N/A
3	0.09	0.00	0.00	0.09	0.09			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.21	0.00	0.00	0.21	0.21			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.27	0.03	0.25	0.46	0.48			N/A	N/A
3	0.14	0.03	0.25	0.46	0.48			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.27	0.03	0.29	0.84	1.18			N/A	N/A
3	0.15	0.00	0.00	0.15	0.15			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.21	0.00	0.00	0.21	0.21			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.17	0.00	0.00	0.17	0.17			N/A	N/A
3	0.10	0.00	0.00	0.10	0.10			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

Parkway Retail Park Roundabout - 2025 'Do Nothing' Baseline, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.15	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	265	Arm 2	3.15	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	2025 'Do Nothing' Baseline	PM	ONE HOUR	13:30	15:00	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	3	100.000
2		✓	256	100.000
3		✓	252	100.000
4		✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
	1	0	0	3	0
	2	1	0	255	0
	3	3	246	3	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
13:30-13:45	1	0	0
	2	193	193
	3	190	190
	4	0	0
13:45-14:00	1	0	0
	2	230	230
	3	227	227
	4	0	0
14:00-14:15	1	0	0
	2	282	282
	3	277	277
	4	0	0
14:15-14:30	1	0	0
	2	282	282
	3	277	277
	4	0	0
14:30-14:45	1	0	0
	2	230	230
	3	227	227
	4	0	0
14:45-15:00	1	0	0
	2	193	193
	3	190	190
	4	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.25	4.28	0.3	1.4	A
3	0.13	2.00	0.2	0.5	A
4	0.00	0.00	0.0	~1	A

Main Results for each time segment

13:30 - 13:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	187	990	0.000	0	0.0	0.000	A
2	193	2	1123	0.172	192	0.2	3.864	A
3	190	0.75	2077	0.091	189	0.1	1.906	A
4	0	190	673	0.000	0	0.0	0.000	A

13:45 - 14:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	224	970	0.000	0	0.0	0.000	A
2	230	3	1122	0.205	230	0.3	4.032	A
3	227	0.90	2077	0.109	226	0.1	1.945	A
4	0	227	657	0.000	0	0.0	0.000	A

14:00 - 14:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	274	943	0.000	0	0.0	0.000	A
2	282	3	1122	0.251	282	0.3	4.282	A
3	277	1	2077	0.134	277	0.2	2.000	A
4	0	278	636	0.000	0	0.0	0.000	A

14:15 - 14:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	274	943	0.000	0	0.0	0.000	A
2	282	3	1122	0.251	282	0.3	4.284	A
3	277	1	2077	0.134	277	0.2	2.000	A
4	0	279	636	0.000	0	0.0	0.000	A

14:30 - 14:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	224	970	0.000	0	0.0	0.000	A
2	230	3	1122	0.205	230	0.3	4.036	A
3	227	0.90	2077	0.109	227	0.1	1.946	A
4	0	228	657	0.000	0	0.0	0.000	A

14:45 - 15:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	188	990	0.000	0	0.0	0.000	A
2	193	2	1123	0.172	193	0.2	3.872	A
3	190	0.75	2077	0.091	190	0.1	1.906	A
4	0	191	673	0.000	0	0.0	0.000	A

Queue Variation Results for each time segment

13:30 - 13:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.21	0.00	0.00	0.21	0.21			N/A	N/A
3	0.10	0.00	0.00	0.10	0.10			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

13:45 - 14:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.26	0.00	0.00	0.26	0.26			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:00 - 14:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.33	0.03	0.25	0.46	0.48			N/A	N/A
3	0.15	0.03	0.25	0.46	0.48			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:15 - 14:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.33	0.03	0.32	1.15	1.43			N/A	N/A
3	0.15	0.00	0.00	0.15	0.15			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:30 - 14:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.26	0.00	0.00	0.26	0.26			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:45 - 15:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.21	0.00	0.00	0.21	0.21			N/A	N/A
3	0.10	0.00	0.00	0.10	0.10			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2028 'Do Nothing', AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.01	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	310	Arm 2	3.01	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)
D3	2028 'Do Nothing'	AM	ONE HOUR	11:00	12:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	2	100.000
2		✓	227	100.000
3		✓	251	100.000
4		✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
From	1	0	0	2	0
	2	3	0	224	0
	3	0	246	5	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
11:00-11:15	1	0	0
	2	171	171
	3	189	189
	4	0	0
11:15-11:30	1	0	0
	2	204	204
	3	226	226
	4	0	0
11:30-11:45	1	0	0
	2	250	250
	3	276	276
	4	0	0
11:45-12:00	1	0	0
	2	250	250
	3	276	276
	4	0	0
12:00-12:15	1	0	0
	2	204	204
	3	226	226
	4	0	0
12:15-12:30	1	0	0
	2	171	171
	3	189	189
	4	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.22	4.13	0.3	1.3	A
3	0.13	2.00	0.2	0.5	A
4	0.00	0.00	0.0	~1	A

Main Results for each time segment

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	189	990	0.000	0	0.0	0.000	A
2	171	4	1122	0.152	170	0.2	3.781	A
3	189	2	2076	0.091	189	0.1	1.906	A
4	0	191	672	0.000	0	0.0	0.000	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	226	969	0.000	0	0.0	0.000	A
2	204	4	1121	0.182	204	0.2	3.923	A
3	226	3	2076	0.109	226	0.1	1.945	A
4	0	228	657	0.000	0	0.0	0.000	A

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	276	941	0.000	0	0.0	0.000	A
2	250	6	1121	0.223	250	0.3	4.131	A
3	276	3	2075	0.133	276	0.2	2.000	A
4	0	280	636	0.000	0	0.0	0.000	A

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	276	941	0.000	0	0.0	0.000	A
2	250	6	1121	0.223	250	0.3	4.133	A
3	276	3	2075	0.133	276	0.2	2.000	A
4	0	280	636	0.000	0	0.0	0.000	A

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	226	969	0.000	0	0.0	0.000	A
2	204	4	1121	0.182	204	0.2	3.926	A
3	226	3	2076	0.109	226	0.1	1.947	A
4	0	228	657	0.000	0	0.0	0.000	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	189	989	0.000	0	0.0	0.000	A
2	171	4	1122	0.152	171	0.2	3.786	A
3	189	2	2076	0.091	189	0.1	1.906	A
4	0	191	672	0.000	0	0.0	0.000	A

Queue Variation Results for each time segment

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.18	0.00	0.00	0.18	0.18			N/A	N/A
3	0.10	0.00	0.00	0.10	0.10			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.22	0.00	0.00	0.22	0.22			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.29	0.03	0.25	0.46	0.48			N/A	N/A
3	0.15	0.03	0.25	0.46	0.48			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.29	0.03	0.30	0.97	1.26			N/A	N/A
3	0.15	0.00	0.00	0.15	0.15			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.22	0.00	0.00	0.22	0.22			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.18	0.00	0.00	0.18	0.18			N/A	N/A
3	0.10	0.00	0.00	0.10	0.10			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2028 'Do Nothing', PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.20	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	248	Arm 2	3.20	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)
D4	2028 'Do Nothing'	PM	ONE HOUR	13:30	15:00	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	3	100.000
2		✓	269	100.000
3		✓	265	100.000
4		✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
	1	0	0	3	0
	2	1	0	268	0
	3	3	259	3	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
13:30-13:45	1	0	0
	2	203	203
	3	200	200
	4	0	0
13:45-14:00	1	0	0
	2	242	242
	3	238	238
	4	0	0
14:00-14:15	1	0	0
	2	296	296
	3	292	292
	4	0	0
14:15-14:30	1	0	0
	2	296	296
	3	292	292
	4	0	0
14:30-14:45	1	0	0
	2	242	242
	3	238	238
	4	0	0
14:45-15:00	1	0	0
	2	203	203
	3	200	200
	4	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.26	4.36	0.4	1.1	A
3	0.14	2.02	0.2	0.5	A
4	0.00	0.00	0.0	~1	A

Main Results for each time segment

13:30 - 13:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	197	985	0.000	0	0.0	0.000	A
2	203	2	1123	0.180	202	0.2	3.905	A
3	200	0.75	2077	0.096	199	0.1	1.916	A
4	0	200	669	0.000	0	0.0	0.000	A

13:45 - 14:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	235	964	0.000	0	0.0	0.000	A
2	242	3	1122	0.215	242	0.3	4.086	A
3	238	0.90	2077	0.115	238	0.1	1.957	A
4	0	239	652	0.000	0	0.0	0.000	A

14:00 - 14:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	288	935	0.000	0	0.0	0.000	A
2	296	3	1122	0.264	296	0.4	4.354	A
3	292	1	2077	0.140	292	0.2	2.016	A
4	0	293	630	0.000	0	0.0	0.000	A

14:15 - 14:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	288	935	0.000	0	0.0	0.000	A
2	296	3	1122	0.264	296	0.4	4.358	A
3	292	1	2077	0.140	292	0.2	2.016	A
4	0	293	630	0.000	0	0.0	0.000	A

14:30 - 14:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	236	964	0.000	0	0.0	0.000	A
2	242	3	1122	0.215	242	0.3	4.092	A
3	238	0.90	2077	0.115	238	0.1	1.957	A
4	0	239	652	0.000	0	0.0	0.000	A

14:45 - 15:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	197	985	0.000	0	0.0	0.000	A
2	203	2	1123	0.180	203	0.2	3.913	A
3	200	0.75	2077	0.096	200	0.1	1.916	A
4	0	200	668	0.000	0	0.0	0.000	A

Queue Variation Results for each time segment

13:30 - 13:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.22	0.00	0.00	0.22	0.22			N/A	N/A
3	0.11	0.00	0.00	0.11	0.11			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

13:45 - 14:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.27	0.00	0.00	0.27	0.27			N/A	N/A
3	0.13	0.00	0.00	0.13	0.13			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:00 - 14:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.36	0.03	0.25	0.46	0.48			N/A	N/A
3	0.16	0.03	0.25	0.46	0.48			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:15 - 14:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.36	0.03	0.32	1.09	1.09			N/A	N/A
3	0.16	0.00	0.00	0.16	0.16			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:30 - 14:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.28	0.00	0.00	0.28	0.28			N/A	N/A
3	0.13	0.00	0.00	0.13	0.13			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:45 - 15:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.22	0.00	0.00	0.22	0.22			N/A	N/A
3	0.11	0.00	0.00	0.11	0.11			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.22	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	278	Arm 2	3.22	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)
D5	2028 Opening Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	11:00	12:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	2	100.000
2		✓	227	100.000
3		✓	270	100.000
4		✓	33	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
From		1	2	3	4
	1	0	0	2	0
	2	3	0	224	0
	3	0	246	5	19
	4	0	0	33	0

Vehicle Mix

Heavy Vehicle %

	To				
From		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
11:00-11:15	1	0	0
	2	171	171
	3	203	203
	4	25	25
11:15-11:30	1	0	0
	2	204	204
	3	243	243
	4	30	30
11:30-11:45	1	0	0
	2	250	250
	3	297	297
	4	36	36
11:45-12:00	1	0	0
	2	250	250
	3	297	297
	4	36	36
12:00-12:15	1	0	0
	2	204	204
	3	243	243
	4	30	30
12:15-12:30	1	0	0
	2	171	171
	3	203	203
	4	25	25

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.23	4.23	0.3	1.3	A
3	0.14	2.02	0.2	0.5	A
4	0.06	6.01	0.1	0.5	A

Main Results for each time segment

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	213	976	0.000	0	0.0	0.000	A
2	171	28	1108	0.154	170	0.2	3.837	A
3	203	2	2076	0.098	203	0.1	1.922	A
4	25	191	672	0.037	25	0.0	5.556	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	255	953	0.000	0	0.0	0.000	A
2	204	34	1105	0.185	204	0.2	3.995	A
3	243	3	2076	0.117	243	0.1	1.963	A
4	30	228	657	0.045	30	0.0	5.738	A

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	313	921	0.000	0	0.0	0.000	A
2	250	42	1100	0.227	250	0.3	4.231	A
3	297	3	2075	0.143	297	0.2	2.024	A
4	36	280	636	0.057	36	0.1	6.006	A

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	313	921	0.000	0	0.0	0.000	A
2	250	42	1100	0.227	250	0.3	4.232	A
3	297	3	2075	0.143	297	0.2	2.024	A
4	36	280	636	0.057	36	0.1	6.007	A

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	255	953	0.000	0	0.0	0.000	A
2	204	34	1105	0.185	204	0.2	3.999	A
3	243	3	2076	0.117	243	0.1	1.964	A
4	30	228	657	0.045	30	0.0	5.742	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	214	976	0.000	0	0.0	0.000	A
2	171	29	1108	0.154	171	0.2	3.843	A
3	203	2	2076	0.098	203	0.1	1.923	A
4	25	191	672	0.037	25	0.0	5.560	A

Queue Variation Results for each time segment

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.18	0.00	0.00	0.18	0.18			N/A	N/A
3	0.11	0.00	0.00	0.11	0.11			N/A	N/A
4	0.04	0.00	0.00	0.04	0.04			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.23	0.00	0.00	0.23	0.23			N/A	N/A
3	0.13	0.00	0.00	0.13	0.13			N/A	N/A
4	0.05	0.03	0.25	0.45	0.48			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.29	0.03	0.25	0.46	0.48			N/A	N/A
3	0.17	0.03	0.25	0.46	0.48			N/A	N/A
4	0.06	0.03	0.26	0.46	0.49			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.29	0.03	0.31	1.00	1.28			N/A	N/A
3	0.17	0.00	0.00	0.17	0.17			N/A	N/A
4	0.06	0.00	0.00	0.06	0.06			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.23	0.00	0.00	0.23	0.23			N/A	N/A
3	0.13	0.00	0.00	0.13	0.13			N/A	N/A
4	0.05	0.00	0.00	0.05	0.05			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.18	0.00	0.00	0.18	0.18			N/A	N/A
3	0.11	0.00	0.00	0.11	0.11			N/A	N/A
4	0.04	0.00	0.00	0.04	0.04			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.30	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	231	Arm 2	3.30	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)
D6	2028 Opening Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	13:30	15:00	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	3	100.000
2		✓	269	100.000
3		✓	298	100.000
4		✓	24	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
	1	0	0	3	0
	2	1	0	268	0
	3	3	259	3	33
	4	0	0	24	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
13:30-13:45	1	0	0
	2	203	203
	3	224	224
	4	18	18
13:45-14:00	1	0	0
	2	242	242
	3	268	268
	4	22	22
14:00-14:15	1	0	0
	2	296	296
	3	328	328
	4	26	26
14:15-14:30	1	0	0
	2	296	296
	3	328	328
	4	26	26
14:30-14:45	1	0	0
	2	242	242
	3	268	268
	4	22	22
14:45-15:00	1	0	0
	2	203	203
	3	224	224
	4	18	18

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.27	4.44	0.4	1.2	A
3	0.16	2.06	0.2	0.5	A
4	0.04	5.96	0.0	0.5	A

Main Results for each time segment

13:30 - 13:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	215	975	0.000	0	0.0	0.000	A
2	203	20	1113	0.182	202	0.2	3.949	A
3	224	0.75	2077	0.108	224	0.1	1.942	A
4	18	200	669	0.027	18	0.0	5.532	A

13:45 - 14:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	257	952	0.000	0	0.0	0.000	A
2	242	24	1110	0.218	242	0.3	4.143	A
3	268	0.90	2077	0.129	268	0.1	1.989	A
4	22	239	652	0.033	22	0.0	5.706	A

14:00 - 14:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	315	920	0.000	0	0.0	0.000	A
2	296	30	1107	0.268	296	0.4	4.434	A
3	328	1	2077	0.158	328	0.2	2.058	A
4	26	293	630	0.042	26	0.0	5.962	A

14:15 - 14:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	315	920	0.000	0	0.0	0.000	A
2	296	30	1107	0.268	296	0.4	4.438	A
3	328	1	2077	0.158	328	0.2	2.058	A
4	26	293	630	0.042	26	0.0	5.963	A

14:30 - 14:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	257	952	0.000	0	0.0	0.000	A
2	242	24	1110	0.218	242	0.3	4.148	A
3	268	0.90	2077	0.129	268	0.1	1.989	A
4	22	239	652	0.033	22	0.0	5.707	A

14:45 - 15:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	215	975	0.000	0	0.0	0.000	A
2	203	20	1112	0.182	203	0.2	3.957	A
3	224	0.75	2077	0.108	224	0.1	1.942	A
4	18	200	668	0.027	18	0.0	5.536	A

Queue Variation Results for each time segment

13:30 - 13:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.22	0.00	0.00	0.22	0.22			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.03	0.00	0.00	0.03	0.03			N/A	N/A

13:45 - 14:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.28	0.00	0.00	0.28	0.28			N/A	N/A
3	0.15	0.00	0.00	0.15	0.15			N/A	N/A
4	0.03	0.03	0.25	0.45	0.48			N/A	N/A

14:00 - 14:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.36	0.03	0.25	0.46	0.48			N/A	N/A
3	0.19	0.03	0.25	0.46	0.48			N/A	N/A
4	0.04	0.03	0.25	0.46	0.48			N/A	N/A

14:15 - 14:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.36	0.03	0.32	1.18	1.18			N/A	N/A
3	0.19	0.03	0.25	0.45	0.48			N/A	N/A
4	0.04	0.00	0.00	0.04	0.04			N/A	N/A

14:30 - 14:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.28	0.00	0.00	0.28	0.28			N/A	N/A
3	0.15	0.00	0.00	0.15	0.15			N/A	N/A
4	0.03	0.00	0.00	0.03	0.03			N/A	N/A

14:45 - 15:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.22	0.00	0.00	0.22	0.22			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.03	0.00	0.00	0.03	0.03			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2028 Opening Year (Overall Masterplan Development), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.22	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	263	Arm 2	3.22	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)
D7	2028 Opening Year (Overall Masterplan Development)	AM	ONE HOUR	11:00	12:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	2	100.000
2		✓	227	100.000
3		✓	376	100.000
4		✓	51	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
	1	0	0	2	0
	2	3	0	224	0
	3	0	246	5	125
	4	0	0	51	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
11:00-11:15	1	0	0
	2	171	171
	3	283	283
	4	38	38
11:15-11:30	1	0	0
	2	204	204
	3	338	338
	4	46	46
11:30-11:45	1	0	0
	2	250	250
	3	414	414
	4	56	56
11:45-12:00	1	0	0
	2	250	250
	3	414	414
	4	56	56
12:00-12:15	1	0	0
	2	204	204
	3	338	338
	4	46	46
12:15-12:30	1	0	0
	2	171	171
	3	283	283
	4	38	38

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.23	4.29	0.3	1.3	A
3	0.20	2.17	0.2	0.5	A
4	0.09	6.21	0.1	0.5	A

Main Results for each time segment

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	227	969	0.000	0	0.0	0.000	A
2	171	42	1100	0.155	170	0.2	3.864	A
3	283	2	2076	0.136	282	0.2	2.007	A
4	38	191	672	0.057	38	0.1	5.674	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	271	944	0.000	0	0.0	0.000	A
2	204	50	1096	0.186	204	0.2	4.036	A
3	338	3	2076	0.163	338	0.2	2.071	A
4	46	228	657	0.070	46	0.1	5.890	A

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	332	911	0.000	0	0.0	0.000	A
2	250	62	1089	0.229	250	0.3	4.287	A
3	414	3	2075	0.199	414	0.2	2.166	A
4	56	280	636	0.088	56	0.1	6.212	A

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	333	910	0.000	0	0.0	0.000	A
2	250	62	1089	0.229	250	0.3	4.289	A
3	414	3	2075	0.199	414	0.2	2.166	A
4	56	280	636	0.088	56	0.1	6.212	A

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	272	944	0.000	0	0.0	0.000	A
2	204	50	1095	0.186	204	0.2	4.040	A
3	338	3	2076	0.163	338	0.2	2.073	A
4	46	228	657	0.070	46	0.1	5.895	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	228	968	0.000	0	0.0	0.000	A
2	171	42	1100	0.155	171	0.2	3.876	A
3	283	2	2076	0.136	283	0.2	2.009	A
4	38	191	672	0.057	38	0.1	5.680	A

Queue Variation Results for each time segment

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.18	0.00	0.00	0.18	0.18			N/A	N/A
3	0.16	0.00	0.00	0.16	0.16			N/A	N/A
4	0.06	0.00	0.00	0.06	0.06			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.23	0.00	0.00	0.23	0.23			N/A	N/A
3	0.19	0.00	0.00	0.19	0.19			N/A	N/A
4	0.07	0.03	0.25	0.45	0.48			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.30	0.03	0.25	0.46	0.48			N/A	N/A
3	0.25	0.03	0.25	0.45	0.48			N/A	N/A
4	0.10	0.03	0.26	0.47	0.49			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.30	0.03	0.31	1.02	1.30			N/A	N/A
3	0.25	0.03	0.26	0.47	0.49			N/A	N/A
4	0.10	0.00	0.00	0.10	0.10			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.23	0.00	0.00	0.23	0.23			N/A	N/A
3	0.20	0.00	0.00	0.20	0.20			N/A	N/A
4	0.08	0.00	0.00	0.08	0.08			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.18	0.00	0.00	0.18	0.18			N/A	N/A
3	0.16	0.00	0.00	0.16	0.16			N/A	N/A
4	0.06	0.00	0.00	0.06	0.06			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2028 Opening Year (Overall Masterplan Development), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	4.08	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	147	Arm 4	4.08	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)
D8	2028 Opening Year (Overall Masterplan Development)	PM	ONE HOUR	13:30	15:00	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	3	100.000
2		✓	269	100.000
3		✓	317	100.000
4		✓	130	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
	1	2	3	4	
From	1	0	0	3	0
	2	1	0	268	0
	3	3	259	3	52
	4	0	0	130	0

Vehicle Mix

Heavy Vehicle %

	To				
	1	2	3	4	
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
13:30-13:45	1	0	0
	2	203	203
	3	239	239
	4	98	98
13:45-14:00	1	0	0
	2	242	242
	3	285	285
	4	117	117
14:00-14:15	1	0	0
	2	296	296
	3	349	349
	4	143	143
14:15-14:30	1	0	0
	2	296	296
	3	349	349
	4	143	143
14:30-14:45	1	0	0
	2	242	242
	3	285	285
	4	117	117
14:45-15:00	1	0	0
	2	203	203
	3	239	239
	4	98	98

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.28	4.83	0.4	1.5	A
3	0.17	2.08	0.2	0.5	A
4	0.23	7.39	0.3	1.3	A

Main Results for each time segment

13:30 - 13:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	294	932	0.000	0	0.0	0.000	A
2	203	99	1068	0.190	202	0.2	4.151	A
3	239	0.75	2077	0.115	238	0.1	1.957	A
4	98	200	669	0.146	97	0.2	6.289	A

13:45 - 14:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	352	900	0.000	0	0.0	0.000	A
2	242	119	1057	0.229	242	0.3	4.416	A
3	285	0.90	2077	0.137	285	0.2	2.008	A
4	117	239	652	0.179	117	0.2	6.718	A

14:00 - 14:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	431	856	0.000	0	0.0	0.000	A
2	296	146	1041	0.284	296	0.4	4.826	A
3	349	1	2077	0.168	349	0.2	2.083	A
4	143	293	630	0.227	143	0.3	7.383	A

14:15 - 14:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	432	856	0.000	0	0.0	0.000	A
2	296	146	1041	0.284	296	0.4	4.831	A
3	349	1	2077	0.168	349	0.2	2.083	A
4	143	293	630	0.227	143	0.3	7.392	A

14:30 - 14:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	353	899	0.000	0	0.0	0.000	A
2	242	120	1056	0.229	242	0.3	4.425	A
3	285	0.90	2077	0.137	285	0.2	2.008	A
4	117	239	652	0.179	117	0.2	6.729	A

14:45 - 15:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	295	931	0.000	0	0.0	0.000	A
2	203	100	1067	0.190	203	0.2	4.164	A
3	239	0.75	2077	0.115	239	0.1	1.959	A
4	98	200	668	0.146	98	0.2	6.312	A

Queue Variation Results for each time segment

13:30 - 13:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.23	0.00	0.00	0.23	0.23			N/A	N/A
3	0.13	0.00	0.00	0.13	0.13			N/A	N/A
4	0.17	0.00	0.00	0.17	0.17			N/A	N/A

13:45 - 14:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.29	0.00	0.00	0.29	0.29			N/A	N/A
3	0.16	0.00	0.00	0.16	0.16			N/A	N/A
4	0.22	0.00	0.00	0.22	0.22			N/A	N/A

14:00 - 14:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.39	0.03	0.25	0.46	0.48			N/A	N/A
3	0.20	0.03	0.25	0.46	0.48			N/A	N/A
4	0.29	0.03	0.25	0.46	0.48			N/A	N/A

14:15 - 14:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.40	0.03	0.32	1.29	1.53			N/A	N/A
3	0.20	0.03	0.25	0.45	0.48			N/A	N/A
4	0.29	0.03	0.31	1.03	1.33			N/A	N/A

14:30 - 14:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.30	0.00	0.00	0.30	0.30			N/A	N/A
3	0.16	0.00	0.00	0.16	0.16			N/A	N/A
4	0.22	0.00	0.00	0.22	0.22			N/A	N/A

14:45 - 15:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.24	0.00	0.00	0.24	0.24			N/A	N/A
3	0.13	0.00	0.00	0.13	0.13			N/A	N/A
4	0.17	0.00	0.00	0.17	0.17			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2033 'Do Nothing', AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.06	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	287	Arm 2	3.06	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)
D9	2033 'Do Nothing'	AM	ONE HOUR	11:00	12:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	2	100.000
2		✓	240	100.000
3		✓	266	100.000
4		✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
	1	0	0	2	0
	2	3	0	237	0
	3	0	260	6	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
11:00-11:15	1	0	0
	2	181	181
	3	200	200
	4	0	0
11:15-11:30	1	0	0
	2	216	216
	3	239	239
	4	0	0
11:30-11:45	1	0	0
	2	264	264
	3	293	293
	4	0	0
11:45-12:00	1	0	0
	2	264	264
	3	293	293
	4	0	0
12:00-12:15	1	0	0
	2	216	216
	3	239	239
	4	0	0
12:15-12:30	1	0	0
	2	181	181
	3	200	200
	4	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.24	4.20	0.3	1.3	A
3	0.14	2.02	0.2	0.5	A
4	0.00	0.00	0.0	~1	A

Main Results for each time segment

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	200	983	0.000	0	0.0	0.000	A
2	181	5	1121	0.161	180	0.2	3.819	A
3	200	2	2076	0.096	200	0.1	1.918	A
4	0	202	668	0.000	0	0.0	0.000	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	239	962	0.000	0	0.0	0.000	A
2	216	5	1121	0.192	216	0.2	3.975	A
3	239	3	2076	0.115	239	0.1	1.959	A
4	0	242	651	0.000	0	0.0	0.000	A

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	293	932	0.000	0	0.0	0.000	A
2	264	7	1120	0.236	264	0.3	4.203	A
3	293	3	2075	0.141	293	0.2	2.019	A
4	0	296	629	0.000	0	0.0	0.000	A

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	293	932	0.000	0	0.0	0.000	A
2	264	7	1120	0.236	264	0.3	4.205	A
3	293	3	2075	0.141	293	0.2	2.019	A
4	0	296	629	0.000	0	0.0	0.000	A

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	239	962	0.000	0	0.0	0.000	A
2	216	5	1121	0.192	216	0.2	3.980	A
3	239	3	2076	0.115	239	0.1	1.960	A
4	0	242	651	0.000	0	0.0	0.000	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	200	983	0.000	0	0.0	0.000	A
2	181	5	1121	0.161	181	0.2	3.830	A
3	200	2	2076	0.096	200	0.1	1.921	A
4	0	203	668	0.000	0	0.0	0.000	A

Queue Variation Results for each time segment

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.19	0.00	0.00	0.19	0.19			N/A	N/A
3	0.11	0.00	0.00	0.11	0.11			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.24	0.00	0.00	0.24	0.24			N/A	N/A
3	0.13	0.00	0.00	0.13	0.13			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.31	0.03	0.25	0.46	0.48			N/A	N/A
3	0.16	0.03	0.25	0.46	0.48			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.31	0.03	0.31	1.06	1.33			N/A	N/A
3	0.16	0.00	0.00	0.16	0.16			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.24	0.00	0.00	0.24	0.24			N/A	N/A
3	0.13	0.00	0.00	0.13	0.13			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.19	0.00	0.00	0.19	0.19			N/A	N/A
3	0.11	0.00	0.00	0.11	0.11			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

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Parkway Retail Park Roundabout - 2033 'Do Nothing', PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.25	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	229	Arm 2	3.25	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)
D10	2033 'Do Nothing'	PM	ONE HOUR	13:30	15:00	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	3	100.000
2		✓	284	100.000
3		✓	280	100.000
4		✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
	1	0	0	3	0
	2	1	0	283	0
	3	3	274	3	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
13:30-13:45	1	0	0
	2	214	214
	3	211	211
	4	0	0
13:45-14:00	1	0	0
	2	255	255
	3	252	252
	4	0	0
14:00-14:15	1	0	0
	2	313	313
	3	308	308
	4	0	0
14:15-14:30	1	0	0
	2	313	313
	3	308	308
	4	0	0
14:30-14:45	1	0	0
	2	255	255
	3	252	252
	4	0	0
14:45-15:00	1	0	0
	2	214	214
	3	211	211
	4	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.28	4.45	0.4	1.4	A
3	0.15	2.03	0.2	0.5	A
4	0.00	0.00	0.0	~1	A

Main Results for each time segment

13:30 - 13:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	208	979	0.000	0	0.0	0.000	A
2	214	2	1123	0.190	213	0.2	3.952	A
3	211	0.75	2077	0.101	210	0.1	1.928	A
4	0	211	664	0.000	0	0.0	0.000	A

13:45 - 14:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	249	956	0.000	0	0.0	0.000	A
2	255	3	1122	0.227	255	0.3	4.149	A
3	252	0.90	2077	0.121	252	0.1	1.971	A
4	0	253	647	0.000	0	0.0	0.000	A

14:00 - 14:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	305	926	0.000	0	0.0	0.000	A
2	313	3	1122	0.279	312	0.4	4.443	A
3	308	1	2077	0.148	308	0.2	2.035	A
4	0	309	623	0.000	0	0.0	0.000	A

14:15 - 14:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	305	926	0.000	0	0.0	0.000	A
2	313	3	1122	0.279	313	0.4	4.447	A
3	308	1	2077	0.148	308	0.2	2.035	A
4	0	309	623	0.000	0	0.0	0.000	A

14:30 - 14:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	249	956	0.000	0	0.0	0.000	A
2	255	3	1122	0.227	256	0.3	4.154	A
3	252	0.90	2077	0.121	252	0.1	1.972	A
4	0	253	647	0.000	0	0.0	0.000	A

14:45 - 15:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	209	979	0.000	0	0.0	0.000	A
2	214	2	1123	0.190	214	0.2	3.962	A
3	211	0.75	2077	0.101	211	0.1	1.928	A
4	0	212	664	0.000	0	0.0	0.000	A

Queue Variation Results for each time segment

13:30 - 13:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.23	0.00	0.00	0.23	0.23			N/A	N/A
3	0.11	0.00	0.00	0.11	0.11			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

13:45 - 14:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.29	0.00	0.00	0.29	0.29			N/A	N/A
3	0.14	0.00	0.00	0.14	0.14			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:00 - 14:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.38	0.03	0.25	0.46	0.48			N/A	N/A
3	0.17	0.03	0.25	0.46	0.48			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:15 - 14:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.39	0.03	0.32	1.27	1.43			N/A	N/A
3	0.17	0.00	0.00	0.17	0.17			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:30 - 14:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.30	0.00	0.00	0.30	0.30			N/A	N/A
3	0.14	0.00	0.00	0.14	0.14			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:45 - 15:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.24	0.00	0.00	0.24	0.24			N/A	N/A
3	0.11	0.00	0.00	0.11	0.11			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2033 Design Year (Residential, Creche & Medical Centre), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.26	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	259	Arm 2	3.26	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)
D11	2033 Design Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	11:00	12:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	2	100.000
2		✓	240	100.000
3		✓	285	100.000
4		✓	33	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
	1	2	3	4	
From	1	0	0	2	0
	2	3	0	237	0
	3	0	260	6	19
	4	0	0	33	0

Vehicle Mix

Heavy Vehicle %

	To				
	1	2	3	4	
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
11:00-11:15	1	0	0
	2	181	181
	3	215	215
	4	25	25
11:15-11:30	1	0	0
	2	216	216
	3	256	256
	4	30	30
11:30-11:45	1	0	0
	2	264	264
	3	314	314
	4	36	36
11:45-12:00	1	0	0
	2	264	264
	3	314	314
	4	36	36
12:00-12:15	1	0	0
	2	216	216
	3	256	256
	4	30	30
12:15-12:30	1	0	0
	2	181	181
	3	215	215
	4	25	25

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.24	4.31	0.3	1.4	A
3	0.15	2.04	0.2	0.5	A
4	0.06	6.08	0.1	0.5	A

Main Results for each time segment

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	225	970	0.000	0	0.0	0.000	A
2	181	29	1107	0.163	180	0.2	3.877	A
3	215	2	2076	0.103	214	0.1	1.933	A
4	25	202	668	0.037	25	0.0	5.596	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	269	946	0.000	0	0.0	0.000	A
2	216	35	1104	0.195	216	0.2	4.050	A
3	256	3	2076	0.123	256	0.1	1.978	A
4	30	242	651	0.046	30	0.0	5.790	A

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	329	912	0.000	0	0.0	0.000	A
2	264	43	1100	0.240	264	0.3	4.306	A
3	314	3	2075	0.151	314	0.2	2.043	A
4	36	296	629	0.058	36	0.1	6.076	A

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	329	912	0.000	0	0.0	0.000	A
2	264	43	1100	0.240	264	0.3	4.308	A
3	314	3	2075	0.151	314	0.2	2.043	A
4	36	296	629	0.058	36	0.1	6.076	A

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	269	945	0.000	0	0.0	0.000	A
2	216	35	1104	0.195	216	0.2	4.054	A
3	256	3	2076	0.123	256	0.1	1.978	A
4	30	242	651	0.046	30	0.0	5.794	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	225	969	0.000	0	0.0	0.000	A
2	181	29	1107	0.163	181	0.2	3.887	A
3	215	2	2076	0.103	215	0.1	1.935	A
4	25	203	668	0.037	25	0.0	5.603	A

Queue Variation Results for each time segment

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.19	0.00	0.00	0.19	0.19			N/A	N/A
3	0.11	0.00	0.00	0.11	0.11			N/A	N/A
4	0.04	0.00	0.00	0.04	0.04			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.24	0.00	0.00	0.24	0.24			N/A	N/A
3	0.14	0.00	0.00	0.14	0.14			N/A	N/A
4	0.05	0.03	0.25	0.45	0.48			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.31	0.03	0.25	0.46	0.48			N/A	N/A
3	0.18	0.03	0.25	0.46	0.48			N/A	N/A
4	0.06	0.03	0.26	0.46	0.49			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.32	0.03	0.32	1.09	1.36			N/A	N/A
3	0.18	0.00	0.00	0.18	0.18			N/A	N/A
4	0.06	0.00	0.00	0.06	0.06			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.24	0.00	0.00	0.24	0.24			N/A	N/A
3	0.14	0.00	0.00	0.14	0.14			N/A	N/A
4	0.05	0.00	0.00	0.05	0.05			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.20	0.00	0.00	0.20	0.20			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.04	0.00	0.00	0.04	0.04			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2033 Design Year (Residential, Creche & Medical Centre), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.35	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	214	Arm 2	3.35	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)
D12	2033 Design Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	13:30	15:00	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	3	100.000
2		✓	284	100.000
3		✓	313	100.000
4		✓	24	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
	1	0	0	3	0
	2	1	0	283	0
	3	3	274	3	33
	4	0	0	24	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
13:30-13:45	1	0	0
	2	214	214
	3	236	236
	4	18	18
13:45-14:00	1	0	0
	2	255	255
	3	281	281
	4	22	22
14:00-14:15	1	0	0
	2	313	313
	3	345	345
	4	26	26
14:15-14:30	1	0	0
	2	313	313
	3	345	345
	4	26	26
14:30-14:45	1	0	0
	2	255	255
	3	281	281
	4	22	22
14:45-15:00	1	0	0
	2	214	214
	3	236	236
	4	18	18

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.28	4.53	0.4	1.5	A
3	0.17	2.08	0.2	0.5	A
4	0.04	6.03	0.0	0.5	A

Main Results for each time segment

13:30 - 13:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	226	969	0.000	0	0.0	0.000	A
2	214	20	1113	0.192	213	0.2	3.997	A
3	236	0.75	2077	0.113	235	0.1	1.954	A
4	18	211	664	0.027	18	0.0	5.572	A

13:45 - 14:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	270	945	0.000	0	0.0	0.000	A
2	255	24	1110	0.230	255	0.3	4.208	A
3	281	0.90	2077	0.135	281	0.2	2.004	A
4	22	253	647	0.033	22	0.0	5.757	A

14:00 - 14:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	331	911	0.000	0	0.0	0.000	A
2	313	30	1107	0.282	312	0.4	4.527	A
3	345	1	2077	0.166	344	0.2	2.077	A
4	26	309	623	0.042	26	0.0	6.031	A

14:15 - 14:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	331	911	0.000	0	0.0	0.000	A
2	313	30	1107	0.282	313	0.4	4.530	A
3	345	1	2077	0.166	345	0.2	2.077	A
4	26	309	623	0.042	26	0.0	6.032	A

14:30 - 14:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	271	944	0.000	0	0.0	0.000	A
2	255	24	1110	0.230	256	0.3	4.214	A
3	281	0.90	2077	0.135	282	0.2	2.006	A
4	22	253	647	0.033	22	0.0	5.761	A

14:45 - 15:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	227	969	0.000	0	0.0	0.000	A
2	214	20	1112	0.192	214	0.2	4.009	A
3	236	0.75	2077	0.113	236	0.1	1.956	A
4	18	212	664	0.027	18	0.0	5.575	A

Queue Variation Results for each time segment

13:30 - 13:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.24	0.00	0.00	0.24	0.24			N/A	N/A
3	0.13	0.00	0.00	0.13	0.13			N/A	N/A
4	0.03	0.00	0.00	0.03	0.03			N/A	N/A

13:45 - 14:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.30	0.00	0.00	0.30	0.30			N/A	N/A
3	0.16	0.00	0.00	0.16	0.16			N/A	N/A
4	0.03	0.03	0.25	0.45	0.48			N/A	N/A

14:00 - 14:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.39	0.03	0.25	0.46	0.48			N/A	N/A
3	0.20	0.03	0.25	0.46	0.48			N/A	N/A
4	0.04	0.03	0.25	0.46	0.48			N/A	N/A

14:15 - 14:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.39	0.03	0.32	1.29	1.50			N/A	N/A
3	0.20	0.03	0.25	0.45	0.48			N/A	N/A
4	0.04	0.00	0.00	0.04	0.04			N/A	N/A

14:30 - 14:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.30	0.00	0.00	0.30	0.30			N/A	N/A
3	0.16	0.00	0.00	0.16	0.16			N/A	N/A
4	0.03	0.00	0.00	0.03	0.03			N/A	N/A

14:45 - 15:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.24	0.00	0.00	0.24	0.24			N/A	N/A
3	0.13	0.00	0.00	0.13	0.13			N/A	N/A
4	0.03	0.00	0.00	0.03	0.03			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2033 Design Year (Overall Masterplan Development), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.26	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	245	Arm 2	3.26	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)
D13	2033 Design Year (Overall Masterplan Development)	AM	ONE HOUR	11:00	12:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	2	100.000
2		✓	240	100.000
3		✓	391	100.000
4		✓	51	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
	1	0	0	2	0
	2	3	0	237	0
	3	0	260	6	125
	4	0	0	51	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
11:00-11:15	1	0	0
	2	181	181
	3	294	294
	4	38	38
11:15-11:30	1	0	0
	2	216	216
	3	352	352
	4	46	46
11:30-11:45	1	0	0
	2	264	264
	3	430	430
	4	56	56
11:45-12:00	1	0	0
	2	264	264
	3	430	430
	4	56	56
12:00-12:15	1	0	0
	2	216	216
	3	352	352
	4	46	46
12:15-12:30	1	0	0
	2	181	181
	3	294	294
	4	38	38

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.24	4.37	0.3	1.4	A
3	0.21	2.19	0.3	0.8	A
4	0.09	6.29	0.1	0.5	A

Main Results for each time segment

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	238	962	0.000	0	0.0	0.000	A
2	181	43	1100	0.164	180	0.2	3.910	A
3	294	2	2076	0.142	294	0.2	2.020	A
4	38	202	668	0.058	38	0.1	5.718	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	285	937	0.000	0	0.0	0.000	A
2	216	51	1095	0.197	216	0.2	4.092	A
3	352	3	2076	0.169	351	0.2	2.087	A
4	46	242	651	0.070	46	0.1	5.945	A

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	349	902	0.000	0	0.0	0.000	A
2	264	63	1089	0.243	264	0.3	4.365	A
3	430	3	2075	0.207	430	0.3	2.188	A
4	56	296	629	0.089	56	0.1	6.286	A

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	349	901	0.000	0	0.0	0.000	A
2	264	63	1089	0.243	264	0.3	4.367	A
3	430	3	2075	0.207	430	0.3	2.188	A
4	56	296	629	0.089	56	0.1	6.287	A

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	285	936	0.000	0	0.0	0.000	A
2	216	51	1095	0.197	216	0.2	4.098	A
3	352	3	2076	0.169	352	0.2	2.089	A
4	46	242	651	0.070	46	0.1	5.950	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	239	962	0.000	0	0.0	0.000	A
2	181	43	1100	0.164	181	0.2	3.918	A
3	294	2	2076	0.142	295	0.2	2.022	A
4	38	203	668	0.058	38	0.1	5.722	A

Queue Variation Results for each time segment

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.20	0.00	0.00	0.20	0.20			N/A	N/A
3	0.16	0.00	0.00	0.16	0.16			N/A	N/A
4	0.06	0.00	0.00	0.06	0.06			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.24	0.00	0.00	0.24	0.24			N/A	N/A
3	0.20	0.00	0.00	0.20	0.20			N/A	N/A
4	0.08	0.03	0.25	0.45	0.48			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.32	0.03	0.25	0.46	0.48			N/A	N/A
3	0.26	0.03	0.25	0.45	0.48			N/A	N/A
4	0.10	0.03	0.26	0.47	0.49			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.32	0.03	0.32	1.10	1.38			N/A	N/A
3	0.26	0.03	0.27	0.48	0.78			N/A	N/A
4	0.10	0.00	0.00	0.10	0.10			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.25	0.00	0.00	0.25	0.25			N/A	N/A
3	0.20	0.00	0.00	0.20	0.20			N/A	N/A
4	0.08	0.00	0.00	0.08	0.08			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.20	0.00	0.00	0.20	0.20			N/A	N/A
3	0.17	0.00	0.00	0.17	0.17			N/A	N/A
4	0.06	0.00	0.00	0.06	0.06			N/A	N/A

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Parkway Retail Park Roundabout - 2033 Design Year (Overall Masterplan Development), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	4.12	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	140	Arm 4	4.12	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)
D14	2033 Design Year (Overall Masterplan Development)	PM	ONE HOUR	13:30	15:00	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	3	100.000
2		✓	284	100.000
3		✓	332	100.000
4		✓	130	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
	1	0	0	3	0
	2	1	0	283	0
	3	3	274	3	52
	4	0	0	130	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
13:30-13:45	1	0	0
	2	214	214
	3	250	250
	4	98	98
13:45-14:00	1	0	0
	2	255	255
	3	298	298
	4	117	117
14:00-14:15	1	0	0
	2	313	313
	3	366	366
	4	143	143
14:15-14:30	1	0	0
	2	313	313
	3	366	366
	4	143	143
14:30-14:45	1	0	0
	2	255	255
	3	298	298
	4	117	117
14:45-15:00	1	0	0
	2	214	214
	3	250	250
	4	98	98

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.30	4.94	0.4	1.8	A
3	0.18	2.10	0.2	0.5	A
4	0.23	7.50	0.3	1.3	A

Main Results for each time segment

13:30 - 13:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	305	925	0.000	0	0.0	0.000	A
2	214	99	1068	0.200	213	0.2	4.206	A
3	250	0.75	2077	0.120	249	0.1	1.969	A
4	98	211	664	0.147	97	0.2	6.343	A

13:45 - 14:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	366	892	0.000	0	0.0	0.000	A
2	255	119	1057	0.242	255	0.3	4.490	A
3	298	0.90	2077	0.144	298	0.2	2.023	A
4	117	253	647	0.181	117	0.2	6.789	A

14:00 - 14:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	448	847	0.000	0	0.0	0.000	A
2	313	146	1041	0.300	312	0.4	4.933	A
3	366	1	2077	0.176	365	0.2	2.103	A
4	143	309	623	0.230	143	0.3	7.488	A

14:15 - 14:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	448	847	0.000	0	0.0	0.000	A
2	313	146	1041	0.300	313	0.4	4.940	A
3	366	1	2077	0.176	366	0.2	2.103	A
4	143	309	623	0.230	143	0.3	7.498	A

14:30 - 14:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	366	892	0.000	0	0.0	0.000	A
2	255	120	1056	0.242	256	0.3	4.498	A
3	298	0.90	2077	0.144	299	0.2	2.025	A
4	117	253	647	0.181	117	0.2	6.801	A

14:45 - 15:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	307	925	0.000	0	0.0	0.000	A
2	214	100	1067	0.200	214	0.3	4.221	A
3	250	0.75	2077	0.120	250	0.1	1.971	A
4	98	212	664	0.147	98	0.2	6.365	A

Queue Variation Results for each time segment

13:30 - 13:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.25	0.00	0.00	0.25	0.25			N/A	N/A
3	0.14	0.00	0.00	0.14	0.14			N/A	N/A
4	0.17	0.00	0.00	0.17	0.17			N/A	N/A

13:45 - 14:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.32	0.00	0.00	0.32	0.32			N/A	N/A
3	0.17	0.00	0.00	0.17	0.17			N/A	N/A
4	0.22	0.00	0.00	0.22	0.22			N/A	N/A

14:00 - 14:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.43	0.03	0.25	0.46	0.48			N/A	N/A
3	0.21	0.03	0.25	0.46	0.48			N/A	N/A
4	0.30	0.03	0.25	0.46	0.48			N/A	N/A

14:15 - 14:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.43	0.03	0.31	1.34	1.77			N/A	N/A
3	0.21	0.03	0.25	0.45	0.48			N/A	N/A
4	0.30	0.03	0.31	1.05	1.34			N/A	N/A

14:30 - 14:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.32	0.00	0.00	0.32	0.32			N/A	N/A
3	0.17	0.00	0.00	0.17	0.17			N/A	N/A
4	0.22	0.00	0.00	0.22	0.22			N/A	N/A

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14:45 - 15:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.25	0.00	0.00	0.25	0.25			N/A	N/A
3	0.14	0.00	0.00	0.14	0.14			N/A	N/A
4	0.17	0.00	0.00	0.17	0.17			N/A	N/A

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Parkway Retail Park Roundabout - 2043 'Do Nothing', AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.12	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	260	Arm 2	3.12	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)
D15	2043 'Do Nothing'	AM	ONE HOUR	11:00	12:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	2	100.000
2		✓	258	100.000
3		✓	285	100.000
4		✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
From	1	0	0	2	0
	2	4	0	254	0
	3	0	279	6	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
11:00-11:15	1	0	0
	2	194	194
	3	215	215
	4	0	0
11:15-11:30	1	0	0
	2	232	232
	3	256	256
	4	0	0
11:30-11:45	1	0	0
	2	284	284
	3	314	314
	4	0	0
11:45-12:00	1	0	0
	2	284	284
	3	314	314
	4	0	0
12:00-12:15	1	0	0
	2	232	232
	3	256	256
	4	0	0
12:15-12:30	1	0	0
	2	194	194
	3	215	215
	4	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.25	4.30	0.3	1.4	A
3	0.15	2.04	0.2	0.5	A
4	0.00	0.00	0.0	~1	A

Main Results for each time segment

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	214	976	0.000	0	0.0	0.000	A
2	194	5	1121	0.173	193	0.2	3.876	A
3	215	3	2075	0.103	214	0.1	1.934	A
4	0	217	662	0.000	0	0.0	0.000	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	256	952	0.000	0	0.0	0.000	A
2	232	5	1121	0.207	232	0.3	4.047	A
3	256	4	2075	0.123	256	0.1	1.979	A
4	0	260	644	0.000	0	0.0	0.000	A

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	314	921	0.000	0	0.0	0.000	A
2	284	7	1120	0.254	284	0.3	4.303	A
3	314	4	2074	0.151	314	0.2	2.044	A
4	0	318	620	0.000	0	0.0	0.000	A

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	314	921	0.000	0	0.0	0.000	A
2	284	7	1120	0.254	284	0.3	4.304	A
3	314	4	2074	0.151	314	0.2	2.044	A
4	0	318	620	0.000	0	0.0	0.000	A

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	256	952	0.000	0	0.0	0.000	A
2	232	5	1121	0.207	232	0.3	4.053	A
3	256	4	2075	0.123	256	0.1	1.979	A
4	0	260	644	0.000	0	0.0	0.000	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	215	975	0.000	0	0.0	0.000	A
2	194	5	1121	0.173	194	0.2	3.885	A
3	215	3	2075	0.103	215	0.1	1.934	A
4	0	218	661	0.000	0	0.0	0.000	A

Queue Variation Results for each time segment

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.21	0.00	0.00	0.21	0.21			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.26	0.00	0.00	0.26	0.26			N/A	N/A
3	0.14	0.00	0.00	0.14	0.14			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.34	0.03	0.25	0.46	0.48			N/A	N/A
3	0.18	0.03	0.25	0.46	0.48			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.34	0.03	0.32	1.16	1.45			N/A	N/A
3	0.18	0.03	0.25	0.45	0.48			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.26	0.00	0.00	0.26	0.26			N/A	N/A
3	0.14	0.00	0.00	0.14	0.14			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.21	0.00	0.00	0.21	0.21			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

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Parkway Retail Park Roundabout - 2043 'Do Nothing', PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.33	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	206	Arm 2	3.33	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)
D16	2043 'Do Nothing'	PM	ONE HOUR	13:30	15:00	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	3	100.000
2		✓	305	100.000
3		✓	301	100.000
4		✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
	1	0	0	3	0
	2	1	0	304	0
	3	3	294	4	0
	4	0	0	0	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
13:30-13:45	1	0	0
	2	230	230
	3	227	227
	4	0	0
13:45-14:00	1	0	0
	2	274	274
	3	271	271
	4	0	0
14:00-14:15	1	0	0
	2	336	336
	3	331	331
	4	0	0
14:15-14:30	1	0	0
	2	336	336
	3	331	331
	4	0	0
14:30-14:45	1	0	0
	2	274	274
	3	271	271
	4	0	0
14:45-15:00	1	0	0
	2	230	230
	3	227	227
	4	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.30	4.58	0.4	1.8	A
3	0.16	2.06	0.2	0.5	A
4	0.00	0.00	0.0	~1	A

Main Results for each time segment

13:30 - 13:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	224	970	0.000	0	0.0	0.000	A
2	230	3	1122	0.205	229	0.3	4.024	A
3	227	0.75	2077	0.109	226	0.1	1.945	A
4	0	227	657	0.000	0	0.0	0.000	A

13:45 - 14:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	268	946	0.000	0	0.0	0.000	A
2	274	4	1122	0.244	274	0.3	4.244	A
3	271	0.90	2077	0.130	270	0.1	1.992	A
4	0	271	639	0.000	0	0.0	0.000	A

14:00 - 14:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	328	913	0.000	0	0.0	0.000	A
2	336	4	1121	0.299	335	0.4	4.578	A
3	331	1	2077	0.160	331	0.2	2.062	A
4	0	332	614	0.000	0	0.0	0.000	A

14:15 - 14:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	328	913	0.000	0	0.0	0.000	A
2	336	4	1121	0.299	336	0.4	4.581	A
3	331	1	2077	0.160	331	0.2	2.062	A
4	0	333	614	0.000	0	0.0	0.000	A

14:30 - 14:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	268	946	0.000	0	0.0	0.000	A
2	274	4	1122	0.244	275	0.3	4.251	A
3	271	0.90	2077	0.130	271	0.2	1.992	A
4	0	272	639	0.000	0	0.0	0.000	A

14:45 - 15:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	224	970	0.000	0	0.0	0.000	A
2	230	3	1122	0.205	230	0.3	4.036	A
3	227	0.75	2077	0.109	227	0.1	1.945	A
4	0	227	657	0.000	0	0.0	0.000	A

Queue Variation Results for each time segment

13:30 - 13:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.26	0.00	0.00	0.26	0.26			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

13:45 - 14:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.32	0.00	0.00	0.32	0.32			N/A	N/A
3	0.15	0.00	0.00	0.15	0.15			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:00 - 14:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.42	0.03	0.25	0.46	0.48			N/A	N/A
3	0.19	0.03	0.25	0.46	0.48			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:15 - 14:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.43	0.03	0.31	1.33	1.77			N/A	N/A
3	0.19	0.03	0.25	0.45	0.48			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:30 - 14:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.33	0.00	0.00	0.33	0.33			N/A	N/A
3	0.15	0.00	0.00	0.15	0.15			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

14:45 - 15:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.26	0.00	0.00	0.26	0.26			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.00	0.00	0.00	0.00	0.00			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2043 Design Year (Residential, Creche & Medical Centre), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.31	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	236	Arm 2	3.31	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)
D17	2043 Design Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	11:00	12:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	2	100.000
2		✓	258	100.000
3		✓	304	100.000
4		✓	33	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		1	2	3	4
	1	0	0	2	0
	2	4	0	254	0
	3	0	279	6	19
	4	0	0	33	0

Vehicle Mix

Heavy Vehicle %

	To				
		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
11:00-11:15	1	0	0
	2	194	194
	3	229	229
	4	25	25
11:15-11:30	1	0	0
	2	232	232
	3	273	273
	4	30	30
11:30-11:45	1	0	0
	2	284	284
	3	335	335
	4	36	36
11:45-12:00	1	0	0
	2	284	284
	3	335	335
	4	36	36
12:00-12:15	1	0	0
	2	232	232
	3	273	273
	4	30	30
12:15-12:30	1	0	0
	2	194	194
	3	229	229
	4	25	25

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.26	4.41	0.3	1.5	A
3	0.16	2.07	0.2	0.5	A
4	0.06	6.17	0.1	0.5	A

Main Results for each time segment

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	239	962	0.000	0	0.0	0.000	A
2	194	29	1107	0.175	193	0.2	3.935	A
3	229	3	2075	0.110	228	0.1	1.949	A
4	25	217	662	0.038	25	0.0	5.651	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	286	936	0.000	0	0.0	0.000	A
2	232	35	1104	0.210	232	0.3	4.125	A
3	273	4	2075	0.132	273	0.2	1.997	A
4	30	260	644	0.046	30	0.0	5.861	A

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	350	901	0.000	0	0.0	0.000	A
2	284	43	1100	0.258	284	0.3	4.409	A
3	335	4	2074	0.161	335	0.2	2.069	A
4	36	318	620	0.059	36	0.1	6.171	A

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	350	901	0.000	0	0.0	0.000	A
2	284	43	1100	0.258	284	0.3	4.413	A
3	335	4	2074	0.161	335	0.2	2.069	A
4	36	318	620	0.059	36	0.1	6.172	A

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	286	936	0.000	0	0.0	0.000	A
2	232	35	1104	0.210	232	0.3	4.131	A
3	273	4	2075	0.132	273	0.2	1.998	A
4	30	260	644	0.046	30	0.0	5.863	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	240	962	0.000	0	0.0	0.000	A
2	194	29	1107	0.175	194	0.2	3.945	A
3	229	3	2075	0.110	229	0.1	1.949	A
4	25	218	661	0.038	25	0.0	5.658	A

Queue Variation Results for each time segment

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.21	0.00	0.00	0.21	0.21			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.04	0.00	0.00	0.04	0.04			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.26	0.00	0.00	0.26	0.26			N/A	N/A
3	0.15	0.00	0.00	0.15	0.15			N/A	N/A
4	0.05	0.03	0.25	0.45	0.48			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.35	0.03	0.25	0.46	0.48			N/A	N/A
3	0.19	0.03	0.25	0.46	0.48			N/A	N/A
4	0.06	0.03	0.26	0.47	0.49			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.35	0.03	0.32	1.19	1.48			N/A	N/A
3	0.19	0.03	0.25	0.45	0.48			N/A	N/A
4	0.06	0.00	0.00	0.06	0.06			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.27	0.00	0.00	0.27	0.27			N/A	N/A
3	0.15	0.00	0.00	0.15	0.15			N/A	N/A
4	0.05	0.00	0.00	0.05	0.05			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.21	0.00	0.00	0.21	0.21			N/A	N/A
3	0.12	0.00	0.00	0.12	0.12			N/A	N/A
4	0.04	0.00	0.00	0.04	0.04			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2043 Design Year (Residential, Creche & Medical Centre), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.43	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	193	Arm 2	3.43	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)
D18	2043 Design Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	13:30	15:00	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	3	100.000
2		✓	305	100.000
3		✓	334	100.000
4		✓	24	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
	1	2	3	4	
From	1	0	0	3	0
	2	1	0	304	0
	3	3	294	4	33
	4	0	0	24	0

Vehicle Mix

Heavy Vehicle %

	To				
	1	2	3	4	
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
13:30-13:45	1	0	0
	2	230	230
	3	251	251
	4	18	18
13:45-14:00	1	0	0
	2	274	274
	3	300	300
	4	22	22
14:00-14:15	1	0	0
	2	336	336
	3	368	368
	4	26	26
14:15-14:30	1	0	0
	2	336	336
	3	368	368
	4	26	26
14:30-14:45	1	0	0
	2	274	274
	3	300	300
	4	22	22
14:45-15:00	1	0	0
	2	230	230
	3	251	251
	4	18	18

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.30	4.67	0.4	1.8	A
3	0.18	2.11	0.2	0.5	A
4	0.04	6.13	0.0	0.5	A

Main Results for each time segment

13:30 - 13:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	242	960	0.000	0	0.0	0.000	A
2	230	21	1112	0.206	229	0.3	4.071	A
3	251	0.75	2077	0.121	251	0.1	1.971	A
4	18	227	657	0.027	18	0.0	5.629	A

13:45 - 14:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	289	934	0.000	0	0.0	0.000	A
2	274	25	1110	0.247	274	0.3	4.306	A
3	300	0.90	2077	0.145	300	0.2	2.025	A
4	22	271	639	0.034	22	0.0	5.830	A

14:00 - 14:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	354	898	0.000	0	0.0	0.000	A
2	336	31	1107	0.303	335	0.4	4.666	A
3	368	1	2077	0.177	368	0.2	2.105	A
4	26	332	614	0.043	26	0.0	6.129	A

14:15 - 14:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	355	898	0.000	0	0.0	0.000	A
2	336	31	1107	0.303	336	0.4	4.670	A
3	368	1	2077	0.177	368	0.2	2.105	A
4	26	333	614	0.043	26	0.0	6.130	A

14:30 - 14:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	290	934	0.000	0	0.0	0.000	A
2	274	25	1110	0.247	275	0.3	4.312	A
3	300	0.90	2077	0.145	300	0.2	2.026	A
4	22	272	639	0.034	22	0.0	5.832	A

14:45 - 15:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	243	960	0.000	0	0.0	0.000	A
2	230	21	1112	0.206	230	0.3	4.081	A
3	251	0.75	2077	0.121	252	0.1	1.973	A
4	18	227	657	0.027	18	0.0	5.632	A

Queue Variation Results for each time segment

13:30 - 13:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.26	0.00	0.00	0.26	0.26			N/A	N/A
3	0.14	0.00	0.00	0.14	0.14			N/A	N/A
4	0.03	0.00	0.00	0.03	0.03			N/A	N/A

13:45 - 14:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.33	0.00	0.00	0.33	0.33			N/A	N/A
3	0.17	0.00	0.00	0.17	0.17			N/A	N/A
4	0.03	0.03	0.25	0.45	0.48			N/A	N/A

14:00 - 14:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.43	0.03	0.25	0.46	0.48			N/A	N/A
3	0.21	0.03	0.25	0.46	0.48			N/A	N/A
4	0.04	0.03	0.25	0.46	0.48			N/A	N/A

14:15 - 14:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.43	0.03	0.31	1.34	1.82			N/A	N/A
3	0.21	0.03	0.25	0.45	0.48			N/A	N/A
4	0.04	0.00	0.00	0.04	0.04			N/A	N/A

14:30 - 14:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.33	0.00	0.00	0.33	0.33			N/A	N/A
3	0.17	0.00	0.00	0.17	0.17			N/A	N/A
4	0.04	0.00	0.00	0.04	0.04			N/A	N/A

14:45 - 15:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.26	0.00	0.00	0.26	0.26			N/A	N/A
3	0.14	0.00	0.00	0.14	0.14			N/A	N/A
4	0.03	0.00	0.00	0.03	0.03			N/A	N/A

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Parkway Retail Park Roundabout - 2043 Design Year (Overall Masterplan Development), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	3.32	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	224	Arm 2	3.32	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)
D19	2043 Design Year (Overall Masterplan Development)	AM	ONE HOUR	11:00	12:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	2	100.000
2		✓	258	100.000
3		✓	410	100.000
4		✓	51	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
	1	2	3	4	
From	1	0	0	2	0
	2	4	0	254	0
	3	0	279	6	125
	4	0	0	51	0

Vehicle Mix

Heavy Vehicle %

	To				
	1	2	3	4	
From	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
11:00-11:15	1	0	0
	2	194	194
	3	309	309
	4	38	38
11:15-11:30	1	0	0
	2	232	232
	3	369	369
	4	46	46
11:30-11:45	1	0	0
	2	284	284
	3	451	451
	4	56	56
11:45-12:00	1	0	0
	2	284	284
	3	451	451
	4	56	56
12:00-12:15	1	0	0
	2	232	232
	3	369	369
	4	46	46
12:15-12:30	1	0	0
	2	194	194
	3	309	309
	4	38	38

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.26	4.47	0.4	1.5	A
3	0.22	2.22	0.3	1.1	A
4	0.09	6.39	0.1	0.5	A

Main Results for each time segment

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	252	955	0.000	0	0.0	0.000	A
2	194	43	1100	0.177	193	0.2	3.968	A
3	309	3	2075	0.149	308	0.2	2.035	A
4	38	217	662	0.058	38	0.1	5.775	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	302	927	0.000	0	0.0	0.000	A
2	232	51	1095	0.212	232	0.3	4.168	A
3	369	4	2075	0.178	368	0.2	2.109	A
4	46	260	644	0.071	46	0.1	6.019	A

11:30 - 11:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	370	890	0.000	0	0.0	0.000	A
2	284	63	1089	0.261	284	0.4	4.470	A
3	451	4	2074	0.218	451	0.3	2.217	A
4	56	318	620	0.091	56	0.1	6.388	A

11:45 - 12:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	370	890	0.000	0	0.0	0.000	A
2	284	63	1089	0.261	284	0.4	4.474	A
3	451	4	2074	0.218	451	0.3	2.217	A
4	56	318	620	0.091	56	0.1	6.389	A

12:00 - 12:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	302	927	0.000	0	0.0	0.000	A
2	232	51	1095	0.212	232	0.3	4.174	A
3	369	4	2075	0.178	369	0.2	2.109	A
4	46	260	644	0.071	46	0.1	6.022	A

12:15 - 12:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	253	954	0.000	0	0.0	0.000	A
2	194	43	1100	0.177	194	0.2	3.979	A
3	309	3	2075	0.149	309	0.2	2.039	A
4	38	218	661	0.058	38	0.1	5.782	A

Queue Variation Results for each time segment

11:00 - 11:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.21	0.00	0.00	0.21	0.21			N/A	N/A
3	0.17	0.00	0.00	0.17	0.17			N/A	N/A
4	0.06	0.00	0.00	0.06	0.06			N/A	N/A

11:15 - 11:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.27	0.00	0.00	0.27	0.27			N/A	N/A
3	0.22	0.00	0.00	0.22	0.22			N/A	N/A
4	0.08	0.03	0.25	0.45	0.48			N/A	N/A

11:30 - 11:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.35	0.03	0.25	0.46	0.48			N/A	N/A
3	0.28	0.03	0.25	0.45	0.48			N/A	N/A
4	0.10	0.03	0.26	0.47	0.49			N/A	N/A

11:45 - 12:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.35	0.03	0.32	1.20	1.50			N/A	N/A
3	0.28	0.03	0.28	0.64	1.07			N/A	N/A
4	0.10	0.00	0.00	0.10	0.10			N/A	N/A

12:00 - 12:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.27	0.00	0.00	0.27	0.27			N/A	N/A
3	0.22	0.00	0.00	0.22	0.22			N/A	N/A
4	0.08	0.00	0.00	0.08	0.08			N/A	N/A

12:15 - 12:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.22	0.00	0.00	0.22	0.22			N/A	N/A
3	0.18	0.00	0.00	0.18	0.18			N/A	N/A
4	0.06	0.00	0.00	0.06	0.06			N/A	N/A

RECEIVED: 28/05/2026

Parkway Retail Park Roundabout - 2043 Design Year (Overall Masterplan Development), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
3	Parkway Retail Park Roundabout	Standard Roundabout		1, 2, 3, 4	4.19	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	132	Arm 4	4.19	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)
D20	2043 Design Year (Overall Masterplan Development)	PM	ONE HOUR	13:30	15:00	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	3	100.000
2		✓	305	100.000
3		✓	353	100.000
4		✓	130	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
From		1	2	3	4
	1	0	0	3	0
	2	1	0	304	0
	3	3	294	4	52
	4	0	0	130	0

Vehicle Mix

Heavy Vehicle %

	To				
From		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
13:30-13:45	1	0	0
	2	230	230
	3	266	266
	4	98	98
13:45-14:00	1	0	0
	2	274	274
	3	317	317
	4	117	117
14:00-14:15	1	0	0
	2	336	336
	3	389	389
	4	143	143
14:15-14:30	1	0	0
	2	336	336
	3	389	389
	4	143	143
14:30-14:45	1	0	0
	2	274	274
	3	317	317
	4	117	117
14:45-15:00	1	0	0
	2	230	230
	3	266	266
	4	98	98

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS
1	0.00	0.00	0.0	~1	A
2	0.32	5.11	0.5	2.1	A
3	0.19	2.13	0.2	0.5	A
4	0.23	7.65	0.3	1.4	A

Main Results for each time segment

13:30 - 13:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	321	917	0.000	0	0.0	0.000	A
2	230	100	1067	0.215	229	0.3	4.286	A
3	266	0.75	2077	0.128	265	0.1	1.987	A
4	98	227	657	0.149	97	0.2	6.417	A

13:45 - 14:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	384	882	0.000	0	0.0	0.000	A
2	274	120	1056	0.260	274	0.3	4.599	A
3	317	0.90	2077	0.153	317	0.2	2.045	A
4	117	271	639	0.183	117	0.2	6.891	A

14:00 - 14:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	471	835	0.000	0	0.0	0.000	A
2	336	147	1041	0.323	335	0.5	5.099	A
3	389	1	2077	0.187	388	0.2	2.132	A
4	143	332	614	0.233	143	0.3	7.641	A

14:15 - 14:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	471	834	0.000	0	0.0	0.000	A
2	336	148	1041	0.323	336	0.5	5.106	A
3	389	1	2077	0.187	389	0.2	2.132	A
4	143	333	614	0.233	143	0.3	7.651	A

14:30 - 14:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	385	882	0.000	0	0.0	0.000	A
2	274	121	1056	0.260	275	0.4	4.613	A
3	317	0.90	2077	0.153	318	0.2	2.047	A
4	117	272	639	0.183	117	0.2	6.904	A

14:45 - 15:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	0	323	916	0.000	0	0.0	0.000	A
2	230	101	1067	0.215	230	0.3	4.302	A
3	266	0.75	2077	0.128	266	0.1	1.987	A
4	98	227	657	0.149	98	0.2	6.442	A

Queue Variation Results for each time segment

13:30 - 13:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.27	0.00	0.00	0.27	0.27			N/A	N/A
3	0.15	0.00	0.00	0.15	0.15			N/A	N/A
4	0.17	0.00	0.00	0.17	0.17			N/A	N/A

13:45 - 14:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.35	0.00	0.00	0.35	0.35			N/A	N/A
3	0.18	0.00	0.00	0.18	0.18			N/A	N/A
4	0.22	0.00	0.00	0.22	0.22			N/A	N/A

14:00 - 14:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.47	0.03	0.25	0.47	0.48			N/A	N/A
3	0.23	0.03	0.25	0.45	0.48			N/A	N/A
4	0.30	0.03	0.26	0.46	0.48			N/A	N/A

14:15 - 14:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.47	0.03	0.30	1.36	2.09			N/A	N/A
3	0.23	0.03	0.25	0.45	0.48			N/A	N/A
4	0.30	0.03	0.31	1.07	1.36			N/A	N/A

14:30 - 14:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.35	0.00	0.00	0.35	0.35			N/A	N/A
3	0.18	0.00	0.00	0.18	0.18			N/A	N/A
4	0.23	0.00	0.00	0.23	0.23			N/A	N/A

14:45 - 15:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.00	0.00	0.00	0.00	0.00			N/A	N/A
2	0.28	0.00	0.00	0.28	0.28			N/A	N/A
3	0.15	0.00	0.00	0.15	0.15			N/A	N/A
4	0.18	0.00	0.00	0.18	0.18			N/A	N/A

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Junctions 10
ARCADY 10 - Roundabout Module
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Filename: Junction Site 4 - Existing Groody Roundabout with Capacity Adjustment (Do Nothing & Development Scenarios).j10
Path: I:\DWGS\231\151-200\231171\3.0 Calculations\1. Civils\231171-PUNCH-XX-XX-CA-C-0001_TTA\Junction Modelling
Report generation date: 03/11/2025 21:51:23

- »Groody Roundabout - 2025 'Do Nothing' Baseline, AM
- »Groody Roundabout - 2025 'Do Nothing' Baseline, PM
- »Groody Roundabout - 2028 'Do Nothing', AM
- »Groody Roundabout - 2028 'Do Nothing', PM
- »Groody Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), AM
- »Groody Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), PM
- »Groody Roundabout - 2028 Opening Year (Overall Masterplan Development), AM
- »Groody Roundabout - 2028 Opening Year (Overall Masterplan Development), PM
- »Groody Roundabout - 2033 'Do Nothing', AM
- »Groody Roundabout - 2033 'Do Nothing', PM
- »Groody Roundabout - 2033 Design Year (Residential, Creche & Medical Centre), AM
- »Groody Roundabout - 2033 Design Year (Residential, Creche & Medical Centre), PM
- »Groody Roundabout - 2033 Design Year (Overall Masterplan Development), AM
- »Groody Roundabout - 2033 Design Year (Overall Masterplan Development), PM
- »Groody Roundabout - 2043 'Do Nothing', AM
- »Groody Roundabout - 2043 'Do Nothing', PM
- »Groody Roundabout - 2043 Design Year (Residential, Creche & Medical Centre), AM
- »Groody Roundabout - 2043 Design Year (Residential, Creche & Medical Centre), PM
- »Groody Roundabout - 2043 Design Year (Overall Masterplan Development), AM
- »Groody Roundabout - 2043 Design Year (Overall Masterplan Development), PM

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Summary of junction performance

	AM									PM								
	Set ID	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Set ID	Queue (PCU)	95% Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
	Groody Roundabout - 2025 'Do Nothing' Baseline																	
Arm 1	D1	0.6	2.7	4.74	0.37	A	18.52	C	1 % [Arm 4]	D2	6.1	31.2	23.83	0.87	C	16.15	C	4 % [Arm 1]
Arm 2		3.6	15.7	12.25	0.79	B					3.1	13.7	14.22	0.76	B			
Arm 3		3.4	16.8	17.06	0.78	C					3.1	13.9	15.14	0.76	C			
Arm 4		10.2	56.1	28.76	0.93	D					4.2	19.7	12.21	0.81	B			
	Groody Roundabout - 2028 'Do Nothing'																	
Arm 1	D3	0.6	2.8	4.99	0.40	A	30.83	D	-4 % [Arm 4]	D4	10.8	56.5	40.70	0.94	E	24.11	C	-2 % [Arm 1]
Arm 2		4.9	25.0	16.14	0.84	C					4.5	22.3	19.72	0.83	C			
Arm 3		5.2	26.2	24.75	0.85	C					4.3	21.8	20.62	0.82	C			
Arm 4		21.1	87.9	54.20	0.98	F					6.0	30.8	16.49	0.86	C			
	Groody Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre)																	
Arm 1	D5	0.7	2.8	5.07	0.40	A	38.64	E	-6 % [Arm 4]	D6	13.3	64.3	48.98	0.96	E	28.12	D	-3 % [Arm 1]
Arm 2		5.4	27.9	17.68	0.85	C					5.2	25.4	22.50	0.85	C			
Arm 3		5.6	29.8	26.98	0.86	D					5.0	24.6	23.57	0.85	C			
Arm 4		30.2	99.5	72.07	1.01	F					6.9	34.9	18.79	0.88	C			
	Groody Roundabout - 2028 Opening Year (Overall Masterplan Development)																	
Arm 1	D7	0.7	2.8	5.25	0.42	A	48.74	E	-7 % [Arm 4]	D8	20.0	75.9	69.85	0.99	F	40.55	E	-6 % [Arm 1]
Arm 2		9.7	53.0	30.16	0.92	D					5.8	30.6	25.24	0.87	D			
Arm 3		9.2	48.2	43.73	0.92	E					5.3	27.3	25.00	0.85	D			
Arm 4		35.3	105.0	81.31	1.02	F					14.8	75.6	37.67	0.96	E			
	Groody Roundabout - 2033 'Do Nothing'																	
Arm 1	D9	0.7	2.8	5.23	0.42	A	57.34	F	-9 % [Arm 4]	D10	26.1	83.8	85.39	1.01	F	42.98	E	-7 % [Arm 1]
Arm 2		7.5	39.9	23.79	0.89	C					7.2	39.4	30.33	0.89	D			
Arm 3		9.7	50.6	44.61	0.93	E					7.0	38.4	31.94	0.89	D			
Arm 4		49.6	118.2	107.87	1.05	F					9.6	52.9	25.60	0.92	D			
	Groody Roundabout - 2033 Design Year (Residential, Creche & Medical Centre)																	
Arm 1	D11	0.7	2.7	5.29	0.43	A	70.71	F	-11 % [Arm 4]	D12	32.9	90.5	102.98	1.03	F	51.43	F	-8 % [Arm 1]
Arm 2		8.5	46.9	26.86	0.91	D					8.5	46.3	35.31	0.91	E			
Arm 3		11.1	54.8	50.44	0.94	F					8.3	45.4	37.69	0.91	E			
Arm 4		66.0	134.4	136.89	1.08	F					11.9	65.0	31.26	0.94	D			
	Groody Roundabout - 2033 Design Year (Overall Masterplan Development)																	
Arm 1	D13	0.8	2.6	5.49	0.45	A	89.57	F	-12 % [Arm 4]	D14	44.0	100.7	132.56	1.07	F	73.42	F	-10 % [Arm 1]
Arm 2		19.1	81.4	54.78	0.98	F					9.3	50.1	38.35	0.92	E			
Arm 3		21.2	71.4	88.20	1.01	F					8.8	47.6	39.63	0.92	E			
Arm 4		71.9	140.3	147.01	1.08	F					32.1	104.1	71.36	1.01	F			
	Groody Roundabout - 2043 'Do Nothing'																	
Arm 1	D15	0.8	2.4	5.54	0.45	A	125.47	F	-15 % [Arm 4]	D16	67.9	124.7	191.05	1.12	F	92.44	F	-13 % [Arm 1]
Arm 2		17.1	77.7	50.10	0.97	F					14.4	65.7	55.83	0.96	F			
Arm 3		30.9	82.1	116.53	1.04	F					15.6	66.2	64.63	0.98	F			
Arm 4		103.8	172.0	229.14	1.13	F					24.5	95.0	57.90	0.99	F			
	Groody Roundabout - 2043 Design Year (Residential, Creche & Medical Centre)																	
Arm 1	D17	0.8	2.3	5.59	0.46	A	152.69	F	-17 % [Arm 4]	D18	76.1	132.9	212.76	1.13	F	106.60	F	-14 % [Arm 1]
Arm 2		20.6	84.0	58.60	0.98	F					17.3	71.1	65.15	0.98	F			
Arm 3		34.7	85.7	128.70	1.06	F					19.3	71.6	77.12	1.00	F			
Arm 4		122.6	191.8	286.56	1.16	F					31.6	103.3	70.79	1.01	F			
	Groody Roundabout - 2043 Design Year (Overall Masterplan Development)																	
Arm 1	D19	0.9	2.0	5.82	0.48	A	185.64	F	-17 % [Arm 4]	D20	83.7	140.8	268.76	1.15	F	148.66	F	-16 % [Arm 1]
Arm 2		50.9	115.8	121.52	1.06	F					19.3	74.3	71.04	0.99	F			
Arm 3		50.9	101.2	183.90	1.10	F					21.3	73.9	83.16	1.00	F			
Arm 4		127.5	198.0	299.14	1.16	F					76.6	147.5	146.57	1.08	F			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

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

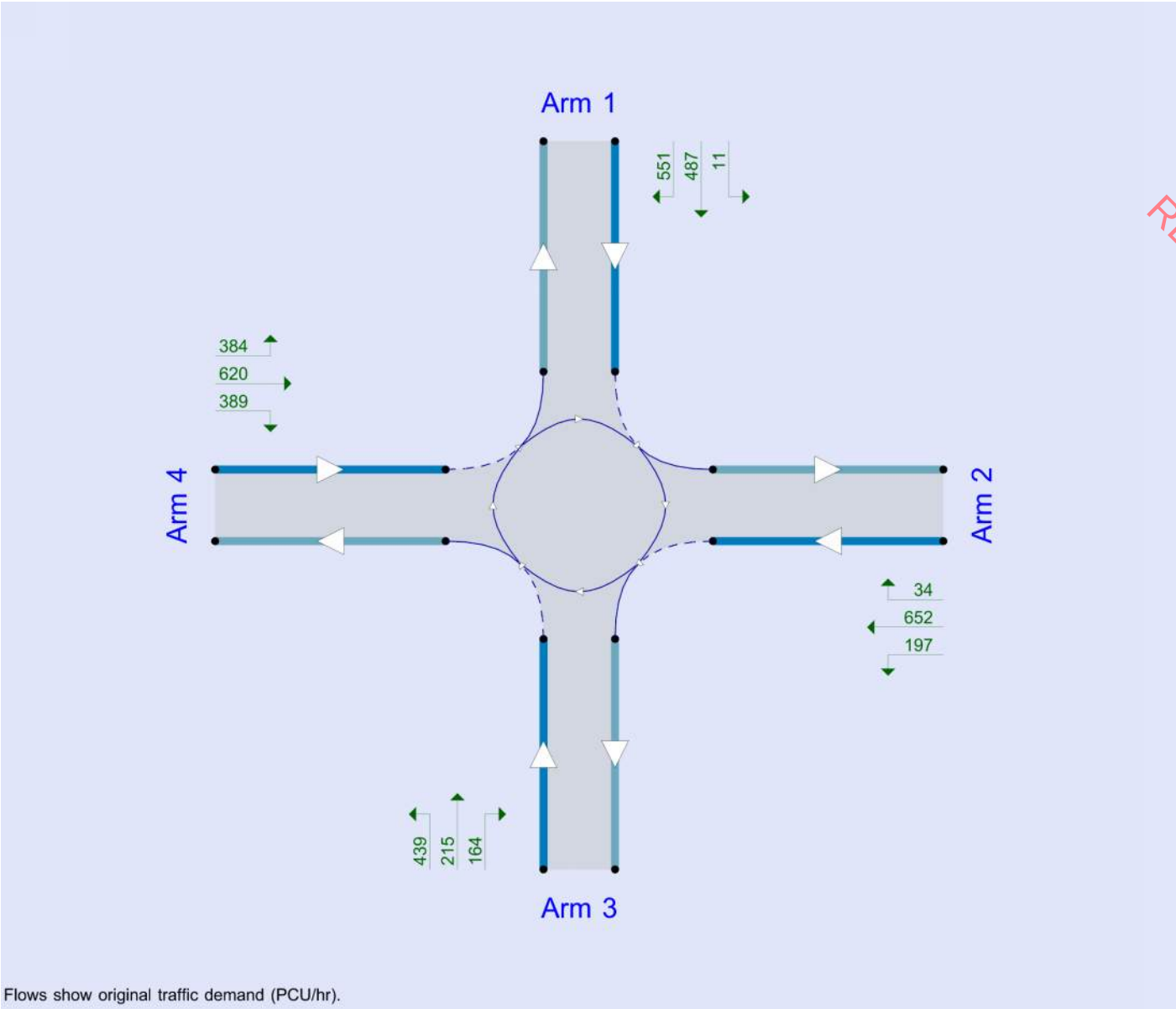
File summary

File Description

Title	Groody Roundabout with Capacity Adjustment
Location	Limerick
Site number	04
Date	07/10/2025
Version	
Status	
Identifier	
Client	
Jobnumber	231171
Enumerator	MPPNET\AMcCarthy
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

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use simulation for HCM roundabouts	Use iterations for HCM roundabouts
5.75	✓				✓	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)	Run automatically
D1	2025 'Do Nothing' Baseline	AM	ONE HOUR	07:45	09:15	15	✓
D2	2025 'Do Nothing' Baseline	PM	ONE HOUR	16:00	17:30	15	✓
D3	2028 'Do Nothing'	AM	ONE HOUR	07:45	09:15	15	✓
D4	2028 'Do Nothing'	PM	ONE HOUR	16:00	17:30	15	✓
D5	2028 Opening Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	07:45	09:15	15	✓
D6	2028 Opening Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	16:00	17:30	15	✓
D7	2028 Opening Year (Overall Masterplan Development)	AM	ONE HOUR	07:45	09:15	15	✓
D8	2028 Opening Year (Overall Masterplan Development)	PM	ONE HOUR	16:00	17:30	15	✓
D9	2033 'Do Nothing'	AM	ONE HOUR	07:45	09:15	15	✓
D10	2033 'Do Nothing'	PM	ONE HOUR	16:00	17:30	15	✓
D11	2033 Design Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	07:45	09:15	15	✓
D12	2033 Design Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	16:00	17:30	15	✓
D13	2033 Design Year (Overall Masterplan Development)	AM	ONE HOUR	07:45	09:15	15	✓
D14	2033 Design Year (Overall Masterplan Development)	PM	ONE HOUR	16:00	17:30	15	✓
D15	2043 'Do Nothing'	AM	ONE HOUR	07:45	09:15	15	✓
D16	2043 'Do Nothing'	PM	ONE HOUR	16:00	17:30	15	✓
D17	2043 Design Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	07:45	09:15	15	✓
D18	2043 Design Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	16:00	17:30	15	✓
D19	2043 Design Year (Overall Masterplan Development)	AM	ONE HOUR	07:45	09:15	15	✓
D20	2043 Design Year (Overall Masterplan Development)	PM	ONE HOUR	16:00	17:30	15	✓

Analysis Set Details

ID	Name	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	Groody Roundabout	✓	100.000	100.000

Groody Roundabout - 2025 'Do Nothing' Baseline, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	18.52	C

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	1	Arm 4	18.52	C

Arms

Arms

Arm	Name	Description	No give-way line
1	Plassey Park Road		
2	Dublin Road (East)		
3	Groody Road		
4	Dublin Road (West)		

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Entry only	Exit only
1	7.50	9.60	30.0	33.0	60.0	0.0		
2	7.50	9.50	15.0	28.0	60.0	0.0		
3	6.10	7.00	14.0	29.0	60.0	0.0		
4	7.30	10.00	30.0	34.0	60.0	0.0		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.838	3137
2	0.816	3016
3	0.696	2322
4	0.850	3201

The slope and intercept shown above include any corrections and adjustments.

Arm Capacity Adjustments

Arm	Type	Reason	Percentage capacity adjustment (%)
1	Percentage	Observed queuing on approach	50.00
2	Percentage	Observed queuing on approach	55.00
3	Percentage	Observed queuing on approach	65.00
4	Percentage	Observed queuing on approach	55.00

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)	Run automatically
D1	2025 'Do Nothing' Baseline	AM	ONE HOUR	07:45	09:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	406	100.000
2		ONE HOUR	✓	977	100.000
3		ONE HOUR	✓	683	100.000
4		ONE HOUR	✓	1242	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
From		1	2	3	4
	1	0	11	147	248
	2	14	0	133	830
	3	451	80	4	148
	4	540	512	181	9

Proportions

	To				
From		1	2	3	4
	1	0.00	0.03	0.36	0.61
	2	0.01	0.00	0.14	0.85
	3	0.66	0.12	0.01	0.22
	4	0.43	0.41	0.15	0.01

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %

	To				
From		1	2	3	4
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0

Average PCU Per Veh

	To				
From		1	2	3	4
	1	1.000	1.000	1.000	1.000
	2	1.000	1.000	1.000	1.000
	3	1.000	1.000	1.000	1.000
	4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
07:45-08:00	1	306	306
	2	736	736
	3	514	514
	4	935	935
08:00-08:15	1	365	365
	2	878	878
	3	614	614
	4	1117	1117
08:15-08:30	1	447	447
	2	1076	1076
	3	752	752
	4	1367	1367
08:30-08:45	1	447	447
	2	1076	1076
	3	752	752
	4	1367	1367
08:45-09:00	1	365	365
	2	878	878
	3	614	614
	4	1117	1117
09:00-09:15	1	306	306
	2	736	736
	3	514	514
	4	935	935

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.37	4.74	0.6	2.7	A	373	559
2	0.79	12.25	3.6	15.7	B	897	1345
3	0.78	17.06	3.4	16.8	C	627	940
4	0.93	28.76	10.2	56.1	D	1140	1710

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	306	76	588	1322	0.231	304	752	0.0	0.3	3.536	A
2	736	184	441	1461	0.504	732	451	0.0	1.0	4.912	A
3	514	129	825	1136	0.453	511	348	0.0	0.8	5.729	A
4	935	234	411	1568	0.596	929	925	0.0	1.5	5.582	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	365	91	704	1273	0.287	365	900	0.3	0.4	3.959	A
2	878	220	528	1422	0.618	876	540	1.0	1.6	6.569	A
3	614	154	987	1062	0.578	612	417	0.8	1.3	7.954	A
4	1117	279	492	1531	0.729	1112	1108	1.5	2.6	8.504	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	447	112	850	1212	0.369	446	1090	0.4	0.6	4.697	A
2	1076	269	644	1370	0.785	1068	652	1.6	3.5	11.658	B
3	752	188	1205	964	0.780	744	507	1.3	3.3	15.849	C
4	1367	342	598	1481	0.923	1342	1351	2.6	9.0	22.640	C

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	447	112	863	1207	0.370	447	1104	0.6	0.6	4.737	A
2	1076	269	648	1368	0.786	1075	662	3.5	3.6	12.252	B
3	752	188	1212	961	0.783	751	511	3.3	3.4	17.058	C
4	1367	342	604	1478	0.925	1362	1359	9.0	10.2	28.755	D

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	365	91	724	1265	0.289	366	922	0.6	0.4	4.007	A
2	878	220	535	1419	0.619	886	555	3.6	1.7	6.850	A
3	614	154	997	1058	0.580	622	424	3.4	1.4	8.406	A
4	1117	279	500	1527	0.731	1146	1119	10.2	2.8	10.147	B

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	306	76	595	1319	0.232	306	760	0.4	0.3	3.557	A
2	736	184	445	1459	0.504	738	456	1.7	1.0	5.011	A
3	514	129	831	1133	0.454	516	351	1.4	0.8	5.859	A
4	935	234	415	1566	0.597	940	933	2.8	1.5	5.796	A

Queue Variation Results for each time segment

07:45 - 08:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.30	0.00	0.00	0.30	0.30			N/A	N/A
2	1.00	0.55	1.00	1.40	1.45			N/A	N/A
3	0.82	0.55	1.00	1.40	1.45			N/A	N/A
4	1.45	0.57	1.36	1.85	1.98			N/A	N/A

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.40	0.00	0.00	0.40	0.40			N/A	N/A
2	1.59	0.05	0.60	3.96	6.04			N/A	N/A
3	1.34	0.06	0.72	3.06	4.53			N/A	N/A
4	2.61	0.05	0.49	7.19	11.79			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.58	0.03	0.25	0.58	0.58			N/A	N/A
2	3.46	0.03	0.30	3.49	15.72			N/A	N/A
3	3.29	0.03	0.32	5.24	16.83			N/A	N/A
4	9.00	0.06	0.98	26.17	44.82			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.59	0.03	0.29	1.32	2.73			N/A	N/A
2	3.57	0.03	0.28	3.57	7.83			N/A	N/A
3	3.44	0.03	0.29	3.44	12.49			N/A	N/A
4	10.24	0.04	0.40	25.77	56.14			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.41	0.00	0.00	0.41	0.41			N/A	N/A
2	1.66	0.06	0.71	4.10	6.17			N/A	N/A
3	1.41	0.05	0.50	3.52	5.36			N/A	N/A
4	2.82	0.04	0.42	7.78	14.07			N/A	N/A

09:00 - 09:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.30	0.00	0.00	0.30	0.30			N/A	N/A
2	1.03	0.04	0.38	2.58	4.56			N/A	N/A
3	0.84	0.03	0.35	1.97	3.81			N/A	N/A
4	1.50	0.03	0.31	2.56	7.68			N/A	N/A

Groody Roundabout - 2025 'Do Nothing' Baseline, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	16.15	C

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	4	Arm 1	16.15	C

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)	Run automatically
D2	2025 'Do Nothing' Baseline	PM	ONE HOUR	16:00	17:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	879	100.000
2		ONE HOUR	✓	740	100.000
3		ONE HOUR	✓	686	100.000
4		ONE HOUR	✓	1171	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	9	408	462		1	0.00	0.01	0.46	0.53
	2	28	1	165	546		2	0.04	0.00	0.22	0.74
	3	180	137	1	368		3	0.26	0.20	0.00	0.54
	4	322	519	326	4		4	0.27	0.44	0.28	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:00-16:15	1	662	662
	2	557	557
	3	516	516
	4	882	882
16:15-16:30	1	790	790
	2	665	665
	3	617	617
	4	1053	1053
16:30-16:45	1	968	968
	2	815	815
	3	755	755
	4	1289	1289
16:45-17:00	1	968	968
	2	815	815
	3	755	755
	4	1289	1289
17:00-17:15	1	790	790
	2	665	665
	3	617	617
	4	1053	1053
17:15-17:30	1	662	662
	2	557	557
	3	516	516
	4	882	882

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.87	23.83	6.1	31.2	C	807	1210
2	0.76	14.22	3.1	13.7	B	679	1019
3	0.76	15.14	3.1	13.9	C	629	944
4	0.81	12.21	4.2	19.7	B	1075	1612

Main Results for each time segment

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	662	165	740	1258	0.526	657	397	0.0	1.1	5.949	A
2	557	139	899	1255	0.444	554	499	0.0	0.8	5.110	A
3	516	129	779	1157	0.446	513	674	0.0	0.8	5.568	A
4	882	220	260	1639	0.538	877	1033	0.0	1.2	4.696	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	790	198	886	1197	0.660	787	475	1.1	1.9	8.710	A
2	665	166	1076	1176	0.566	663	597	0.8	1.3	6.997	A
3	617	154	933	1087	0.567	615	806	0.8	1.3	7.586	A
4	1053	263	311	1615	0.652	1050	1236	1.2	1.8	6.340	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	968	242	1080	1116	0.867	953	579	1.9	5.6	20.496	C
2	815	204	1305	1073	0.759	808	728	1.3	3.0	13.258	B
3	755	189	1133	997	0.758	749	980	1.3	2.9	14.158	B
4	1289	322	379	1583	0.814	1280	1503	1.8	4.1	11.537	B

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	968	242	1087	1113	0.870	966	583	5.6	6.1	23.826	C
2	815	204	1320	1066	0.764	814	733	3.0	3.1	14.217	B
3	755	189	1145	991	0.762	755	990	2.9	3.1	15.140	C
4	1289	322	382	1582	0.815	1289	1518	4.1	4.2	12.211	B

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	790	198	896	1193	0.663	806	481	6.1	2.0	9.688	A
2	665	166	1098	1166	0.571	672	604	3.1	1.4	7.399	A
3	617	154	950	1079	0.571	624	821	3.1	1.4	8.013	A
4	1053	263	315	1613	0.653	1062	1258	4.2	1.9	6.642	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	662	165	746	1256	0.527	665	400	2.0	1.1	6.135	A
2	557	139	909	1251	0.445	559	503	1.4	0.8	5.220	A
3	516	129	787	1153	0.448	519	681	1.4	0.8	5.695	A
4	882	220	262	1638	0.538	885	1044	1.9	1.2	4.797	A

Queue Variation Results for each time segment

16:00 - 16:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.09	0.55	1.02	1.44	1.49			N/A	N/A
2	0.79	0.55	1.00	1.40	1.45			N/A	N/A
3	0.80	0.55	1.00	1.40	1.45			N/A	N/A
4	1.15	0.55	1.00	1.40	1.45			N/A	N/A

16:15 - 16:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.89	0.05	0.55	4.95	7.75			N/A	N/A
2	1.28	0.06	0.70	2.90	4.25			N/A	N/A
3	1.29	0.06	0.76	2.87	4.11			N/A	N/A
4	1.84	0.05	0.49	4.84	7.69			N/A	N/A

16:30 - 16:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	5.58	0.04	0.40	14.78	30.12			N/A	N/A
2	2.98	0.03	0.30	3.09	13.66			N/A	N/A
3	2.94	0.03	0.30	3.42	13.87			N/A	N/A
4	4.11	0.03	0.31	5.12	19.74			N/A	N/A

16:45 - 17:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	6.07	0.03	0.33	9.70	31.20			N/A	N/A
2	3.12	0.03	0.28	3.12	8.97			N/A	N/A
3	3.08	0.03	0.28	3.08	9.42			N/A	N/A
4	4.25	0.03	0.28	4.25	10.27			N/A	N/A

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	2.02	0.04	0.43	5.50	9.42			N/A	N/A
2	1.35	0.06	0.70	3.15	4.65			N/A	N/A
3	1.36	0.05	0.66	3.21	4.76			N/A	N/A
4	1.92	0.05	0.64	4.97	7.69			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.13	0.03	0.32	2.27	5.75			N/A	N/A
2	0.81	0.04	0.37	1.91	3.42			N/A	N/A
3	0.82	0.04	0.36	1.94	3.50			N/A	N/A
4	1.18	0.04	0.37	2.96	5.55			N/A	N/A

RECEIVED: 28/05/2026

Groody Roundabout - 2028 'Do Nothing', AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	30.83	D

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-4	Arm 4	30.83	D

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)	Run automatically
D3	2028 'Do Nothing'	AM	ONE HOUR	07:45	09:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	428	100.000
2		ONE HOUR	✓	1030	100.000
3		ONE HOUR	✓	719	100.000
4		ONE HOUR	✓	1308	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	12	155	261		1	0.00	0.03	0.36	0.61
	2	15	0	140	875		2	0.01	0.00	0.14	0.85
	3	475	84	4	156		3	0.66	0.12	0.01	0.22
	4	569	539	191	9		4	0.44	0.41	0.15	0.01

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
07:45-08:00	1	322	322
	2	775	775
	3	541	541
	4	985	985
08:00-08:15	1	385	385
	2	926	926
	3	646	646
	4	1176	1176
08:15-08:30	1	471	471
	2	1134	1134
	3	792	792
	4	1440	1440
08:30-08:45	1	471	471
	2	1134	1134
	3	792	792
	4	1440	1440
08:45-09:00	1	385	385
	2	926	926
	3	646	646
	4	1176	1176
09:00-09:15	1	322	322
	2	775	775
	3	541	541
	4	985	985

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.40	4.99	0.6	2.8	A	393	589
2	0.84	16.14	4.9	25.0	C	945	1418
3	0.85	24.75	5.2	26.2	C	660	990
4	0.98	54.20	21.1	87.9	F	1200	1800

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	322	81	618	1309	0.246	321	792	0.0	0.3	3.638	A
2	775	194	464	1450	0.535	771	475	0.0	1.1	5.265	A
3	541	135	869	1116	0.485	538	367	0.0	0.9	6.182	A
4	985	246	432	1558	0.632	978	974	0.0	1.7	6.134	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	385	96	740	1258	0.306	384	947	0.3	0.4	4.117	A
2	926	231	556	1409	0.657	923	568	1.1	1.9	7.359	A
3	646	162	1040	1039	0.622	644	439	0.9	1.6	9.050	A
4	1176	294	517	1519	0.774	1170	1166	1.7	3.3	10.129	B

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	471	118	881	1199	0.393	470	1136	0.4	0.6	4.935	A
2	1134	284	674	1356	0.836	1123	677	1.9	4.6	14.779	B
3	792	198	1267	936	0.846	779	530	1.6	4.7	21.412	C
4	1440	360	626	1468	0.981	1390	1419	3.3	15.7	34.253	D

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	471	118	898	1192	0.395	471	1155	0.6	0.6	4.994	A
2	1134	284	679	1354	0.838	1133	690	4.6	4.9	16.136	C
3	792	198	1276	932	0.850	790	536	4.7	5.2	24.753	C
4	1440	360	635	1464	0.984	1418	1431	15.7	21.1	54.201	F

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	385	96	784	1240	0.310	386	992	0.6	0.5	4.220	A
2	926	231	569	1403	0.660	938	601	4.9	2.0	7.912	A
3	646	162	1054	1032	0.626	660	453	5.2	1.7	10.007	B
4	1176	294	531	1512	0.777	1246	1183	21.1	3.7	16.687	C

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	322	81	627	1305	0.247	323	803	0.5	0.3	3.667	A
2	775	194	468	1448	0.535	779	482	2.0	1.2	5.403	A
3	541	135	876	1113	0.487	544	371	1.7	1.0	6.367	A
4	985	246	438	1556	0.633	993	983	3.7	1.8	6.474	A

Queue Variation Results for each time segment

07:45 - 08:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.32	0.00	0.00	0.32	0.32			N/A	N/A
2	1.13	0.55	1.00	1.40	1.45			N/A	N/A
3	0.93	0.55	1.00	1.40	1.45			N/A	N/A
4	1.68	0.50	1.03	2.57	2.97			N/A	N/A

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.44	0.00	0.00	0.44	0.44			N/A	N/A
2	1.87	0.05	0.51	4.92	7.75			N/A	N/A
3	1.61	0.05	0.62	3.99	6.09			N/A	N/A
4	3.27	0.05	0.63	9.15	14.89			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.64	0.03	0.25	0.64	0.64			N/A	N/A
2	4.65	0.03	0.34	9.16	24.99			N/A	N/A
3	4.75	0.04	0.39	12.16	25.65			N/A	N/A
4	15.70	0.20	7.03	41.44	58.52			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.65	0.03	0.29	1.15	2.84			N/A	N/A
2	4.89	0.03	0.29	4.89	18.64			N/A	N/A
3	5.16	0.03	0.32	7.83	26.16			N/A	N/A
4	21.12	0.14	6.86	59.35	87.93			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.45	0.00	0.00	0.45	0.45			N/A	N/A
2	1.99	0.05	0.48	5.33	8.58			N/A	N/A
3	1.72	0.04	0.43	4.61	7.72			N/A	N/A
4	3.70	0.04	0.41	10.12	19.12			N/A	N/A

09:00 - 09:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.33	0.00	0.00	0.33	0.33			N/A	N/A
2	1.17	0.03	0.34	2.78	5.80			N/A	N/A
3	0.96	0.03	0.32	1.92	4.79			N/A	N/A
4	1.76	0.03	0.30	1.89	8.11			N/A	N/A

RECEIVED: 28/05/2026

Groody Roundabout - 2028 'Do Nothing', PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	24.11	C

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-2	Arm 1	24.11	C

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)	Run automatically
D4	2028 'Do Nothing'	PM	ONE HOUR	16:00	17:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	925	100.000
2		ONE HOUR	✓	780	100.000
3		ONE HOUR	✓	722	100.000
4		ONE HOUR	✓	1234	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	9	430	486		1	0.00	0.01	0.46	0.53
	2	30	1	174	575		2	0.04	0.00	0.22	0.74
	3	190	144	1	387		3	0.26	0.20	0.00	0.54
	4	339	547	344	4		4	0.27	0.44	0.28	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:00-16:15	1	696	696
	2	587	587
	3	544	544
	4	929	929
16:15-16:30	1	832	832
	2	701	701
	3	649	649
	4	1109	1109
16:30-16:45	1	1018	1018
	2	859	859
	3	795	795
	4	1359	1359
16:45-17:00	1	1018	1018
	2	859	859
	3	795	795
	4	1359	1359
17:00-17:15	1	832	832
	2	701	701
	3	649	649
	4	1109	1109
17:15-17:30	1	696	696
	2	587	587
	3	544	544
	4	929	929

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.94	40.70	10.8	56.5	E	849	1273
2	0.83	19.72	4.5	22.3	C	716	1074
3	0.82	20.62	4.3	21.8	C	663	994
4	0.86	16.49	6.0	30.8	C	1132	1699

Main Results for each time segment

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	696	174	779	1242	0.561	691	418	0.0	1.3	6.484	A
2	587	147	946	1234	0.476	584	525	0.0	0.9	5.505	A
3	544	136	820	1138	0.478	540	710	0.0	0.9	5.980	A
4	929	232	274	1633	0.569	924	1086	0.0	1.3	5.044	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	832	208	933	1177	0.706	827	501	1.3	2.3	10.159	B
2	701	175	1132	1151	0.609	699	628	0.9	1.5	7.921	A
3	649	162	981	1065	0.609	647	850	0.9	1.5	8.546	A
4	1109	277	328	1607	0.690	1106	1300	1.3	2.2	7.130	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1018	255	1134	1093	0.932	992	609	2.3	9.0	29.865	D
2	859	215	1362	1047	0.820	848	763	1.5	4.1	17.275	C
3	795	199	1185	973	0.817	785	1026	1.5	4.0	18.224	C
4	1359	340	398	1574	0.863	1345	1572	2.2	5.6	14.853	B

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1018	255	1145	1088	0.936	1011	615	9.0	10.8	40.699	E
2	859	215	1385	1037	0.828	857	771	4.1	4.5	19.720	C
3	795	199	1202	965	0.823	794	1041	4.0	4.3	20.620	C
4	1359	340	402	1572	0.864	1357	1593	5.6	6.0	16.487	C

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	832	208	949	1171	0.710	864	510	10.8	2.6	12.924	B
2	701	175	1174	1132	0.620	713	639	4.5	1.7	8.807	A
3	649	162	1011	1052	0.617	660	875	4.3	1.7	9.430	A
4	1109	277	334	1604	0.692	1124	1337	6.0	2.3	7.716	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	696	174	787	1238	0.562	701	423	2.6	1.3	6.762	A
2	587	147	958	1229	0.478	590	530	1.7	0.9	5.667	A
3	544	136	830	1134	0.479	546	719	1.7	0.9	6.159	A
4	929	232	277	1631	0.570	933	1100	2.3	1.3	5.184	A

Queue Variation Results for each time segment

16:00 - 16:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.26	0.55	1.17	1.64	1.84			N/A	N/A
2	0.90	0.55	1.00	1.40	1.45			N/A	N/A
3	0.90	0.55	1.00	1.40	1.45			N/A	N/A
4	1.30	0.57	1.16	1.59	1.80			N/A	N/A

16:15 - 16:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	2.32	0.05	0.55	6.28	9.98			N/A	N/A
2	1.53	0.05	0.59	3.80	5.77			N/A	N/A
3	1.52	0.05	0.68	3.73	5.57			N/A	N/A
4	2.17	0.05	0.48	5.90	9.60			N/A	N/A

16:30 - 16:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	9.00	0.07	1.43	26.04	41.24			N/A	N/A
2	4.12	0.03	0.34	8.68	22.32			N/A	N/A
3	4.02	0.03	0.35	8.68	21.79			N/A	N/A
4	5.63	0.04	0.36	12.51	30.77			N/A	N/A

16:45 - 17:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	10.78	0.05	0.50	30.83	56.50			N/A	N/A
2	4.49	0.03	0.30	4.49	19.92			N/A	N/A
3	4.35	0.03	0.30	4.35	19.51			N/A	N/A
4	5.96	0.03	0.30	5.96	25.20			N/A	N/A

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	2.55	0.04	0.40	6.90	12.87			N/A	N/A
2	1.67	0.05	0.48	4.36	6.87			N/A	N/A
3	1.65	0.05	0.47	4.33	6.87			N/A	N/A
4	2.30	0.05	0.47	6.30	10.42			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.31	0.03	0.30	1.72	6.29			N/A	N/A
2	0.93	0.03	0.33	2.06	4.54			N/A	N/A
3	0.93	0.03	0.33	2.09	4.57			N/A	N/A
4	1.34	0.03	0.34	3.08	6.84			N/A	N/A

RECEIVED: 28/05/2026

Groody Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	38.64	E

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-6	Arm 4	38.64	E

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)	Run automatically
D5	2028 Opening Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	07:45	09:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	433	100.000
2		ONE HOUR	✓	1045	100.000
3		ONE HOUR	✓	722	100.000
4		ONE HOUR	✓	1342	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	12	155	266		1	0.00	0.03	0.36	0.61
	2	15	0	140	890		2	0.01	0.00	0.13	0.85
	3	475	84	4	159		3	0.66	0.12	0.01	0.22
	4	584	553	196	9		4	0.44	0.41	0.15	0.01

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
07:45-08:00	1	326	326
	2	787	787
	3	544	544
	4	1010	1010
08:00-08:15	1	389	389
	2	939	939
	3	649	649
	4	1206	1206
08:15-08:30	1	477	477
	2	1151	1151
	3	795	795
	4	1478	1478
08:30-08:45	1	477	477
	2	1151	1151
	3	795	795
	4	1478	1478
08:45-09:00	1	389	389
	2	939	939
	3	649	649
	4	1206	1206
09:00-09:15	1	326	326
	2	787	787
	3	544	544
	4	1010	1010

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.40	5.07	0.7	2.8	A	397	596
2	0.85	17.68	5.4	27.9	C	959	1438
3	0.86	26.98	5.6	29.8	D	663	994
4	1.01	72.07	30.2	99.5	F	1231	1847

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	326	81	632	1303	0.250	325	803	0.0	0.3	3.673	A
2	787	197	472	1447	0.544	782	485	0.0	1.2	5.378	A
3	544	136	883	1110	0.490	540	370	0.0	0.9	6.278	A
4	1010	253	432	1558	0.648	1003	991	0.0	1.8	6.402	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	389	97	756	1251	0.311	389	960	0.3	0.4	4.171	A
2	939	235	565	1405	0.669	936	580	1.2	2.0	7.625	A
3	649	162	1058	1031	0.630	646	443	0.9	1.7	9.295	A
4	1206	302	517	1519	0.794	1199	1187	1.8	3.7	11.011	B

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	477	119	892	1195	0.399	476	1144	0.4	0.7	5.002	A
2	1151	288	683	1352	0.851	1138	685	2.0	5.1	15.935	C
3	795	199	1287	927	0.858	781	533	1.7	5.1	22.843	C
4	1478	369	625	1468	1.006	1411	1443	3.7	20.4	41.133	E

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	477	119	909	1187	0.402	477	1164	0.7	0.7	5.065	A
2	1151	288	688	1350	0.852	1149	698	5.1	5.4	17.675	C
3	795	199	1298	922	0.862	793	539	5.1	5.6	26.981	D
4	1478	369	635	1464	1.009	1438	1456	20.4	30.2	72.066	F

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	389	97	821	1224	0.318	390	1021	0.7	0.5	4.320	A
2	939	235	583	1397	0.672	953	628	5.4	2.1	8.330	A
3	649	162	1073	1024	0.634	664	462	5.6	1.8	10.428	B
4	1206	302	532	1512	0.798	1310	1206	30.2	4.3	25.477	D

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	326	81	643	1299	0.251	327	815	0.5	0.3	3.705	A
2	787	197	476	1445	0.544	790	493	2.1	1.2	5.531	A
3	544	136	892	1106	0.492	547	375	1.8	1.0	6.476	A
4	1010	253	438	1556	0.649	1020	1001	4.3	1.9	6.834	A

Queue Variation Results for each time segment

07:45 - 08:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.33	0.00	0.00	0.33	0.33			N/A	N/A
2	1.18	0.55	1.04	1.38	1.38			N/A	N/A
3	0.95	0.55	1.00	1.40	1.45			N/A	N/A
4	1.81	0.34	1.09	2.89	3.63			N/A	N/A

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.45	0.00	0.00	0.45	0.45			N/A	N/A
2	1.97	0.05	0.50	5.23	8.27			N/A	N/A
3	1.66	0.05	0.61	4.19	6.43			N/A	N/A
4	3.65	0.05	0.79	10.27	16.55			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.66	0.03	0.25	0.66	0.66			N/A	N/A
2	5.10	0.04	0.36	11.36	27.86			N/A	N/A
3	5.11	0.04	0.41	13.75	27.37			N/A	N/A
4	20.39	0.68	12.66	48.40	64.30			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.67	0.03	0.29	1.09	2.83			N/A	N/A
2	5.41	0.03	0.30	5.41	23.18			N/A	N/A
3	5.63	0.03	0.33	10.10	29.77			N/A	N/A
4	30.22	0.73	17.94	73.94	99.46			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.47	0.00	0.00	0.47	0.47			N/A	N/A
2	2.11	0.05	0.47	5.72	9.37			N/A	N/A
3	1.78	0.04	0.43	4.79	8.19			N/A	N/A
4	4.28	0.04	0.42	11.79	22.21			N/A	N/A

09:00 - 09:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.34	0.00	0.00	0.34	0.34			N/A	N/A
2	1.21	0.03	0.34	2.78	6.12			N/A	N/A
3	0.98	0.03	0.31	1.87	4.91			N/A	N/A
4	1.89	0.03	0.29	1.89	8.31			N/A	N/A

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Groody Roundabout - 2028 Opening Year (Residential, Creche & Medical Centre), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	28.12	D

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-3	Arm 1	28.12	D

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)	Run automatically
D6	2028 Opening Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	16:00	17:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	937	100.000
2		ONE HOUR	✓	795	100.000
3		ONE HOUR	✓	732	100.000
4		ONE HOUR	✓	1260	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	9	430	498		1	0.00	0.01	0.46	0.53
	2	30	1	174	590		2	0.04	0.00	0.22	0.74
	3	190	144	1	397		3	0.26	0.20	0.00	0.54
	4	346	559	351	4		4	0.27	0.44	0.28	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:00-16:15	1	705	705
	2	599	599
	3	551	551
	4	949	949
16:15-16:30	1	842	842
	2	715	715
	3	658	658
	4	1133	1133
16:30-16:45	1	1032	1032
	2	875	875
	3	806	806
	4	1387	1387
16:45-17:00	1	1032	1032
	2	875	875
	3	806	806
	4	1387	1387
17:00-17:15	1	842	842
	2	715	715
	3	658	658
	4	1133	1133
17:15-17:30	1	705	705
	2	599	599
	3	551	551
	4	949	949

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.96	48.98	13.3	64.3	E	860	1290
2	0.85	22.50	5.2	25.4	C	730	1094
3	0.85	23.57	5.0	24.6	C	672	1008
4	0.88	18.79	6.9	34.9	C	1156	1734

Main Results for each time segment

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	705	176	793	1236	0.571	700	423	0.0	1.3	6.658	A
2	599	150	960	1228	0.487	595	534	0.0	0.9	5.655	A
3	551	138	840	1129	0.488	547	715	0.0	0.9	6.147	A
4	949	237	274	1633	0.581	943	1113	0.0	1.4	5.182	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	842	211	950	1170	0.720	838	507	1.3	2.5	10.672	B
2	715	179	1149	1143	0.625	712	639	0.9	1.6	8.295	A
3	658	165	1005	1055	0.624	655	856	0.9	1.6	8.957	A
4	1133	283	328	1607	0.705	1129	1333	1.4	2.3	7.466	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1032	258	1153	1085	0.951	999	615	2.5	10.5	33.667	D
2	875	219	1377	1041	0.841	863	775	1.6	4.7	19.104	C
3	806	201	1210	962	0.838	794	1031	1.6	4.5	20.207	C
4	1387	347	397	1575	0.881	1371	1607	2.3	6.4	16.469	C

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1032	258	1165	1080	0.955	1021	622	10.5	13.3	48.976	E
2	875	219	1402	1029	0.850	873	784	4.7	5.2	22.497	C
3	806	201	1229	953	0.846	804	1047	4.5	5.0	23.568	C
4	1387	347	402	1573	0.882	1385	1631	6.4	6.9	18.789	C

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	842	211	968	1163	0.725	884	518	13.3	2.8	14.744	B
2	715	179	1201	1120	0.638	728	652	5.2	1.8	9.495	A
3	658	165	1042	1038	0.634	671	887	5.0	1.8	10.146	B
4	1133	283	335	1604	0.706	1150	1378	6.9	2.5	8.234	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	705	176	802	1232	0.572	711	428	2.8	1.4	6.979	A
2	599	150	973	1222	0.490	602	539	1.8	1.0	5.839	A
3	551	138	851	1124	0.490	554	724	1.8	1.0	6.354	A
4	949	237	277	1631	0.582	953	1128	2.5	1.4	5.343	A

Queue Variation Results for each time segment

16:00 - 16:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.31	0.54	1.22	1.74	1.91			N/A	N/A
2	0.94	0.55	1.00	1.40	1.45			N/A	N/A
3	0.94	0.55	1.00	1.40	1.45			N/A	N/A
4	1.37	0.57	1.25	1.71	1.87			N/A	N/A

16:15 - 16:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	2.47	0.05	0.58	6.73	10.74			N/A	N/A
2	1.63	0.05	0.56	4.13	6.38			N/A	N/A
3	1.62	0.05	0.65	4.01	6.09			N/A	N/A
4	2.32	0.05	0.48	6.36	10.38			N/A	N/A

16:30 - 16:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	10.53	0.10	2.92	29.59	44.38			N/A	N/A
2	4.67	0.04	0.37	11.22	25.35			N/A	N/A
3	4.54	0.04	0.37	11.07	24.54			N/A	N/A
4	6.41	0.04	0.39	16.06	34.91			N/A	N/A

16:45 - 17:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	13.26	0.07	1.43	39.01	64.28			N/A	N/A
2	5.19	0.03	0.32	6.91	25.36			N/A	N/A
3	5.00	0.03	0.32	6.86	24.65			N/A	N/A
4	6.89	0.03	0.32	8.52	33.08			N/A	N/A

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	2.76	0.04	0.40	7.41	14.05			N/A	N/A
2	1.81	0.05	0.47	4.83	7.82			N/A	N/A
3	1.78	0.05	0.46	4.76	7.77			N/A	N/A
4	2.47	0.05	0.45	6.83	11.61			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.36	0.03	0.30	1.51	6.29			N/A	N/A
2	0.97	0.03	0.32	2.00	4.83			N/A	N/A
3	0.97	0.03	0.32	2.03	4.84			N/A	N/A
4	1.41	0.03	0.33	3.04	7.26			N/A	N/A

RECEIVED: 28/05/2026

Groody Roundabout - 2028 Opening Year (Overall Masterplan Development), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	48.74	E

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-7	Arm 4	48.74	E

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)	Run automatically
D7	2028 Opening Year (Overall Masterplan Development)	AM	ONE HOUR	07:45	09:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	455	100.000
2		ONE HOUR	✓	1120	100.000
3		ONE HOUR	✓	735	100.000
4		ONE HOUR	✓	1359	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	12	155	288		1	0.00	0.03	0.34	0.63
	2	15	0	140	965		2	0.01	0.00	0.13	0.86
	3	475	84	4	172		3	0.65	0.11	0.01	0.23
	4	592	560	198	9		4	0.44	0.41	0.15	0.01

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
07:45-08:00	1	343	343
	2	843	843
	3	553	553
	4	1023	1023
08:00-08:15	1	409	409
	2	1007	1007
	3	661	661
	4	1222	1222
08:15-08:30	1	501	501
	2	1233	1233
	3	809	809
	4	1496	1496
08:30-08:45	1	501	501
	2	1233	1233
	3	809	809
	4	1496	1496
08:45-09:00	1	409	409
	2	1007	1007
	3	661	661
	4	1222	1222
09:00-09:15	1	343	343
	2	843	843
	3	553	553
	4	1023	1023

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.42	5.25	0.7	2.8	A	418	626
2	0.92	30.16	9.7	53.0	D	1028	1542
3	0.92	43.73	9.2	48.2	E	674	1012
4	1.02	81.31	35.3	105.0	F	1247	1871

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	343	86	639	1301	0.263	341	809	0.0	0.4	3.748	A
2	843	211	490	1439	0.586	838	490	0.0	1.4	5.934	A
3	553	138	956	1077	0.514	549	372	0.0	1.0	6.770	A
4	1023	256	432	1559	0.656	1016	1073	0.0	1.9	6.543	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	409	102	764	1248	0.328	409	967	0.4	0.5	4.284	A
2	1007	252	586	1396	0.721	1002	586	1.4	2.5	9.054	A
3	661	165	1144	992	0.666	657	445	1.0	1.9	10.646	B
4	1222	305	517	1519	0.804	1214	1284	1.9	3.9	11.500	B

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	501	125	896	1193	0.420	500	1143	0.5	0.7	5.190	A
2	1233	308	708	1341	0.919	1209	689	2.5	8.5	23.841	C
3	809	202	1384	883	0.916	787	533	1.9	7.6	31.874	D
4	1496	374	619	1471	1.017	1421	1552	3.9	22.8	44.386	E

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	501	125	912	1186	0.422	501	1165	0.7	0.7	5.254	A
2	1233	308	712	1339	0.921	1229	701	8.5	9.7	30.158	D
3	809	202	1402	875	0.925	803	539	7.6	9.2	43.732	E
4	1496	374	631	1465	1.021	1446	1573	22.8	35.3	81.311	F

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	409	102	841	1216	0.336	410	1045	0.7	0.5	4.472	A
2	1007	252	608	1386	0.726	1035	643	9.7	2.8	10.990	B
3	661	165	1174	978	0.675	689	469	9.2	2.2	13.564	B
4	1222	305	542	1507	0.811	1344	1321	35.3	4.7	33.538	D

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	343	86	650	1296	0.264	343	822	0.5	0.4	3.780	A
2	843	211	495	1437	0.587	848	499	2.8	1.4	6.173	A
3	553	138	966	1072	0.516	558	377	2.2	1.1	7.059	A
4	1023	256	439	1555	0.658	1034	1086	4.7	2.0	7.046	A

Queue Variation Results for each time segment

07:45 - 08:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.36	0.00	0.00	0.36	0.36			N/A	N/A
2	1.39	0.57	1.29	1.78	1.93			N/A	N/A
3	1.04	0.54	1.03	1.17	1.17			N/A	N/A
4	1.87	0.29	1.12	3.08	3.86			N/A	N/A

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.48	0.00	0.00	0.48	0.48			N/A	N/A
2	2.50	0.05	0.51	6.86	11.07			N/A	N/A
3	1.93	0.05	0.56	5.07	7.94			N/A	N/A
4	3.87	0.06	0.89	10.88	17.41			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.72	0.03	0.25	0.72	0.72			N/A	N/A
2	8.52	0.06	0.97	24.75	42.23			N/A	N/A
3	7.57	0.06	1.43	21.87	35.10			N/A	N/A
4	22.77	1.26	15.48	51.67	67.26			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.73	0.03	0.28	0.87	2.82			N/A	N/A
2	9.68	0.04	0.40	24.43	53.04			N/A	N/A
3	9.19	0.05	0.48	26.01	48.22			N/A	N/A
4	35.33	1.40	24.19	80.66	105.03			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.51	0.51	1.00	1.40	1.45			N/A	N/A
2	2.76	0.04	0.43	7.62	13.67			N/A	N/A
3	2.16	0.04	0.40	5.83	10.73			N/A	N/A
4	4.74	0.04	0.44	13.26	24.37			N/A	N/A

09:00 - 09:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.36	0.00	0.00	0.36	0.36			N/A	N/A
2	1.44	0.03	0.31	2.42	7.34			N/A	N/A
3	1.08	0.03	0.30	1.33	5.11			N/A	N/A
4	1.96	0.03	0.29	1.96	8.47			N/A	N/A

RECEIVED: 28/05/2026

Groody Roundabout - 2028 Opening Year (Overall Masterplan Development), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	40.55	E

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-6	Arm 1	40.55	E

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)	Run automatically
D8	2028 Opening Year (Overall Masterplan Development)	PM	ONE HOUR	16:00	17:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	944	100.000
2		ONE HOUR	✓	802	100.000
3		ONE HOUR	✓	737	100.000
4		ONE HOUR	✓	1365	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	9	430	505		1	0.00	0.01	0.46	0.53
	2	30	1	174	597		2	0.04	0.00	0.22	0.74
	3	190	144	1	402		3	0.26	0.20	0.00	0.55
	4	375	605	380	5		4	0.27	0.44	0.28	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:00-16:15	1	711	711
	2	604	604
	3	555	555
	4	1028	1028
16:15-16:30	1	849	849
	2	721	721
	3	663	663
	4	1227	1227
16:30-16:45	1	1039	1039
	2	883	883
	3	811	811
	4	1503	1503
16:45-17:00	1	1039	1039
	2	883	883
	3	811	811
	4	1503	1503
17:00-17:15	1	849	849
	2	721	721
	3	663	663
	4	1227	1227
17:15-17:30	1	711	711
	2	604	604
	3	555	555
	4	1028	1028

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.99	69.85	20.0	75.9	F	866	1299
2	0.87	25.24	5.8	30.6	D	736	1104
3	0.85	25.00	5.3	27.3	D	676	1014
4	0.96	37.67	14.8	75.6	E	1253	1879

Main Results for each time segment

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	711	178	850	1212	0.586	705	445	0.0	1.4	7.025	A
2	604	151	987	1216	0.497	600	568	0.0	1.0	5.812	A
3	555	139	851	1124	0.494	551	736	0.0	1.0	6.239	A
4	1028	257	274	1633	0.629	1021	1128	0.0	1.7	5.825	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	849	212	1017	1142	0.743	843	532	1.4	2.8	11.822	B
2	721	180	1181	1129	0.639	718	679	1.0	1.7	8.699	A
3	663	166	1018	1049	0.632	660	881	1.0	1.7	9.186	A
4	1227	307	328	1607	0.763	1221	1350	1.7	3.1	9.193	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1039	260	1222	1056	0.984	994	641	2.8	14.0	42.066	E
2	883	221	1400	1030	0.857	869	817	1.7	5.2	20.779	C
3	811	203	1218	958	0.847	799	1051	1.7	4.8	21.144	C
4	1503	376	397	1575	0.954	1466	1620	3.1	12.2	26.940	D

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1039	260	1243	1047	0.992	1015	652	14.0	20.0	69.852	F
2	883	221	1428	1018	0.868	880	830	5.2	5.8	25.236	D
3	811	203	1238	949	0.855	809	1070	4.8	5.3	25.004	D
4	1503	376	402	1573	0.956	1493	1645	12.2	14.8	37.667	E

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	849	212	1057	1125	0.754	915	552	20.0	3.3	21.956	C
2	721	180	1266	1090	0.661	736	706	5.8	2.0	10.582	B
3	663	166	1071	1025	0.647	676	932	5.3	1.9	10.718	B
4	1227	307	336	1603	0.765	1273	1411	14.8	3.4	12.265	B

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	711	178	861	1208	0.589	718	451	3.3	1.5	7.457	A
2	604	151	1004	1208	0.500	608	575	2.0	1.0	6.036	A
3	555	139	864	1118	0.496	558	748	1.9	1.0	6.467	A
4	1028	257	277	1631	0.630	1034	1145	3.4	1.7	6.103	A

Queue Variation Results for each time segment

16:00 - 16:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.39	0.47	1.28	1.90	2.32			N/A	N/A
2	0.97	0.55	1.00	1.40	1.45			N/A	N/A
3	0.96	0.55	1.00	1.40	1.45			N/A	N/A
4	1.67	0.55	1.06	2.38	2.81			N/A	N/A

16:15 - 16:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	2.75	0.05	0.67	7.58	12.04			N/A	N/A
2	1.72	0.05	0.56	4.45	6.85			N/A	N/A
3	1.67	0.05	0.65	4.20	6.38			N/A	N/A
4	3.10	0.05	0.54	8.65	14.13			N/A	N/A

16:30 - 16:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	13.97	0.24	7.00	35.64	49.32			N/A	N/A
2	5.15	0.04	0.39	13.41	27.86			N/A	N/A
3	4.80	0.04	0.39	12.25	25.94			N/A	N/A
4	12.22	0.09	2.72	35.10	54.07			N/A	N/A

16:45 - 17:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	19.95	0.20	8.61	53.37	75.89			N/A	N/A
2	5.84	0.03	0.33	9.99	30.57			N/A	N/A
3	5.33	0.03	0.32	8.36	27.27			N/A	N/A
4	14.81	0.06	1.28	43.45	75.64			N/A	N/A

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	3.28	0.04	0.41	8.90	16.83			N/A	N/A
2	2.01	0.05	0.48	5.44	8.79			N/A	N/A
3	1.89	0.05	0.46	5.04	8.29			N/A	N/A
4	3.41	0.04	0.42	9.41	17.41			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.46	0.03	0.29	1.46	6.20			N/A	N/A
2	1.01	0.03	0.32	1.96	5.08			N/A	N/A
3	1.00	0.03	0.32	2.00	4.97			N/A	N/A
4	1.73	0.03	0.31	2.56	8.63			N/A	N/A

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Groody Roundabout - 2033 'Do Nothing', AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	57.34	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-9	Arm 4	57.34	F

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)	Run automatically
D9	2033 'Do Nothing'	AM	ONE HOUR	07:45	09:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	452	100.000
2		ONE HOUR	✓	1088	100.000
3		ONE HOUR	✓	760	100.000
4		ONE HOUR	✓	1380	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	12	164	276		1	0.00	0.03	0.36	0.61
	2	16	0	148	924		2	0.01	0.00	0.14	0.85
	3	502	89	4	165		3	0.66	0.12	0.01	0.22
	4	601	569	201	9		4	0.44	0.41	0.15	0.01

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
07:45-08:00	1	340	340
	2	819	819
	3	572	572
	4	1039	1039
08:00-08:15	1	406	406
	2	978	978
	3	683	683
	4	1241	1241
08:15-08:30	1	498	498
	2	1198	1198
	3	837	837
	4	1519	1519
08:30-08:45	1	498	498
	2	1198	1198
	3	837	837
	4	1519	1519
08:45-09:00	1	406	406
	2	978	978
	3	683	683
	4	1241	1241
09:00-09:15	1	340	340
	2	819	819
	3	572	572
	4	1039	1039

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.42	5.23	0.7	2.8	A	415	622
2	0.89	23.79	7.5	39.9	C	998	1498
3	0.93	44.61	9.7	50.6	E	697	1046
4	1.05	107.87	49.6	118.2	F	1266	1899

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	340	85	651	1295	0.263	339	836	0.0	0.4	3.759	A
2	819	205	490	1439	0.569	814	501	0.0	1.3	5.715	A
3	572	143	917	1094	0.523	568	387	0.0	1.1	6.784	A
4	1039	260	457	1547	0.672	1031	1028	0.0	2.0	6.873	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	406	102	778	1242	0.327	406	999	0.4	0.5	4.301	A
2	978	245	586	1396	0.701	974	598	1.3	2.3	8.462	A
3	683	171	1098	1013	0.675	680	463	1.1	2.0	10.688	B
4	1241	310	546	1505	0.824	1231	1231	2.0	4.3	12.718	B

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	498	124	900	1191	0.418	497	1172	0.5	0.7	5.179	A
2	1198	299	704	1343	0.892	1180	693	2.3	6.8	20.135	C
3	837	209	1332	907	0.923	813	552	2.0	8.0	32.397	D
4	1519	380	654	1455	1.044	1419	1491	4.3	29.5	53.868	F

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	498	124	914	1185	0.420	498	1192	0.7	0.7	5.234	A
2	1198	299	708	1341	0.893	1195	704	6.8	7.5	23.791	C
3	837	209	1346	900	0.930	830	557	8.0	9.7	44.608	E
4	1519	380	667	1449	1.049	1439	1509	29.5	49.6	107.867	F

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	406	102	886	1197	0.339	407	1102	0.7	0.5	4.564	A
2	978	245	615	1382	0.708	998	678	7.5	2.5	9.818	A
3	683	171	1120	1002	0.682	713	493	9.7	2.2	13.638	B
4	1241	310	573	1493	0.831	1415	1260	49.6	6.0	63.309	F

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	340	85	666	1289	0.264	341	852	0.5	0.4	3.800	A
2	819	205	495	1436	0.570	824	511	2.5	1.3	5.919	A
3	572	143	927	1090	0.525	577	392	2.2	1.1	7.073	A
4	1039	260	464	1544	0.673	1054	1040	6.0	2.1	7.576	A

Queue Variation Results for each time segment

07:45 - 08:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.35	0.00	0.00	0.35	0.35			N/A	N/A
2	1.30	0.57	1.18	1.64	1.83			N/A	N/A
3	1.08	0.54	1.05	1.47	1.47			N/A	N/A
4	2.00	0.22	1.16	3.61	4.57			N/A	N/A

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.48	0.00	0.00	0.48	0.48			N/A	N/A
2	2.27	0.05	0.50	6.17	9.89			N/A	N/A
3	2.00	0.05	0.56	5.32	8.34			N/A	N/A
4	4.35	0.06	1.11	12.22	19.23			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.71	0.03	0.25	0.71	0.71			N/A	N/A
2	6.84	0.04	0.44	18.90	36.42			N/A	N/A
3	8.00	0.07	1.21	23.06	36.53			N/A	N/A
4	29.50	3.50	23.30	59.59	73.99			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.72	0.03	0.28	0.87	2.80			N/A	N/A
2	7.47	0.03	0.34	13.84	39.91			N/A	N/A
3	9.70	0.05	0.50	27.81	50.57			N/A	N/A
4	49.65	8.05	40.98	96.63	118.20			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.52	0.52	1.00	1.40	1.45			N/A	N/A
2	2.50	0.04	0.44	6.89	11.88			N/A	N/A
3	2.23	0.04	0.40	5.96	11.13			N/A	N/A
4	5.97	0.05	0.55	17.18	29.78			N/A	N/A

09:00 - 09:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.36	0.00	0.00	0.36	0.36			N/A	N/A
2	1.35	0.03	0.32	2.64	6.94			N/A	N/A
3	1.12	0.03	0.30	1.34	5.27			N/A	N/A
4	2.11	0.03	0.29	2.11	8.50			N/A	N/A

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Groody Roundabout - 2033 'Do Nothing', PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	42.98	E

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-7	Arm 1	42.98	E

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)	Run automatically
D10	2033 'Do Nothing'	PM	ONE HOUR	16:00	17:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	978	100.000
2		ONE HOUR	✓	824	100.000
3		ONE HOUR	✓	763	100.000
4		ONE HOUR	✓	1303	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	10	454	514		1	0.00	0.01	0.46	0.53
	2	31	1	184	608		2	0.04	0.00	0.22	0.74
	3	200	153	1	409		3	0.26	0.20	0.00	0.54
	4	358	578	363	4		4	0.27	0.44	0.28	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:00-16:15	1	736	736
	2	620	620
	3	574	574
	4	981	981
16:15-16:30	1	879	879
	2	741	741
	3	686	686
	4	1171	1171
16:30-16:45	1	1077	1077
	2	907	907
	3	840	840
	4	1435	1435
16:45-17:00	1	1077	1077
	2	907	907
	3	840	840
	4	1435	1435
17:00-17:15	1	879	879
	2	741	741
	3	686	686
	4	1171	1171
17:15-17:30	1	736	736
	2	620	620
	3	574	574
	4	981	981

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	1.01	85.39	26.1	83.8	F	897	1346
2	0.89	30.33	7.2	39.4	D	756	1134
3	0.89	31.94	7.0	38.4	D	700	1050
4	0.92	25.60	9.6	52.9	D	1196	1793

Main Results for each time segment

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	736	184	823	1223	0.602	730	441	0.0	1.5	7.218	A
2	620	155	998	1211	0.512	616	555	0.0	1.0	6.014	A
3	574	144	865	1118	0.514	570	749	0.0	1.0	6.528	A
4	981	245	289	1626	0.603	975	1147	0.0	1.5	5.483	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	879	220	985	1156	0.761	873	527	1.5	3.0	12.475	B
2	741	185	1194	1123	0.660	737	664	1.0	1.9	9.255	A
3	686	171	1035	1041	0.659	683	896	1.0	1.9	9.956	A
4	1171	293	345	1599	0.733	1167	1372	1.5	2.7	8.239	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1077	269	1191	1069	1.007	1020	637	3.0	17.2	48.149	E
2	907	227	1408	1027	0.884	890	803	1.9	6.2	23.857	C
3	840	210	1232	952	0.883	823	1066	1.9	6.0	25.289	D
4	1435	359	417	1566	0.916	1411	1639	2.7	8.5	20.700	C

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1077	269	1207	1062	1.014	1041	646	17.2	26.1	85.389	F
2	907	227	1435	1015	0.894	903	814	6.2	7.2	30.334	D
3	840	210	1253	942	0.892	836	1085	6.0	7.0	31.943	D
4	1435	359	423	1563	0.918	1430	1666	8.5	9.6	25.598	D

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	879	220	1012	1144	0.768	969	543	26.1	3.6	29.387	D
2	741	185	1298	1076	0.688	760	684	7.2	2.3	12.044	B
3	686	171	1104	1010	0.679	705	954	7.0	2.2	12.496	B
4	1171	293	357	1594	0.735	1198	1452	9.6	2.9	9.677	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	736	184	833	1219	0.604	744	446	3.6	1.6	7.707	A
2	620	155	1015	1203	0.516	625	562	2.3	1.1	6.281	A
3	574	144	880	1111	0.517	579	761	2.2	1.1	6.818	A
4	981	245	293	1624	0.604	986	1166	2.9	1.5	5.696	A

Queue Variation Results for each time segment

16:00 - 16:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.48	0.33	1.34	2.17	2.73			N/A	N/A
2	1.04	0.55	1.02	1.43	1.48			N/A	N/A
3	1.04	0.55	1.01	1.42	1.48			N/A	N/A
4	1.50	0.58	1.41	1.88	2.00			N/A	N/A

16:15 - 16:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	3.01	0.05	0.74	8.33	13.25			N/A	N/A
2	1.88	0.05	0.54	4.93	7.74			N/A	N/A
3	1.87	0.05	0.63	4.86	7.50			N/A	N/A
4	2.65	0.05	0.49	7.32	11.99			N/A	N/A

16:30 - 16:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	17.25	0.64	10.84	40.51	53.62			N/A	N/A
2	6.16	0.05	0.46	17.34	31.99			N/A	N/A
3	6.04	0.05	0.47	17.14	31.16			N/A	N/A
4	8.54	0.05	0.53	24.61	44.09			N/A	N/A

16:45 - 17:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	26.14	0.79	16.07	62.78	83.76			N/A	N/A
2	7.17	0.04	0.37	16.30	39.41			N/A	N/A
3	6.99	0.04	0.37	16.18	38.38			N/A	N/A
4	9.58	0.04	0.38	21.98	52.91			N/A	N/A

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	3.60	0.04	0.41	9.75	18.80			N/A	N/A
2	2.29	0.05	0.47	6.26	10.32			N/A	N/A
3	2.20	0.04	0.45	6.00	10.17			N/A	N/A
4	2.87	0.04	0.43	7.96	14.16			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.56	0.03	0.29	1.56	6.24			N/A	N/A
2	1.08	0.03	0.31	1.82	5.43			N/A	N/A
3	1.09	0.03	0.31	1.86	5.48			N/A	N/A
4	1.55	0.03	0.32	2.86	8.01			N/A	N/A

RECEIVED: 28/05/2026

Groody Roundabout - 2033 Design Year (Residential, Creche & Medical Centre), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	70.71	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-11	Arm 4	70.71	F

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)	Run automatically
D11	2033 Design Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	07:45	09:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	457	100.000
2		ONE HOUR	✓	1103	100.000
3		ONE HOUR	✓	763	100.000
4		ONE HOUR	✓	1416	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	12	164	281		1	0.00	0.03	0.36	0.61
	2	16	0	148	939		2	0.01	0.00	0.13	0.85
	3	502	89	4	168		3	0.66	0.12	0.01	0.22
	4	616	584	206	10		4	0.44	0.41	0.15	0.01

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
07:45-08:00	1	344	344
	2	830	830
	3	574	574
	4	1066	1066
08:00-08:15	1	411	411
	2	992	992
	3	686	686
	4	1273	1273
08:15-08:30	1	503	503
	2	1214	1214
	3	840	840
	4	1559	1559
08:30-08:45	1	503	503
	2	1214	1214
	3	840	840
	4	1559	1559
08:45-09:00	1	411	411
	2	992	992
	3	686	686
	4	1273	1273
09:00-09:15	1	344	344
	2	830	830
	3	574	574
	4	1066	1066

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.43	5.29	0.7	2.7	A	419	629
2	0.91	26.86	8.5	46.9	D	1012	1518
3	0.94	50.44	11.1	54.8	F	700	1050
4	1.08	136.89	66.0	134.4	F	1299	1949

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	344	86	667	1289	0.267	343	847	0.0	0.4	3.800	A
2	830	208	498	1435	0.579	825	512	0.0	1.4	5.849	A
3	574	144	932	1087	0.528	570	390	0.0	1.1	6.902	A
4	1066	267	456	1547	0.689	1057	1046	0.0	2.2	7.231	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	411	103	796	1235	0.333	410	1012	0.4	0.5	4.363	A
2	992	248	596	1391	0.713	987	611	1.4	2.4	8.820	A
3	686	171	1116	1004	0.683	682	467	1.1	2.1	11.039	B
4	1273	318	546	1505	0.846	1262	1252	2.2	5.0	14.157	B

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	503	126	907	1188	0.423	502	1174	0.5	0.7	5.242	A
2	1214	304	711	1339	0.907	1193	698	2.4	7.7	22.040	C
3	840	210	1352	897	0.936	813	553	2.1	8.8	35.067	E
4	1559	390	651	1456	1.071	1430	1514	5.0	37.3	64.044	F

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	503	126	917	1184	0.425	503	1193	0.7	0.7	5.287	A
2	1214	304	715	1338	0.908	1211	706	7.7	8.5	26.858	D
3	840	210	1368	890	0.944	831	557	8.8	11.1	50.442	F
4	1559	390	666	1449	1.076	1444	1534	37.3	66.0	136.892	F

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	411	103	918	1184	0.347	412	1128	0.7	0.5	4.666	A
2	992	248	629	1377	0.720	1015	701	8.5	2.7	10.555	B
3	686	171	1142	992	0.691	721	501	11.1	2.3	14.833	B
4	1273	318	577	1491	0.854	1469	1286	66.0	17.1	106.252	F

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	344	86	706	1272	0.270	345	883	0.5	0.4	3.883	A
2	830	208	510	1430	0.581	835	541	2.7	1.4	6.111	A
3	574	144	943	1082	0.531	579	403	2.3	1.1	7.220	A
4	1066	267	464	1544	0.691	1125	1059	17.1	2.3	9.823	A

Queue Variation Results for each time segment

07:45 - 08:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.36	0.00	0.00	0.36	0.36			N/A	N/A
2	1.35	0.57	1.24	1.72	1.88			N/A	N/A
3	1.10	0.54	1.07	1.23	1.62			N/A	N/A
4	2.16	0.18	1.20	4.13	5.36			N/A	N/A

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.50	0.00	0.00	0.50	0.50			N/A	N/A
2	2.40	0.05	0.51	6.56	10.55			N/A	N/A
3	2.08	0.05	0.56	5.55	8.72			N/A	N/A
4	4.99	0.07	1.40	13.95	21.51			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.73	0.03	0.25	0.73	0.73			N/A	N/A
2	7.67	0.05	0.49	21.98	39.58			N/A	N/A
3	8.82	0.08	1.99	25.02	38.23			N/A	N/A
4	37.29	7.98	31.93	68.56	82.36			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.73	0.03	0.28	0.77	2.74			N/A	N/A
2	8.52	0.04	0.37	19.04	46.88			N/A	N/A
3	11.06	0.06	1.27	32.38	54.81			N/A	N/A
4	66.03	19.07	59.03	114.24	134.37			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.54	0.54	1.00	1.40	1.45			N/A	N/A
2	2.67	0.04	0.44	7.39	12.93			N/A	N/A
3	2.34	0.04	0.39	6.24	11.77			N/A	N/A
4	17.11	1.29	12.13	37.32	47.87			N/A	N/A

09:00 - 09:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.37	0.00	0.00	0.37	0.37			N/A	N/A
2	1.41	0.03	0.31	2.57	7.24			N/A	N/A
3	1.15	0.03	0.29	1.16	5.21			N/A	N/A
4	2.30	0.03	0.29	2.30	8.79			N/A	N/A

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Groody Roundabout - 2033 Design Year (Residential, Creche & Medical Centre), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	51.43	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-8	Arm 1	51.43	F

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)	Run automatically
D12	2033 Design Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	16:00	17:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	990	100.000
2		ONE HOUR	✓	839	100.000
3		ONE HOUR	✓	773	100.000
4		ONE HOUR	✓	1332	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	10	454	526		1	0.00	0.01	0.46	0.53
	2	31	1	184	623		2	0.04	0.00	0.22	0.74
	3	200	153	1	419		3	0.26	0.20	0.00	0.54
	4	366	590	371	5		4	0.27	0.44	0.28	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:00-16:15	1	745	745
	2	632	632
	3	582	582
	4	1003	1003
16:15-16:30	1	890	890
	2	754	754
	3	695	695
	4	1197	1197
16:30-16:45	1	1090	1090
	2	924	924
	3	851	851
	4	1467	1467
16:45-17:00	1	1090	1090
	2	924	924
	3	851	851
	4	1467	1467
17:00-17:15	1	890	890
	2	754	754
	3	695	695
	4	1197	1197
17:15-17:30	1	745	745
	2	632	632
	3	582	582
	4	1003	1003

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	1.03	102.98	32.9	90.5	F	908	1363
2	0.91	35.31	8.5	46.3	E	770	1155
3	0.91	37.69	8.3	45.4	E	709	1064
4	0.94	31.26	11.9	65.0	D	1222	1833

Main Results for each time segment

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	745	186	838	1217	0.612	739	446	0.0	1.5	7.441	A
2	632	158	1014	1204	0.525	627	564	0.0	1.1	6.201	A
3	582	145	886	1108	0.525	578	755	0.0	1.1	6.729	A
4	1003	251	288	1626	0.617	996	1175	0.0	1.6	5.666	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	890	222	1003	1148	0.775	883	534	1.5	3.2	13.267	B
2	754	189	1212	1115	0.677	750	675	1.1	2.0	9.780	A
3	695	174	1060	1030	0.675	691	903	1.1	2.0	10.519	B
4	1197	299	345	1599	0.749	1192	1406	1.6	2.9	8.738	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1090	273	1209	1062	1.027	1021	643	3.2	20.4	54.463	F
2	924	231	1418	1022	0.904	903	812	2.0	7.1	26.674	D
3	851	213	1253	942	0.903	831	1068	2.0	7.0	28.452	D
4	1467	367	415	1566	0.936	1437	1669	2.9	10.2	23.751	C

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1090	273	1228	1054	1.035	1040	654	20.4	32.9	102.976	F
2	924	231	1442	1011	0.913	918	826	7.1	8.5	35.306	E
3	851	213	1275	932	0.913	846	1086	7.0	8.3	37.687	E
4	1467	367	422	1563	0.938	1460	1698	10.2	11.9	31.259	D

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	890	222	1038	1133	0.785	1005	553	32.9	4.1	43.828	E
2	754	189	1344	1055	0.715	778	699	8.5	2.6	13.948	B
3	695	174	1146	991	0.701	718	976	8.3	2.5	14.255	B
4	1197	299	359	1593	0.752	1233	1506	11.9	3.2	10.895	B

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	745	186	849	1212	0.615	755	453	4.1	1.6	8.038	A
2	632	158	1033	1195	0.529	638	571	2.6	1.1	6.524	A
3	582	145	903	1101	0.529	587	768	2.5	1.1	7.079	A
4	1003	251	293	1623	0.618	1009	1197	3.2	1.6	5.913	A

Queue Variation Results for each time segment

16:00 - 16:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.55	0.25	1.36	2.48	2.95			N/A	N/A
2	1.09	0.55	1.05	1.44	1.44			N/A	N/A
3	1.09	0.55	1.04	1.36	1.36			N/A	N/A
4	1.58	0.57	1.49	1.99	2.55			N/A	N/A

16:15 - 16:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	3.24	0.06	0.84	8.98	14.22			N/A	N/A
2	2.03	0.05	0.55	5.39	8.47			N/A	N/A
3	2.01	0.05	0.64	5.27	8.15			N/A	N/A
4	2.87	0.05	0.50	7.97	13.07			N/A	N/A

16:30 - 16:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	20.40	1.06	14.57	44.53	57.07			N/A	N/A
2	7.11	0.05	0.79	20.56	35.20			N/A	N/A
3	6.98	0.06	0.91	20.25	34.18			N/A	N/A
4	10.24	0.06	1.50	29.98	49.31			N/A	N/A

16:45 - 17:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	32.95	2.35	24.32	71.13	90.54			N/A	N/A
2	8.48	0.04	0.41	22.19	46.32			N/A	N/A
3	8.33	0.04	0.42	22.25	45.36			N/A	N/A
4	11.94	0.05	0.45	32.73	64.98			N/A	N/A

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	4.09	0.04	0.42	11.26	21.15			N/A	N/A
2	2.62	0.05	0.49	7.23	11.85			N/A	N/A
3	2.46	0.05	0.45	6.78	11.54			N/A	N/A
4	3.15	0.04	0.43	8.75	15.86			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.63	0.03	0.29	1.63	6.14			N/A	N/A
2	1.14	0.03	0.30	1.68	5.60			N/A	N/A
3	1.14	0.03	0.30	1.70	5.62			N/A	N/A
4	1.64	0.03	0.31	2.71	8.37			N/A	N/A

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Groody Roundabout - 2033 Design Year (Overall Masterplan Development), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	89.57	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-12	Arm 4	89.57	F

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)	Run automatically
D13	2033 Design Year (Overall Masterplan Development)	AM	ONE HOUR	07:45	09:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	479	100.000
2		ONE HOUR	✓	1179	100.000
3		ONE HOUR	✓	776	100.000
4		ONE HOUR	✓	1434	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	12	164	303		1	0.00	0.03	0.34	0.63
	2	16	0	148	1015		2	0.01	0.00	0.13	0.86
	3	502	89	4	181		3	0.65	0.11	0.01	0.23
	4	624	591	209	10		4	0.44	0.41	0.15	0.01

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
07:45-08:00	1	361	361
	2	888	888
	3	584	584
	4	1080	1080
08:00-08:15	1	431	431
	2	1060	1060
	3	698	698
	4	1289	1289
08:15-08:30	1	527	527
	2	1298	1298
	3	854	854
	4	1579	1579
08:30-08:45	1	527	527
	2	1298	1298
	3	854	854
	4	1579	1579
08:45-09:00	1	431	431
	2	1060	1060
	3	698	698
	4	1289	1289
09:00-09:15	1	361	361
	2	888	888
	3	584	584
	4	1080	1080

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.45	5.49	0.8	2.6	A	440	659
2	0.98	54.78	19.1	81.4	F	1082	1623
3	1.01	88.20	21.2	71.4	F	712	1068
4	1.08	147.01	71.9	140.3	F	1316	1974

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	361	90	674	1286	0.280	359	853	0.0	0.4	3.878	A
2	888	222	517	1427	0.622	881	517	0.0	1.6	6.524	A
3	584	146	1005	1054	0.554	579	393	0.0	1.2	7.502	A
4	1080	270	456	1547	0.698	1071	1128	0.0	2.2	7.421	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	431	108	804	1231	0.350	430	1018	0.4	0.5	4.490	A
2	1060	265	618	1381	0.767	1054	616	1.6	3.1	10.788	B
3	698	174	1202	965	0.723	693	469	1.2	2.5	12.968	B
4	1289	322	545	1506	0.856	1277	1350	2.2	5.4	14.965	B

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	527	132	910	1187	0.444	526	1166	0.5	0.8	5.440	A
2	1298	325	737	1328	0.978	1253	699	3.1	14.5	35.513	E
3	854	214	1438	858	0.995	809	551	2.5	13.9	50.152	F
4	1579	395	637	1463	1.079	1439	1610	5.4	40.2	67.739	F

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	527	132	919	1183	0.446	527	1183	0.8	0.8	5.489	A
2	1298	325	740	1326	0.979	1280	706	14.5	19.1	54.776	F
3	854	214	1463	847	1.008	825	557	13.9	21.2	88.199	F
4	1579	395	650	1457	1.084	1452	1638	40.2	71.9	147.010	F

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	431	108	915	1185	0.363	432	1147	0.8	0.6	4.786	A
2	1060	265	647	1368	0.775	1122	700	19.1	3.7	17.827	C
3	698	174	1264	937	0.744	770	505	21.2	3.1	29.241	D
4	1289	322	605	1477	0.873	1457	1428	71.9	29.9	128.604	F

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	361	90	743	1257	0.287	361	912	0.6	0.4	4.023	A
2	888	222	537	1418	0.626	895	567	3.7	1.7	6.991	A
3	584	146	1020	1048	0.558	592	413	3.1	1.3	8.016	A
4	1080	270	466	1543	0.700	1189	1146	29.9	2.4	13.684	B

Queue Variation Results for each time segment

07:45 - 08:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.39	0.00	0.00	0.39	0.39			N/A	N/A
2	1.61	0.51	1.47	2.37	2.83			N/A	N/A
3	1.22	0.34	1.15	1.72	1.93			N/A	N/A
4	2.25	0.17	1.23	4.43	5.74			N/A	N/A

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.53	0.53	1.00	1.40	1.45			N/A	N/A
2	3.14	0.05	0.71	8.74	14.02			N/A	N/A
3	2.48	0.05	0.64	6.74	10.65			N/A	N/A
4	5.35	0.07	1.13	14.85	22.56			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.79	0.03	0.25	0.79	0.79			N/A	N/A
2	14.54	0.18	6.31	38.57	54.72			N/A	N/A
3	13.92	0.36	8.02	33.74	45.45			N/A	N/A
4	40.24	9.85	35.10	71.94	85.61			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.80	0.03	0.28	0.80	2.58			N/A	N/A
2	19.07	0.12	5.47	54.18	81.44			N/A	N/A
3	21.19	0.41	11.91	52.61	71.44			N/A	N/A
4	71.89	23.42	65.29	120.51	140.29			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.58	0.55	1.00	1.40	1.45			N/A	N/A
2	3.66	0.04	0.42	10.06	18.75			N/A	N/A
3	3.15	0.04	0.41	8.59	16.04			N/A	N/A
4	29.88	8.15	26.36	51.75	61.03			N/A	N/A

09:00 - 09:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.40	0.00	0.00	0.40	0.40			N/A	N/A
2	1.71	0.03	0.30	1.89	7.93			N/A	N/A
3	1.28	0.03	0.28	1.28	4.86			N/A	N/A
4	2.41	0.03	0.29	2.41	9.28			N/A	N/A

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Groody Roundabout - 2033 Design Year (Overall Masterplan Development), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	73.42	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-10	Arm 1	73.42	F

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)	Run automatically
D14	2033 Design Year (Overall Masterplan Development)	PM	ONE HOUR	16:00	17:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	996	100.000
2		ONE HOUR	✓	846	100.000
3		ONE HOUR	✓	778	100.000
4		ONE HOUR	✓	1435	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	10	454	532		1	0.00	0.01	0.46	0.53
	2	31	1	184	630		2	0.04	0.00	0.22	0.74
	3	200	153	1	424		3	0.26	0.20	0.00	0.54
	4	394	636	400	5		4	0.27	0.44	0.28	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:00-16:15	1	750	750
	2	637	637
	3	586	586
	4	1080	1080
16:15-16:30	1	895	895
	2	761	761
	3	699	699
	4	1290	1290
16:30-16:45	1	1097	1097
	2	931	931
	3	857	857
	4	1580	1580
16:45-17:00	1	1097	1097
	2	931	931
	3	857	857
	4	1580	1580
17:00-17:15	1	895	895
	2	761	761
	3	699	699
	4	1290	1290
17:15-17:30	1	750	750
	2	637	637
	3	586	586
	4	1080	1080

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	1.07	132.56	44.0	100.7	F	914	1371
2	0.92	38.35	9.3	50.1	E	776	1164
3	0.92	39.63	8.8	47.6	E	714	1071
4	1.01	71.36	32.1	104.1	F	1317	1975

Main Results for each time segment

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	750	187	894	1194	0.628	743	467	0.0	1.6	7.882	A
2	637	159	1039	1192	0.534	632	598	0.0	1.1	6.380	A
3	586	146	896	1104	0.531	581	776	0.0	1.1	6.831	A
4	1080	270	288	1626	0.665	1073	1188	0.0	1.9	6.423	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	895	224	1069	1120	0.799	887	559	1.6	3.7	14.934	B
2	761	190	1241	1102	0.690	756	715	1.1	2.2	10.305	B
3	699	175	1070	1025	0.682	696	927	1.1	2.1	10.802	B
4	1290	323	345	1599	0.807	1282	1421	1.9	3.9	11.079	B

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1097	274	1261	1040	1.055	1010	662	3.7	25.4	64.917	F
2	931	233	1427	1018	0.915	909	844	2.2	7.7	28.530	D
3	857	214	1256	941	0.910	835	1080	2.1	7.4	29.604	D
4	1580	395	415	1567	1.008	1509	1677	3.9	21.6	40.608	E

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1097	274	1285	1030	1.065	1022	675	25.4	44.0	132.555	F
2	931	233	1447	1009	0.923	925	860	7.7	9.3	38.348	E
3	857	214	1275	932	0.919	851	1097	7.4	8.8	39.631	E
4	1580	395	422	1563	1.011	1538	1704	21.6	32.1	71.361	F

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	895	224	1160	1082	0.827	1045	599	44.0	6.5	88.730	F
2	761	190	1431	1017	0.748	785	774	9.3	3.2	16.974	C
3	699	175	1177	976	0.716	724	1038	8.8	2.7	15.504	C
4	1290	323	359	1593	0.810	1400	1542	32.1	4.7	27.012	D

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	750	187	909	1187	0.632	769	475	6.5	1.8	8.976	A
2	637	159	1070	1179	0.540	645	608	3.2	1.2	6.841	A
3	586	146	919	1093	0.536	592	796	2.7	1.2	7.258	A
4	1080	270	294	1623	0.666	1091	1217	4.7	2.0	6.892	A

Queue Variation Results for each time segment

16:00 - 16:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.65	0.19	1.39	2.83	3.61			N/A	N/A
2	1.13	0.55	1.07	1.28	1.64			N/A	N/A
3	1.11	0.55	1.06	1.11	1.53			N/A	N/A
4	1.94	0.35	1.21	3.19	3.92			N/A	N/A

16:15 - 16:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	3.68	0.06	1.07	10.19	15.84			N/A	N/A
2	2.15	0.05	0.61	5.75	8.99			N/A	N/A
3	2.07	0.05	0.66	5.47	8.47			N/A	N/A
4	3.93	0.06	0.89	11.07	17.75			N/A	N/A

16:30 - 16:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	25.36	3.32	20.29	50.31	62.13			N/A	N/A
2	7.73	0.06	1.19	22.49	37.14			N/A	N/A
3	7.35	0.06	1.15	21.37	35.29			N/A	N/A
4	21.62	0.80	13.67	50.96	67.48			N/A	N/A

16:45 - 17:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	43.96	8.31	37.05	83.09	100.69			N/A	N/A
2	9.28	0.04	0.45	25.59	50.09			N/A	N/A
3	8.81	0.04	0.44	24.25	47.56			N/A	N/A
4	32.11	0.88	19.53	77.78	104.08			N/A	N/A

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	6.51	0.07	1.46	18.64	29.38			N/A	N/A
2	3.15	0.06	0.86	8.68	13.63			N/A	N/A
3	2.65	0.05	0.47	7.37	12.35			N/A	N/A
4	4.66	0.04	0.44	12.97	24.04			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.76	0.03	0.28	1.76	6.03			N/A	N/A
2	1.19	0.03	0.30	1.63	5.78			N/A	N/A
3	1.17	0.03	0.30	1.68	5.74			N/A	N/A
4	2.03	0.03	0.30	2.03	9.19			N/A	N/A

RECEIVED: 28/05/2026

Groody Roundabout - 2043 'Do Nothing', AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	125.47	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-15	Arm 4	125.47	F

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)	Run automatically
D15	2043 'Do Nothing'	AM	ONE HOUR	07:45	09:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	485	100.000
2		ONE HOUR	✓	1167	100.000
3		ONE HOUR	✓	816	100.000
4		ONE HOUR	✓	1480	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	13	176	296		1	0.00	0.03	0.36	0.61
	2	17	0	159	991		2	0.01	0.00	0.14	0.85
	3	538	96	5	177		3	0.66	0.12	0.01	0.22
	4	644	610	216	10		4	0.44	0.41	0.15	0.01

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
07:45-08:00	1	365	365
	2	879	879
	3	614	614
	4	1114	1114
08:00-08:15	1	436	436
	2	1049	1049
	3	734	734
	4	1330	1330
08:15-08:30	1	534	534
	2	1285	1285
	3	898	898
	4	1630	1630
08:30-08:45	1	534	534
	2	1285	1285
	3	898	898
	4	1630	1630
08:45-09:00	1	436	436
	2	1049	1049
	3	734	734
	4	1330	1330
09:00-09:15	1	365	365
	2	879	879
	3	614	614
	4	1114	1114

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.45	5.54	0.8	2.4	A	445	668
2	0.97	50.10	17.1	77.7	F	1071	1606
3	1.04	116.53	30.9	82.1	F	749	1123
4	1.13	229.14	103.8	172.0	F	1358	2037

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	365	91	699	1275	0.286	364	895	0.0	0.4	3.942	A
2	879	220	526	1423	0.618	872	536	0.0	1.6	6.469	A
3	614	154	983	1065	0.577	609	416	0.0	1.3	7.814	A
4	1114	279	490	1532	0.727	1104	1102	0.0	2.6	8.230	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	436	109	831	1220	0.357	435	1066	0.4	0.6	4.584	A
2	1049	262	629	1377	0.762	1043	638	1.6	3.1	10.614	B
3	734	183	1176	977	0.751	728	496	1.3	2.8	14.084	B
4	1330	333	585	1487	0.895	1312	1318	2.6	7.1	18.907	C

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	534	133	913	1186	0.450	533	1192	0.6	0.8	5.505	A
2	1285	321	743	1325	0.969	1243	703	3.1	13.4	33.628	D
3	898	225	1409	872	1.031	835	577	2.8	18.6	60.454	F
4	1630	407	672	1446	1.127	1433	1572	7.1	56.2	89.692	F

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	534	133	918	1184	0.451	534	1205	0.8	0.8	5.541	A
2	1285	321	745	1324	0.970	1270	707	13.4	17.1	50.095	F
3	898	225	1433	861	1.044	849	582	18.6	30.9	116.529	F
4	1630	407	684	1441	1.131	1439	1599	56.2	103.8	207.176	F

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	436	109	913	1186	0.368	437	1194	0.8	0.6	4.814	A
2	1049	262	649	1367	0.767	1103	701	17.1	3.5	16.158	C
3	734	183	1229	953	0.770	842	523	30.9	3.8	50.470	F
4	1330	333	675	1445	0.921	1431	1396	103.8	78.7	229.136	F

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	365	91	878	1201	0.304	366	1041	0.6	0.4	4.316	A
2	879	220	576	1400	0.628	886	667	3.5	1.7	7.090	A
3	614	154	998	1058	0.581	624	464	3.8	1.4	8.466	A
4	1114	279	501	1526	0.730	1417	1120	78.7	3.0	79.770	F

Queue Variation Results for each time segment

07:45 - 08:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.40	0.00	0.00	0.40	0.40			N/A	N/A
2	1.59	0.53	1.45	2.24	2.74			N/A	N/A
3	1.34	0.22	1.21	1.95	2.54			N/A	N/A
4	2.58	0.13	1.27	5.61	7.50			N/A	N/A

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.55	0.55	1.00	1.40	1.45			N/A	N/A
2	3.06	0.05	0.69	8.50	13.63			N/A	N/A
3	2.84	0.05	0.74	7.78	12.29			N/A	N/A
4	7.09	0.11	2.53	18.94	27.40			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.81	0.03	0.26	0.81	0.81			N/A	N/A
2	13.42	0.14	4.99	36.51	52.87			N/A	N/A
3	18.60	1.05	13.42	40.12	51.21			N/A	N/A
4	56.22	21.67	52.04	89.42	102.51			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.82	0.03	0.28	0.82	2.41			N/A	N/A
2	17.07	0.09	3.42	49.69	77.66			N/A	N/A
3	30.87	2.66	23.36	65.11	82.15			N/A	N/A
4	103.79	50.03	98.78	153.54	172.00			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.59	0.55	1.00	1.40	1.45			N/A	N/A
2	3.49	0.04	0.41	9.53	17.91			N/A	N/A
3	3.77	0.04	0.42	10.39	19.34			N/A	N/A
4	78.66	47.15	76.31	105.93	115.52			N/A	N/A

09:00 - 09:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.44	0.00	0.00	0.44	0.44			N/A	N/A
2	1.72	0.03	0.30	2.21	8.28			N/A	N/A
3	1.41	0.03	0.28	1.41	4.74			N/A	N/A
4	3.02	0.03	0.29	3.02	12.16			N/A	N/A

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Groody Roundabout - 2043 'Do Nothing', PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	92.44	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-13	Arm 1	92.44	F

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)	Run automatically
D16	2043 'Do Nothing'	PM	ONE HOUR	16:00	17:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	1049	100.000
2		ONE HOUR	✓	884	100.000
3		ONE HOUR	✓	819	100.000
4		ONE HOUR	✓	1398	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	11	487	551		1	0.00	0.01	0.46	0.53
	2	34	1	197	652		2	0.04	0.00	0.22	0.74
	3	215	164	1	439		3	0.26	0.20	0.00	0.54
	4	384	620	389	5		4	0.27	0.44	0.28	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:00-16:15	1	790	790
	2	666	666
	3	617	617
	4	1052	1052
16:15-16:30	1	943	943
	2	795	795
	3	736	736
	4	1257	1257
16:30-16:45	1	1155	1155
	2	973	973
	3	902	902
	4	1539	1539
16:45-17:00	1	1155	1155
	2	973	973
	3	902	902
	4	1539	1539
17:00-17:15	1	943	943
	2	795	795
	3	736	736
	4	1257	1257
17:15-17:30	1	790	790
	2	666	666
	3	617	617
	4	1052	1052

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	1.12	191.05	67.9	124.7	F	963	1444
2	0.96	55.83	14.4	65.7	F	811	1217
3	0.98	64.63	15.6	66.2	F	752	1127
4	0.99	57.90	24.5	95.0	F	1283	1924

Main Results for each time segment

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	790	197	882	1199	0.659	782	473	0.0	1.9	8.500	A
2	666	166	1069	1179	0.565	660	595	0.0	1.3	6.879	A
3	617	154	928	1089	0.566	611	802	0.0	1.3	7.455	A
4	1052	263	310	1616	0.651	1045	1229	0.0	1.8	6.234	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	943	236	1055	1126	0.837	932	566	1.9	4.6	17.615	C
2	795	199	1275	1086	0.732	789	711	1.3	2.6	11.916	B
3	736	184	1108	1008	0.730	731	957	1.3	2.6	12.759	B
4	1257	314	370	1587	0.792	1250	1468	1.8	3.6	10.444	B

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1155	289	1251	1044	1.106	1026	671	4.6	36.8	85.480	F
2	973	243	1434	1015	0.959	939	843	2.6	11.1	37.219	E
3	902	225	1274	933	0.967	866	1099	2.6	11.5	41.130	E
4	1539	385	439	1555	0.990	1483	1701	3.6	17.6	35.435	E

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1155	289	1276	1034	1.118	1031	685	36.8	67.9	191.049	F
2	973	243	1447	1009	0.964	960	860	11.1	14.4	55.826	F
3	902	225	1293	924	0.976	885	1114	11.5	15.6	64.632	F
4	1539	385	449	1551	0.993	1512	1729	17.6	24.5	57.901	F

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	943	236	1129	1095	0.861	1079	605	67.9	33.9	171.863	F
2	795	199	1446	1010	0.787	836	763	14.4	4.0	24.480	C
3	736	184	1221	957	0.770	784	1060	15.6	3.6	25.458	D
4	1257	314	397	1575	0.798	1338	1609	24.5	4.2	19.655	C

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	790	197	897	1192	0.662	917	482	33.9	2.0	20.271	C
2	666	166	1207	1117	0.596	676	606	4.0	1.5	8.338	A
3	617	154	1011	1052	0.586	625	872	3.6	1.4	8.601	A
4	1052	263	317	1612	0.653	1062	1319	4.2	1.9	6.644	A

Queue Variation Results for each time segment

16:00 - 16:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.88	0.13	1.41	3.70	4.83			N/A	N/A
2	1.27	0.51	1.19	1.74	1.93			N/A	N/A
3	1.28	0.51	1.20	1.74	1.93			N/A	N/A
4	1.83	0.46	1.16	2.86	3.53			N/A	N/A

16:15 - 16:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	4.60	0.07	1.46	12.66	19.18			N/A	N/A
2	2.60	0.05	0.75	7.04	11.04			N/A	N/A
3	2.58	0.06	0.79	6.94	10.81			N/A	N/A
4	3.61	0.05	0.76	10.14	16.37			N/A	N/A

16:30 - 16:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	36.82	10.43	32.71	63.46	74.67			N/A	N/A
2	11.08	0.12	3.83	30.36	44.36			N/A	N/A
3	11.47	0.15	4.70	30.52	43.55			N/A	N/A
4	17.63	0.27	8.92	45.15	62.50			N/A	N/A

16:45 - 17:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	67.88	25.81	62.80	108.64	124.72			N/A	N/A
2	14.37	0.08	2.69	41.81	65.68			N/A	N/A
3	15.63	0.11	4.57	44.19	66.19			N/A	N/A
4	24.47	0.20	10.21	66.30	94.96			N/A	N/A

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	33.85	12.58	31.06	53.94	61.95			N/A	N/A
2	4.03	0.06	0.87	11.39	18.32			N/A	N/A
3	3.63	0.05	0.48	10.26	17.43			N/A	N/A
4	4.24	0.04	0.44	11.82	21.74			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	2.04	0.03	0.28	2.04	6.19			N/A	N/A
2	1.51	0.03	0.30	1.91	7.24			N/A	N/A
3	1.45	0.03	0.30	1.57	6.66			N/A	N/A
4	1.92	0.03	0.30	2.14	8.93			N/A	N/A

RECEIVED: 28/05/2026

Groody Roundabout - 2043 Design Year (Residential, Creche & Medical Centre), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	152.69	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-17	Arm 4	152.69	F

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)	Run automatically
D17	2043 Design Year (Residential, Creche & Medical Centre)	AM	ONE HOUR	07:45	09:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	490	100.000
2		ONE HOUR	✓	1182	100.000
3		ONE HOUR	✓	819	100.000
4		ONE HOUR	✓	1516	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	13	176	301		1	0.00	0.03	0.36	0.61
	2	17	0	159	1006		2	0.01	0.00	0.13	0.85
	3	538	96	5	180		3	0.66	0.12	0.01	0.22
	4	660	625	221	10		4	0.44	0.41	0.15	0.01

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
07:45-08:00	1	369	369
	2	890	890
	3	617	617
	4	1141	1141
08:00-08:15	1	440	440
	2	1063	1063
	3	736	736
	4	1363	1363
08:15-08:30	1	540	540
	2	1301	1301
	3	902	902
	4	1669	1669
08:30-08:45	1	540	540
	2	1301	1301
	3	902	902
	4	1669	1669
08:45-09:00	1	440	440
	2	1063	1063
	3	736	736
	4	1363	1363
09:00-09:15	1	369	369
	2	890	890
	3	617	617
	4	1141	1141

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.46	5.59	0.8	2.3	A	450	674
2	0.98	58.60	20.6	84.0	F	1085	1627
3	1.06	128.70	34.7	85.7	F	752	1127
4	1.16	286.56	122.6	191.8	F	1391	2087

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	369	92	713	1269	0.291	367	906	0.0	0.4	3.983	A
2	890	222	533	1419	0.627	883	547	0.0	1.6	6.637	A
3	617	154	998	1058	0.583	611	419	0.0	1.4	7.964	A
4	1141	285	490	1532	0.745	1130	1119	0.0	2.8	8.735	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	440	110	847	1213	0.363	440	1078	0.4	0.6	4.649	A
2	1063	266	637	1373	0.774	1056	650	1.6	3.3	11.143	B
3	736	184	1193	969	0.760	730	500	1.4	3.0	14.651	B
4	1363	341	585	1487	0.916	1340	1338	2.8	8.5	21.733	C

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	540	135	915	1185	0.455	538	1191	0.6	0.8	5.560	A
2	1301	325	748	1323	0.984	1253	705	3.3	15.4	37.223	E
3	902	225	1424	865	1.043	832	577	3.0	20.3	64.765	F
4	1669	417	667	1449	1.152	1439	1589	8.5	66.1	103.013	F

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	540	135	919	1183	0.456	539	1201	0.8	0.8	5.591	A
2	1301	325	750	1322	0.984	1281	708	15.4	20.6	58.601	F
3	902	225	1449	853	1.057	844	582	20.3	34.7	128.702	F
4	1669	417	677	1444	1.156	1443	1616	66.1	122.6	242.140	F

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	440	110	912	1186	0.371	441	1202	0.8	0.6	4.842	A
2	1063	266	653	1366	0.778	1130	701	20.6	3.7	19.126	C
3	736	184	1259	940	0.784	858	524	34.7	4.2	65.481	F
4	1363	341	686	1440	0.946	1428	1431	122.6	106.3	286.559	F

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	369	92	931	1178	0.313	369	1083	0.6	0.5	4.453	A
2	890	222	594	1392	0.639	898	706	3.7	1.8	7.390	A
3	617	154	1014	1051	0.587	628	478	4.2	1.5	8.730	A
4	1141	285	503	1526	0.748	1511	1139	106.3	13.8	147.021	F

Queue Variation Results for each time segment

07:45 - 08:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.41	0.00	0.00	0.41	0.41			N/A	N/A
2	1.65	0.50	1.49	2.49	2.91			N/A	N/A
3	1.37	0.19	1.22	2.07	2.71			N/A	N/A
4	2.81	0.10	1.15	6.61	9.11			N/A	N/A

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.57	0.09	0.81	1.36	1.43			N/A	N/A
2	3.25	0.05	0.77	9.05	14.48			N/A	N/A
3	2.96	0.06	0.80	8.13	12.80			N/A	N/A
4	8.48	0.14	3.64	22.05	31.15			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.83	0.03	0.26	0.83	0.83			N/A	N/A
2	15.44	0.22	7.40	40.05	55.93			N/A	N/A
3	20.30	1.75	15.40	42.13	52.95			N/A	N/A
4	66.06	29.36	62.20	100.32	113.37			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.83	0.03	0.27	0.83	2.29			N/A	N/A
2	20.62	0.15	7.25	57.31	84.03			N/A	N/A
3	34.65	4.56	27.77	69.30	85.70			N/A	N/A
4	122.64	66.28	118.13	173.49	191.79			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.60	0.55	1.00	1.40	1.45			N/A	N/A
2	3.74	0.04	0.41	10.20	19.42			N/A	N/A
3	4.24	0.05	0.45	11.96	21.40			N/A	N/A
4	106.26	64.79	103.39	142.36	154.94			N/A	N/A

09:00 - 09:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.46	0.00	0.00	0.46	0.46			N/A	N/A
2	1.81	0.03	0.30	2.15	8.56			N/A	N/A
3	1.45	0.03	0.28	1.45	4.62			N/A	N/A
4	13.77	0.22	6.69	35.42	49.27			N/A	N/A

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Groody Roundabout - 2043 Design Year (Residential, Creche & Medical Centre), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	106.60	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-14	Arm 1	106.60	F

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)	Run automatically
D18	2043 Design Year (Residential, Creche & Medical Centre)	PM	ONE HOUR	16:00	17:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	1061	100.000
2		ONE HOUR	✓	898	100.000
3		ONE HOUR	✓	829	100.000
4		ONE HOUR	✓	1424	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	11	487	563		1	0.00	0.01	0.46	0.53
	2	34	1	197	666		2	0.04	0.00	0.22	0.74
	3	215	164	1	449		3	0.26	0.20	0.00	0.54
	4	391	631	397	5		4	0.27	0.44	0.28	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:00-16:15	1	799	799
	2	676	676
	3	624	624
	4	1072	1072
16:15-16:30	1	954	954
	2	807	807
	3	745	745
	4	1280	1280
16:30-16:45	1	1168	1168
	2	989	989
	3	913	913
	4	1568	1568
16:45-17:00	1	1168	1168
	2	989	989
	3	913	913
	4	1568	1568
17:00-17:15	1	954	954
	2	807	807
	3	745	745
	4	1280	1280
17:15-17:30	1	799	799
	2	676	676
	3	624	624
	4	1072	1072

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	1.13	212.76	76.1	132.9	F	974	1460
2	0.98	65.15	17.3	71.1	F	824	1236
3	1.00	77.12	19.3	71.6	F	761	1141
4	1.01	70.79	31.6	103.3	F	1307	1960

Main Results for each time segment

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	799	200	896	1193	0.670	791	478	0.0	2.0	8.794	A
2	676	169	1084	1172	0.577	671	603	0.0	1.3	7.105	A
3	624	156	947	1081	0.577	619	808	0.0	1.3	7.706	A
4	1072	268	310	1616	0.664	1064	1256	0.0	1.9	6.443	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	954	238	1071	1119	0.852	942	571	2.0	5.0	19.024	C
2	807	202	1292	1079	0.748	801	721	1.3	2.8	12.704	B
3	745	186	1130	998	0.747	739	964	1.3	2.8	13.619	B
4	1280	320	370	1587	0.806	1272	1499	1.9	3.9	11.140	B

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1168	292	1261	1040	1.124	1025	673	5.0	40.9	93.382	F
2	989	247	1438	1013	0.976	949	848	2.8	12.8	41.364	E
3	913	228	1290	926	0.986	870	1097	2.8	13.4	46.272	E
4	1568	392	436	1557	1.007	1499	1724	3.9	21.2	40.378	E

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1168	292	1285	1030	1.135	1027	686	40.9	76.1	212.764	F
2	989	247	1449	1008	0.980	971	864	12.8	17.3	65.154	F
3	913	228	1308	917	0.995	889	1111	13.4	19.3	77.118	F
4	1568	392	445	1552	1.010	1527	1752	21.2	31.6	70.788	F

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	954	238	1168	1079	0.884	1065	623	76.1	48.3	210.628	F
2	807	202	1446	1009	0.800	859	786	17.3	4.4	29.537	D
3	745	186	1240	948	0.786	806	1065	19.3	4.1	32.934	D
4	1280	320	403	1572	0.814	1387	1644	31.6	4.8	27.914	D

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	799	200	913	1186	0.674	983	488	48.3	2.2	38.412	E
2	676	169	1280	1084	0.623	687	616	4.4	1.7	9.295	A
3	624	156	1062	1029	0.607	634	905	4.1	1.6	9.341	A
4	1072	268	317	1612	0.665	1083	1379	4.8	2.0	6.946	A

Queue Variation Results for each time segment

16:00 - 16:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	1.97	0.12	1.41	3.98	5.35			N/A	N/A
2	1.34	0.39	1.24	1.86	2.19			N/A	N/A
3	1.34	0.41	1.24	1.86	2.17			N/A	N/A
4	1.93	0.35	1.20	3.15	3.89			N/A	N/A

16:15 - 16:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	5.05	0.08	1.29	13.77	20.56			N/A	N/A
2	2.82	0.06	0.83	7.68	11.96			N/A	N/A
3	2.79	0.06	0.87	7.56	11.70			N/A	N/A
4	3.92	0.06	0.90	11.04	17.67			N/A	N/A

16:30 - 16:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	40.91	13.38	37.03	67.97	79.03			N/A	N/A
2	12.81	0.19	5.82	33.41	46.94			N/A	N/A
3	13.42	0.26	7.02	33.70	46.24			N/A	N/A
4	21.25	0.73	13.27	50.36	66.84			N/A	N/A

16:45 - 17:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	76.09	32.61	71.41	117.19	132.93			N/A	N/A
2	17.32	0.13	5.77	48.25	71.08			N/A	N/A
3	19.35	0.23	8.96	50.89	71.56			N/A	N/A
4	31.55	0.80	18.93	76.95	103.32			N/A	N/A

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	48.31	24.10	45.93	69.97	78.02			N/A	N/A
2	4.42	0.05	0.83	12.58	20.52			N/A	N/A
3	4.08	0.05	0.49	11.59	19.66			N/A	N/A
4	4.81	0.05	0.45	13.60	24.61			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	2.18	0.03	0.28	2.18	6.60			N/A	N/A
2	1.70	0.03	0.30	2.37	8.34			N/A	N/A
3	1.58	0.03	0.30	1.68	7.25			N/A	N/A
4	2.03	0.03	0.30	2.03	9.19			N/A	N/A

RECEIVED: 28/05/2026

Groody Roundabout - 2043 Design Year (Overall Masterplan Development), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	185.64	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-17	Arm 4	185.64	F

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)	Run automatically
D19	2043 Design Year (Overall Masterplan Development)	AM	ONE HOUR	07:45	09:15	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	512	100.000
2		ONE HOUR	✓	1257	100.000
3		ONE HOUR	✓	832	100.000
4		ONE HOUR	✓	1534	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	13	176	323		1	0.00	0.03	0.34	0.63
	2	17	0	159	1081		2	0.01	0.00	0.13	0.86
	3	538	96	5	193		3	0.65	0.12	0.01	0.23
	4	667	632	224	11		4	0.43	0.41	0.15	0.01

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
07:45-08:00	1	385	385
	2	946	946
	3	626	626
	4	1155	1155
08:00-08:15	1	460	460
	2	1130	1130
	3	748	748
	4	1379	1379
08:15-08:30	1	564	564
	2	1384	1384
	3	916	916
	4	1689	1689
08:30-08:45	1	564	564
	2	1384	1384
	3	916	916
	4	1689	1689
08:45-09:00	1	460	460
	2	1130	1130
	3	748	748
	4	1379	1379
09:00-09:15	1	385	385
	2	946	946
	3	626	626
	4	1155	1155

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.48	5.82	0.9	2.0	A	470	705
2	1.06	121.52	50.9	115.8	F	1153	1730
3	1.10	183.90	50.9	101.2	F	763	1145
4	1.16	299.14	127.5	198.0	F	1408	2111

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	385	96	721	1266	0.304	384	911	0.0	0.4	4.071	A
2	946	237	553	1411	0.671	938	552	0.0	2.0	7.505	A
3	626	157	1070	1025	0.611	620	421	0.0	1.5	8.765	A
4	1155	289	489	1532	0.754	1143	1201	0.0	2.9	9.007	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	460	115	855	1210	0.380	460	1082	0.4	0.6	4.793	A
2	1130	283	660	1363	0.829	1120	655	2.0	4.5	14.290	B
3	748	187	1278	931	0.803	739	502	1.5	3.7	18.004	C
4	1379	345	583	1488	0.927	1354	1434	2.9	9.3	23.300	C

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	564	141	919	1183	0.476	563	1177	0.6	0.9	5.789	A
2	1384	346	775	1311	1.056	1280	706	4.5	30.4	60.562	F
3	916	229	1484	838	1.093	818	572	3.7	28.2	85.050	F
4	1689	422	646	1459	1.158	1450	1656	9.3	69.0	106.839	F

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	564	141	923	1182	0.477	564	1184	0.9	0.9	5.824	A
2	1384	346	777	1310	1.057	1302	709	30.4	50.9	121.518	F
3	916	229	1503	829	1.105	825	576	28.2	50.9	183.903	F
4	1689	422	651	1456	1.160	1455	1677	69.0	127.5	249.791	F

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	460	115	916	1185	0.389	461	1187	0.9	0.6	4.986	A
2	1130	283	675	1356	0.834	1308	702	50.9	6.5	78.257	F
3	748	187	1443	856	0.874	840	539	50.9	28.0	171.112	F
4	1379	345	663	1451	0.951	1440	1621	127.5	112.4	299.142	F

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	385	96	924	1181	0.326	386	1129	0.6	0.5	4.532	A
2	946	237	607	1386	0.683	964	703	6.5	2.2	8.850	A
3	626	157	1096	1013	0.618	732	475	28.0	1.7	18.361	C
4	1155	289	575	1492	0.774	1479	1253	112.4	31.5	178.193	F

Queue Variation Results for each time segment

07:45 - 08:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.43	0.00	0.00	0.43	0.43			N/A	N/A
2	1.99	0.20	1.12	3.64	4.62			N/A	N/A
3	1.53	0.12	1.25	2.80	3.64			N/A	N/A
4	2.94	0.08	1.38	7.45	10.75			N/A	N/A

08:00 - 08:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.61	0.11	0.85	1.37	1.44			N/A	N/A
2	4.46	0.07	1.28	12.42	19.18			N/A	N/A
3	3.72	0.06	1.20	10.17	15.54			N/A	N/A
4	9.29	0.15	4.05	24.16	34.05			N/A	N/A

08:15 - 08:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.90	0.03	0.26	0.90	0.90			N/A	N/A
2	30.40	4.62	24.83	59.21	72.60			N/A	N/A
3	28.24	6.25	24.23	51.19	61.28			N/A	N/A
4	69.03	31.31	65.15	104.11	117.40			N/A	N/A

08:30 - 08:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.91	0.03	0.27	0.91	1.99			N/A	N/A
2	50.92	10.00	43.17	95.77	115.83			N/A	N/A
3	50.95	15.57	45.81	86.54	101.25			N/A	N/A
4	127.53	69.94	123.03	179.37	197.97			N/A	N/A

08:45 - 09:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.64	0.55	1.00	1.40	1.45			N/A	N/A
2	6.54	0.05	0.82	18.91	32.05			N/A	N/A
3	28.03	10.23	25.61	44.74	51.47			N/A	N/A
4	112.41	60.14	108.13	159.61	176.66			N/A	N/A

09:00 - 09:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	0.49	0.04	0.44	1.27	1.38			N/A	N/A
2	2.21	0.03	0.29	2.21	9.20			N/A	N/A
3	1.68	0.03	0.28	1.68	4.52			N/A	N/A
4	31.50	7.50	27.32	56.36	67.15			N/A	N/A

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Groody Roundabout - 2043 Design Year (Overall Masterplan Development), PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
4	Groody Roundabout	Standard Roundabout		1, 2, 3, 4	148.66	F

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	-16	Arm 1	148.66	F

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)	Run automatically
D20	2043 Design Year (Overall Masterplan Development)	PM	ONE HOUR	16:00	17:30	15	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	1067	100.000
2		ONE HOUR	✓	906	100.000
3		ONE HOUR	✓	834	100.000
4		ONE HOUR	✓	1529	100.000

Origin-Destination Data

Demand (PCU/hr)						Proportions					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	11	487	569		1	0.00	0.01	0.46	0.53
	2	34	1	197	674		2	0.04	0.00	0.22	0.74
	3	215	164	1	454		3	0.26	0.20	0.00	0.54
	4	420	678	426	5		4	0.27	0.44	0.28	0.00

Vehicle Mix

HV data entry mode	PCU Factor for a HV (PCU)
HV Percentages	2.00

Heavy Vehicle %						Average PCU Per Veh					
From	To					From	To				
		1	2	3	4			1	2	3	4
	1	0	0	0	0		1	1.000	1.000	1.000	1.000
	2	0	0	0	0		2	1.000	1.000	1.000	1.000
	3	0	0	0	0		3	1.000	1.000	1.000	1.000
	4	0	0	0	0		4	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:00-16:15	1	803	803
	2	682	682
	3	628	628
	4	1151	1151
16:15-16:30	1	959	959
	2	814	814
	3	750	750
	4	1375	1375
16:30-16:45	1	1175	1175
	2	998	998
	3	918	918
	4	1683	1683
16:45-17:00	1	1175	1175
	2	998	998
	3	918	918
	4	1683	1683
17:00-17:15	1	959	959
	2	814	814
	3	750	750
	4	1375	1375
17:15-17:30	1	803	803
	2	682	682
	3	628	628
	4	1151	1151

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max 95th percentile Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	1.15	268.76	83.7	140.8	F	979	1469
2	0.99	71.04	19.3	74.3	F	831	1247
3	1.00	83.16	21.3	73.9	F	765	1148
4	1.08	146.57	76.6	147.5	F	1403	2105

Main Results for each time segment

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	803	201	952	1169	0.687	795	499	0.0	2.1	9.409	A
2	682	171	1109	1161	0.588	676	637	0.0	1.4	7.350	A
3	628	157	957	1076	0.583	622	829	0.0	1.4	7.842	A
4	1151	288	310	1616	0.712	1141	1270	0.0	2.4	7.449	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	959	240	1135	1093	0.878	944	596	2.1	6.0	22.195	C
2	814	204	1319	1067	0.763	808	760	1.4	3.0	13.566	B
3	750	187	1140	993	0.755	744	987	1.4	2.9	14.074	B
4	1375	344	370	1587	0.866	1361	1514	2.4	5.8	15.072	C

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1175	294	1287	1029	1.142	1017	682	6.0	45.4	103.492	F
2	998	249	1440	1012	0.985	954	864	3.0	13.9	44.103	E
3	918	230	1294	924	0.994	872	1100	2.9	14.3	48.608	E
4	1683	421	434	1557	1.081	1535	1732	5.8	43.0	67.460	F

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	1175	294	1301	1023	1.148	1021	692	45.4	83.7	236.464	F
2	998	249	1449	1008	0.989	976	874	13.9	19.3	71.041	F
3	918	230	1314	915	1.004	891	1111	14.3	21.3	83.157	F
4	1683	421	443	1553	1.084	1549	1761	43.0	76.6	146.569	F

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	959	240	1287	1029	0.932	1017	670	83.7	69.4	268.759	F
2	814	204	1444	1011	0.806	873	860	19.3	4.7	33.195	D
3	750	187	1230	953	0.787	818	1087	21.3	4.1	35.828	E
4	1375	344	407	1570	0.875	1550	1642	76.6	32.7	129.557	F

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	803	201	1049	1129	0.712	1069	540	69.4	2.9	108.034	F
2	682	171	1417	1023	0.667	692	701	4.7	2.1	11.224	B
3	628	157	1116	1004	0.625	638	994	4.1	1.7	10.060	B
4	1151	288	317	1612	0.714	1271	1436	32.7	2.6	14.723	B

Queue Variation Results for each time segment

16:00 - 16:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	2.12	0.11	1.42	4.59	6.18			N/A	N/A
2	1.40	0.31	1.27	1.96	2.55			N/A	N/A
3	1.37	0.35	1.26	1.91	2.40			N/A	N/A
4	2.41	0.18	1.35	4.78	6.19			N/A	N/A

16:15 - 16:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	5.99	0.10	2.10	15.86	22.89			N/A	N/A
2	3.04	0.06	0.95	8.28	12.81			N/A	N/A
3	2.90	0.06	0.92	7.86	12.14			N/A	N/A
4	5.75	0.08	1.38	15.93	24.03			N/A	N/A

16:30 - 16:45

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	45.41	16.78	41.76	72.95	83.92			N/A	N/A
2	13.94	0.25	7.16	35.27	48.61			N/A	N/A
3	14.35	0.35	8.13	35.07	47.41			N/A	N/A
4	42.97	11.09	37.75	75.96	90.06			N/A	N/A

16:45 - 17:00

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	83.74	39.12	79.38	125.22	140.82			N/A	N/A
2	19.27	0.18	8.00	51.96	74.35			N/A	N/A
3	21.27	0.34	11.31	53.82	73.86			N/A	N/A
4	76.57	25.92	69.90	127.10	147.53			N/A	N/A

17:00 - 17:15

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	69.38	40.50	67.11	94.45	103.36			N/A	N/A
2	4.65	0.05	0.50	13.27	22.66			N/A	N/A
3	4.12	0.05	0.47	11.68	20.43			N/A	N/A
4	32.67	9.48	29.07	55.76	65.42			N/A	N/A

17:15 - 17:30

Arm	Mean (PCU)	Q05 (PCU)	Q50 (PCU)	Q90 (PCU)	Q95 (PCU)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
1	2.92	0.03	0.30	2.92	12.71			N/A	N/A
2	2.07	0.03	0.32	3.87	10.85			N/A	N/A
3	1.71	0.03	0.30	2.04	8.11			N/A	N/A
4	2.59	0.03	0.29	2.59	10.49			N/A	N/A

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Appendix C GoCar Letter of Intent



RECEIVED: 28/05/2026

Kirkland Investments
Singland,
Dublin Road,
Limerick

21st October 2025

To Whom It May Concern,

This is a letter to confirm that GoCar intends to provide a car sharing service in the Parkway Valley development, Dublin Road, Limerick. GoCar representatives have discussed the project with representatives of Kirkland Investments and are excited to provide 5 (five) car sharing spaces to service this location. The development consists of 403-unit dwellings, and 2 business units within the Limerick area. The developer proposes to have available two 5 (five) vehicles for service at surface level for the wider communities and onsite residents within the development.

GoCar is Ireland's leading car sharing service with over 60,000 members and over 1200 cars and vans on fleet. Each GoCar which is placed in a community has the potential to replace the journeys of up to 15 private cars. The Department of Housing's Design Standards for New Apartments - Guidelines for Planning Authorities 2018 outline: "For all types of location, where it is sought to eliminate or reduce car parking provision, it is necessary to ensure... provision is also to be made for alternative mobility solutions including facilities for car sharing club vehicles."

Carsharing is a sustainable service. By allowing multiple people to use the same vehicle at different times, car sharing reduces car ownership, car dependency, congestion, noise, and air pollution. It frees up land which would otherwise be used for additional parking spaces. Most GoCar users only use a car when necessary and walk and use public transport more often than car owners.

By having GoCar car sharing vehicles in a development such as this, the residents therein will have access to pay-as-you go driving, in close proximity to their homes, which will increase usership of the service.

I trust that this information is satisfactory. For any queries, please do not hesitate to contact me.

Daniel Ralston
Business Account Manager
GoCar Carsharing Ltd
Mobile: 086 0414 991
E: daniel.ralston@gocar.ie

APPENDIX 14.1

Resource Waste Management Plan AWN Consulting

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Trinity
Consultants

awnconsulting

Resource & Waste Management Plan

Project Title: Parkway Valley LRD at Dublin Road, Limerick

CLIENT

Kirkland
Investments
Ltd.

DOCUMENT REFERENCE

257501.0277WR02

DATE

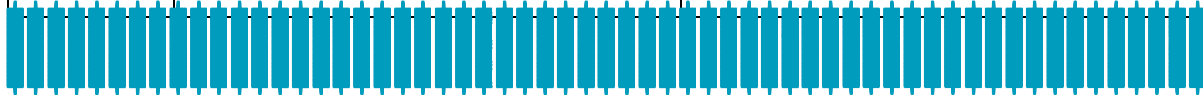
15/05/2026

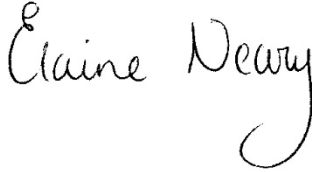
DOCUMENT CONTROL SHEET

RECEIVED: 28/05/2026

Document Control Sheet	
Our Reference	257501.0277WR02
Original Issue Date	15 May 2026
Client:	Kirkland Investments Ltd.
Client Address:	3 rd Floor, Carlton House, Henry Street, Limerick, Co. Limerick, V94 FD80

Revision	Revision Date	Description



Details	Written by	Approved by
Signature		
Name	Ana Neary	Elaine Neary
Title	Environmental Consultant	Associate
Date	15/05/2026	15/05/2026

Disclaimer

This report considers the specific instructions and requirements of our client. It is not intended for third-party use or reliance, and no responsibility is accepted for any third party. The provisions in this report apply solely to this project and should not be assumed applicable to other developments without review and modification.



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1. INTRODUCTION

AWN Consulting, a Trinity Consultants Company, has prepared this Construction and Demolition (C&D) Resource & Waste Management Plan (RWMP) for the proposed Parkway Valley LRD which is located on the Dublin Road in Limerick. The Proposed Development comprises 5 no. blocks with a total of 403 no. residential units, ranging from 5 to 8 storeys in height; a medical centre located at the western edge of the site; a creche located at ground level within Block B; and all associated site works and development.

This plan provides information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with the current legal and industry standards including the *Waste Management Act 1996* as amended and associated Regulations ¹, *Environmental Protection Agency Act 1992* as amended ², *Litter Pollution Act 1997* as amended ³, the National Waste Management Plan for a Circular Economy 2024 - 2030 (NWMPCE) (2024) ⁴. In particular, this plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also provides appropriate measures in relation to the collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

This RWMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and prescribes measures for the management of different waste streams. The RWMP should be viewed as a live document and will be regularly revisited throughout the project's lifecycle so that opportunities to maximise waste reduction / efficiencies are exploited throughout, and that data is collected on an ongoing basis so that it is as accurate as possible.

2. OVERVIEW OF WASTE MANAGEMENT IN IRELAND

2.1 National level

The Irish Government issued a policy statement in September 1998, *Changing Our Ways*⁵, which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2018).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste*'⁶ concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

In September 2020, the Irish Government published a policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan, '*A Waste Action Plan for a Circular Economy*'⁷ (WAPCE), replaces the previous national waste management plan, '*A Resource Opportunity*' (2012), and was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to an altered economical model, where climate and environmental challenges are turned into opportunities.

The WAPCE sets the direction for waste planning and management in Ireland up to 2025. This reorientates policy from a focus on managing waste to a much greater focus on creating circular patterns of production and consumption. Other policy statements of a number of public bodies already acknowledge the circular economy as a national policy priority.

The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

One of the first actions to be taken was the development of the *Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'* (2021)⁸ to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021. It is anticipated that the Strategy will be updated in full every 18 months to 2 years.

The Circular Economy and Miscellaneous Provisions Act 2022⁹ was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will work to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions, tackling the delays which can be encountered by industry, and supporting the availability of recycled secondary raw materials in the Irish market, and tackles illegal fly-tipping and littering.

The Environmental Protection Agency (EPA) of Ireland issued '*Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects*' in November 2021¹⁰. These guidelines replace the previous 2006 guidelines issued by The National Construction and Demolition Waste Council (NCDWC) and the Department of the Environment, Heritage and Local Government (DoEHLG) in 2006¹¹. The guidelines provide a practical approach which is informed by best practice in the prevention and management of C&D wastes and resources from design to construction of a project, including consideration of the deconstruction of a project.

These guidelines have been followed in the preparation of this document and include the following elements:

- ▶ Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- ▶ Design teams roles and approach;
- ▶ Relevant EU, national and local waste policy, legislation and guidelines;
- ▶ Waste disposal/recycling of C&D wastes at the site;
- ▶ Provision of training for Resource Waste Manager (RM) and site crew;
- ▶ Details of proposed record keeping system;
- ▶ Details of waste audit procedures and plan; and
- ▶ Details of consultation with relevant bodies i.e. waste recycling companies, Local Authority, etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a bespoke RWMP for developments. The new guidance classifies developments on a two-tiered system. Developments which do not exceed any of the following thresholds may be classed as Tier 1 development, which require a simplified RWMP:

- ▶ New residential development of less than 10 dwellings.
- ▶ Retrofit of 20 dwellings or less.
- ▶ New commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 1,250m².
- ▶ Retrofit of commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 2,000m²; and
- ▶ Demolition projects generating in total less than 100m³ in volume of C&D waste.

A development which exceeds one or more of these thresholds is classed as Tier-2 development.

This development requires a RWMP as a Tier 1 development as it is above following criterion:

- ▶ New commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 1,250m².
- ▶ New residential development of less than 10 dwellings.

The Department of Housing, Local Government and Heritage authored *Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities (2024)*¹² suggest the below thresholds at which the need for supplemental information such as the RWMP should be considered.

- ▶ 30 or more residential units,
- ▶ 1,000 sq. meters of mixed-us development

Other guidelines followed in the preparation of this report include '*Construction and Demolition Waste Management – a handbook for Contractors and Site Managers*'¹², published by FÁS and the Construction Industry Federation in 2002 and the previous guidelines, 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects' (2006).

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

2.2 Regional Level

The proposed development is located in the Local Authority area of Limerick City and County Council (LCCC).

The Southern Region Waste Management Plan 2015 – 2021, which previously governed waste management policy in the LCCC area, has been superseded as of March 2024 by the NWMPCE 2024 – 2030, the new national waste management plan for Ireland.

The NWMPCE does not dissolve the three regional waste areas. The NWCPCE sets the ambition of the plan to have a 0% total waste growth per person over the life of the Plan with an emphasis on non-household wastes including waste from commercial activities and the construction and demolition sector. This Plan seeks to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation.

The national plan sets out the following strategic targets for waste management in the country that are relevant to the development:

National Targets

- 1B. (Construction Materials) 12% Reduction in Construction & Demolition Waste Generated by 2030.
- 3B. (Reuse Facilities) Provide for reuse at 10 Civic Amenity Sites, minimum

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Munster Region, charges are approximately €140 - €160 per tonne of waste which includes an €85 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2015 (as amended)*¹³. The *Circular Economy (Waste Recovery Levy) Regulations 2024*¹⁴ will also incur a levy of €10 per tonne for waste accepted for recovery. This will include backfilling at authorised recovery sites and at municipal waste landfills.

The *Limerick Development Plan 2022-2028*¹⁶ sets out a number of objectives for the Limerick City and County area, in line with the objectives of the regional waste management plan and the Circular Economy Policy. Waste objectives with a particular relevance to the proposed development are:

Objective IN O21 *Construction and Demolition*

It is an objective of the Council to:

- a) Require construction Waste Management Plans to be submitted as part of planning applications, to address waste management on site during construction and mitigation measures to address waste generation, in accordance with the principles of the circular economy and the principles of prevention, renewal and recycle.
- b) Require a Refurbishment/Demolition Asbestos Survey (RDAS) with full details of disposal of the asbestos to be submitted with any planning application. The RDAS should be carried out in accordance with Section 8 of the Health and Safety Authority, Asbestos Guidelines (Practical Guidelines on ACM Management and Abatement) by a suitable qualified professional with expertise in asbestos disposal.

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the development are:

- ▶ *Waste Management Act 1996 as amended;*
- ▶ *Environmental Protection Agency Act 1992 as amended;*
- ▶ *Litter Pollution Act 1997 as amended;*
- ▶ *Planning and Development Act 2000 as amended* ¹⁶;
- ▶ *Circular Economy and Miscellaneous Provisions Act 2022.*

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 as amended* and subsequent Irish legislation, is the principle of "Duty of Care". This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination. Following on from this is the concept of "Polluter Pays" whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

It is therefore imperative that the Developer ensures that the waste contractors engaged by demolition and construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007 as amended* or a Waste Licence granted by the EPA. The COR / permit / licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site

3. DESIGN APPROACH

The client and the design team have integrated the *'Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects'* guidelines into the design workshops, to help review processes, identify and evaluate resource reduction measures and investigate the impact on cost, time, quality, buildability, second life and management post demolition and construction. Further details on these design principals can be found within the aforementioned guidance document.

The design team have undertaken the design process in line with the international best practice principles to firstly prevent wastes, reuse where possible and thereafter sustainably reduce and recover materials. The below sections have been the focal point of the design process and material selections and will continued to be analysed and investigated throughout the design process and when selecting material.

As noted in the EPA guidelines, the approaches presented are based on international principles of optimizing resources and reducing waste on construction projects through:

- ▶ *Prevention;*
- ▶ *Reuse;*
- ▶ *Recycling;*
- ▶ *Green Procurement Principles;*
- ▶ *Off-Site Construction;*
- ▶ *Materials Optimisation; and*
- ▶ *Flexibility and Deconstruction.*

3.1 Designing For Prevention, Reuse and Recycling

Undertaken at the outset and during project feasibility and evaluation the Client and Design Team considered:

- ▶ Establishing the potential for any reusable site assets (buildings, structures, equipment, materials, soils, etc.); and
- ▶ Enabling the optimum recovery of assets on site.

3.2 Designing for Green Procurement

Waste prevention and minimisation pre-procurement have been discussed and will be further discussed in this section. The Design Team will discuss proposed design solutions, encourage innovation in tenders and incentivise competitions to recognise sustainable approaches. They will also discuss options for packaging reduction with the main Contractor and subcontractors/suppliers using measures such as 'Just-in-Time' delivery and use ordering procedures that avoid excessive waste. The Green procurement extends from the planning stage into the detailed design and tender stage and will be an ongoing part of the long-term design and selection process for this development.

3.3 Designing for Off-Site Construction

Use of off-site manufacturing has been shown to reduce residual wastes by up to 90% (volumetric building versus traditional). The decision to use offsite construction is typically cost led but there are significant benefits for resource management. Some further considerations for procurement which are being investigated as part of the planning stage design process are listed as follows:

- ▶ Modular buildings as these can displace the use of concrete and the resource losses associated with concrete blocks such as broken blocks, mortars, etc.;
- Modular buildings are typically pre-fitted with fixed plasterboard and installed insulation, eliminating these residual streams from site.
- ▶ Use of pre-cast structural concrete panels which can reduce the residual volumes of concrete blocks, mortars, plasters, etc.;
- ▶ The use of prefabricated composite panels for walls and roofing to reduce residual volumes of insulation and plasterboards;
- ▶ Using pre-cast hollow-core flooring instead of in-situ ready mix flooring or timber flooring to reduce the residual volumes of concrete/formwork and wood/packaging, respectively; and
- ▶ Designing for the preferential use of offsite modular units.

3.4 Designing for Materials Optimisation During Construction

To ensure manufacturers and construction companies adopt lean production models, including maximising the reuse of materials onsite as outlined in section 3.1, structures should be designed with the intent of designing out waste. This helps to reduce the environmental impacts associated with transportation of materials and from waste management activities. This includes investigating the use of standardised sizes for certain materials to help reduce the amount of offcuts produced on site, focusing on promotion and development of off-site manufacture.

3.5 Designing for Flexibility and Deconstruction

Design flexibility has and will be investigated throughout the design process to ensure that where possible products (including buildings) only contain materials that can be recycled and are designed to be easily disassembled. Material efficiency is being considered for the duration and end of life of a building project to produce; flexible, adaptable spaces that enable a resource-efficient, low-waste future change of use; durability of materials and how they can be recovered effectively when maintenance and refurbishment are undertaken and during disassembly/deconstruction.

4. DESCRIPTION OF THE DEVELOPMENT

4.1 Location, Size and Scale of the Development

The proposed development is located at the former Horizon Mall site in Singland on the Dublin Road in Limerick City.

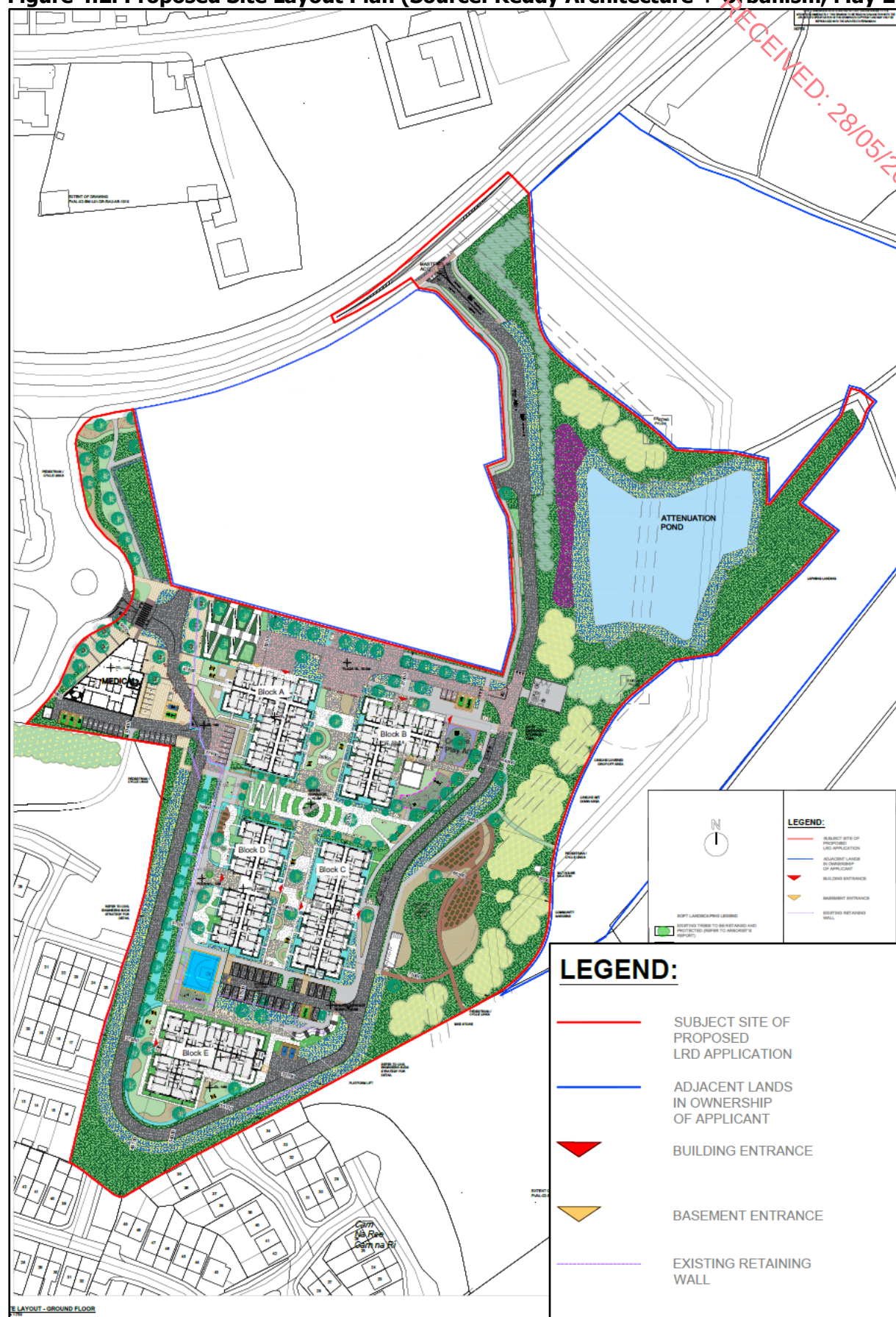
The proposed development comprises 5 no. blocks with a total of 403 no. residential units, ranging from 5 to 8 storeys in height; a medical centre located at the western edge of the site; a creche located at ground level within Block B; and all associated site works and development.

Figure 4.1. Site Location Map (Redline)



Urbanism, May 2026

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4.2 Details of the Non-Hazardous Wastes to be Produced

There will be waste materials generated from the demolition of some of the existing concrete slab and hardstanding areas on site. The project engineers, Punch Consulting Engineers, have advised that this will amount to c. 40m³ of concrete.

In general excavations will be limited as existing site levels will need to be raised using imported fill to achieve floor levels for Blocks A to D. Excavations will however be required to facilitate the floor levels for Block E, for road development, installation of services and landscaping purposes. In addition, localised excavations will be required to facilitate pile installation. It has been estimated by the quantity surveyors for the project, Mitchell Mc Dermott, that approximately 41,275m³ of made ground and subsoil will need to be excavated to facilitate construction. It is currently envisaged that around 10% of this, c. 4,127m³ will be able to be retained and reused onsite for landscaping and fill, the remaining material, will need to be removed offsite due to the limited opportunities for reuse on site. This will be taken for appropriate offsite reuse, recovery, recycling and / or disposal. Where the material is suitable for reuse on site, it is proposed that it will be retained on site and used in locations of landscaping only and covered with topsoil.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and supply of materials will also be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on site during the construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

4.3 Potential Hazardous Wastes Arising

4.3.1 Contaminated Soil

Site investigations were undertaken by OCB Geotechnical within the site boundary between July and September 2025. The site investigation showed the presence of made ground overlying the majority of the site to a depth. The made ground is described in the OCB Geotechnical report (Report No. OCB25-049 dated 1st October 2025) as follows:

- ▶ Crushed or Broken Concrete: Slightly silty sandy to very sandy Gravel and Cobble size with variable proportions of boulder size fragments of angular to subangular crushed concrete, locally with occasional to some gravel and cobbles of limestone and/or basalt, and with occasional to frequent steel rebar was encountered at the surface throughout most of the site. Thickness of the ranged from 0.2m to 1.35m
- ▶ Hardcore: Grey, slightly silty, very sandy Gravel and Cobbles or locally Gravel, Cobble and Small Boulders composed of dark grey limestone or locally basalt was encountered beneath the crushed concrete fill material at eight trial pits and was also encountered from the surface at one location at the southern end of the site. It ranged in thickness from 0.1m to about 2.0m.
- ▶ CONCRETE is present at the surface at two areas at the northern portion of the site and at a larger higher elevation irregular sub-triangular area near the southern end of the site. The concrete on the northwest side of TP03 was at least 1.5m thick. Subsurface concrete was encountered at 0.6m BGL at TP06 and 0.7m BGL at TP07.

Other than the concrete and steel rebar encountered, metal, plastic and timber fragments were also encountered occasionally in four of the trial pit locations. There was no visual or olfactory evidence of contamination noted on the trial pit and borehole logs provided in the OCB Geotechnical report. Three

samples were collected from the made ground layer during the OCB site investigation and were analysed for the Waste Acceptance Criteria (WAC) to classify the material for offsite disposal purposes. Based on the samples collected, the material would be classified as inert for offsite disposal purposes.

The subsoil underlying the made ground varied from sand to cohesive soils to glaciofluvial deposits. Possible bedrock outcrops were encountered at the lower elevation at the southeastern portion of the site. Bedrock encountered consisted mainly of strong grey to dark grey fine grained micritic LIMESTONE, at depths of 8.7m BGL in the north, 4-6.5m BGL in the middle and 3.5m BGL in the south of the site.

If any potentially contaminated material is encountered during the excavations required to facilitate construction, it will need to be segregated from clean / inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled '*Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous*'¹⁸ using the *HazWasteOnline* application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the *EC Council Decision 2003/33/EC*¹⁹, which establishes the criteria for the acceptance of waste at landfills.

In the event that Asbestos Containing Materials (ACMs) are found within the excavated material, the removal will only be carried out by a suitably permitted waste contractor, in accordance with *the Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010 and the Best Practice Guidance for Handling Asbestos (2023)*²⁰. All asbestos will be taken to a suitably licensed or permitted facility. Not, the samples collected for WAC analysis were also tested for the presence/absence of asbestos. The laboratory report shows no asbestos was detected.

In the event that hazardous soil is encountered during the construction phase, the contractor will notify LCCC and provide a Hazardous / Contaminated Soil Management Plan, to include estimated tonnages, description of location, any relevant mitigation, destination for disposal / treatment, in addition to information on the authorised waste collector(s).

4.3.2 Fuel/Oils

Fuels and oils are classed as hazardous materials; any on-site storage of fuel / oil, and all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and the site crew are trained in the appropriate refueling techniques, it is not expected that there will be any fuel / oil waste generated at the site.

If refueling or accidental spills occur onsite small associated waste volumes will be generated from their cleanup, with the proposed mitigation this will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

4.3.3 Invasive Plant Species

A site invasive species survey was undertaken by the project ecologists, Moore Group. This included a site walkover survey of the entire site, and around part of the outside perimeter to search for any invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended). There was Third Schedule invasive species recorded within the site.

Cherry laurel (*Prunus laurocerasus*) was encountered on the site. It is also known as English laurel and is a popular evergreen shrub or small tree widely used for hedging and landscaping. While it is not a Third Schedule invasive species, it is an invasive species. It is intended to remove it prior to commencement of construction activities.

In the event that any Third Schedule invasive species detected during the construction phase of the development, then an invasive species management plan will be produced and submitted to LCCC.

4.3.4 Asbestos

If asbestos or ACMs are encountered, removal will be carried out by a suitably qualified contractor and ACMs will only be removed from site by a suitably permitted / licenced waste contractor, in accordance with the *Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010* and the *Best Practice Guidance for Handling Asbestos (2023)*. All material will be taken to a suitably licensed or permitted facility.

4.3.5 Other Known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner / cartridges, batteries (Lead, Ni-Cd or Mercury) and / or fluorescent tubes and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes, if generated, will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

5. ROLES AND RESPONSIBILITIES

The *Best Practice Guidelines on the Preparation of Resource Waste Management Plans for Construction and Demolition Projects* promotes that a suitably qualified Resource Manager (RM) with expertise in waste and resource management to implement the RWMP should be appointed. The RM may be performed by number of different individuals over the life-cycle of the Project, however it is intended to be a reliable person chosen from within the Planning/Design/Contracting Team, who is technically competent and appropriately trained, who takes the responsibility to ensure that the objectives and measures within the Project RWMP are complied with. The RM is assigned the requisite authority to meet the objective and obligations of the RWMP. The role will include the important activities of conducting waste checks/audits and adopting construction and demolition methodology that is designed to facilitate maximum reuse and/or recycling of waste.

5.1 Role of the Client

The Client are the body establishing the aims and the performance targets for the project.

- ▶ The Client has commissioned the preparation and submission of this RWMP as part of the design and planning submission;
- ▶ The Client is to commission the preparation and submission of an updated RWMP as part of the construction tendering process;
- ▶ The Client will ensure that the RWMP is agreed on and submitted to the local authority and their agreement obtained prior to commencement of works on site;
- ▶ The Client will request the end-of-project RWMP from the Contractor.

5.2 Role of the Client Advisory Team

The Client Advisory Team or Design Team is formed of architects, consultants, quantity surveyors and engineers and is responsible for:

- ▶ Drafting and maintaining the RWMP through the design, planning and procurement phases of the project;
- ▶ Appointing a RM to track and document the design process, inform the Design Team and prepare the RWMP.
- ▶ Including details and estimated quantities of all projected waste streams with the support of environmental consultants/scientists. This will also include data on waste types (e.g. waste characterisation data, contaminated land assessments, site investigation information) and prevention mechanisms (such as by-products) to illustrate the positive circular economy principles applied by the Design Team;
- ▶ Managing and valuing the demolition work with the support of quantity surveyors;
- ▶ Handing over of the RWMP to the selected Contractor upon commencement of construction of the development, in a similar fashion to how the safety file is handed over to the Contractor;
- ▶ Working with the Contractor as required to meet the performance targets for the project.

5.3 Future Role of the Contractor

The future demolition and construction Contractors have not yet been decided upon for this RWMP. However, once select they will have major roles to fulfil. They will be responsible for:

- ▶ Preparing, implementing and reviewing the (including the Pre-Demolition) RWMP throughout the demolition and construction phases (including the management of all suppliers and sub-contractors) as per the requirements of the EPA guidelines;

- ▶ Identifying a designated and suitably qualified RM who will be responsible for implementing the RWMP;
- ▶ Identifying all hauliers to be engaged to transport each of the resources / wastes off-site;
- ▶ Implementing waste management policies whereby waste materials generated on site are to be segregated as far as practicable;
- ▶ Renting and operating a mobile-crusher to crush concrete for temporary reuse onsite during construction and reduce the amount of HGV loads required to remove material from site;
- ▶ Applying for the appropriate waste permit to crush concrete onsite;
- ▶ Identifying all destinations for resources taken off-site. As above, any resource that is legally classified as a 'waste' must only be transported to an authorised waste facility;
- ▶ End-of-waste and by-product notifications addressed with the EPA where required;
- ▶ Clarification of any other statutory waste management obligations, which could include on-site processing;
- ▶ Full records of all resources (both wastes and other resources) will be maintained for the duration of the project; and
- ▶ Preparing a RWMP Implementation Review Report at project handover.

6. KEY MATERIALS & QUANTITIES

6.1 Project Resource Targets

Project specific resource and waste management targets for the site have not yet been set and this information will be updated for these targets once these targets have been confirmed by the client. However, it is expected for projects of this nature that a minimum of 70% of waste is fully re-used, recycled or recovered. Target setting will inform the setting of project-specific benchmarks to track target progress. Typical Key Performance Indicators (KPIs) that will be used to set targets include (as per guidelines):

- ▶ Weight (tonnes) or Volume (m3) of waste generated per construction value;
- ▶ Weight (tonnes) or Volume (m3) of waste generated per construction floor area (m2);
- ▶ Fraction of resource reused on site;
- ▶ Fraction of resource notified as by-product;
- ▶ Fraction of waste segregated at source before being sent off-site for recycling/recovery; and
- ▶ Fraction of waste recovered, fraction of waste recycled, or fraction of waste disposed.

6.2 Main Construction and Demolition Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction activities at a typical site are shown in Table 6.1. The List of Waste (LoW) code (2018) for each waste stream is also shown.

Table 6.1 Typical waste types generated and LoW codes (individual waste types may contain hazardous substances)

Waste Material	LoW Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Bituminous mixtures, coal tar and tarred products	17 03 01*, 02 & 03*
Metals (including their alloys) and cable	17 04 01-11
Soil and stones	17 05 03* & 04
Gypsum-based construction material	17 08 01* & 02
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-10
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04
Organic (food) waste	20 01 08
Mixed Municipal Waste	20 03 01

* Individual waste type may contain hazardous substances

6.3 Demolition Waste Generation

There will be waste materials generated from the demolition of some of the existing concrete slab and hardstanding areas on site. It has been estimated by the project engineers, Punch Consulting Engineers, that approximately 40m³ of concrete will be generated. It is currently anticipated that this material will not be suitable for reuse on site and will require removal from site for offsite reuse, recycling / recovery and/or disposal as required.

6.4 Construction Waste Generation

Table 6.2 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports*¹⁷ and the joint EPA & GMIT study¹⁸.

Table 6.2 Waste materials generated on a typical Irish construction site

Waste Types	%
Mixed C&D	33
Timber	28
Plasterboard	10
Metals	8
Concrete	6
Other	15
Total	100

Table 6.3, below, shows the estimated construction waste generation for the proposed Project based on the gross floor area of construction and other information available to date, along with indicative targets for management of the waste streams. The estimated amounts for the main waste types (with the exception of soils and stones) are based on an average large-scale development waste generation rate per m², using the waste breakdown rates shown in Table 6.3. These have been calculated from the schedule of development areas provided by the architect.

Table 6.3 Predicted on and off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	730	10	73	80	584	10	73
Timber	620	40	248	55	341	5	31
Plasterboard	221	30	66	60	133	10	22
Metals	177	5	9	90	159	5	9
Concrete	66	30	20	65	43	5	3
Other	332	20	66	60	199	20	66
Total	2146		482		1459		205

In addition to the waste streams in Table 6.4 there will be c. 41,275 m³ of made ground and subsoil excavated to facilitate construction of Block E, road development, the installation of services, landscaping purpose and installation of piles. Any suitable excavated material will be temporarily stockpiled for reuse as fill, where possible, but reuse on site is expected to be limited and all of the excavated material except for c. 10%, estimated as 4,127m³ is expected to be removed off-site for appropriate reuse, recovery and / or disposal.

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

6.5 Proposed Resource and Waste Management Options

Waste materials generated will be segregated on-site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source, where feasible. All waste receptacles leaving the site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin region that provide this service.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required.

National End-of-Waste Decision EoW-N001/2023 (Regulation 28) published by the EPA in September 2023, establishes criteria determining when recycled aggregate resulting from a recovery operation ceases to be waste. Material from this proposed development will be investigated to see if it can cease to be a waste under the requirements of the National End of Waste Criteria for Aggregates.

During construction, some of the sub-contractors on site will generate waste in relatively low quantities. The transportation of non-hazardous waste by persons who are not directly involved with the waste business, at weights less than or equal to 2 tonnes, and in vehicles not designed for the carriage of waste, are exempt from the requirement to have a waste collection permit (per Article 30 (1) (b) of the Waste Collection Permit Regulations 2007, as amended). Any sub-contractors engaged that do not generate more than 2 tonnes of waste at any one time can transport this waste off-site in their work vehicles (which are not designed for the carriage of waste). However, they are required to ensure that the receiving facility has the appropriate COR / permit / licence.

Written records will be maintained by the contractor(s), detailing the waste arising throughout the C&D phases, the classification of each waste type, waste collection permits for all waste contractors who collect waste from the site and COR / permit / licence for the receiving waste facility for all waste removed off-site for appropriate reuse, recycling, recovery and / or disposal

Dedicated bunded storage containers will be provided for hazardous wastes which may arise, such as batteries, paints, oils, chemicals, if required.

The anticipated management of the main waste streams is outlined as follows:

Made Ground and Subsoil

The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction works so the preferred option (prevention and minimisation) cannot be accommodated for the excavation phase.

It is anticipated that c. 37,147.5 of made ground and subsoil excavated will need to be removed offsite for appropriate reuse, recovery and/or disposal. Surplus material removed off-site it could be reused as a by-product (and not as a waste). If this is done, it will be done in accordance with Regulation 27 of the European Communities (Waste Directive) Regulations 2011, as amended, which requires that certain conditions are met and that by-product notifications are made to the EPA via their online notification form. Excavated material should not be removed from site until approval from the EPA has been received. The

potential to reuse material as a by-product will be confirmed during the course of the excavation works, with the objective of eliminating any unnecessary disposal of material.

The next option (beneficial reuse) may be appropriate for the excavated material, pending environmental testing to classify the material as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication. Clean inert material may be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end use.

Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Regulation 27. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Regulation 27. Regulation 27 will be investigated to see if the material can be imported onto this site for beneficial reuse instead of using virgin materials.

If the material is deemed to be a waste, then removal and reuse / recovery / disposal of the material will be carried out in accordance with the Waste Framework Directive (Directive 2008/98/EC), the *Waste Management Act 1996* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Bedrock

It is anticipated that bedrock will be encountered during excavations for Block E in the southern portion of the site. Any excavated rock is expected to be removed off-site for appropriate reuse, recovery and / or disposal. If bedrock is to be crushed on-site, the appropriate mobile waste facility permit will be obtained from LCCC, if required.

Silt & Sludge

During the construction phase, silt and petrochemical interception will be carried out on run-off and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed off-site.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and will be recycled, where possible. If concrete is to be crushed on-site, the appropriate mobile waste facility permit will be obtained from LCCC.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues, etc., will be disposed of in a separate skip and recycled off-site.

Metal

Metals will be segregated, where practical, and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

There are currently a number of recycling services for plasterboard in Ireland. Plasterboard from the construction phases will be stored in a separate skip, pending collection for recycling. The site Manager will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical & Electronic Equipment (WEEE)

Any WEEE will be stored in dedicated covered cages / receptacles / pallets pending collection for recycling.

Other Recyclables

Where any other recyclable wastes, such as cardboard and soft plastic, are generated, these will be segregated at source into dedicated skips and removed off-site.

Non-Recyclable Waste

C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip / receptacle will be examined by a member of the waste team (see Section 8) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Asbestos Containing Materials

Any asbestos or ACM found on-site will be removed by a suitably competent contractor and disposed of as asbestos waste before the demolition works begin. All asbestos removal work or encapsulation work must be carried out in accordance with the *Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010*.

Other Hazardous Wastes

On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and / or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

On-Site Crushing

It is currently not envisaged that the crushing of waste materials will occur on-site. However, if the crushing of material is to be undertaken, a mobile waste facility permit will first be obtained from LCCC, if required and the destination of the accepting waste facility or if an application under regulation 28 will be made using National End-of-Waste Decision EoW-N001/2023, will be supplied to the LCCC waste unit.

It should be noted that until a construction contractor is appointed it is not possible to provide information on the specific destinations of each construction waste stream. Prior to commencement of construction

and removal of any waste offsite, details of the proposed destination of each waste stream will be provided to LCCC by the project team.

6.6 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by a weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project RM (see Section 8).

All movement of waste and the use of waste contractors will be undertaken in accordance with the Waste Framework Directive (Directive 2008/98/EC), the *Waste Management Act 1996* as amended, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project RM (see Section 8) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority waste COR / permit or EPA Waste Licence for that site will be provided to the nominated project Waste Manager (see Section 8). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from DCC (as the relevant authority on behalf of all Local Authorities in Ireland) and kept on-site along with details of the final destination (COR, permits, licences, etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered in a waste management recording system to be maintained on-site.

7. ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is outlined below. The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

7.1 Reuse

By reusing materials on site, there will be a reduction in the transport and recycle / recovery / disposal costs associated with the requirement for a waste contractor to take the material off-site. Clean and inert soils, gravel, stones, etc., which cannot be reused on-site may be used as access roads or capping material for landfill sites, etc. This material is often taken free of charge or at a reduced fee for such purposes, reducing final waste disposal costs.

7.2 Recycling

Salvageable metals will earn a rebate, which can be offset against the costs of collection and transportation of the skips.

Clean, uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste.

Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes, such as timber, from a site than mixed waste.

7.3 Disposal

Landfill charges are currently at around €140 - €160 per tonne which includes a €85 per tonne landfill levy specified in the *Waste Management (Landfill Levy) Regulations 2015* as amended. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc., is also used as fill / capping material, wherever possible.

8. TRAINING PROVISIONS

A member of the construction team will be appointed as the RM to ensure commitment, operational efficiency and accountability in relation to waste management during the C&D phases of the development.

8.1 Resource Manager Training and Responsibilities

The nominated RM will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid them in the organisation, operation and recording of the waste management system implemented on site.

The RM will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the Waste Manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The RM will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The RM will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this RWMP.

8.2 Site Crew Training

Training of site crew in relation to waste is the responsibility of the RM and, as such, a waste training program will be organised. A basic awareness course will be held for all site crew to outline the RWMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

9. TRACKING AND TRACING / RECORD KEEPING

Records will be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the waste arisings on Site.

A waste tracking log will be used to track each waste movement from the site. On exit from the site, the waste collection vehicle driver will stop at the site office and sign out as a visitor and provide the security personnel or RM with a waste docket (or Waste Transfer Form (WTF) for hazardous waste) for the waste load collected. At this time, the security personnel will complete and sign the Waste Tracking Register with the following information:

- ▶ Date
- ▶ Time
- ▶ Waste Contractor
- ▶ Company waste contractor appointed by, e.g. Contractor or subcontractor name
- ▶ Collection Permit No.
- ▶ Vehicle Reg.
- ▶ Driver Name
- ▶ Docket No.
- ▶ Waste Type
- ▶ LoW
- ▶ Weight/Quantity

The waste vehicle will be checked by security personal or the RM to ensure it has the waste collection permit no. displayed and a copy of the waste collection permit in the vehicle before they are allowed to remove the waste from the site.

The waste transfer dockets will be transferred to the RM on a weekly basis and can be placed in the Waste Tracking Log file. This information will be forwarded onto the LCCC Waste Regulation Unit when requested.

Each subcontractor that has engaged their own waste contractor will be required to maintain a similar waste tracking log with the waste dockets / WTF maintained on file and available for inspection on site by the main contractor as required. These subcontractor logs will be merged with the main waste log.

Waste receipts from the receiving waste facility will also be obtained by the site contractor(s) and retained. A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site at all times and will be periodically reviewed by the RM. Subcontractors who have engaged their own waste contractors, will provide the main contractor with a copy of the waste collection permits and COR / permit / licence for the receiving waste facilities and maintain a copy on file, available for inspection on site as required.

10. OUTLINE WASTE AUDIT PROCEDURE

10.1 Responsibility for Waste Audit

The appointed RM will be responsible for conducting a waste audit at the site during the C&D phase of the proposed Project. Contact details for the nominated RM will be provided to the LCCC Waste Regulation Unit after the main contractor is appointed and prior to any material being removed from site.

10.2 Review of Records and Identification of Corrective Actions

A review of all waste management costs and the records for the waste generated and transported off-site will be undertaken mid-way through the demolition and construction phase of the proposed Project.

If waste movements are not accounted for, the reasons for this will be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery / reuse / recycling targets for the site. Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Upon completion of the C&D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling / reuse / recovery figures for the development.

11. CONSULTATION WITH RELEVANT BODIES

11.1 Local Authority

Once construction contractors have been appointed and have appointed waste contractors, and prior to removal of any C&D waste materials off-site, details of the proposed destination of each waste stream will be provided to the LCCC Waste Regulation Unit.

LCCC will also be consulted, as required, throughout the demolition, excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

11.2 Recycling / Salvage Companies

The appointed waste contractor for the main waste streams managed by the demolition and construction contractors will be audited in order to ensure that relevant and up-to-date waste collection permits and facility registrations / permits / licences are held. In addition, information will be obtained regarding the feasibility of recycling each material, the costs of recycling / reclamation, the means by which the wastes will be collected and transported off-site, and the recycling / reclamation process each material will undergo off-site.

12. SUMMARY AND CONCLUSION

Adherence to this plan will also ensure that waste management during the construction phase at the proposed development is carried out in accordance with the requirements in the EPA's Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects and the LCCC Waste Bye-Laws and the NWMPCE.

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APPENDIX 14.2

Operational Waste Management Plan AWN Consulting

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Trinity
Consultants

 **awnconsulting**

Operational Waste Management Plan

Project Title: Parkway Valley LRD at Dublin Road, Limerick

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Kirkland
Investments

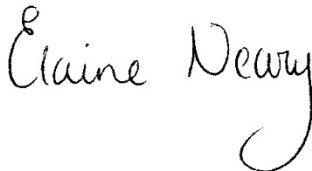
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Disclaimer

This report considers the specific instructions and requirements of our client. It is not intended for third-party use or reliance, and no responsibility is accepted for any third party. The provisions in this report apply solely to this project and should not be assumed applicable to other developments without review and modification.



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1. INTRODUCTION

AWN Consulting, a Trinity Consultants Company, has prepared this Operational Waste Management Plan (OWMP) for the proposed Parkway Valley LRD which is located on the Dublin Road in Limerick. The Proposed Development comprises 5 no. blocks with a total of 403 no. residential units, ranging from 5 to 8 storeys in height; a medical centre located at the western edge of the site; a creche located at ground level within Block B; and all associated site works and development.

This OWMP has been prepared to ensure that the management of waste during the operational phase of the Proposed Development is undertaken in accordance with the current legal and industry standards including, the *Waste Management Act 1996 as amended* and associated Regulations¹, *Environmental Protection Agency Act 1992 as amended*², *Litter Pollution Act 1997 as amended*³, the *National Waste Management Plan for a Circular Economy 2024 - 2030 (NWMPCE) (2024)*⁴ and Limerick City and County Council (LCCC) "*City and County of Limerick (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws (2019)*"⁵. In particular, this OWMP aims to provide a robust strategy for the storage, handling, collection and transport of the wastes generated at the Site.

In addition, the following guidelines were consulted for healthcare specific waste management practice to ensure the medical centre waste facilities are appropriately provided for:

- ▶ Health Service Executive (HSE), *Waste Policy* (2016)⁶,
- ▶ HSE, *Waste Management Awareness Handbook* (2011)⁷;
- ▶ HSE, and Department of Health and Children (DOHC), *Healthcare Risk Waste Management: Segregation, Packaging and Storage Guidelines for Healthcare Risk Waste, 4th Edition* (2010)⁸; and
- ▶ Environmental Protection Agency (EPA) Green Healthcare, best practice guides for the reduction and segregation of hospital waste⁹.

This OWMP aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. The OWMP also seeks to provide guidance on the appropriate collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources). The plan estimates the type and quantity of waste to be generated from the Proposed Development during the operational phase and provides a strategy for managing the different waste streams.

At present, there are no specific national guidelines in Ireland for the preparation of OWMPs. Therefore, in preparing this document, consideration has been given to the requirements of national and regional waste policy, legislation and other guidelines.

2. OVERVIEW OF WASTE MANAGEMENT IN IRELAND

2.1 National level

The Irish Government issued a policy statement in September 1998 entitled '*Changing Our Ways*'¹⁰, which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. A heavy emphasis was placed on reducing reliance on landfill and finding alternative methods for managing waste. Amongst other things, Changing Our Ways stated a target of at least 35% recycling of municipal (i.e. household, commercial and non-process industrial) waste.

A further policy document, '*Preventing and Recycling Waste – Delivering Change*' was published in 2002¹¹. This document proposed a number of programmes to increase recycling of waste and allow diversion from landfill. The need for waste minimisation at source was considered a priority.

This view was also supported by a review of sustainable development policy in Ireland and achievements to date, which was conducted in 2002, entitled '*Making Irelands Development Sustainable – Review, Assessment and Future Action*'¹². This document also stressed the need to decouple economic growth and waste generation, again through waste minimisation and reuse of discarded material.

In order to establish the progress of the Government policy document Changing Our Ways, a review document was published in April 2004 entitled '*Taking Stock and Moving Forward*'¹³. Covering the period 1998 – 2003, the aim of this document was to assess progress to date with regard to waste management in Ireland, to consider developments since the policy framework and the local authority waste management plans were put in place, and to identify measures that could be undertaken to further support progress towards the objectives outlined in *Changing Our Ways*.

In particular, *Taking Stock and Moving Forward* noted a significant increase in the amount of waste being brought to local authority landfills. The report noted that one of the significant challenges in the coming years was the extension of the dry recyclable collection services.

In September 2020, the Irish Government published a new policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan '*A Waste Action Plan for a Circular Economy*'¹⁴ (WAPCE), was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities, replacing the previous national waste management plan '*A Resource Opportunity*' (2012).

The WAPCE sets the direction for waste planning and management in Ireland up to 2025. This reorientates policy from a focus on managing waste to a much greater focus on creating circular patterns of production and consumption. Other policy statements of a number of public bodies already acknowledge the circular economy as a national policy priority.

The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

One of the first actions to be taken was the development of the Whole of Government Circular Economy Strategy 2022-2023 '*Living More, Using Less*' (2021)¹⁵ to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021. It is anticipated that the Strategy will be updated in full every 18 months to 2 years. There has not yet been an update released regarding a new iteration.

The *Circular Economy and Miscellaneous Provisions Act 2022*¹⁶ was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible

and that will to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions, tackling the delays which can be encountered by industry, and supporting the availability of recycled secondary raw materials in the Irish market, and tackles illegal fly-tipping and littering.

The Department of Housing, Local Government and Heritage authored *Sustainable Residential Development and Compact Settlements - Guidelines for Planning Authorities* (2024)¹⁷, suggests the below thresholds at which the need for the supplemental information such as the OWMP should be considered.

- ▶ *30 or more residential units,*
- ▶ *1,000 sq. metres of mixed-use development*

Since 1998, the Environmental Protection Agency (EPA) has produced periodic 'National Waste (Database) Reports' which as of 2023 have been renamed *Circular Economy and Waste Statistics Highlight Reports*¹⁸ detailing, among other things, estimates for household and commercial (municipal) waste generation in Ireland and the level of recycling, recovery and disposal of these materials. The 2024 National Circular Economy and Waste Statistics web resource, which is the most recent study published, along with the national waste statistics web resource (2024) reported the following key statistics for 2022:

- ▶ **Generated** – Ireland produced 3,190,000 t of municipal waste in 2022. This is a slight increase since 2021. Of this, 55% came from households and 45% came from commercial and public service sources.
- ▶ **Managed** – In 2022, a total of 1.76 million Household waste collected and treated by the waste industry.
- ▶ **Unmanaged** – An estimated 36,970 tonnes of household waste was unmanaged waste i.e., not disposed of in the correct manner in 2022.
- ▶ **Recovered** – A rounded 1.3 million tonnes of Ireland's municipal waste went for incineration with energy recovery in 2022. This tonnage is 43% of municipal waste managed and a marginal increase on the 42% achieved in 2021.
- ▶ **Recycled** – Some 1.3 million tonnes of municipal waste generated in Ireland was recycled in 2022, resulting in a recycling rate of 41% . This indicates that we face significant challenges to meet the upcoming EU recycling targets for 2025 to 2035
- ▶ Of the municipal waste recycled in 2022, over 825,000 tonnes went for material recycling (approximately the same as 2021) and over 480,000 tonnes were treated by composting/anaerobic digestion (approximately the same as 2021 but up 37% on 2020). The large increase of **composted/anaerobically digested** biowaste from 2020 is mainly due to a change in our way of estimating home composting.
- ▶ **Disposed** – Ireland's landfill rate for municipal waste managed was 15% in 2022. This is a 1% decrease from 2021's rate of 16%.
- ▶ **Reuse** – 54,800 tonnes of second-hand products we estimated by the EPA to have been reused in Ireland in 2021. The average annual Reuse rate per person in Ireland is 10.6 kg per person.

2.2 Regional Level

The Proposed Development is located in the Local Authority administrative area of Limerick City and County Council (CCC).

The *Southern Region Waste Management Plan 2015 – 2021*, which previously governed waste management policy in the LCCC area, has been superseded as of March 2024 by the NWMPCE 2024 – 2030, the national waste management plan for Ireland.

The NWMPCE does not dissolve the three regional waste areas. The NWCPCE sets the ambition of the plan to have a 0% total waste growth per person over the life of the Plan with an emphasis on non-household wastes including waste from commercial activities and the construction and demolition sector. This Plan seeks to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation.

This Plan seeks to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation.

The national plan sets out the following strategic targets for waste management in the country that are relevant to the development:

National Targets

- 1A. *(Residual Municipal Waste) 6% Reduction in Residual Municipal Waste per person by 2030*
- 2A. *(Contamination of Materials) 90% of Material in Compliance in the Dry Recycling Bin*
- 2B. *(Material Compliance Residual) 10% per annum increase in Material Compliance in the residual bin. (90% by the end of 2030)*
- 3A. *(Reuse of Materials) 20kg Per person / year – Reuse of materials like cloths or furniture to prevent waste.*

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Munster Region, charges are approximately €140-160 per tonne of waste, which includes a €85 per tonne landfill levy introduced under the Waste Management (Landfill Levy) (Amendment) Regulations 2015. The nearest landfill to the Proposed Development, Mungret Civic Amenity Centre, charges €280 per tonne, which includes the €85 euro levy. *The Circular Economy (Waste Recovery Levy) Regulations 2024*¹⁹ will also incur a levy of €10 per tonne for waste accepted for recovery. This will include backfilling at authorised recovery sites and at municipal waste landfills.

The *Limerick City and County Development Plan 2022-2028*²⁰ sets out a number of objectives for the Limerick City and County area, in line with the objectives of the regional waste management plan and the Circular Economy Policy. Waste objectives with a particular relevance to the Proposed Development are:

Objective IN O17 Waste Management and the Circular Economy

It is an objective of the Council to:

- ▶ *Support innovative, smart solutions and processes, based on the principles of the circular economy to implement the Regional Waste Management Plan for the Southern Region 2015 – 2021 and any subsequent plan, including any targets contained therein.*
- ▶ *Collaborate with the Regional Waste Management Office and other agencies to implement the EU Action Plan for the Circular Economy – Closing the Loop, 2015, its successor the Circular Economy Action Plan: A New Circular Economy Action Plan for a Cleaner More Competitive Europe, 2020 and the Resource Opportunity Waste Management Policy, DECLG, 2012 and any subsequent plans.*
- ▶ *Promote sustainable patterns of consumption and production in the areas of product design, production processes and waste management.*
- ▶ *Implement the provisions of the Waste Action Plan for a Circular Economy – Ireland's National Waste Policy 2020 - 2025, DECC, 2020 in the assessment of planning applications.*

- ▶ *Protect existing civic amenity sites and bring sites throughout Limerick and support the development of additional sites in accordance with the Southern Regional Waste Management Plan 2015 – 2021 and any subsequent plans.*

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the Proposed Development are:

- ▶ *Waste Management Act 1996 as amended;*
- ▶ *Environmental Protection Agency Act 1992 as amended;*
- ▶ *Litter Pollution Act 1997 as amended;*
- ▶ *Planning and Development Act 2000 as amended*²¹;
- ▶ *Circular Economy and Miscellaneous Provisions Act 2022.*

These Acts and subordinate Regulations transpose the relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the Waste Management Act 1996 as amended and subsequent Irish legislation, is the principle of “Duty of Care”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final disposal area, waste contractors will be employed to physically transport waste to the final waste disposal site.

It is, therefore, imperative that the residents, commercial tenants, and the proposed building management company undertake on-site management of waste in accordance with all legal requirements and that the facilities management company employ suitably permitted / licenced contractors to undertake off-site management of their waste in accordance with all legal requirements. This includes the requirement that a waste contractor handle, transport and reuse / recover / recycle / dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the Waste Management (Facility Permit & Registration) Regulations 2007, as amended, or a Waste Licence granted by the EPA. The COR / permit / licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and / or disposed of at the specified site.

2.3.1 Limerick City and County Council Waste Management Bye-Laws

The LCCC “*City and County of Limerick (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws (2019)*” came into use in March 2019. The Bye-Laws set a number of enforceable requirements on waste holders with regard to storage, separation and presentation of waste within the LCCC functional area. Key requirements under these Bye-Laws of relevance to the Proposed Development include the following:

- ▶ Kerbside waste presented for collection shall not be presented for collection earlier than 6.00 pm on the day immediately preceding the designated waste collection day; while the Metropolitan District of Limerick area shall not be presented for collection earlier than 8.00 pm on the day immediately preceding the designated waste collection day.

- ▶ All containers used for the presentation of kerbside waste and any uncollected waste shall be removed from any roadway, footway, footpath or any other public place no later than 9.00pm the day of collection; while the Metropolitan District of Limerick area shall remove their bins no later than 9.30am on the designated waste collection day.
- ▶ Documentation, including receipts, is obtained and retained for a period of no less than one year to provide proof that any waste removed from the premises has been managed in a manner that conforms to these bye-laws, to the Waste Management Act and, where such legislation is applicable to that person, to the European Union (Household Food Waste and Bio-Waste) Regulations 2015; and
- ▶ Adequate access and egress onto and from the premises by waste collection vehicles is maintained.

The full text of the Waste Bye-Laws is available from the LCCC website.

2.4 Regional Waste Management Service Providers and Facilities

Various contractors offer waste collection services for the residential sector in the LCCC region. Details of waste collection permits (granted, pending and withdrawn) for the region are available from the NWCPD.

There are a number of licensed and permitted facilities in operation in the region including waste transfer stations, hazardous waste facilities and integrated waste management facilities. There is a proposed thermal treatment facility in Ringaskiddy, Co. Cork which was approved by An Bord Pleanála in 2018. However, a legal challenge in the high court has overturned this decision and the project is now in limbo.

The Limerick City and County Council-operated Mungret Civic Amenity Centre is located c. 6.5 km southwest of the Proposed Development site, which can be used by residents for other household waste streams. The nearest Bring Bank is located c. 0.6km to the west of the Proposed Development at Parkway Shopping Centre; a free electrical recycling drop-off point is located at Curry's Limerick, c. 0.3 km west of the Proposed Development site.

A copy of all CORs and waste permits issued by the Local Authorities are available from the NWCPD website and all Waste Licenses issued are available from the EPA.

3. DESCRIPTION OF THE DEVELOPMENT

3.1 Location, Size and Scale of the Development

The Proposed Development Site is located at the former Horizon Mall site in Singland on the Dublin Road, Limerick, Co. Limerick.

The development will consist of:

- ▶ 403 no. residential units in 5 no. apartment blocks ranging from 5 to 8 storeys, comprising: Block A containing 78 no. units; Block B containing 92 no. units and a c. 288sq.m creche at lower-ground floor level; Block C containing 88 no. units; and Block D containing 83 no. units. Block E will be 5 no. storeys in height containing 62 no. units. The proposed residential unit mix comprises 246 no. 1-bed apartments, 29 no. 2-bed (3-person) apartments, and 128 no. 2-bed (4-person) apartments. All units will be provided with private amenity space in the form of balconies or terraces;
- ▶ A 4-storey, c. 3082sq.m medical centre located at the west of the site;
- ▶ A c. 306 sq. m creche on the lower ground floor level of Block B.
- ▶ Car, motorcycle and bicycle parking spaces, open space, all associated landscaping, public lighting, pedestrian / cycle linkages with adjoining developments; connections to the surrounding existing and permitted road network; all associated plant and substations/switch rooms; refuse storage areas; drainage arrangements; utility connections; and all site development.

3.2 Typical Waste Categories

The typical non-hazardous and hazardous wastes that will be generated at the Proposed Development will include the following:

- ▶ Dry Mixed Recyclables (DMR) - includes waste paper (including newspapers, magazines, brochures, catalogues, leaflets), cardboard and plastic packaging, metal cans, plastic bottles, aluminium cans, tins and Tetra Pak cartons;
- ▶ Organic waste – food waste and green waste generated from internal plants / flowers;
- ▶ Glass; and
- ▶ Mixed Non-Recyclable (MNR)/General Waste.

In addition to the typical waste materials that will be generated at the development on a daily basis, there will be some additional waste types generated less frequently / in smaller quantities which will need to be managed separately including:

- ▶
- ▶ Drink Cans and Bottles (Deposit Return Scheme)
- ▶ Green / garden waste may be generated from external landscaping;
- ▶ Batteries (both hazardous and non-hazardous);
- ▶ Waste electrical and electronic equipment (WEEE) (both hazardous and non-hazardous);
- ▶ Printer cartridges / toners;
- ▶ Chemicals (paints, adhesives, resins, detergents, etc.);
- ▶ Light bulbs;
- ▶ Textiles;
- ▶ Waste cooking oil (if any generated by the residents and/or commercial tenants);
- ▶ Furniture (and, from time to time, other bulky wastes); and

- Abandoned bicycles.

Wastes will be segregated into the above waste types to ensure compliance with waste legislation and guidance while maximising the re-use, recycling and recovery of waste with diversion from landfill wherever possible.

3.3 Healthcare Waste

The Proposed Development will give rise to a wide variety of waste streams during operations, including waste associated with the proposed medical centre. Healthcare waste is defined in the HSE and DOHC Healthcare Risk Waste Management publication as “solid or liquid waste arising from healthcare”. Waste materials generated will fall into two main categories, namely healthcare non-risk waste (i.e. non-clinical healthcare waste) and HCRW (hazardous) as illustrated in Figure 3.1. Hazardous waste has been further subdivided in this plan into non-clinical hazardous waste and clinical/risk waste.

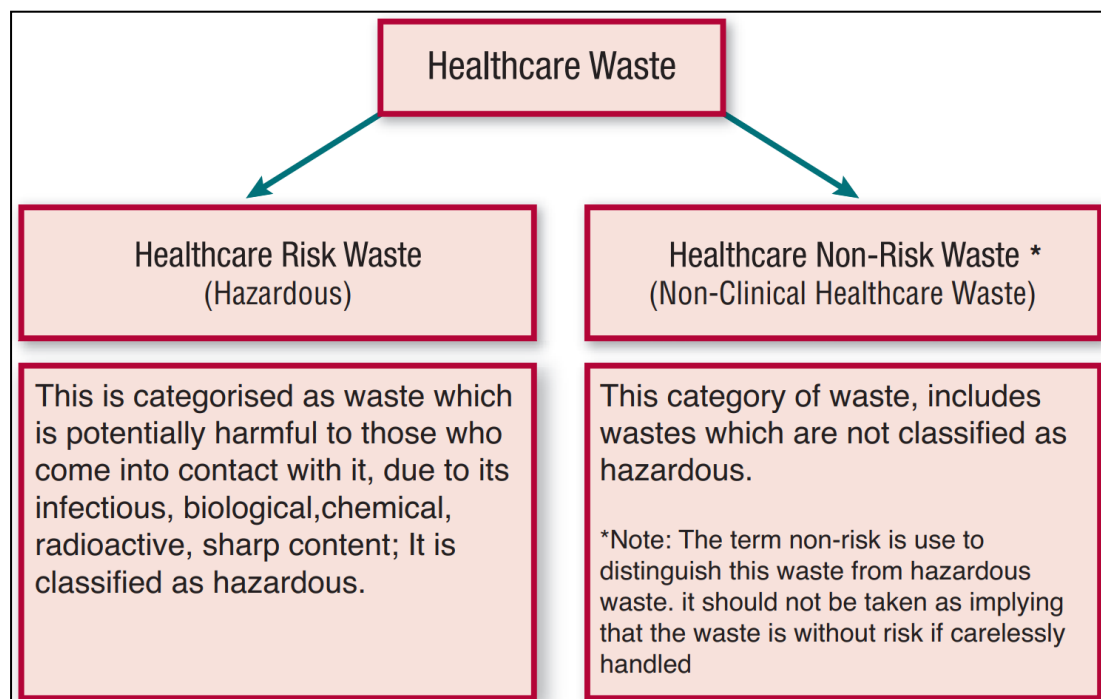


Figure 3.1 Healthcare Waste Categories (Source: HSE, Waste Management Awareness Handbook (2010))

3.3.1 Healthcare Non-Risk Waste

The typical non-risk/non clinical non-hazardous waste streams that will be generated at the proposed medical centre will include the following:

- Dry Mixed Recyclables (DMR) – includes cardboard, non-confidential paper, newspaper, leaflets plastic packaging and bottles, aluminium cans, tins and Tetra Pak cartons;
- Confidential paper;
- Mixed Non-Recyclable /General Waste (MNR);
- Organic (food/catering) waste; and
- Glass.

In addition to the typical non-risk/non-clinical non-hazardous waste materials that will be generated at the medical centre on a daily basis, there will be some additional waste types generated less frequently / in smaller quantities which will need to be managed separately including:

- ▶ Drink Cans and Bottles (Deposit Return Scheme)
- ▶ Green / garden waste may be generated from external landscaping;
- ▶ Batteries (non-hazardous) note: hazardous batteries may also be generated which are referred to in Section 3.2.3;
- ▶ Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (non-hazardous) note: WEEE containing hazardous components may also be generated which are referred to in Section 3.2.3;
- ▶ Metals, timber and mixed C&D waste generated from operational maintenance activities;
- ▶ Polystyrene;
- ▶ Textiles;
- ▶ Waste cooking oil (if any generated by the commercial tenant); and
- ▶ Furniture (and, from time to time, other bulky wastes).

Wastes will be segregated into the above waste types to ensure compliance with waste legislation and guidance while maximising the re-use, recycling and recovery of waste with diversion from landfill wherever possible.

3.3.2 Reducing and Segregating Healthcare Non-Risk Waste

The following steps have been outlined to contribute towards the minimisation and segregation within this waste stream:

- ▶ *Review the facility's current recycling policy and system,*
- ▶ *Make it clear what can be placed in the recycling bags,*
- ▶ *Ensure recycling bags are placed in the right location,*
- ▶ *Make the recycling bins easy to use,*
- ▶ *Use different colour bins for each type of waste, and*
- ▶ *Prevent contamination with liquid and food*

For full details on how to minimise and segregation healthcare non-risk waste, please see Best Practice Guide Maximise Recycling and Reduce Landfill Waste.

3.3.3 Non-Clinical Hazardous Waste

The typical non-clinical hazardous waste streams that are anticipated to be generated at the medical centre will include the following:

- ▶ Printer/toner cartridges;
- ▶ Batteries (hazardous) note: non-hazardous batteries may also be generated which are referred to in Section 3.2.2;
- ▶ Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (containing hazardous components) note: WEEE not containing hazardous components may also be generated which are referred to in Section 3.2.2;
- ▶ Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.); and
- ▶ Light bulbs.

3.3.4 Healthcare Risk Waste (Hazardous)

Healthcare Risk Waste (HCRW) will be generated from any clinical treatment and consultation rooms. Figure 3.2 over shows the classification and colour coding of HCRW as presented in the HSE guidance document.

The HCRW generated at the medical centre will comprise waste disposed of in yellow bags (such as dressings, swabs, bandages, gloves etc.) and yellow sharps buckets (for waste such as surgical kits, needles, syringes, razors, stitch cutters etc.).

3.3.4.1 Reducing Healthcare Risk Waste

To reduce the amount of risk waste generated the following steps can be taken:

- ▶ Review the HCRW classification policy.
- ▶ Ensure staff know what is and is not HCRW.
- ▶ Increase the segregation of recyclables and minimise the non-risk waste content in the healthcare risk waste.

For full detail on methods to minimise HCRW please see Best Practice Guide Healthcare Risk Waste Reduction²² and Best Practice Guide Healthcare Risk Waste Reduction in the Theatre²³.

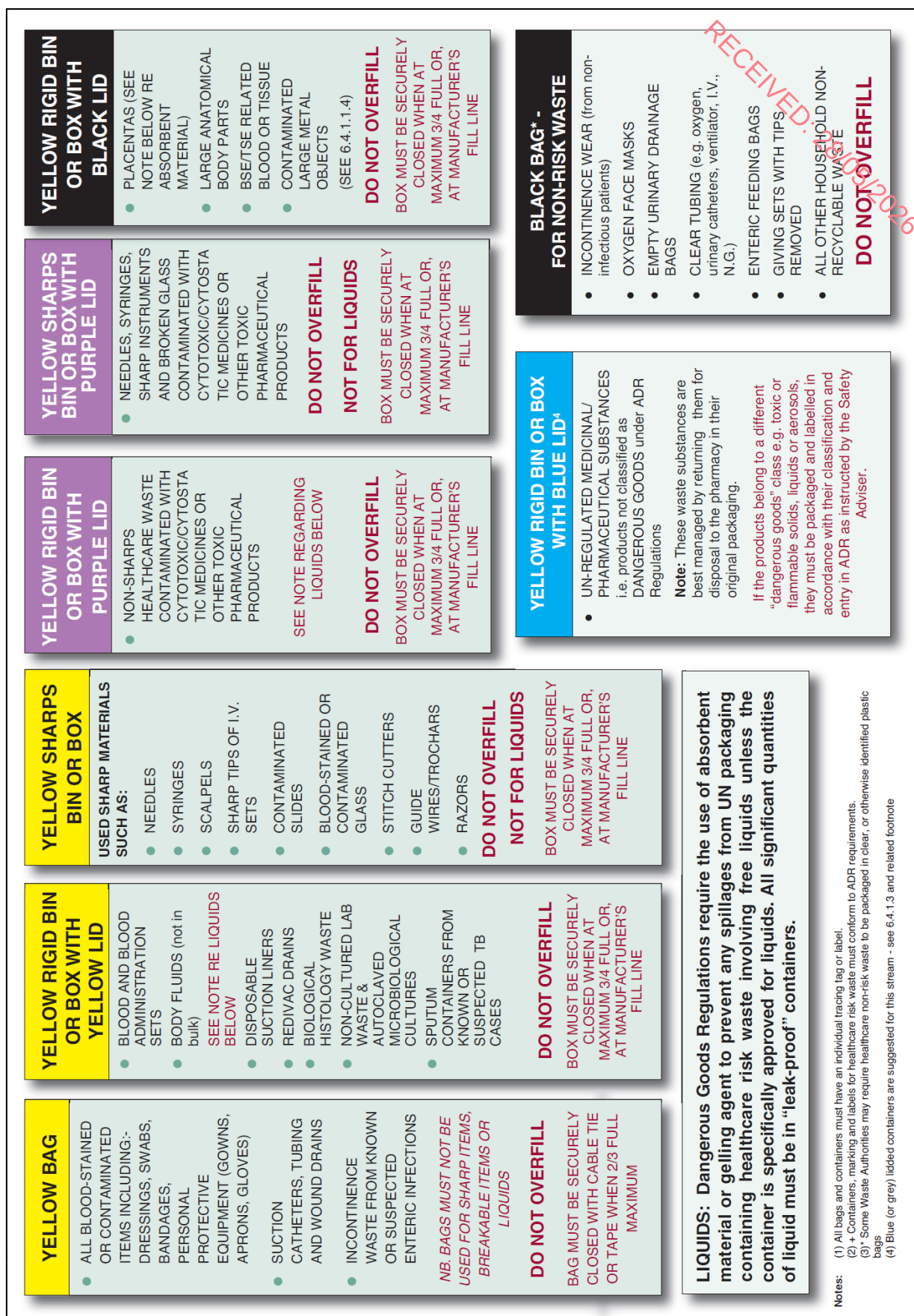


Figure 3.2 Segregation of HCRW (Source: HSE and DOHC, Healthcare Risk Waste Management (2010)⁸ and HSE, Waste Management Awareness Handbook (2011)⁷)

3.4 List of Waste Codes

In 1994, the *European Waste Catalogue*²⁶ and *Hazardous Waste List*²⁷ were published by the European Commission. In 2002, the EPA published a document titled the *European Waste Catalogue and Hazardous Waste List*²⁸, which was a condensed version of the original two documents and their subsequent amendments. This document has recently been replaced by the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2018)²⁹. This waste classification system applies across the EU and is the basis for all national and international waste reporting, such as those associated with waste collection permits, COR's, permits and licences and EPA National Waste Database.

Under the classification system, different types of wastes are fully defined by a code. The List of Waste (LoW) code for typical waste materials expected to be generated during the operation of the Proposed Development are provided in Table 3.1 below.

Table 3.1 Typical Waste Types Generated and LoW Codes

Waste Material	LoW Code
Paper and Cardboard	20 01 01
Plastics	20 01 39
Metals	20 01 40
Mixed Non-Recyclable Waste	20 03 01
Glass	20 01 02
Biodegradable Kitchen Waste	20 01 08
Oils and Fats	20 01 25
Textiles	20 01 11
Batteries and Accumulators*	20 01 33* - 34
Printer Toner/Cartridges*	20 01 27* - 28
Green Waste	20 02 01
WEEE*	20 01 35*-36
Chemicals (solvents, pesticides, paints & adhesives, detergents, etc.) *	20 01 13*/19*/27*/28/29*30
Fluorescent tubes and other mercury containing waste*	20 01 21*
Bulky Wastes	20 03 07
Healthcare wastes (wastes from natal care, diagnosis, treatment or prevention of disease in humans, includes non-hazardous and hazardous wastes) *	18 01*

* Individual waste type may contain hazardous materials

4. ESTIMATED WASTE ARISING

A waste generation model (WGM) developed by AWN has been used to predict waste types, weights and volumes expected to arise from operations within the Proposed Development. The WGM incorporates building area and use and combines these with other data, including Irish and US EPA waste generation rates.

The estimated quantum / volume of waste that will be generated from the residential units has been determined based on the predicted occupancy of the units, this figure includes waste generated in communal areas. The floor area (m²) and usage has been used to estimate the waste arising from the crèche and medical centre.

The estimated waste generation for the Proposed Development for the main waste types is presented in Tables 4.1 – 4.2.

Table 4.1 Estimated Waste Generation for Residential Blocks A-C

Waste Type	Waste Volume (m ³ / week)		
	Block A	Block B	Block C
Organic Waste	1.07	1.27	1.21
Dry Mixed Recyclables	7.60	8.98	8.57
Glass	0.21	0.25	0.23
Mixed Non-Recyclables	3.99	4.72	4.51
Total	12.87	15.21	14.53

Table 4.2 Estimated Waste Generation for Residential Blocks D, E, Creche and Medical

Waste Type	Waste Volume (m ³ / week)			
	Block D	Block E	Creche	Medical Centre
Organic Waste	1.14	0.86	0.03	0.07
Dry Mixed Recyclables	8.08	6.08	1.06	1.60
Glass	0.22	0.17	0.00	0.01
Mixed Non-Recyclables	4.25	3.20	0.58	0.69
Medical Waste	-	-	-	0.50
Confidential Paper	-	-	-	0.16
Total	13.70	10.30	1.67	3.40

*BS5906:2005 Waste Management in Buildings – Code of Practice*³⁰ has been considered in the calculations of waste estimates. AWN's modelling methodology is based on recently published data and data from numerous other similar developments in Ireland and is based on AWN's experience, it provides a more representative estimate of the likely waste arisings from the Proposed Development.

5. WASTE STORAGE AND COLLECTION

This section provides information on how waste generated within the Site will be stored and collected. This has been prepared with due consideration of the proposed Site layout as well as best practice standards, local and national waste management requirements, including those of LCCC. In particular, consideration has been given to the following documents:

- ▶ BS 5906:2005 Waste Management in Buildings – Code of Practice,
- ▶ The NWMPCE (2024);
- ▶ LCCC Limerick Development Plan 2022-2028;
- ▶ LCCC City and County of Limerick (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws (2019);
- ▶ HSE, Waste Management Awareness Handbook;
- ▶ HSE and DOHC, Healthcare Risk Waste Management: Segregation, Packaging and Storage Guidelines for Healthcare Risk Waste; and
- ▶ DoHLGH, Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities (2025)³¹.

Waste Storage Areas

Locations of all Waste Storage Areas (WSAs) can be viewed on the drawings submitted with the planning documentation and as Appendix A of this report.

Residential Blocks A, B, C, D, E

One (1 no.) shared communal WSA has been allocated within the development design for each of Residential Blocks A, B, C, D and E. These have been strategically located at lower-ground or ground floor level of each block and will be accessible externally.

Creche

One (1 no.) shared communal WSA has been allocated within the development design for the creche. This has been strategically located externally at ground floor level, in close proximity to the building.

Medical Centre

One (1 no.) waste storage area has been allocated within the development design for the medical centre. This is located internally on the ground floor level, accessible internally and externally.

The waste receptacles from the WSAs will be collected directly from the WSAs, where practical or will be brought by facilities management personnel or the nominated waste contractor (depending on arrangement), immediately prior to collection and brought to temporary staging areas awaiting collection. The staging areas will be such that they will not obstruct traffic or pedestrians (allowing a footway path of at least 1.8m, the space needed for two wheelchairs to pass each other) as is recommended in the *Design Manual for Urban Roads and Streets* (2019)³².

Using the estimated waste generation volumes in Tables 4.1 and 4.2 above, the waste receptacle requirements for MNR, DMR, organic waste and glass have been established for the WSAs. It is envisaged that MNR, DMR, organic waste, glass and medical waste will be collected on a weekly basis.

Waste Storage Requirements

Estimated waste storage requirements for the operational phase of the Proposed Development are detailed in Table 5.1, below.

Table 5.1 Waste storage requirements for the Proposed Development

Area/Use	Bins Required				
	MNR1	DMR2	Glass	Organic	Medical
Block A	4 no. 1100 L	7 no. 1100 L	1 no. 240 L	5 no. 240 L	N/A
Block B	5 no. 1100 L	9 no. 1100 L	1 no. 240 L	6 no. 240 L	N/A
Block C	5 no. 1100 L	8 no. 1100 L	1 no. 240 L	6 no. 240 L	N/A
Block D	4 no. 1100 L	8 no. 1100 L	1 no. 240 L	5 no. 240 L	N/A
Block E	3 no. 1100 L	6 no. 1100 L	1 no. 240 L	4 no. 240 L	N/A
Creche	1 no. 1100 L	1 no. 1100 L	1 no. 120 L	1 no. 120 L	N/A
Medical Centre	1 no. 1100 L	2 no. 1100 L	1 no. 120 L	1 no. 120 L	1 no. 660l 1 no. roll cage for sharps bins

Note: 1 = Mixed Non-Recyclables

2 = Dry Mixed Recyclables

The waste receptacle requirements have been established from distribution of the total weekly waste generation estimate into the holding capacity of each receptacle type.

Waste storage receptacles as per Table 5.1 above (or similar appropriate approved containers) will be provided by the facilities management company in the WSAs.

The types of bins used will vary in size, design and colour dependent on the appointed waste contractor. However, examples of typical receptacles to be provided in the WSAs are shown in Figure 5.1. All waste receptacles used will comply with the SIST EN 840-1:2020 and SIST EN 840-2:2020 as the standards for performance requirements of mobile waste containers, where appropriate.

Figure 5-1. Typical waste receptacles of varying size (240L and 1100L)

Receptacles for organic, mixed dry recyclable, glass and mixed non-recyclable waste will be provided in the WSAs prior to first occupation of the development i.e. prior to the first residential or commercial units being occupied.

This Plan will be provided to all residents and tenants from first occupation of the development i.e. once the first unit is occupied. This Plan will be supplemented, as required, by the property management company with any new information on waste segregation, storage, reuse and recycling initiatives that are subsequently introduced.

5.1 Operational Phase Waste Storage – Residential Units

Residents will be required to segregate waste into the following main waste streams:

- ▶ DMR;
- ▶ MNR;
- ▶ Glass; and
- ▶ Organic waste.

Provision will be made in all residential units to accommodate 3 no. bin types to facilitate waste segregation at source. An example of a potential 3 bin storage system is provided in Figure 5.3 below.

Figure 5.3 Example three bin storage system to be provided within the unit design



Residents will be required to take their segregated waste materials to their designated WSA and deposit their segregated waste into the appropriate bins. The location of the WSAs are illustrated in the drawings submitted with the planning documents under separate cover and in Appendix A. of this report.

Other waste materials such as textiles, batteries, printer toner/cartridges, cooking oil and WEEE may be generated infrequently by the residents. Residents will be required to identify suitable temporary storage areas for these waste items within their own units and dispose of them appropriately. Further details on additional waste types can be found in Section 5.5.

5.2 Waste Storage – Creche

The creche tenant will be required to segregate waste within their own units into the following main waste types:

- ▶ DMR;
- ▶ MNR;
- ▶ Glass; and
- ▶ Organic waste

The creche tenants will be required to take their segregated waste materials to their designated WSA and deposit their segregated waste into the appropriate bins. The location of the WSA is illustrated in the drawings submitted with the planning documentation under separate cover and Appendix A of this report.

Suppliers for the creche will be requested by the operator to make deliveries in reusable containers, minimize packaging or remove any packaging after delivery, where possible, to reduce waste generated by the Proposed Development.

If there is a kitchen in the creche for preparation of meals for the children, this will contribute a significant portion of the volume of waste generated on a daily basis, and as such it is important that adequate provision is made for the storage and transfer of waste from these areas to the WSA.

All bins / containers WSA will be clearly labelled and colour coded to avoid cross contamination of the different waste streams. Signage will be posted above or on the bins to show exactly which wastes can be put in each.

Other waste materials such as textiles, batteries, lightbulbs, WEEE, cooking oil and printer toner / cartridges will be generated less frequently. The tenant will be required to store these waste types within their own unit and arrange collection with an appropriately licensed waste contractor. Facilities management may arrange collection, depending on the agreement. Further details on additional waste types can be found in Section 5.5.

5.3 Waste Storage – Medical Centre

The operator will be required to segregate their waste within the development into the following main waste types:

- ▶ DMR;
- ▶ MNR;
- ▶ Glass;
- ▶ Organic Waste
- ▶ Confidential Paper; and
- ▶ Medical/Clinical Waste

The nominated personnel will bring the segregated waste materials to the appropriate WSA located on ground floor level. It is accessible from within the medical centre as well as externally. The location of the WSA is illustrated in the drawings submitted with the planning documentation under separate cover and Appendix A of this report.

Suppliers for the medical centre will be requested by the operator to make deliveries in reusable containers, minimize packaging or to remove any packaging after delivery where possible, to reduce waste generated by the development.

Signage will be erected above internal bins and in the main WSA to identify what waste types will be placed into each bin as appropriate. Bins/containers will be labelled and colour coded to avoid cross contamination of the different waste streams.

Appropriate colour coded, labelled and secured receptacles will be required for healthcare risk waste generated in the building as set out in the HSE, *Waste Management Awareness Handbook* (and illustrated in Figure 3.2). The required healthcare risk waste receptacles will be:

- ▶ Yellow bags (stored in rigid bins e.g. 660L bin)
- ▶ Yellow rigid buckets with yellow lid

It is expected that the medical treatment rooms will have 60/80 litre pedal bins for yellow risk waste bags and a sharps bucket, where needed. The 60/80 litre risk waste bags will be transferred to a 660 L yellow

clinical waste bin in medical centre WSA as required. The sharps buckets will be transferred to a roll cage in the medical centre WSA as required.

Other waste materials such as textiles, batteries, printer toner / cartridges, light bulbs, green waste, chemicals, bulky items and WEEE will be generated less frequently. These will be stored within the medical centre WSA until a licensed waste collector is arranged to collect it. Facilities management may arrange collection, depending on the agreement. Further details on additional waste types can be found in Section 5.5.

5.4 Waste Collection

There are numerous private contractors that provide waste collection services in the Limerick City area. All waste contractors servicing the Proposed Development must hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to registered / permitted / licensed facilities only.

Bins from the development will be collected directly from the WSAs or will be brought to staging areas by facilities management personnel or the nominated waste contractor (depending on arrangement), immediately prior to collection.

A trolley / tug or suitable vehicle may be required to convey the bins to and from the staging areas. The facilities management personnel or the nominated waste contractor (depending on arrangement) will ensure that empty bins are promptly returned to the WSAs after collection / emptying.

Suitable access and egress has been provided to enable the bins to be moved easily from the temporary staging areas to the waste collection vehicles on the appropriate days. Waste will be collected at agreed days and times by the nominated waste contractor.

All waste receptacles will be clearly identified as required by waste legislation and the requirements of the LCCC *Waste Bye-Laws*. Waste will be presented for collection in a manner that will not endanger health, create a risk to traffic, harm the environment or create a nuisance through odours or litter.

It is recommended that bin collection times are staggered to reduce the number of bins required to be emptied at once and the time the waste vehicle is on-Site. This will be determined during the process of appointment of a waste contractor.

5.5 Additional Waste Materials

In addition to the typical waste materials that are generated on a daily basis, there will be some additional waste types generated from time to time that will need to be managed separately. A non-exhaustive list is presented below.

Deposit Return Scheme

Most drinks containers can be recycled via the deposit return scheme, such as bottles, cans and tins made from plastic, aluminium or steel can be returned once they are between 150ml and 3 litres in size and have the Re-turn logo on them.

At the shops you can either return the containers:

- ▶ Using a Reverse Vending Machine (RVM)
- ▶ Manually in the shop

If a shop does not have a RVM but they sell containers with the Re-turn logo, the shop may allow you to manually return containers in store, unless they have a take back exemption.

Locations of RVM machines can be found via the Re-turn website (www.re-turn.ie)

Green Waste

Green waste may be generated from gardens, external landscaping and internal plants / flowers. Green waste generated from landscaping of external areas will be removed by external landscape contractors. Green waste generated from gardens internal plants / flowers can be placed in the organic waste bins.

Batteries

A take-back service for waste batteries and accumulators (e.g. rechargeable batteries) is in place in order to comply with the S.I. No. 283/2014 - European Union (Batteries and Accumulators) Regulations 2014, as amended. In accordance with these regulations, consumers are able to bring their waste batteries to their local civic amenity centre or can return them free of charge to retailers which supply the equivalent type of battery, regardless of whether or not the batteries were purchased at the retail outlet and regardless of whether or not the person depositing the waste battery purchases any product or products from the retail outlet.

The commercial tenants cannot use the civic amenity centre. They must segregate their waste batteries and either avail of the take-back service provided by retailers or arrange for recycling / recovery of their waste batteries by a suitably permitted / licenced contractor. Facilities management may arrange collection, depending on the agreement.

Waste Electrical and Electronic Equipment (WEEE)

The WEEE Directive (Directive 2002/96/EC) and associated Waste Management (WEEE) Regulations have been enacted to ensure a high level of recycling of electronic and electrical equipment. In accordance with the regulations, consumers can bring their waste electrical and electronic equipment to their local recycling centre. In addition, consumers can bring back WEEE within 15 days to retailers when they purchase new equipment on a like for like basis. Retailers are also obliged to collect WEEE within 15 days of delivery of a new item, provided the item is disconnected from all mains, does not pose a health and safety risk and is readily available for collection.

As noted above, the commercial tenants cannot use the civic amenity centre. They must segregate their WEEE and either avail of the take-back / collection service provided by retailers or arrange for recycling / recovery of their WEEE by a suitably permitted / licenced contractor. Facilities management may arrange collection, depending on the agreement.

Printer Cartridge / Toners

It is recommended that a printer cartridge / toner bin is provided in the commercial unit, where appropriate. The commercial tenant will be required to store this waste within their unit and arrange for return to retailers or collection by an authorised waste contractor, as required.

Waste printer cartridge / toners generated by residents can usually be returned to the supplier free of charge or can be brought to a civic amenity centre.

Chemicals

Chemicals (such as solvents, paints, adhesives, resins, detergents, etc) are largely generated from building maintenance works. Such works are usually completed by external contractors who are responsible for the off-site removal and appropriate recovery / recycling / disposal of any waste materials generated.

Any waste cleaning products or waste packaging from cleaning products generated in the commercial units that is classed as hazardous (if they arise) will be appropriately stored within the tenants' own space. Facilities management may arrange collection, depending on the agreement.

Any waste cleaning products or waste packaging from cleaning products that are classed as hazardous (if they arise) generated by the residents will be brought to a civic amenity centre.

Light Bulbs

Waste light bulbs (fluorescent, incandescent and LED) may be generated by lighting at the commercial units. It is anticipated that commercial tenants will be responsible for the off-site removal and appropriate recovery / disposal of these wastes. Facilities management may arrange collection, depending on the agreement.

Light bulbs generated by residents will be taken to the nearest civic amenity centre for appropriate storage and recovery / disposal.

Textiles

Where possible, waste textiles will be recycled or donated to a charity organisation for reuse. Commercial and residential tenants will be responsible for disposing of waste textiles appropriately.

Waste Cooking Oil

If the commercial tenants use cooking oil, waste cooking oil will need to be stored within the unit on a bunded area or spill pallet and regular collections by a dedicated waste contractor will need to be organised as required. Under sink grease traps will be installed in any cooking space.

If the residents generate waste cooking oil, this can be brought to a civic amenity centre.

Furniture & Other Bulky Waste Items

Furniture and other bulky waste items (such as carpet, etc.) may occasionally be generated by the commercial tenant. The collection of bulky waste will be arranged, as required by the tenant. If residents wish to dispose of furniture, this can be brought a civic amenity centre.

Abandoned Bicycles

Bicycle parking areas are planned for the development. As happens in other developments, residents sometimes abandon faulty or unused bicycles, and it can be difficult to determine their ownership. Abandoned bicycles should be donated to charity if they arise or Facilities management will may arrange collection by a licensed waste contractor.

5.6 Waste Storage Area Design

The WSAs will be designed and fitted-out to meet the requirements of relevant design Standards, including:

- ▶ Be fitted with a non-slip floor surface;
- ▶ Provide ventilation to reduce the potential for generation of odours with a recommended 6-10 air changes per hour for a mechanical system for internal WSAs;
- ▶ Provide suitable lighting – a minimum Lux rating of 400 is recommended;
- ▶ Be easily accessible for people with limited mobility;
- ▶ Be restricted to access by nominated personnel only;
- ▶ Be supplied with hot or cold water for disinfection and washing of bins;
- ▶ Be fitted with suitable power supply for power washers;
- ▶ Have a sloped floor to a central foul drain for bins washing run-off;
- ▶ Have appropriate signage placed above and on bins indicating correct use;

- ▶ Have access for potential control of vermin, if required; and
- ▶ Be fitted with CCTV for monitoring.

The building management company, tenants and residents will be required to maintain the resident bins and storage areas in good condition as required by the LCCC Waste Bye-Laws.

5.7 Facility Management Responsibilities

It shall be the responsibility of the Facilities Management Company to ensure that all domestic waste generated by residents and commercial waste generated by tenants is managed to ensure correct storage prior to collection by an appropriately permitted waste management company.

Facilities Management will provide the following items:

- ▶ Provision of a Waste Management Plan document, prepared by the Facilities Management Company to all residential and commercial units, which shall clearly state the methods of source waste segregation, storage, reuse and recycling initiatives that shall apply to the management of the development;
- ▶ Provision and maintenance of appropriate graphical signage to inform residents and tenants of their obligation to reduce waste, segregate waste and in the correct bin;
- ▶ Preparation of an annual waste management report for all residential and commercial units;
- ▶ Designation of access routes to common waste storage areas to ensure safe access from the apartment units by mobility impaired persons;
- ▶ Provision of an appropriately qualified and experienced staff member, who will be responsible for all aspects of waste management at the development;
- ▶ Frequent inspection of waste storage areas and signing of a check list, which shall be displayed within the area; and
- ▶ Maintenance of a register, detailing the quantities and breakdown of wastes collected from the development and provision of supporting documentation by the waste collector to allow tracking of waste recycling rates.

5.8 Pest Management

A pest control operator will be appointed as required to manage pests onsite during the operational phase of this development. All waste generated within the development will be stored in closed waste receptacles both within units and within the WSAs. Any waste receptacles will be carefully managed to prevent leaks, odours and pest problems.

All WSAs will have access for potential control of vermin, if required, be supplied with hot or cold water, drainage point and will be regularly inspected by facilities management to deter pests.

6. SUMMARY AND CONCLUSION

In summary, this OWMP presents a waste strategy that addresses all legal requirements, waste policies and best practice guidelines and demonstrates that the required storage areas have been incorporated into the design of the Proposed Development.

Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus contributing to the targets set out in *the NWMPCE*.

Adherence to this plan will also ensure that waste management at the development is carried out in accordance with the requirements of the *LCCC Waste Bye-Laws*.

The waste strategy presented in this document will provide sufficient storage capacity for the estimated quantity of segregated waste. The designated areas for waste storage will provide sufficient room for the required receptacles in accordance with the details of this strategy.

7. REFERENCES

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28. EPA, European Waste Catalogue and Hazardous Waste List (2002)
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30. BS 5906:2005 Waste Management in Buildings – Code of Practice.
31. Department of Housing Local Government and Heritage (DoHLGH), Planning Design Standards for New Apartments, Guidelines for Planning Authorities (2025).
32. DoHLGH, Design Manual for Urban Roads and Streets (2019).

APPENDIX A. WASTE STORAGE AREA LOCATIONS

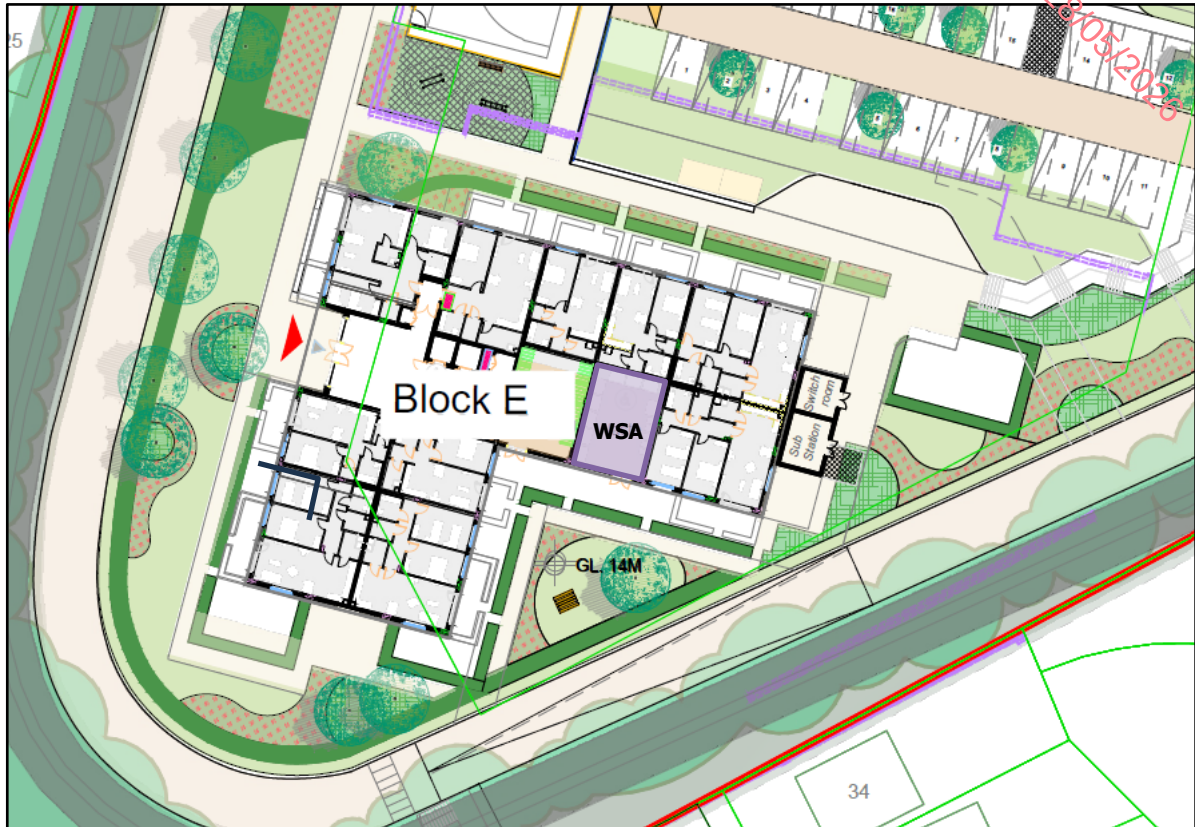
WSAs for Residential Blocks A, B, C and D at Lower Ground Floor Level

(WSA annotated as 'Waste' on architectural drawings)

(Source: Reddy Drawing Ref. PVAL-02-SW-L00-DR-RAU-AR-1004)



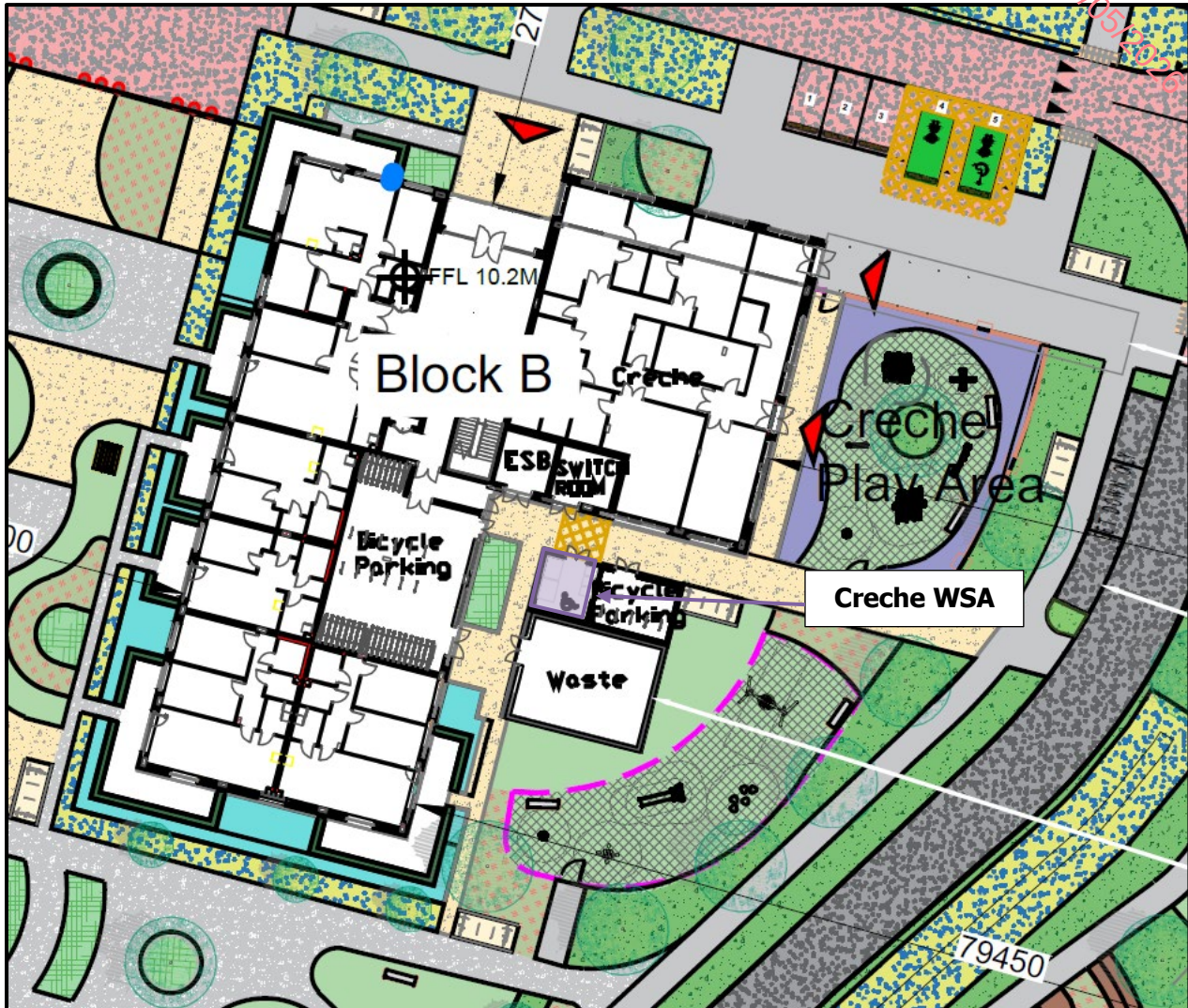
WSA for Residential Block E at Ground Floor Level
(WSA annotated as 'Waste' on architectural drawings)
(Source: Reddy Drawing Ref. PVAL-02-SW-L01-DR-RAU-AR-1005)



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WSA for Creche

(Source: Reddy Drawing Ref. PVAL-02-SW-L00-DR-RAU-AR-1004)



WSA for Medical Centre on Ground Floor
(Annotated as 'Bin Store' on architectural drawings)
(Source: Reddy Drawing Ref. PVAL-02-MED-XX-DR-RAU-AR-1600)



APPENDIX 15.1

Aviation Glint and Glare Assessment Macroworks

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macroworks

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AVIATION GLINT AND GLARE ASSESSMENT

Proposed Large-scale Residential
Development

Parkway Valley, Limerick.

Prepared by Macro Works Ltd

April 2026



LVIA | TVIA | Landscape Design | Visibility Analysis | Glint and Glare | Verified Photomontages | CGI | Shadow Flicker Analysis



1. AVIATION GLINT AND GLARE ASSESSMENT 3

1.1 Introduction 3

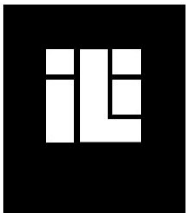
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Appendix A: SGHAT Results A

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Registered
Landscape
Architect



1. AVIATION GLINT AND GLARE ASSESSMENT

1.1 INTRODUCTION

This Glint and Glare Assessment was carried out by Macro Works Ltd to determine the potential for solar reflectance effects upon aviation receptors in respect of proposed roof-mounted solar PV installations on the roofs of a proposed Large-scale Residential Development ("LRD") at Parkway Valley, Limerick. The proposed panels are south to southwest facing and will be placed on the roofs several accommodation buildings. The proposed panels will remain in a fixed position throughout the day and year (i.e. they will not rotate to track the movement of the sun). Figure 1.1 and Figure 1.2 refer.



Figure 1.1 Aerial view indicating the location of the proposed development.



Figure 1.2 Extract from Site Layout - Roof Plan drawing showing the layout of the proposed buildings and locations of the proposed panels.

1.1.1 Project Description

The proposed LRD development comprises 5 no. blocks with a total of 403 no. residential units, ranging from 5 to 8 storeys in height; a medical centre located at the western edge of the site; a creche located at ground level within Block B; and all associated site works and development.

The current LRD development proposals also extend to the R445 to accommodate a proposed entrance from the R445. They will also include a proposed nature-based surface water drainage solution within the neighbouring Groody Valley green wedge.

Specifically, the proposed uses for the LRD development are:

Medical Centre

A c. 3,082 sq. m, 3-storey over podium level medical centre is proposed to be located at the western extent of the application site.

Creche

A c. 306 sq. m creche is proposed on the lower ground floor level of Block B.

Residential Development

The subject proposals will provide a total of 403 no. units comprising of 246 No. 1 Bed units, 29 No. 2 Bed (3 person) units and 128 No. 2 Bed (4 person) units.

1.1.2 Statement of Authority

This technical assessment was undertaken by Peter Connell, GIS and LVIA Consultant (BA, MPhil, MSc) of Macro Works Ltd., a specialist landscape and visual assessment company with over 20 years' experience in the appraisal of visual effects from a variety of energy, infrastructure and commercial developments, including landscape and visual impact assessments, and glint and glare assessments. Peter has previously prepared numerous glint and glare assessments which have been accepted by a number of planning authorities.

1.1.3 Guidance and Best Practice

The Irish Aviation Authority (IAA) has not published any specific guidance on solar PV developments. The IAA identifies the need to ensure safety in relation to potential reflectance effects emitting from solar developments and highlights the potential for an ocular assessment to be requested.¹ The European Union Aviation Safety Authority (EASA) requires an assessment of the luminance of proposed PV panels, rather than by ocular irradiance, so as not to dazzle air traffic controllers to the extent of a reduction in visual perception of airport operations.² EASA found that 20,000 cd/m² was the maximum acceptable luminance value for solar PV arrays in the vicinity of an aviation receptor. As the IAA refer to the need for an ocular assessment, this analysis will focus on potential ocular effects and will not assess luminance levels.

The sequence of guidance developed by the United States Federal Aviation Administration (FAA) to address the potential hazards that solar developments may pose to aviation activities, is considered the most comprehensive for the purposes of assessment of solar developments near aerodromes. The initial guidance was prepared in 2010 (entitled 'Technical Guidance for Evaluating Selected Solar Technologies on Airports' (archived)), was subsequently updated in 2013³ (entitled 'Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports'). The most current version of the guidance (Version 1.1) 'Technical Guidance for Evaluating Selected Solar Technologies on Airports' was released in 2018.⁴

The Solar Glare Hazard Analysis Tool (SGHAT) was developed in conjunction with the FAA in harmony with this guidance and is adopted as the standard for measuring the ocular impact of solar developments. Furthermore, it is commonly regarded as the accepted industry standard by aviation authorities internationally when considering the glint and glare effects upon aviation-related receptors.

¹ Irish Aviation Authority. (2025). IAA - National Aviation Safeguarding Framework, Consultation Document, p. 30.

² European Union Aviation Safety Agency. (2025). Certification Specifications and Guidance Material for Aerodrome Design (CS-ADR-DSN). Issue 7. Page 161. https://www.easa.europa.eu/en/document-library/certification-specifications/group/cs-adr-dsn-aerodromes-design?utm_source=chatgpt.com#cs-adr-dsn-aerodromes-design.

³ Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports, Department of Transportation, Federal Aviation Administration, date: 10/2013

⁴ Technical Guidance for Evaluating Selected Solar Technologies on Airports, Federal Aviation Administration (FAA), date: 04/2018

By virtue of their efficiency, the intensity of reflected light from modern PV solar panels is deliberately low and currently equates with that of the reflection from still water. Recent studies generally agree, however, that there still exists the potential for hazard or nuisance upon surrounding receptors. Macro Works' glint and glare analysis methods and determination of effects are based on a combination of available studies and established best practice. This methodology has been successfully implemented on numerous previous solar farm projects that met with the approval of various Planning Authorities

Federal Aviation Authority

Within the FAA's interim policy, a 'Review of Solar Energy System Projects on Federally Obligated Airports's it states:

Based on FAA guidance, best practice in Ireland is to meet the following standards:

"No potential for glint or glare in the existing or planned Airport Traffic Control Tower (ATCT) cab, and

No potential for glare or "low potential for after-image" (shown in green in Figure 1[Figure 1.3 refers]) along the final approach path for any existing landing threshold or future landing thresholds (including any planned interim phases of the landing thresholds) as shown on the current FAA-approved Airport Layout Plan (ALP). The final approach path is defined as two (2) miles from fifty (50) feet above the landing threshold using a standard three (3) degree glidepath."

An update of the policy in 2021⁶ replaced this interim policy, with the key amendment of deprioritising runway approaches as critical aviation receptors, citing the following;

"Initially, FAA believed that solar energy systems could introduce a novel glint and glare effect to pilots on final approach. FAA has subsequently concluded that in most cases, the glint and glare from solar energy systems to pilots on final approach is similar to glint and glare pilots routinely experience from water bodies, glass-façade buildings, parking lots, and similar features. However, FAA has continued to receive reports of potential glint and glare from on-airport solar energy systems on personnel working in ATCT cabs. Therefore, FAA has determined the scope of agency policy should be focused on the impact of on-airport solar energy systems to federally-obligated towered airports, specifically the airport's ATCT" (Federal Aviation Administration 05/11/2021).

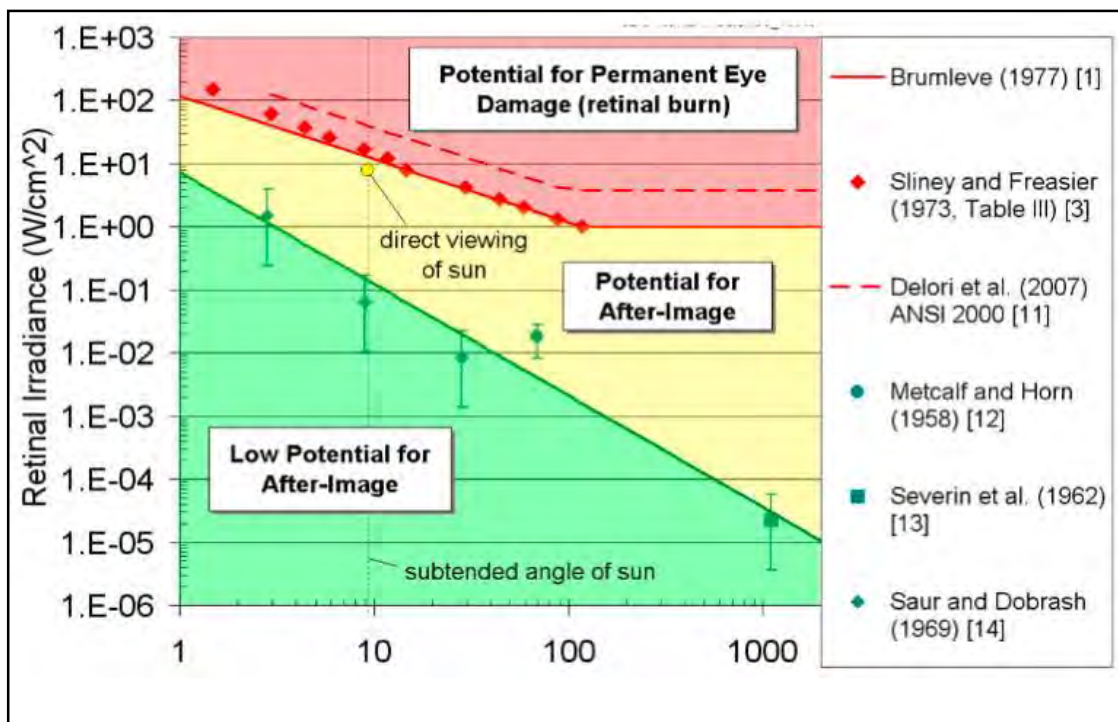
In summary, glare at an ATCT is not acceptable and while still relevant glare with a "low potential for after-image" is generally acceptable along final approach paths to runways in most instances.

5 Federal Aviation Administration (FAA). (2013). Department of Transportation - Federal Aviation Administration. Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports. Vol 78 (No 205), 63276-63279. Available at: <https://www.federalregister.gov/documents/2013/10/23/2013-24729/interim-policy-faa-review-of-solar-energy-system-projects-on-federally-obligated-airports>

6 Federal Aviation Administration Policy: Review of Solar Energy System Projects on Federally-Obligated Airports; date: 11/2021

Solar Glare Hazard Analysis Tool

The SGHAT was designed to determine whether a proposed solar energy project would result in the potential for ocular impact as depicted on the Solar Glare Hazard Analysis Plot (Figure 1.3 refers). SGHAT analyses ocular impact over the entire calendar year in one minute intervals from when the sun rises above the horizon until the sun sets below the horizon. One of the principal outputs from the SGHAT report is a glare plot per receptor that indicates the time of day and days per year that glare has the potential to occur. SGHAT plot classifies the intensity of ocular impact as either Green Glare, Yellow Glare or Red Glare. These colour classifications are equivalent to the FAA's definitions regarding the level of ocular impact e.g. 'Green Glare' in the SGHAT is synonymous to the FAA's "low potential for after-image", and so forth. The various correlations are illustrated on the Solar Glare Hazard Analysis Plot.



Solar Glare Ocular Hazard Plot: The potential ocular hazard from solar glare is a function of retinal irradiance and the subtended angle (size/distance) of the glare source. It should be noted that the ratio of spectrally weighted solar illuminance to solar irradiance at the earth's surface yields a conversion factor of ~100 lumens/W. Plot adapted from Ho et al., 2011.

Chart References: Ho, C.K., C.M. Ghanbari, and R.B. Diver, 2011, Methodology to Assess Potential Glint and Glare Hazards from Concentrating Solar Power Plants: Analytical Models and Experimental Validation, J. Solar Energy Engineering, August 2011, Vol. 133, 031021-1 – 031021-9.

Figure 1.3 - Figure 1 from the FAA Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports

1.2 METHODOLOGY

The process for dealing with aviation receptors is as follows:

1. The Federal Aviation Administration (FAA) approved Solar Glare Hazard Analysis Tool (SGHAT) is used to determine if any of these aviation receptors has the potential to theoretically experience glint or glare. This tool also calculates the intensity of such reflectance and whether it is acceptable by FAA standards.

2. SGHAT does not account for terrain screening or screening provided by surface elements such as existing vegetation or buildings, therefore the results of the SGHAT may need to be considered, in conjunction with an assessment of existing intervening screening that may be present, to establish if reflectance can actually be experienced at the receptors.
3. Finally, if necessary, additional assessment is undertaken using Macro Works' bespoke model which would take into account any screening provided by any proposed mitigation measures.

1.2.1 **Identification of Relevant Receptors**

The Planning and Development (Solar Safeguarding Zone) Regulations 2022 set out 43 Solar Safeguarding Zones (SSZs). A SSZ is an area around an airport, aerodrome or helipad in which there is a potential for glint or glare from solar panels to impact aviation safety. The proposed development does not lie within any SSZ. Receptors at Coonagh Airfield and University Hospital Limerick were considered for this assessment out of an abundance of caution.

Runways Approaches

This SGHAT analysis was produced to assess the potential for impacts upon aviation receptors, resulting from the proposed solar installation. Coonagh Airfield is located approximately 6.1km west of the proposed development and comprises one runway.

Observation Points

University Hospital Limerick helipad is situated approximately 5.1km southwest of the proposed development. Thirteen Observation Points (OP), with heights ranging from 1.7m to 300m, were assessed for potential reflectance. These OPs present a range of flight heights from the urban standard for helicopters down to ground level at 25m intervals, representing the approach to land.



Figure 1.4 Aerial view showing the location of the proposed development relative to the identified aviation receptors.

1.3 RESULTS

1.3.1 Runway Approaches

The SGHAT results are contained in Appendix A and show that, of the two runway approaches analysed at Coonagh Airfield, one had potential for Green Glare to occur (Runway 10).

Neither of the runway approaches showed any potential for Yellow Glare as a result of the proposed solar panels. The absence of Yellow Glare is regarded as a 'Pass' in this assessment as there would only be low potential for after-image.

1.3.2 Observation Points (OP 1 - 13)

The SGHAT results are contained in Appendix A and show that none of the 13 OPs analysed had potential for Green or Yellow Glare to occur.

None of the 13 OPs analysed showed any potential for Yellow Glare to occur. The absence of Yellow Glare is regarded as a 'Pass' in this assessment as there would only be low potential for after-image

1.4 OVERALL CONCLUSION

From the analysis and discussions contained herein, it is considered that the proposed PV arrays at the proposed Parkway Valley Residential development, Limerick results in a 'Pass' at the Coonagh and University Hospital Limerick aviation receptors.

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APPENDIX A: SGHAT RESULTS

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FORGESOLAR GLARE ANALYSIS

Project: **Limerick**

Site configuration: **Parkway Valley**

Analysis conducted by Luis Dominguez (luis@macroworks.ie) at 15:36 on 17 Oct, 2025.

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U.S. FAA 2013 Policy Adherence

The following table summarizes the policy adherence of the glare analysis based on the 2013 U.S. Federal Aviation Administration Interim Policy 78 FR 63276. This policy requires the following criteria be met for solar energy systems on airport property:

- No "yellow" glare (potential for after-image) for any flight path from threshold to 2 miles
- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics (see list below)

ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
2-mile flight path(s)	PASS	Flight path receptor(s) do not receive yellow glare
ATCT(s)	N/A	No ATCT receptors designated

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

FAA Policy 78 FR 63276 can be read at <https://www.federalregister.gov/d/2013-24729>

SITE CONFIGURATION

Analysis Parameters

DNI: peaks at 1,000.0 W/m²
Time interval: 1 min
Ocular transmission coefficient: 0.5
Pupil diameter: 0.002 m
Eye focal length: 0.017 m
Sun subtended angle: 9.3 mrad
Site Config ID: 162059.14979
Methodology: V2



PV Array(s)

Name: PA1
Axis tracking: Fixed (no rotation)
Tilt: 16.7°
Orientation: 194.0°
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	52.661015	-8.588632	-0.20	19.05	18.85
2	52.660985	-8.588443	-0.20	19.05	18.85
3	52.660898	-8.588481	-0.20	19.05	18.85
4	52.660928	-8.588670	-0.20	19.05	18.85
5	52.661015	-8.588632	-0.20	19.05	18.85

Name: PA2

Axis tracking: Fixed (no rotation)

Tilt: 16.7°

Orientation: 194.0°

Rated power: -

Panel material: Smooth glass without AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	52.660844	-8.587503	13.30	22.12	35.42
2	52.660815	-8.587310	13.30	22.12	35.42
3	52.660728	-8.587345	13.30	22.12	35.42
4	52.660757	-8.587539	13.30	22.12	35.42
5	52.660844	-8.587503	13.30	22.12	35.42

Name: PA3

Axis tracking: Fixed (no rotation)

Tilt: 16.7°

Orientation: 194.0°

Rated power: -

Panel material: Smooth glass without AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	52.660380	-8.588516	14.82	22.43	37.25
2	52.660366	-8.588423	14.82	22.43	37.25
3	52.660278	-8.588459	14.82	22.43	37.25
4	52.660292	-8.588552	14.82	22.43	37.25
5	52.660380	-8.588516	14.82	22.43	37.25

Name: PA4

Axis tracking: Fixed (no rotation)

Tilt: 16.7°

Orientation: 194.0°

Rated power: -

Panel material: Smooth glass without AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	52.660092	-8.588634	14.82	22.43	37.25
2	52.660078	-8.588542	14.82	22.43	37.25
3	52.659991	-8.588578	14.82	22.43	37.25
4	52.660005	-8.588671	14.82	22.43	37.25
5	52.660092	-8.588634	14.82	22.43	37.25

Name: PA5

Axis tracking: Fixed (no rotation)

Tilt: 16.7°

Orientation: 194.0°

Rated power: -

Panel material: Smooth glass without AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	52.660292	-8.587983	14.82	22.43	37.25
2	52.660277	-8.587890	14.82	22.43	37.25
3	52.660190	-8.587926	14.82	22.43	37.25
4	52.660204	-8.588019	14.82	22.43	37.25
5	52.660292	-8.587983	14.82	22.43	37.25

Name: PA6

Axis tracking: Fixed (no rotation)

Tilt: 16.7°

Orientation: 194.0°

Rated power: -

Panel material: Smooth glass without AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	52.660000	-8.588094	14.82	22.43	37.25
2	52.659986	-8.588002	14.82	22.43	37.25
3	52.659899	-8.588038	14.82	22.43	37.25
4	52.659913	-8.588131	14.82	22.43	37.25
5	52.660000	-8.588094	14.82	22.43	37.25

Name: PA7

Axis tracking: Fixed (no rotation)

Tilt: 16.7°

Orientation: 194.0°

Rated power: -

Panel material: Smooth glass without AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	52.659567	-8.588787	-0.20	16.27	16.07
2	52.659553	-8.588694	-0.20	16.27	16.07
3	52.659465	-8.588730	-0.20	16.27	16.07
4	52.659480	-8.588823	-0.20	16.27	16.07
5	52.659567	-8.588787	-0.20	16.27	16.07

Name: PA8

Axis tracking: Fixed (no rotation)

Tilt: 16.7°

Orientation: 194.0°

Rated power: -

Panel material: Smooth glass without AR coating

Reflectivity: Vary with sun

Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	52.659543	-8.588633	-0.20	16.27	16.07
2	52.659529	-8.588540	-0.20	16.27	16.07
3	52.659442	-8.588577	-0.20	16.27	16.07
4	52.659456	-8.588670	-0.20	16.27	16.07
5	52.659543	-8.588633	-0.20	16.27	16.07

Flight Path Receptor(s)

Name: Coonagh - LFC 10 Runway

Description: None

Threshold height: 15 m

Direction: 87.0°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
Threshold	52.666417	-8.684562	1.80	15.20	17.00
Two-mile	52.664919	-8.732229	2.80	182.90	185.70

Name: Coonagh - LFC 28 Runway

Description: None

Threshold height: 15 m

Direction: 266.5°

Glide slope: 3.0°

Pilot view restricted? Yes

Vertical view: 30.0°

Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
Threshold	52.666613	-8.679212	2.00	15.20	17.20
Two-mile	52.668378	-8.631570	10.80	175.10	185.90

Discrete Observation Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (m)	Height (m)
OP 1	1	52.632808	-8.650790	25.20	1.70
OP 2	2	52.632808	-8.650790	25.20	25.00
OP 3	3	52.632808	-8.650790	25.20	50.00
OP 4	4	52.632808	-8.650790	25.20	75.00
OP 5	5	52.632808	-8.650790	25.20	100.00
OP 6	6	52.632808	-8.650790	25.20	125.00
OP 7	7	52.632808	-8.650790	25.20	150.00
OP 8	8	52.632808	-8.650790	25.20	175.00
OP 9	9	52.632808	-8.650790	25.20	200.00
OP 10	10	52.632808	-8.650790	25.20	225.00
OP 11	11	52.632808	-8.650790	25.20	250.00
OP 12	12	52.632808	-8.650790	25.20	275.00
OP 13	13	52.632808	-8.650790	25.20	300.00

GLARE ANALYSIS RESULTS

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Summary of Glare

PV Array Name	Tilt (°)	Orient (°)	"Green" Glare min	"Yellow" Glare min	Energy kWh
PA1	16.7	194.0	379	0	-
PA2	16.7	194.0	400	0	-
PA3	16.7	194.0	415	0	-
PA4	16.7	194.0	373	0	-
PA5	16.7	194.0	369	0	-
PA6	16.7	194.0	370	0	-
PA7	16.7	194.0	407	0	-
PA8	16.7	194.0	410	0	-

Total annual glare received by each receptor

Receptor	Annual Green Glare (min)	Annual Yellow Glare (min)
Coonagh - LFC 10 Runway	3123	0
Coonagh - LFC 28 Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0

Results for: PA1

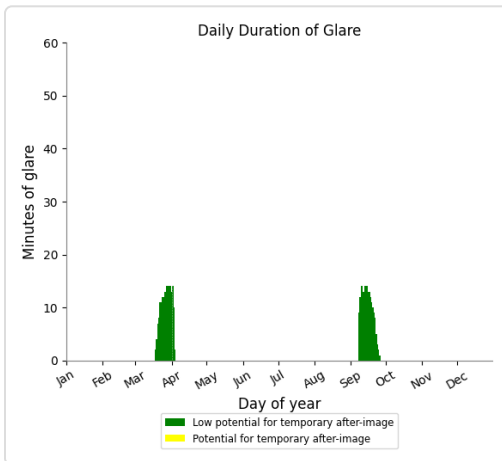
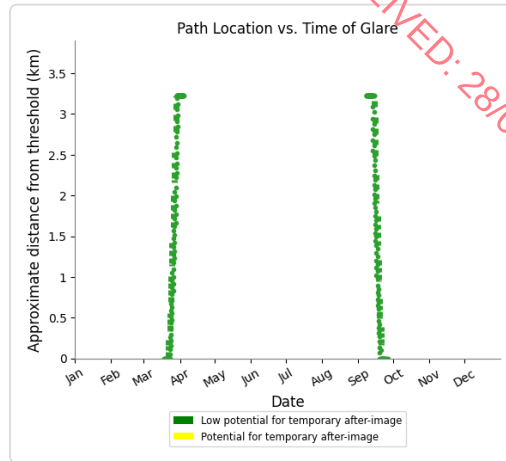
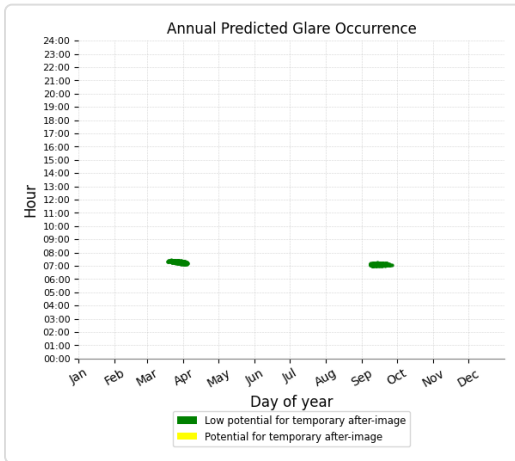
Receptor	Green Glare (min)	Yellow Glare (min)
Coonagh - LFC 10 Runway	379	0
Coonagh - LFC 28 Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0

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Flight Path: Coonagh - LFC 10 Runway

0 minutes of yellow glare

379 minutes of green glare



Flight Path: Coonagh - LFC 28 Runway

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

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Results for: PA2

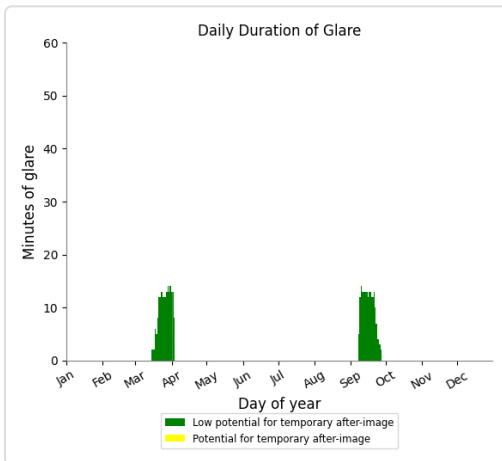
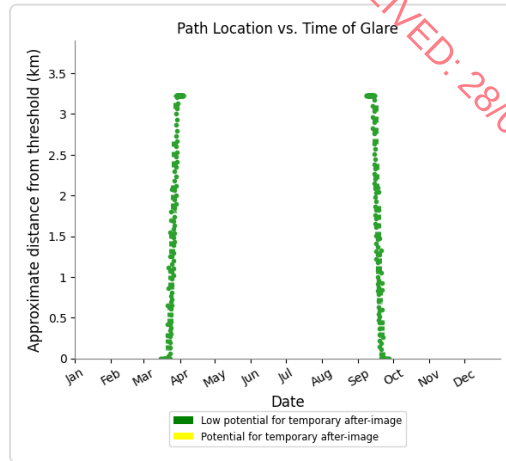
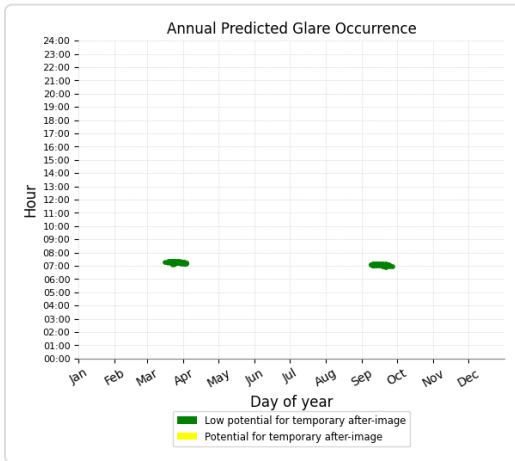
Receptor	Green Glare (min)	Yellow Glare (min)
Coonagh - LFC 10 Runway	400	0
Coonagh - LFC 28 Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0

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Flight Path: Coonagh - LFC 10 Runway

0 minutes of yellow glare

400 minutes of green glare



Flight Path: Coonagh - LFC 28 Runway

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

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Results for: PA3

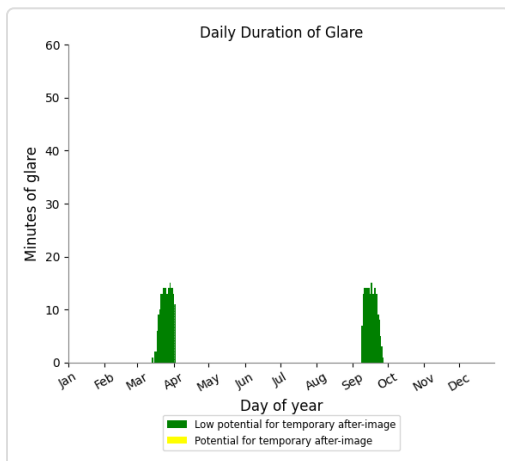
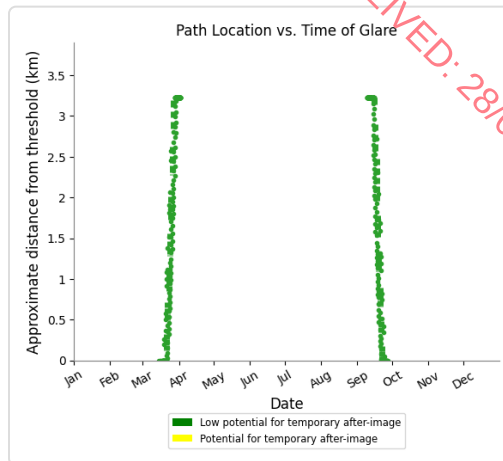
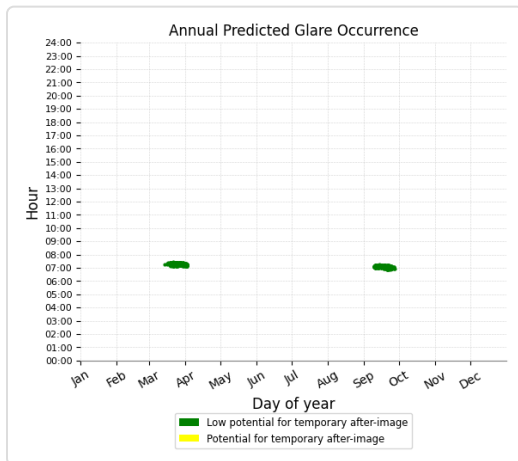
Receptor	Green Glare (min)	Yellow Glare (min)
Coonagh - LFC 10 Runway	415	0
Coonagh - LFC 28 Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0

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Flight Path: Coonagh - LFC 10 Runway

0 minutes of yellow glare

415 minutes of green glare



Flight Path: Coonagh - LFC 28 Runway

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

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Results for: PA4

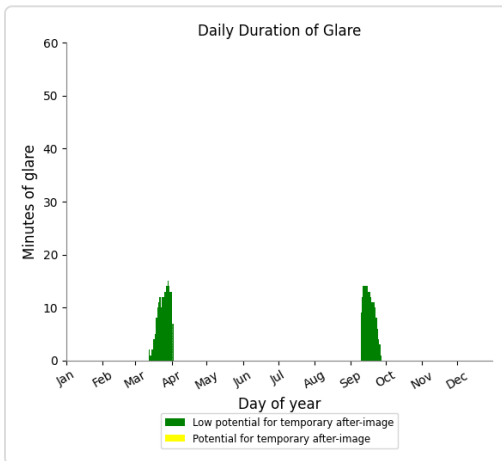
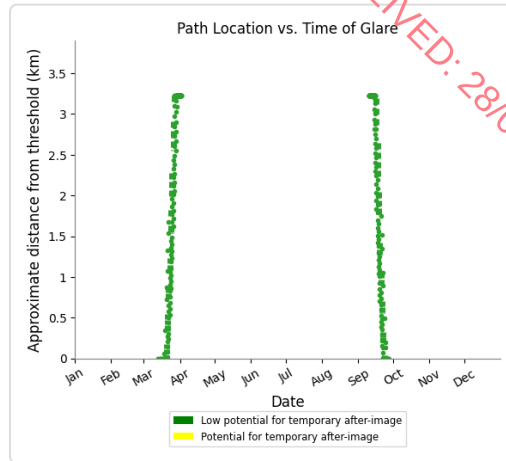
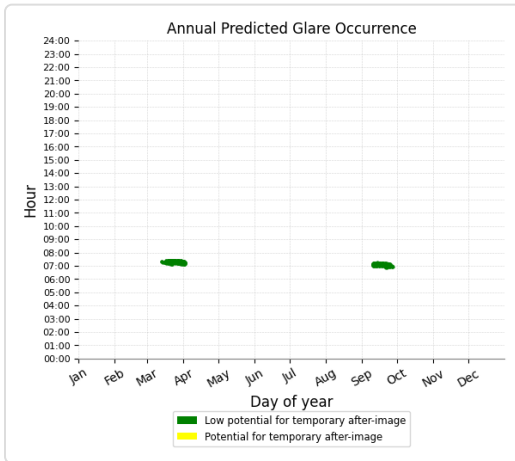
Receptor	Green Glare (min)	Yellow Glare (min)
Coonagh - LFC 10 Runway	373	0
Coonagh - LFC 28 Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0

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Flight Path: Coonagh - LFC 10 Runway

0 minutes of yellow glare

373 minutes of green glare



Flight Path: Coonagh - LFC 28 Runway

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

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Results for: PA5

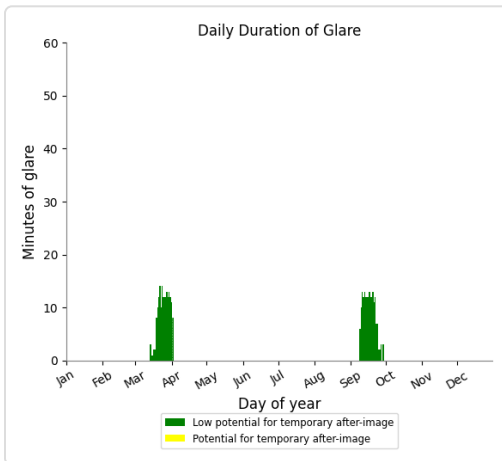
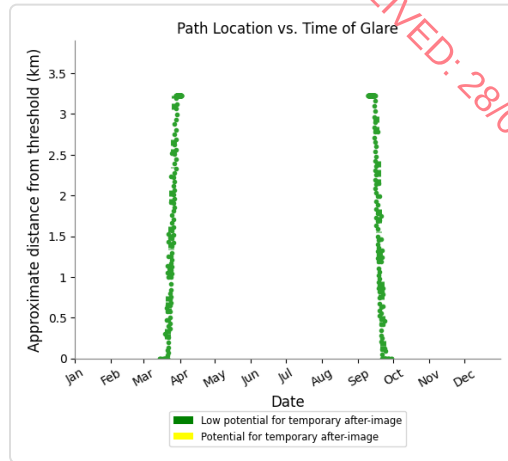
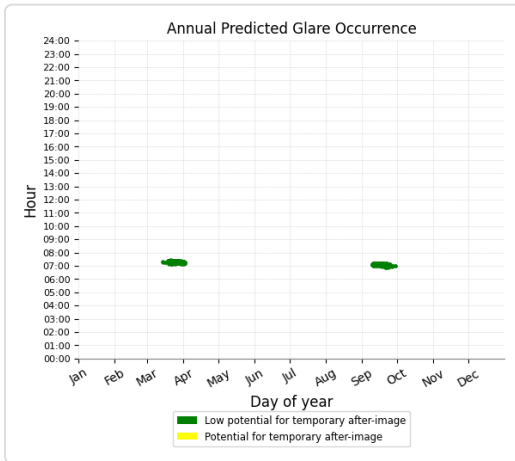
Receptor	Green Glare (min)	Yellow Glare (min)
Coonagh - LFC 10 Runway	369	0
Coonagh - LFC 28 Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0

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Flight Path: Coonagh - LFC 10 Runway

0 minutes of yellow glare

369 minutes of green glare



Flight Path: Coonagh - LFC 28 Runway

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

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Results for: PA6

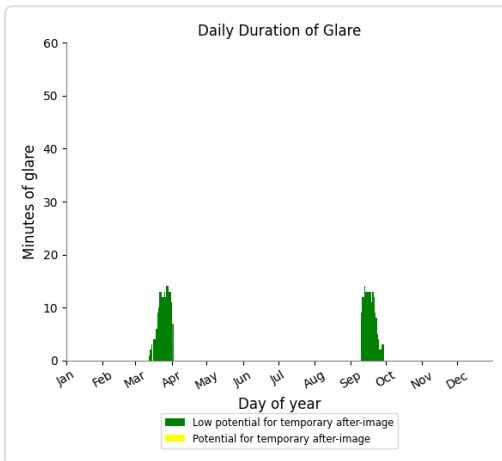
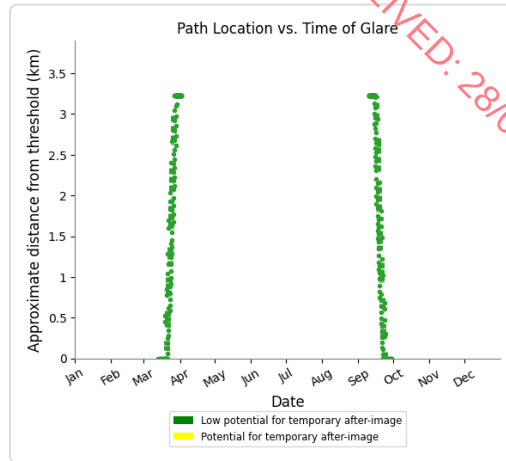
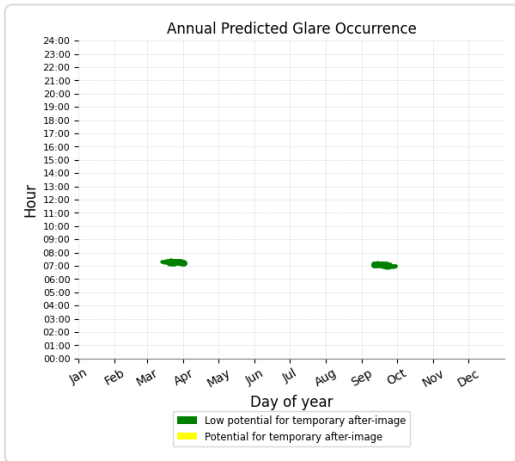
Receptor	Green Glare (min)	Yellow Glare (min)
Coonagh - LFC 10 Runway	370	0
Coonagh - LFC 28 Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0

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Flight Path: Coonagh - LFC 10 Runway

0 minutes of yellow glare

370 minutes of green glare



Flight Path: Coonagh - LFC 28 Runway

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

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Results for: PA7

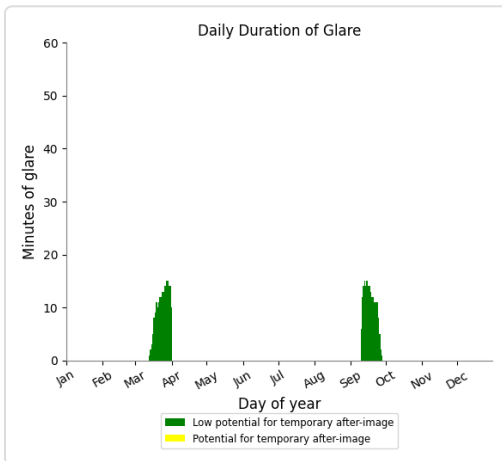
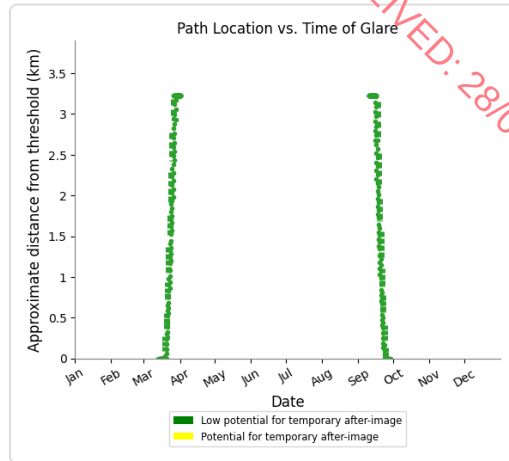
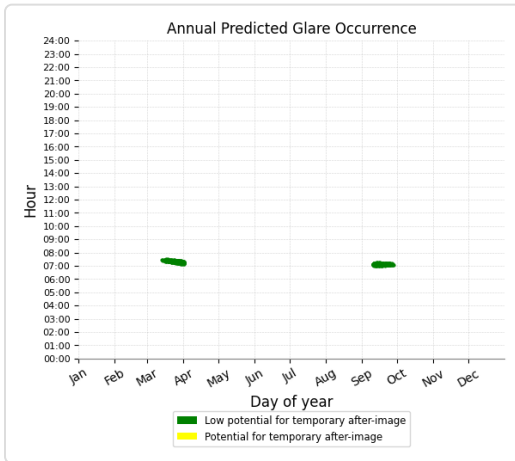
Receptor	Green Glare (min)	Yellow Glare (min)
Coonagh - LFC 10 Runway	407	0
Coonagh - LFC 28 Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0

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Flight Path: Coonagh - LFC 10 Runway

0 minutes of yellow glare

407 minutes of green glare



Flight Path: Coonagh - LFC 28 Runway

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

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Results for: PA8

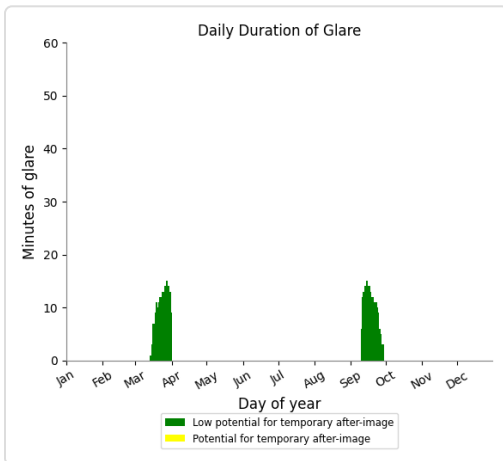
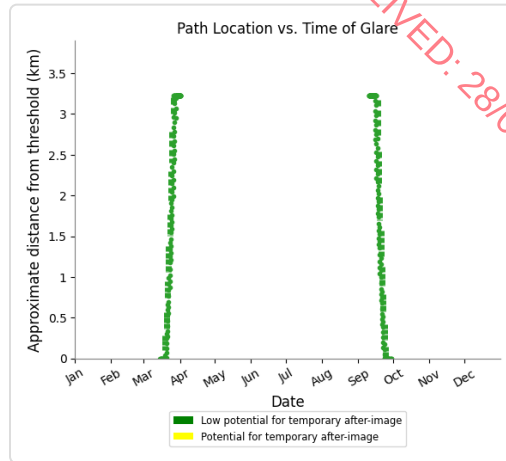
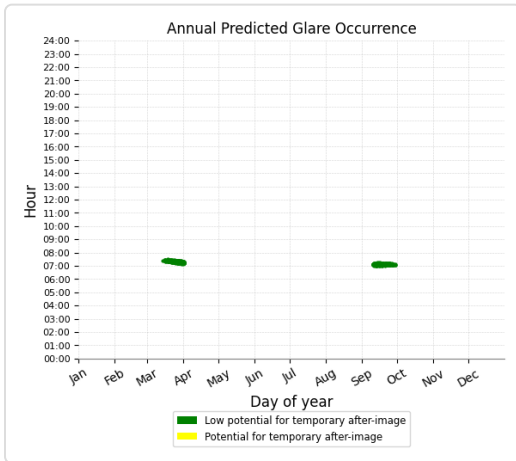
Receptor	Green Glare (min)	Yellow Glare (min)
Coonagh - LFC 10 Runway	410	0
Coonagh - LFC 28 Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0

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Flight Path: Coonagh - LFC 10 Runway

0 minutes of yellow glare

410 minutes of green glare



Flight Path: Coonagh - LFC 28 Runway

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare

0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

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Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.

Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to V1 algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.

The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size.

Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.

Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.

The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual results and glare occurrence may differ.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

Refer to the Help page at www.forgesolar.com/help/ for assumptions and limitations not listed here.

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