WATERFORD NORTH QUAYS STRATEGIC DEVELOPMENT ZONE

DRAFT TRAFFIC & TRANSPORTATION IMPACT ASSESSMENT

OCTOBER 2017

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Waterford North Quays

Strategic Development Zone (SDZ)

Draft Traffic & Transportation Assessment Report

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This report represents a technical assessment of the transportation proposals associated with the redevelopment of the North Quays SDZ.

1.2. Receiving Environment

The SDZ site stretches from Rice Bridge 1.1km eastward to just before Abbey Church. The site is bounded to the south by the River Suir, to the north by the R711 Dock Road and to the east by Abbey Road.

Traffic surveys carried out in 2016 show that Dock Road dual carriageway carries approximately 1,600 vehicles per hour in the AM peak, and 2,000 vehicles per hour in the PM peak. Rice Bridge carries approximately 3,000 vehicles per hour in the AM peak, and 3,300 vehicles per hour in the PM peak.

The junctions along Dock Road and at Rice Bridge are the overall determinant of traffic capacity on the local road network. Queues are often observed extending back from Rice Bridge along Dock Road in both directions (eastbound and westbound) in the AM Peak.

The Waterford City Development Plan 2013- 2019 sets out an overall strategy for the proper planning and sustainable development of the functional area of Waterford City. The development strategy for Waterford City has been guided by the Planning Land Use and Transportation Study (PLUTS) since 2004. The PLUTS seeks to implement an integrated land use and transportation strategy for the city and its environs. Some of the highlights of the PLUTS strategy are as follows:

- A new city centre sustainable transport bridge for pedestrians, cyclists and city centre bus service which will link the redeveloped North Quays with the existing City Centre.
- Provision of a rail-passenger platform on the North Quays as part of a new Public Transport Interchange.
- Development of a high-quality bus-based public transport system in the City supported by Park and Ride facilities located north and south of the River.

In accordance with the Development Plan, the most direct method of tackling congestion is by providing alternative transport choices to encourage a modal shift to public transport and non-car modes, while also focussing local transport policy on developing improved public transport services and other sustainable modes.

1.3. Proposed Development

The proposed development consists of complete redevelopment of the Waterford North Quays SDZ site; to create an urban area with new places, amenities and activities for the people of Waterford. Development will include the construction of residential and hotel buildings; along with retail, tourism and office facilities.

The existing access points to the site from the Dock Road are inadequate and present a barrier to future development of the site. As a result, two new access points are required. One at the upper, eastern end of the site from a widened Abbey Road, and the other to the lower, western end of the site by way of a new junction on the Dock Road and a new over bridge to the site. The existing over bridge to the site from the Dock Road needs to be removed but its location provides a potential

pedestrian entrance to the site by way of the development of the train and bus interchange planned for the area.

Access to parking, loading and unloading, waste management and all such development related traffic should be contained within the site from an internal "spine" road constructed in a fashion that it would not become a visible feature when viewed from the south quay and not forming a barrier to free pedestrian movement across the site or along the waterfront.

A sustainable transport bridge to accommodate pedestrians, cyclists and city bus service will connect from the North Quay to the South Quay in the vicinity of the Clock Tower on the South Quay.

1.4. Access Strategy

Pedestrian and Cycle

The proximity of the proposed SDZ to the city centre is advantageous in terms of encouraging high uptake of pedestrian and cycle modes. The proposed new sustainable transport bridge is required to integrate the North Quays redevelopment with the City Centre. The bridge is to be located in line with Barronstrand Street/Clock Tower to provide a continuous link connecting the City Centre retail spine to the North Quays and beyond.

The benefits of this bridge will be maximised by providing regular links between the surrounding areas including Ferrybank, Abbeylands and Rockshire to the City Centre. The new and upgraded junctions on the Dock Road will incorporate high quality pedestrian and cycle crossing facilities to the SDZ lands to increase permeability from residential areas to the north and east. The principal pedestrian and cycle access to the site will be provided at the western and eastern access junctions. Access will also be available via the proposed greenway along the disused Waterford to New Ross railway line, to the east of the SDZ site.

The principal circulation route for pedestrians and cyclists within the North Quays site will be accommodated along the river front and will be separate to the main access and service road.

All of this will enable pedestrians and cyclists to avoid the need to travel further west to Rice Bridge and will provide a shortcut to the City Centre from the north. The potential benefit of this improved accessibility for pedestrians and cyclists is considered in detail in the following sections of this report.

Rail

As part of the development it is proposed to relocate the train station from its present isolated location to the west of the Rice Bridge into the city centre, a new platform immediately adjacent to the SDZ site, to the south of the R711 Dock Road and approximately 800m east of the existing station, ensuring that the design of the north quays encompasses a transport hub where pedestrians, cyclists, car, rail and bus users can interchange in a comfortable environment. Such a “Transport Hub” type design will render the city centre accessible and sustainable at the highest level.

Bus

Waterford Bus Station is located on the South Quays and will be easily accessible from the site via the proposed new bridge that is to be built over the river as a central feature of the SDZ development.

The ability of the bridge to also carry a city centre bus service will greatly reduce the perceived size of the City Centre and make the area manageable and accessible for all.

Vehicular

The proposed roads and access includes the provision of two main traffic access points to the site as follows:

- A new access to the western side of site and signalised junction on Dock Road at the junction of the former Árd Rí Hotel site at Mountmisery. It is a four arm fully signalised junction and the layout includes two full straight ahead lanes on Dock Road, plus turning lanes on each approach into the site. The existing right turn lane on Dock Road for traffic accessing the former hotel site from the eastern approach to the junction is retained.
- A new entrance will be provided at the eastern side of the site onto an upgraded section of Abbey Road. Approximately 300m length of Abbey Road will be realigned and widened commencing to the south of the existing railway bridge and continuing to the intersection with Dock Road. The site will be accessed via a compact roundabout or signalised junction on this realigned section of Abbey Road. The critical junction at this eastern site entrance is the Abbey Road / Dock Road Junction. The existing junction is a priority junction with turning lanes and several splitter islands. It is proposed to upgrade this junction to a compact roundabout or a signalised junction.

Within the site there will not necessarily be a through route for private vehicles directly through the site, except by public transport and emergency service vehicles, where a route across the plaza will be provided.

Two service yards may be provided on the lower level, which can be utilised by Heavy Goods Vehicles making deliveries to the buildings on site. These yards may be accessed via the one-way HGV spine road which will run from east to west on the lower level of the development that will be accessed via the Junction on Abbey Road with egress onto Dock Road via the new western signalised junction.

1.5. Car Parking Provision

Car parking shall be located on the lower level of the development, and accessed via ramps located at several buildings throughout the development, at plaza level.

The Waterford City Development Plan outlines the car parking requirement for each building use, with the parking standards relevant to the City Centre being applied. Car parking provision can be used as an effective demand management tool, taking into account the location of the site adjacent the City Centre and considering the improvements being made for pedestrians, cyclist and public transport. The challenge will be to limit the commuter parking provision while ensuring adequate parking for the residential, tourism and commercial elements.

1.6. Transport Demand

The TRICS database was used to determine the expected traffic that will be generated by the proposed development during both the AM and PM Peak hours. The predicted peak hour traffic volumes of the SDZ site is estimated as 534 inbound and 181 outbound in the AM peak hour and 339 inbound and 615 outbound in the PM peak hour. These numbers are considered a worst case scenario as they don't take into account the likely mode shift away from private car due to the improved provisions for pedestrians, cyclists and public transport.

The proposed sustainable transport bridge will integrate the North Quays redevelopment with the City Centre and provide significantly improved access between the City Centre and the surrounding areas including Ferrybank, Abbeylands and Rockshire to the City Centre. The potential mode change from car to walking and cycling is significant, where the current population for the areas north of the River Suir that is within walking catchment is approximately 450 people, and cycling catchment is approximately 6,700 people. The construction of the proposed new sustainable transport bridge would potentially increase the walking catchment from the City Centre to the areas north of the River Suir to include a population of approximately 4,000 people, and the cycling catchment to include 7,400 people. Should there be a mode shift for these areas, equivalent to the areas south of the River Suir, this would equate to approximately 1,300 fewer car trips at peak times. This potential reduction in traffic would more than offset the traffic generated by the proposed development.

For the purposes of assessing the traffic impacts of the subject site the traffic survey baseline data has been factored up to an opening and design year using expansion factors taken from unit 5.5 'link-based traffic growth forecasting' within the Transport Infrastructure Ireland (TII) Project Appraisal Guidelines (PAG). This is a simplistic approach in the context of the local impact of the proposed development and it is not feasible within the context of this evaluation to take account of more complex future development factors. A wider Strategic Transportation Assessment by Waterford City Council will be required to make provision for likely major urban growth of the northern area of the city suburbs in accordance with the forthcoming National Planning Framework. It is also does not take account of the likely traffic diversion to a proposed new downstream river crossing.

The traffic assessment considers the opening year taken as 2020 and design year taken as 2035 (15 years after opening year).

1.7. Traffic Impact

Traffic Capacity Analysis was carried out on both the proposed western and eastern access junction to the development along with immediate adjacent junctions likely to be affected by the development. The results of the junctions analysis is summarised below:

- **Western Development Access Junction.** Lin-Sig was used to analyse the capacity of, the proposed signalised 4-arm western access junction, which will be the new western entrance to the site on Dock Road at the junction of the former hotel site at Mountmisery. The results show that the proposed signalised junction at the western site entrance on Dock Road, operating on a 90 second cycle, has more than adequate capacity to accommodate the proposed development with a maximum Degree of Saturation of 58.4% and average maximum queue length of 11.2 pcu in the design year. This indicates that the subject junction could accommodate a greater portion of the overall development traffic, which will allow greater flexibility of route access.
- **Upgraded Abbey Road / Dock Road Junction.** ARCADY roundabout modelling software was used to assess the proposed roundabout at intersection of Abbey Road / Dock Road Junction. The results for the proposed roundabout junction at Dock Road / Abbey Road indicate that the junction will operate at 52% of its theoretical capacity and will be able to cater for the extra traffic generated as a result of the proposed development. It is noted however, that a signalised junction may be considered at this location.

- **Eastern Development Access Junction.** ARCADY roundabout modelling software was used to assess the 4 arm proposed roundabout located on Abbey Road, which provides access to both the development site and Abbey Community College and other accesses. The results for the proposed roundabout junction on Abbey Road indicate that at maximum, the junction will operate at 68% of its theoretical capacity and will be able to cater for the extra traffic generated as a result of the proposed development.
- **Rockshire Road Junction.** The proposed development is estimated to result in an increase in traffic at this junction by 17% in the AM peak and 24% in the PM peak. Lin-Sig was used to analyse the effect of the traffic generated by the development on the capacity of, and potential delays occurring at, the existing signalised 4-arm Rockshire Road junction on the R711 Dock Road. The results show that considering the extra traffic generated by the development, the existing signalised junction will slightly exceed capacity by 3.3% in the Design Year of 2035 due to general traffic growth along the R711 route towards Waterford City Centre, and without a new eastern orbital relief road and bridge downstream of the city centre.
- **Rice Bridge Roundabout**. The proposed development is estimated to result in an increase in traffic at this junction by 7% in the AM peak and 9% in the PM peak. ARCADY roundabout modelling software was used to analyse the effect of the traffic generated by the development on the capacity of, and potential delays occurring at, the existing Rice Bridge Roundabout junction, located to the west of the development site. The results confirm that Rice Bridge forms a bottleneck on the connection from the northern suburban area to the city centre. This highlights the need for a significant mode shift in Waterford from private car to walking, cycling and an upgraded public transport system. It is also probable that the increase in congestion at the Rice Bridge will lead to a natural trip diversion pattern developing from the current through-city movement to the outer ring road, which will, in time increase the demand for a further outer crossing of the River at the PLUTS proposed downstream crossing point. This gradual trip diversion will provide the capacity required in the short to medium term for the development of the North Quays as envisaged in the Planning Scheme.

2.0 INTRODUCTION

The Waterford North Quays Strategic Development Zone (WNQ SDZ) is a 8.23 hectares brown-field site located on the northern banks of the River Suir Estuary in Waterford City Centre.

This Transport Impact Assessment (TIA) has been prepared to assess the traffic and transportation impacts of the proposed development. It generally follows the 'Traffic and Transport Assessment Guidelines' published by the NRA (now Transport Infrastructure Ireland) and the 'Guidelines for Transport Impact Assessment' published by the Institution of Highways and Transportation (IHT).

This report has been prepared taking account the Waterford City Development Plan 2013- 2019; the Waterford Planning, Land Use and Transportation Study (PLUTS) (2004) and the North Quays Urban Design Framework Plan (2008).

3.0 RECEIVING ENVIRONMENT

3.1 Site Location

The SDZ site stretches from Rice Bridge 1.1km eastward to just before Abbey Church (see **Figure 3.1** below). The site is bounded to the south by the River Suir, and to the north by the Dock Road (R711) – a regional road dual carriageway connecting Waterford City Centre with the N29, located 4.7km to the northeast.

Figure 3.1 Aerial View of SDZ Location (map underlay source: Google Maps)

3.2 Surrounding Road Network

The proposed development will be bounded to the north by the R711, known as Dock Road; which links the N29 at Slieverua (County Kilkenny) to Waterford City (via Rice Bridge and roundabout). See Figure 3.2 below.

Figure 3.2 Map of Site and Surrounding Road Network (source: Open-Street map)

The R711 Dock Road is a dual carriageway road, with a posted speed limit of 50km/hr in the vicinity of the site. Along the boundary of the site it contains two traffic lanes, 3-3.5m wide, in both directions. There are continuous footpaths on both sides of the R711, mostly with an average width of between 2 and 3 metres. However on the southern edge of the carriageway the path narrows to a 1m width in places. There are no facilities for cyclists.

Abbey Road runs along the eastern boundary of the development site. This is a single carriageway local road that serves as the primary access route to a number of developments, including Abbey Community College, Saint Joseph's retirement home, several residential developments, a small hotel, and the sewage treatment works. The speed limit of this road is 50km/hr in the vicinity of the site. There is a footpath provided on both sides of the carriageway from the Dock Road/ Abbey Road junction, but only for 60 metres; and after this point a pedestrian footway is provided on the eastern side of the carriageway only. The footpath is typically 1m wide, and there are no facilities provided for cyclists.

Images of the layout and conditions of both Dock Road and Abbey Road are provided in **Table 3.1** below.

Table 3.1 Dock Road and Abbey Road Layouts and Conditions

Dock Road / Rice Bridge Junction

Dock Road view towards North Quays Access

Dock Road towards Rockshire Road Junction

Dock Road view east towards Abbey Road

Dock Road view south towards Abbey Road Junction

Abbey Road view north towards railway bridge

3.3 Existing Traffic

An Automatic Number Plate Recognition (ANPR) link count survey was carried out on Tuesday the 25th of October 2016. The survey took place for 12 hours between 7am and 7pm, and occurred on the roads in the vicinity of the development site – including the R448 (to the east of Rice Bridge), R680 (Rice Bridge), Rockshire Road, R711 (at Ferrybank Sports Grounds), and Abbey Road.

The peak hours for traffic in the vicinity of the development are as follows:

- Weekday AM Peak: 08:00 – 09:00
- Weekday PM Peak: 17:00 – 18:00

Schematics of the traffic counts across the network in the vicinity of the SDZ), showing the 2016 traffic volumes are shown in **Figures 3.3** and **3.4** on the following page.

The results show the Dock Road dual carriageway carries approximately 1,600 vehicles per hour in the AM peak, and 2,000 vehicles per hour in the PM peak.

The junctions along Dock Road and at Rice Bridge are the overall determinant of traffic capacity on the local road network. Queues are often observed extending back from Rice Bridge along Dock Road in both directions (eastbound and westbound) in the AM Peak. There are no known capacity issues with the other junctions along Dock Road.

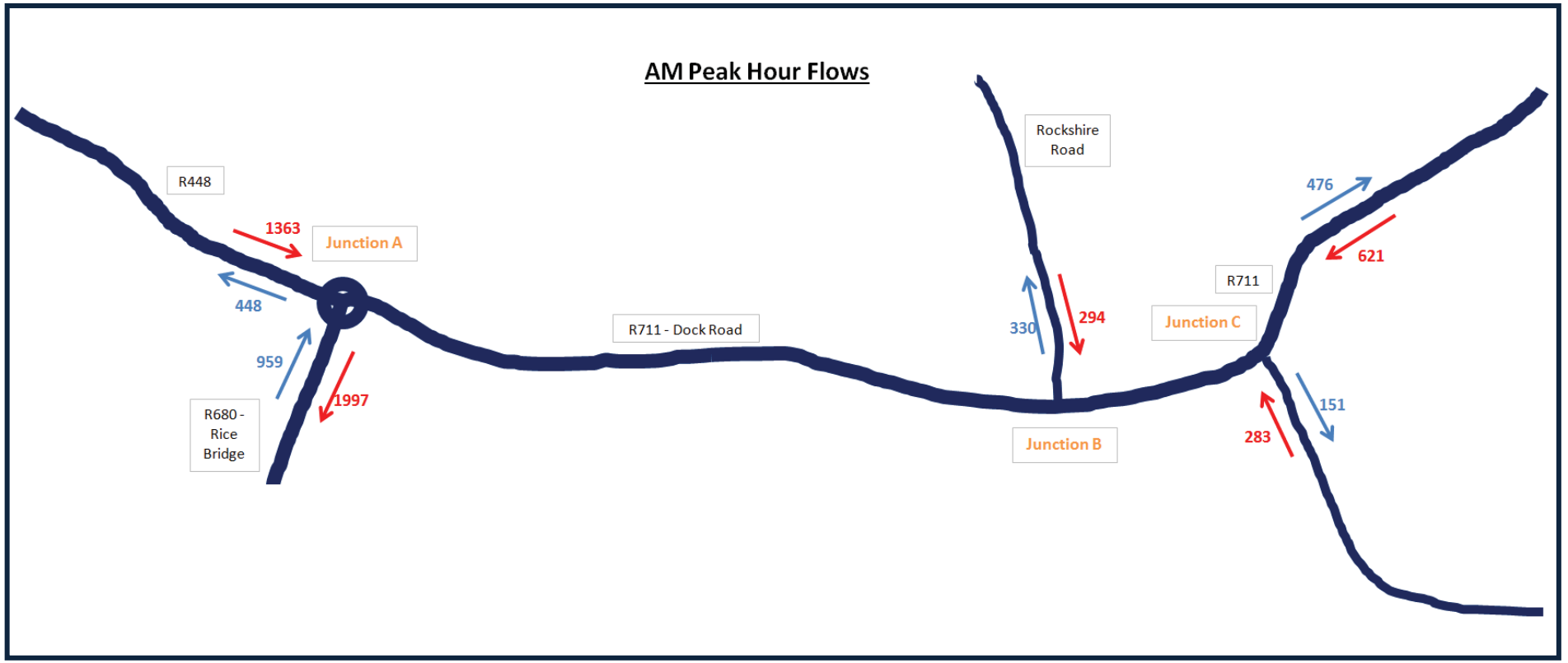


Figure 3.3 Existing 2016 AM Peak Hour Traffic Volumes

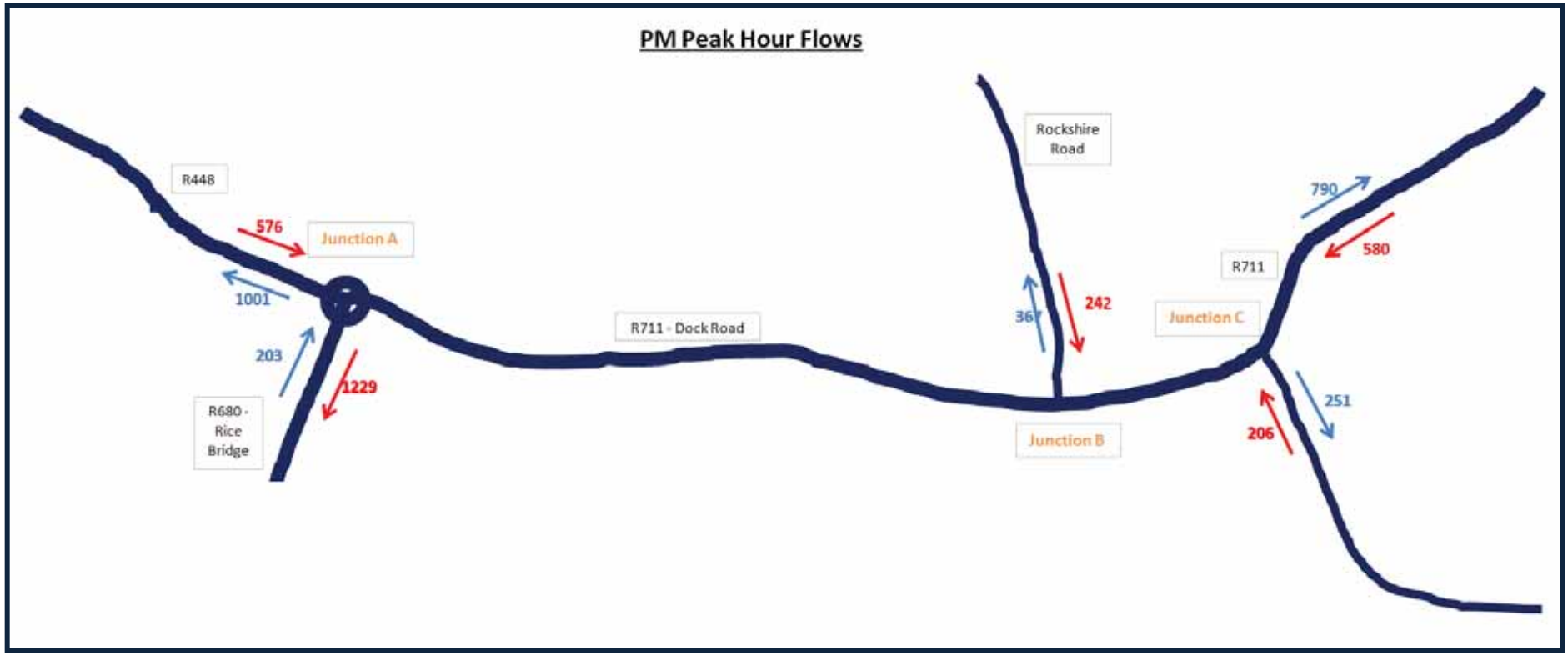


Figure 3.4 Existing 2016 PM Peak Hour Traffic Volumes

The origin – destination surveys and link counts were used to determine the turning movements at junctions intersecting Dock Road bounding the site. Turning counts for the AM and PM peak hours for the key junctions along Dock Road are included Figure 3.5 below.

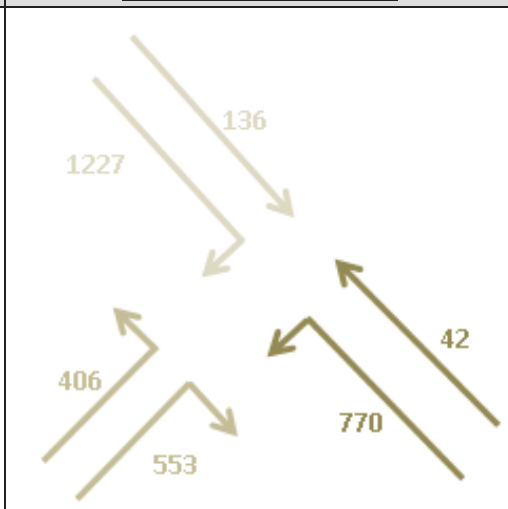
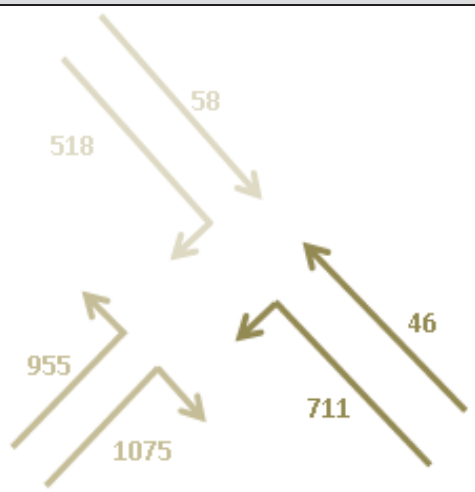
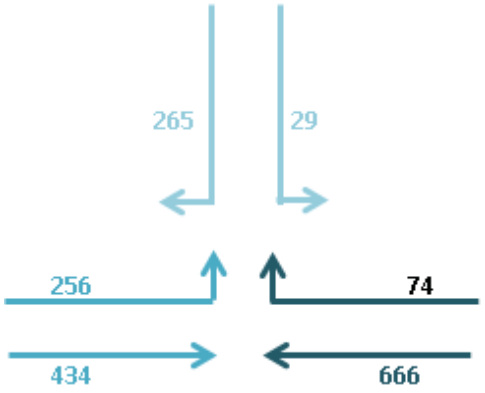
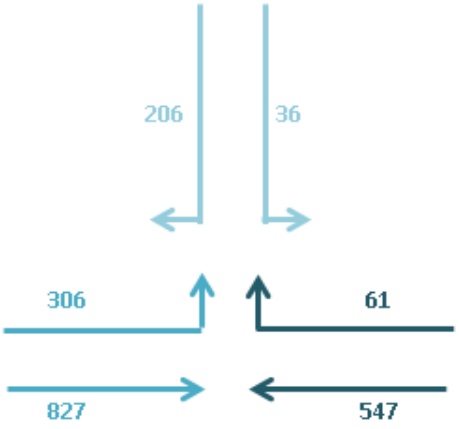
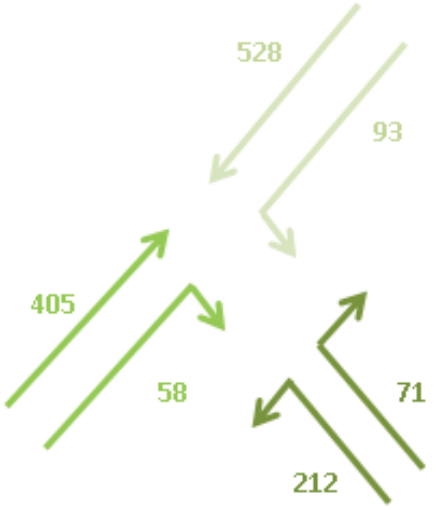
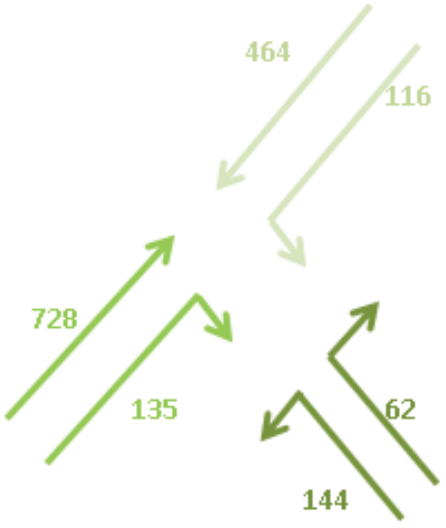
	2016 AM PEAK HOUR	2016 PM PEAK HOUR
Junction A Rice Bridge / Dock Road		
Junction B Dock Road / Rockshire Road		
Junction C Dock Road / Abbey Road		

Figure 3.5 Existing Junction Turning Movements

3.4 Road Safety

Data relating to any collisions on the R711 or Abbey Road in the vicinity of the development site, during the 8 year period between 2005 and 2013 was collected from the Road Safety Authority online mapping tool, and analysed.

The RSA online mapping tool outlines the pattern and location of road collisions in Ireland, where personal injury was involved. Details regarding the date, severity level, circumstances of each collision are provided, along with the type of vehicle involved.

The locations of collisions on the road networks in the vicinity of the development site are visible in **Figure 3.6** below.

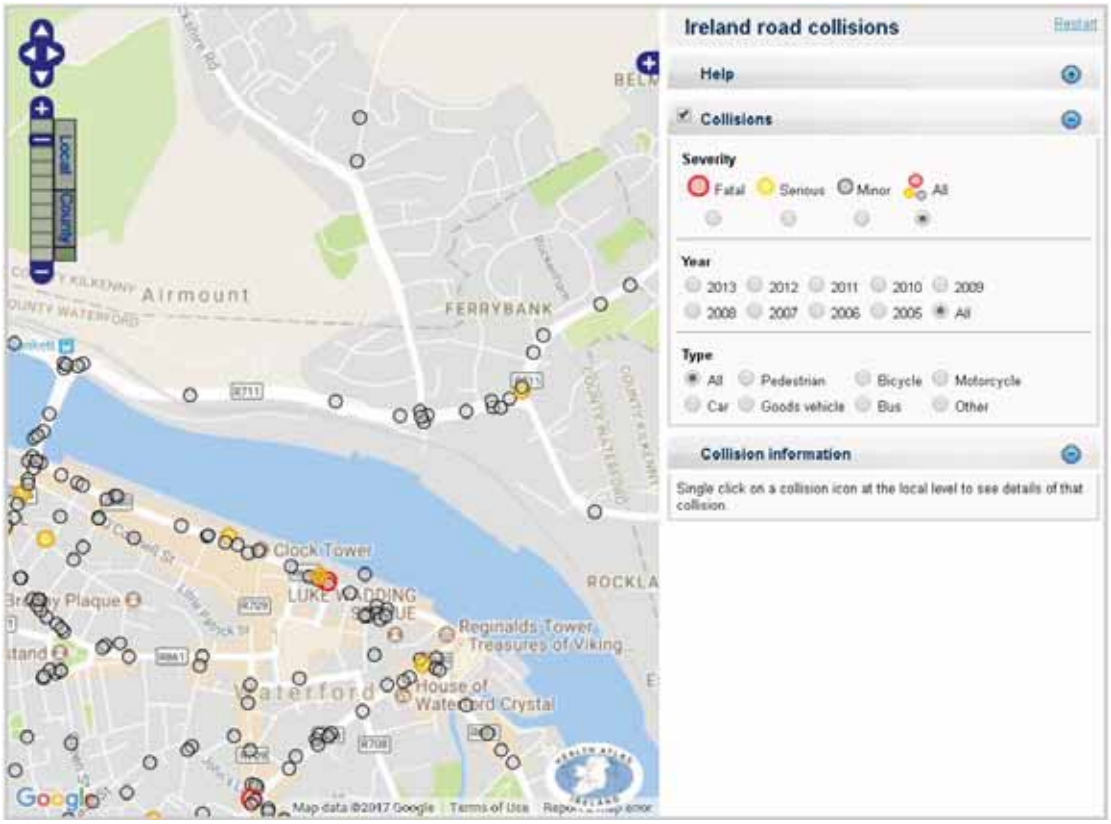


Figure 3.6 Road Collisions Data from RSA

Between 2005 and 2013, there were 20 minor collisions on R711 Dock Road in the vicinity of the development site, with a further serious collision occurring at the Dock Road / Abbey Road junction in 2013. There has only been one minor collision on Abbey Road within this time frame.

3.5 Waterford City Development Plan (2013-2019)

The Waterford City Development Plan 2013- 2019 sets out an overall strategy for the proper planning and sustainable development of the functional area of Waterford City.

The development strategy for Waterford City has been guided by the Planning Land Use and Transportation Study (PLUTS) since 2004. The PLUTS was initiated to provide a strong planning framework for the development of the City and Environs over the period up to 2020. It outlines a sustainable form of spatial development for

Waterford City and Environs with several key features, including improved access to jobs, education, health, culture, leisure and other services through the provision of high quality bus based public transportation system, an orbital road network and additional river crossings.

Some of the highlights of the PLUTS strategy are as follows:

- A new city centre bridge which will link the redeveloped North Quays with the existing City Centre.
- Provision of a rail-passenger platform on the North Quays as part of a new Public Transport Interchange.
- Development of a high-quality bus-based public transport system in the City supported by Park and Ride facilities located north and south of the River.

The PLUTS seeks to implement an integrated land use and transportation strategy for the city and its environs. The development of alternative means of transport to the use of the private car is a major element of PLUTS and national transportation guidance. This requires continuing commitment to the provision of infrastructure to facilitate such modal change, with consequent impacts on access by private transport. In curtailing private transport there is an inherent challenge between policy objectives for growth/regeneration of the City economy on the one hand and traffic restraint/demand management on the other. The challenge lies in striking an appropriate balance between parking provision and public transport. As parking interacts with many planning, transport and development issues it needs to be treated in a strategic manner.

Waterford City Development Plan 2013-2019 supports the development of the North Quays SDZ which is zoned as part of a larger mixed use 'opportunity site'. The opportunity site includes Plunkett Railway Station and lands to the North including Sion Hill House and the former Ard Rí hotel site. The Waterford North Quays – Urban Design Framework Plan prepared in 2008 set out a broad vision for this area comprising development concepts and urban design guidelines including infrastructure options to include a bridge crossing connecting the North Quays.

The South Quays lie within an Architectural Conservation Area (ACA) "designated as being the subject of a future urban design framework" which would address, among other issues:

- roads and links, both internally and from the city centre;
- new city centre bridge;
- new development and infrastructure;
- traffic and movement, parking.

According to the Development Plan, in order to achieve a balance of travel supply and demand in Waterford, development must continue to be directed towards areas where improved transport service capacity is and will be provided. The most direct method of tackling congestion is by providing alternative transport choices to encourage a modal shift to public transport and non-car modes, while also focussing local transport policy on developing improved public transport services and other sustainable modes.

Some of the Key relevant Transport Policies and Objectives to be considered as part of the development options include the following:

Roads Objective:

- "To provide an appropriately designed and constructed pedestrian river crossing located in the vicinity of the Clock Tower to provide accessibility to the North Quays and facilitate future development. (OBJ 6.2.7)" (P.90)
- "Investigate the feasibility of provision of an open span bridge facilitating a light public transport system in the vicinity of Reginald's Tower linking up with future development on the north quays. The provision of such a looped transport system in the City is desirable. There is an option for such a looped transport system also being facilitated via a new pedestrian bridge at the Clock Tower as per the North Quays Urban Design Framework. (OBJ 6.2.8)" (P.90)
- "Continue to develop and implement a parking strategy for the City Centre and its fringe areas. (OBJ 6.2.15)" (P.91)

Green Routes: (These include the provision of new bus network, service improvements, new bus lane and bus priority – see PLUTS Strategy 2004 for more detail).

- "It is an objective of the City Development Plan to extend the scheme of green routes to the Dock Road / Ferrybank Dual Carriageway and to re-align and widen Abbey Road. The open space areas within the neighbourhood include lands adjoining the River Suir at Christendom." (P.102)
- "It is an objective of the strategy to complete the implementation of all remaining Green Routes phases during the lifetime of the new Plan." (P.85)

Walking and Cycling:

- "To provide a citywide cycle network to link all areas of the city to each other via main routes. Existing and proposed extension of the City's cycle network is also outlined on the zoning objectives map. The proposed network is both radial and orbital, with some elements located off street in amenity areas. (OBJ 6.2.1)"
- "To expand the network to connect the city centre to any proposed North Quay development with a foot/cycle bridge. (OBJ 6.2.2)"
- "To provide cycle and walking networks between neighbourhood areas, further negating the need for car based journeys. (OBJ 6.2.4)" (P.87)
- "To further develop the existing network of cycleways on the existing road network, within and between the neighbourhoods, and within selected amenity areas. (OBJ 6.2.14)" (P.91)
- "It is an objective to provide for a sustainable riverside walk along the northern bank of the Suir, as part of the redevelopment of the North Quays, from Rice Bridge to the City boundary, which would run through this area of open space, subject to compliance with the requirements of the Habitats Directive for the protection of otter & bat species." (P.102)

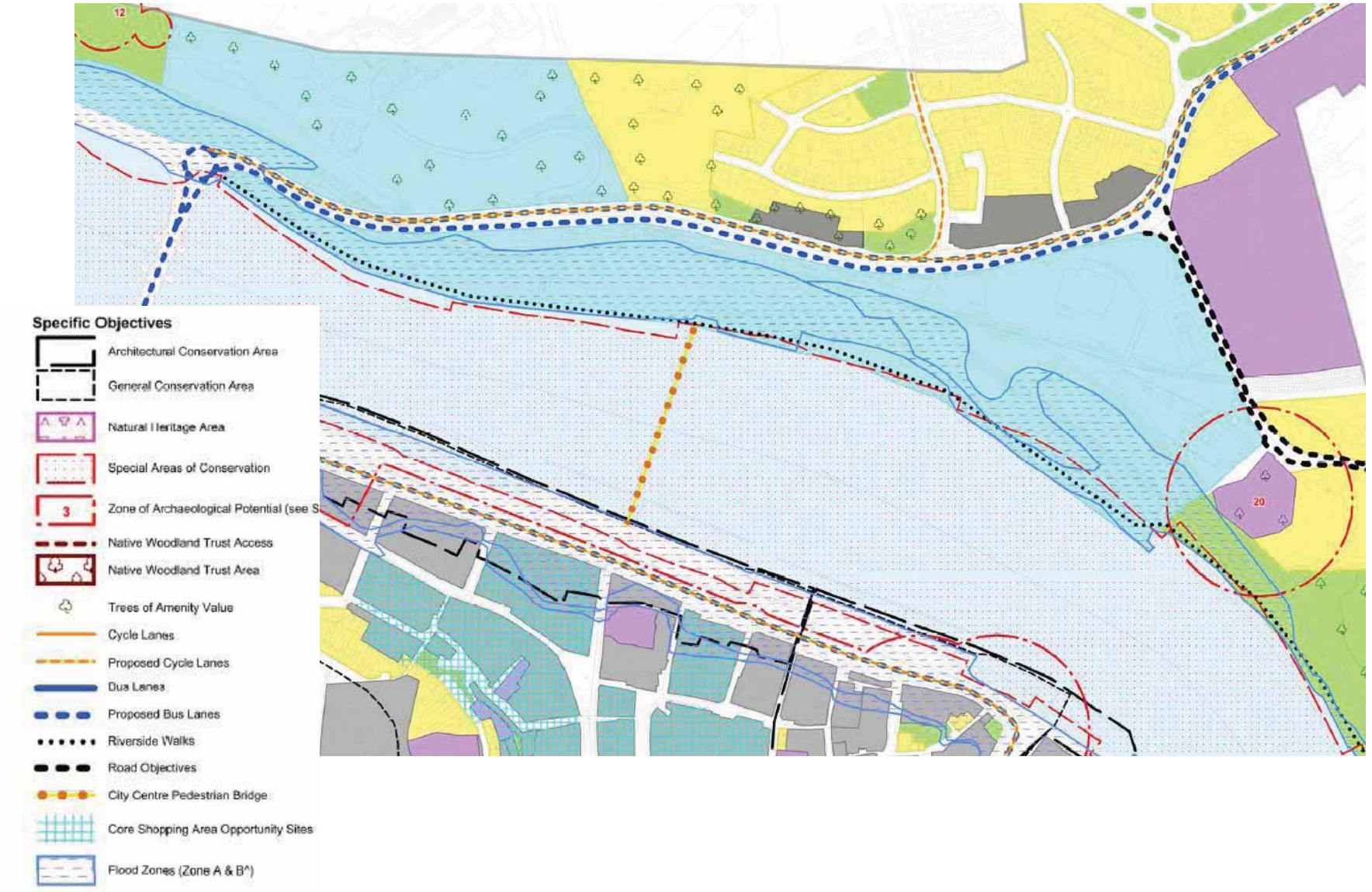


Figure 3.7 Waterford City Development Plan 2013 – 2019, Map B – City Centre Extract

4.0 PROPOSED DEVELOPMENT

The proposed development consists of complete redevelopment of the Waterford North Quays SDZ site; to create an urban area with new places, amenities and activities for the people of Waterford. Development will include the construction of residential and hotel buildings; along with retail, tourism and office facilities.

The existing access points to the site from the Dock Road are inadequate and present a barrier to future development of the site. As a result, two new access points are required. One at the upper, eastern end of the site from a widened Abbey Road, and the other to the lower, western end of the site by way of a new junction on the Dock Road and a new over bridge to the site. The existing over bridge to the site from the Dock Road needs to be removed but its location provides a potential pedestrian entrance to the site by way of the development of the train and bus interchange planned for the area.

Access to parking, loading and unloading, waste management and all such development related traffic should be contained within the site from an internal "spine" road constructed in a fashion that it would not become a visible feature when viewed from the south quay and not forming a barrier to free pedestrian movement across the site or along the waterfront.

A sustainable transport bridge to accommodate pedestrians, cyclists city centre bus service will connect from the North Quay to the South Quay in the vicinity of the Clock Tower on the South Quay. This bridge will provide:

- direct access to the exiting city centre for pedestrians and cyclists;
- a vital link in the connection of the Waterford Greenway to the proposed New Ross - Waterford Greenway, and
- an opportunity the city centre bus service to connect the extremities of the city centre.

The majority of the development will be accessed via an eastern junction at Abbey Road. The remaining western areas of the site will be accessed via a junction on the R711 Dock Road. Internal access roads will be provided through the site linked to the car parking areas. There will not necessarily be a direct through route for private vehicles between the eastern and western access junctions.

There will be a public transport corridor through the site, along with pedestrian and cycling facilities which will encourage modal shift to sustainable modes of transport.

An overview of the site layout has been provided in **Figure 4.1** below.

Figure 4.1 Proposed Site Layout Plan

5.0 ACCESS STRATEGY

5.1 Pedestrian & Cycle Access

The proximity of the proposed SDZ to the city centre is advantageous in terms of encouraging high uptake of pedestrian and cycle modes. The proposed new sustainable transport bridge is required to integrate the North Quays redevelopment with the City Centre. The bridge is to be located in line with Barronstrand Street/Clock Tower to provide a continuous link connecting the City Centre retail spine to the North Quays and beyond.

The benefits of this bridge will be maximised by providing regular links between the surrounding areas including Ferrybank, Abbeylands and Rockshire to the City Centre. The new and upgraded junctions on the Dock Road will incorporate high quality pedestrian and cycle crossing facilities to the SDZ lands to increase permeability from residential areas to the north and east. The principal pedestrian and cycle access to the site will be provided at the western and eastern junctions. Access will also be available via the proposed greenway along the disused Waterford to New Ross railway line, to the east of the SDZ site. The proposed bridge crossing the River Suir will also provide a pedestrian and cyclist link to the development from Waterford City Centre. This will enable pedestrians and cyclists to avoid the need to travel further west to Rice Bridge and will provide a shortcut to the city centre from the north.

In addition to the proposed sustainable transport bridge at the South Quays Clock Tower, a further downstream pedestrian and cycle connection is recommended as desirable to link the eastern and south-eastern hinterland of Waterford to the North Quays, the wider Ferrybank area and proposed greenway route along the abandoned railway line to New Ross.

The principal circulation route for pedestrians and cyclists within the site will be accommodated along the river front for amenity reasons whilst having suitable connections with the new links to the South Quays & Railway Station. This will be separate from the main vehicular traffic routes on the site.

All of this will enable pedestrians and cyclists to avoid the need to travel further west to Rice Bridge and will provide a shortcut to the City Centre from the north. The potential benefit of this improved accessibility for pedestrians and cyclists is considered in detail in the following sections of this report.

5.2 Public Transport Access

Waterford Plunkett Train Station is located approximately 600 metres from the proposed western entrance junction to the development site, and is serviced by both the Dublin – Waterford, and Waterford – Limerick Junction trains. As part of the development it is proposed to relocate the train station with new platforms immediately adjacent to the SDZ site, to the south of the R711 Dock Road and approximately 800m east of the existing station. Typically, 8 trains arrive from Dublin; and 8 depart for Dublin Heuston each day between Monday and Saturday at 1.5 hours frequency on average, but varying up to 3 hours at off-peak periods. Full details regarding the scheduling of trains stopping in Waterford train station have been provided in **Appendix A**.

Waterford Bus Station is located on the South Quays and will be easily accessible from the site via the proposed new bridge that is to be built over the river as a central feature of the SDZ development. The bus station is currently well serviced, with Bus Éireann providing connections to the surrounding regional area, and further afield. Full details on the buses servicing Waterford Bus Station have been provided in **Appendix B**.

The ability of the bridge to also carry a city centre bus service will greatly reduce the perceived size of the City Centre and make the area manageable and accessible for all.

A transport hub will be provided on Dock Road adjacent the proposed public plaza in the centre of the SDZ site.

5.3 Vehicular Access Strategy

The proposed roads and access infrastructure is illustrated in **Figure 5.1** below. This layout includes the provision of two main traffic access points to the site as follows:

- A new access to the western side of site and signalised junction on Dock Road at the junction of the former Árd Rí Hotel site at Mountmisery. It is a four arm fully signalised junction and the layout includes two full straight ahead lanes on Dock Road, plus turning lanes on each approach into the site. The existing right turn lane on Dock Road for traffic accessing the former hotel site from the eastern approach to the junction is retained.
- A new entrance will be provided at the eastern side of the site onto an upgraded section of Abbey Road. Approximately 300m length of Abbey Road will be realigned and widened commencing to the south of the existing railway bridge and continuing to the intersection with Dock Road. The site will be accessed via a compact roundabout or signalised junction on this realigned section of Abbey Road. The critical junction at this eastern site entrance is the Abbey Road / Dock Road Junction. The existing junction is a priority junction with turning lanes and several splitter islands. It is proposed to upgrade this junction to a compact roundabout or a signalised junction.

The existing level crossing access mid-way along the site is deemed unsuitable for the development of the area and is not included in this Traffic and Transportation

Impact Assessment. The adjoining access to the Bus Éireann Depot from Dock Road will be retained.

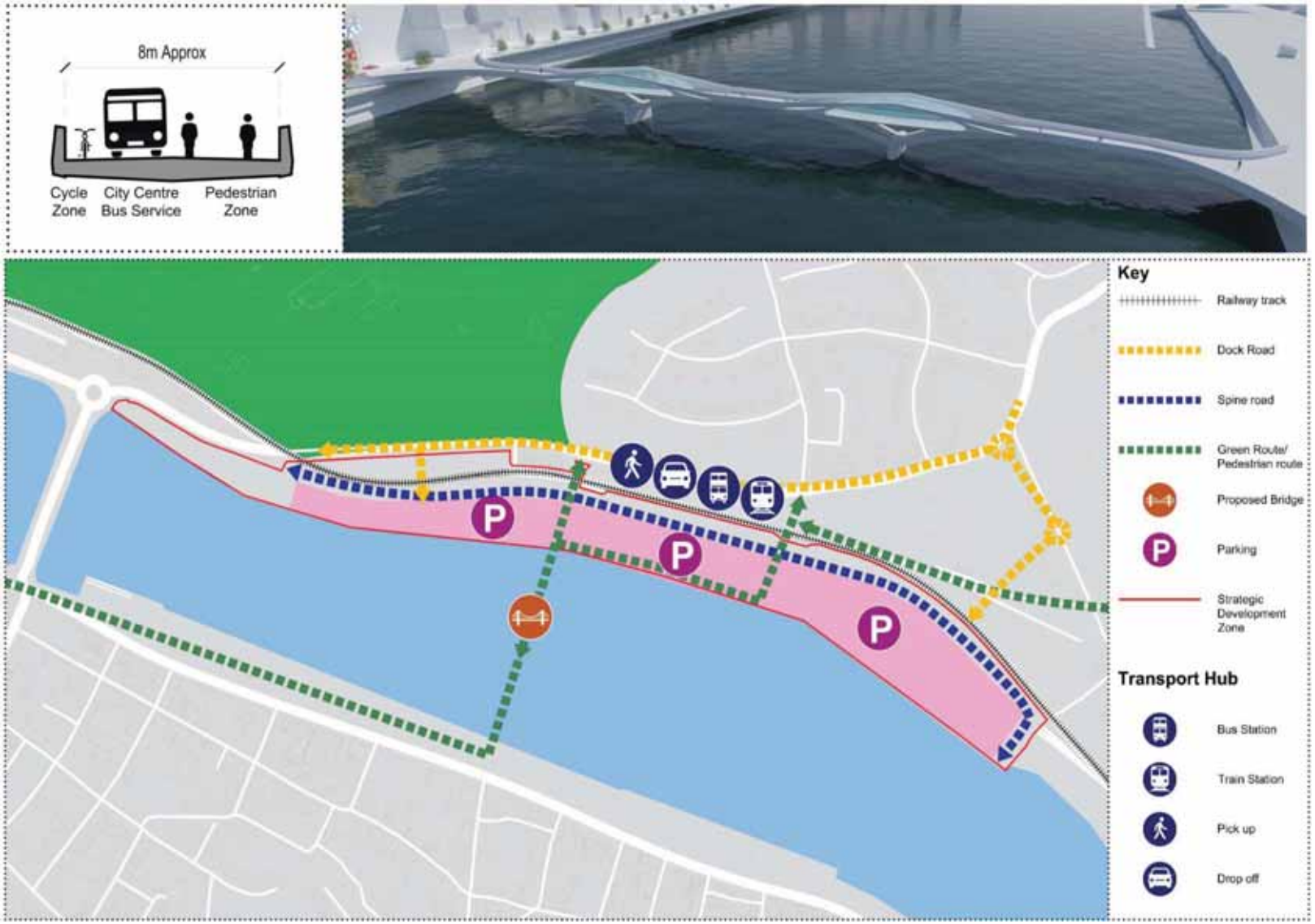


Figure 5.1: Roads Layout and Access Points – Option 9

5.3.1 Internal Circulation

In order to ensure that the development is not used as a 'rat run', there will not necessarily be a through route for private vehicles directly through the site.

5.3.2 Servicing

Service yards will be provided on the lower level, which can be utilised by Heavy Goods Vehicles making deliveries to the buildings on site. These yards will be accessed via the one-way HGV spine road which will run from east to west on the lower level of the development.

Heavy Goods Vehicles to service the site will enter from the Abbey Road access and will traverse in an east to west direction only. A HGV exit will be provided at the western end of the site, where HGV's will exit via the new signalised western access junction. This arrangement will avoid the need for large turning areas for HGV's within the narrow site.

Refuse areas will most likely be located at ground level outside each residential block and office areas, and will most likely be located below ground level adjacent for retail and commercial areas. Refuse trucks will access each area through use of the existing access roads provided on ground level, and via the HGV spine road below ground level. Adequate set down and turning facilities will be provided at each collection point.

5.3.3 Emergency Services Access

Access to all areas of the development site will be available to emergency service vehicles. The road used to access the car parking areas will be suitable for use by emergency service vehicles, as will the public transport section. A further route for emergency service vehicles, running along the promenade area along the river edge, will be developed also.

6.0 CAR PARKING PROVISION

Car parking shall be located on the lower level of the development, and accessed via ramps located at several buildings throughout the development, at plaza level. Underground, the car parking area will be split into a number of sections, and within each section, circulation will be possible.

The Waterford City Development Plan outlines the car parking requirement for each building use, with the parking standards relevant to the City Centre being applied detailed in **Table 6.1** below. The car parking requirement for the development in accordance with the Development plan standards is then described in **Table 6.2**.

Table 6.1 Waterford City Development Plan Car Parking Standards - City Centre Locations

Type of Development	Car Parking Standards
Apartments	1 space per unit
Hotels	1 space per 2 bedrooms
Retail	1 space per 50 sq.m
Offices	1 space per 100 sq.m
Tourism	1 space per 50 sq.m

Table 6.2 Car Parking Requirements for Development Site in Accordance with Waterford City Development Plan

Type of Development	Scale of Development	Required Car Parking Provision
Apartments	300 units	300
Hotels	200 bedrooms	100
Retail	40,000 sq.m	800
Offices	10,000 sq.m	100
Tourism	20,000 sq.m	400
Relocated Train Station		200*
Total parking spaces required		1,900

* based on the current provision at Plunkett Station

It is envisaged that some dual purpose trips may occur, allowing for a potential reduction in the number of parking spaces required. Furthermore, some of the rail station parking may be used for retail at the weekend, as may the office parking also.

Car parking provision can be used as an effective demand management tool, taking into account the location of the site adjacent the City Centre and considering the improvements being made for pedestrians, cyclist and public transport. The challenge will be to limit the commuter parking provision while ensure adequate parking for the residential, tourism and commercial elements.

7.0 TRANSPORT DEMAND GENERATION

7.1 Trip Generation

The TRICS database was used to determine the expected traffic that will be generated by the proposed development during both the AM and PM Peak hours. The database includes data relating to the various proposed land uses in question on the site (Retail, Offices, Apartments, Hotel, Tourism (Conference/Leisure)).

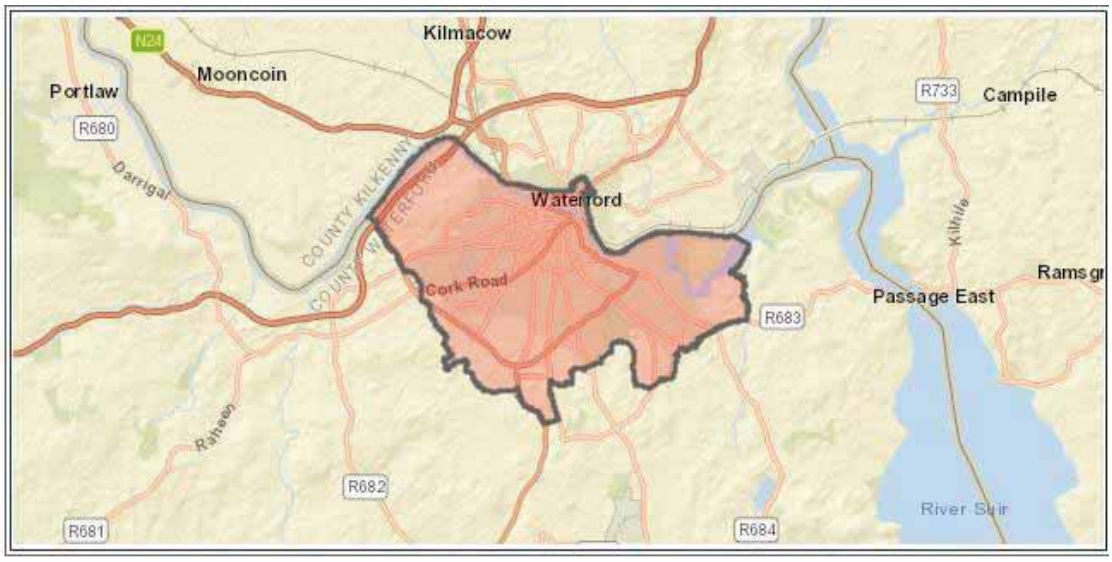
Based on the trip generation rates obtained from the TRICS database (full information on which is provided **Appendix C**), the additional traffic expected to be generated by the proposed development is shown in **Table 7.1** below.

Table 7.1 Development Traffic Generation – Overall Site

Development Type	AM Peak (08:00-09:00)		PM Peak (17:00-18:00)	
	Arrivals	Departures	Arrivals	Departures
Retail	69	29	194	232
Offices	184	30	17	163
Apartments	14	43	30	15
Hotel	22	30	41	32
Tourism (Conference/Leisure)	244	50	57	174
TOTAL	**534**	**181**	**339**	**615**

7.2 Modal Split

Details relating to the travel mode split for the Waterford City area been obtained from the 2011 CSO census data, and a summary is tabulated below. As can be seen in **Table 7.2**, 67.5% of commuters use a car or van as their primary mode of transport, whilst approximately 5% use public transport and a further 22% walk or cycle.



Legal Towns Waterford City (CSO Area Code LT 35004)

Figure 7.1 Waterford City Area (source: CSO SAPMAPS)

Table 7.2 Waterford City (CSO Area Code LT 35004) Modal Split

Population aged 5 years and over by means of travel to work, school or college	Trips	% Split
On Foot	5,507	20.5%
Bicycle	433	1.6%
Bus, Minibus or Coach	1,266	4.7%
Train, DART or LUAS	50	0.2%
Motorcycle or scooter	80	0.3%
Car Driver	1,123	41.3%
Car Passenger	6,337	23.6%
Van	690	2.6%
Other	413	1.5%
Not Stated	1,009	3.7%

The Department for Transport, Tourism and Sport's document, entitled "Smarter Travel – a Sustainable Transport Future", indicates that by 2020, 55% of all commuter based trips will be undertaken by sustainable transport modes such as public transport, cycling and walking; with the remaining 45% of trips being undertaken by private car.

On further inspection of the CSO data there is a clear difference in the modal split between areas north and south of the River Suir, as can be seen in Figures 7.2 and 7.3 below. The area north of the River has a much greater dependence on the car where approximately 75% travel by car compared to 46% for equivalent areas south

of the River. The main difference between these areas is made up from people walking and cycling where the areas north of the River has 15% walking and 1.5% cycling while the equivalent areas south of the River has 41% walking and 2% cycling.

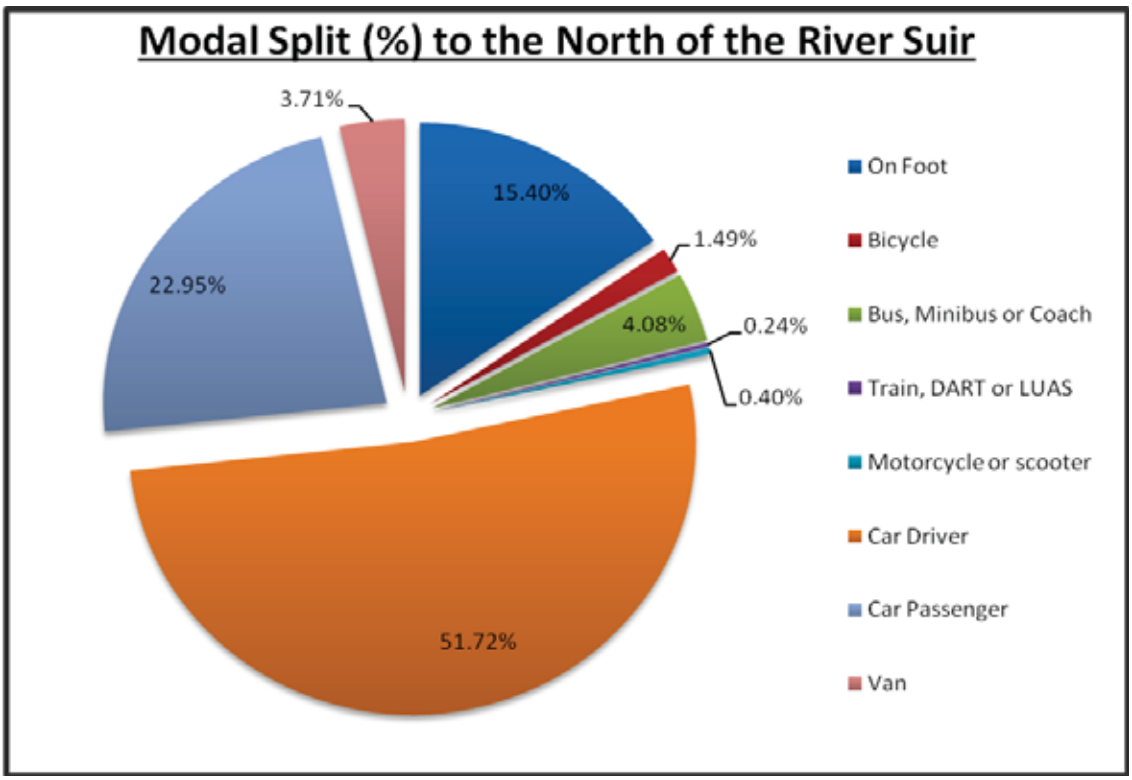


Figure 7.2 Modal Split to North of River

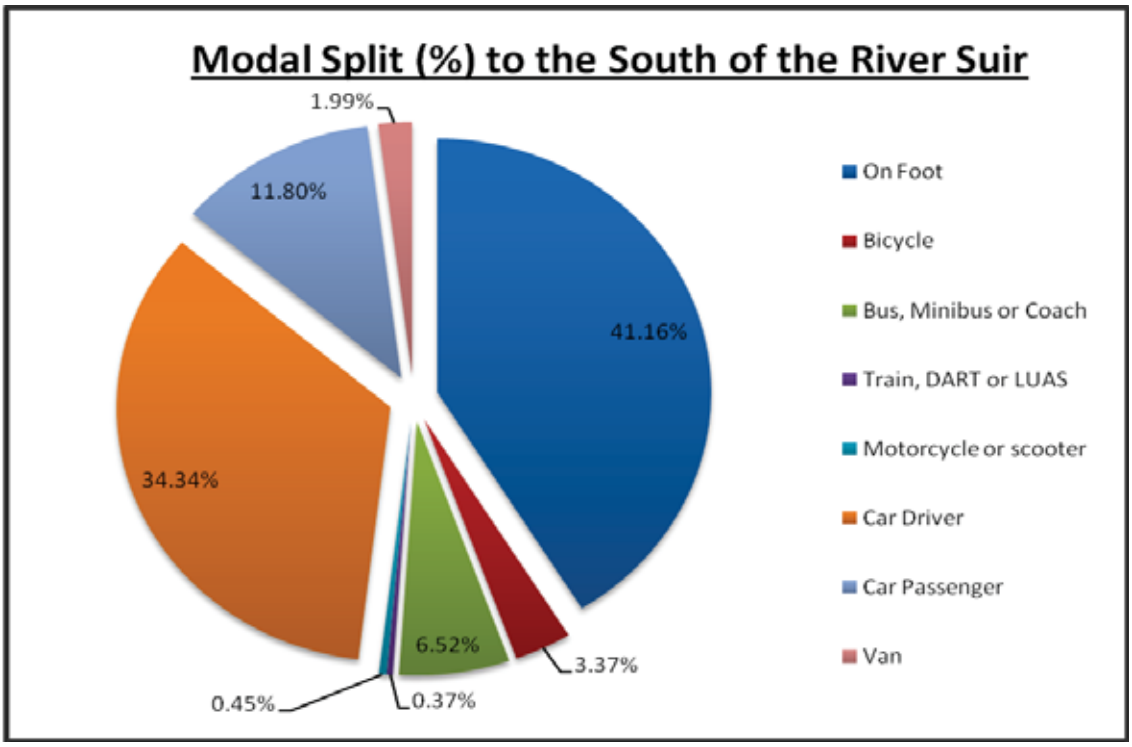
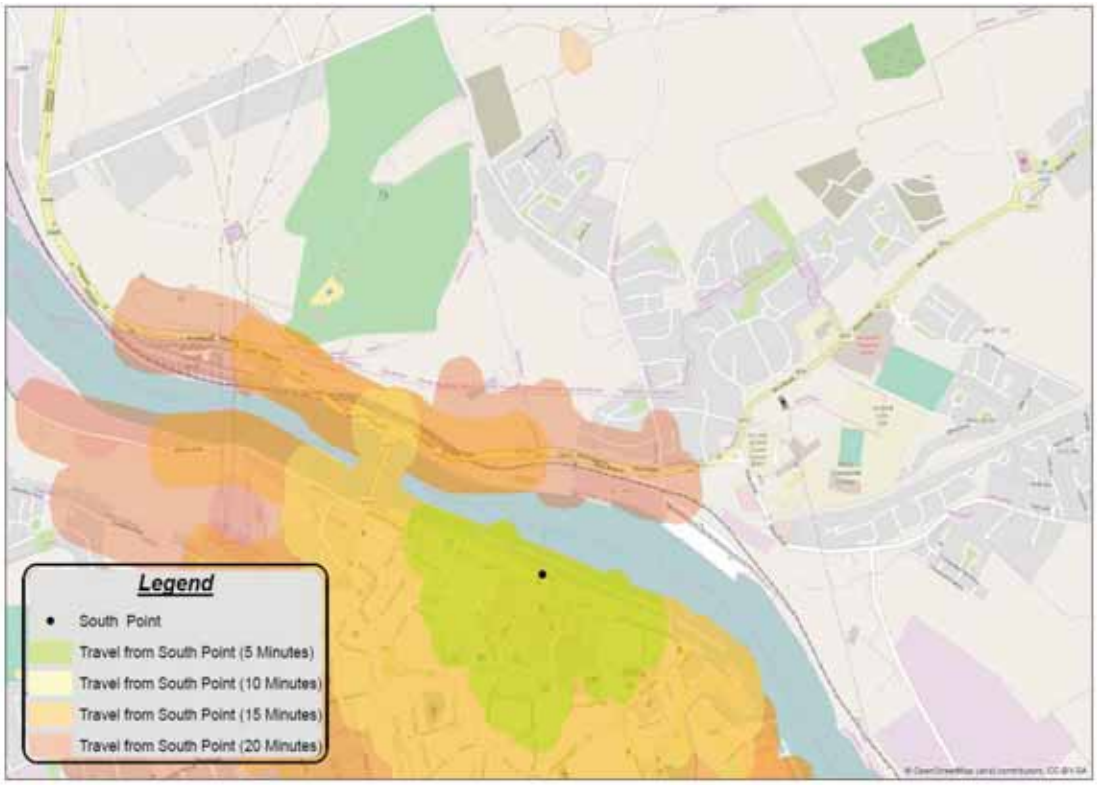


Figure 7.3 Modal Split to South of River

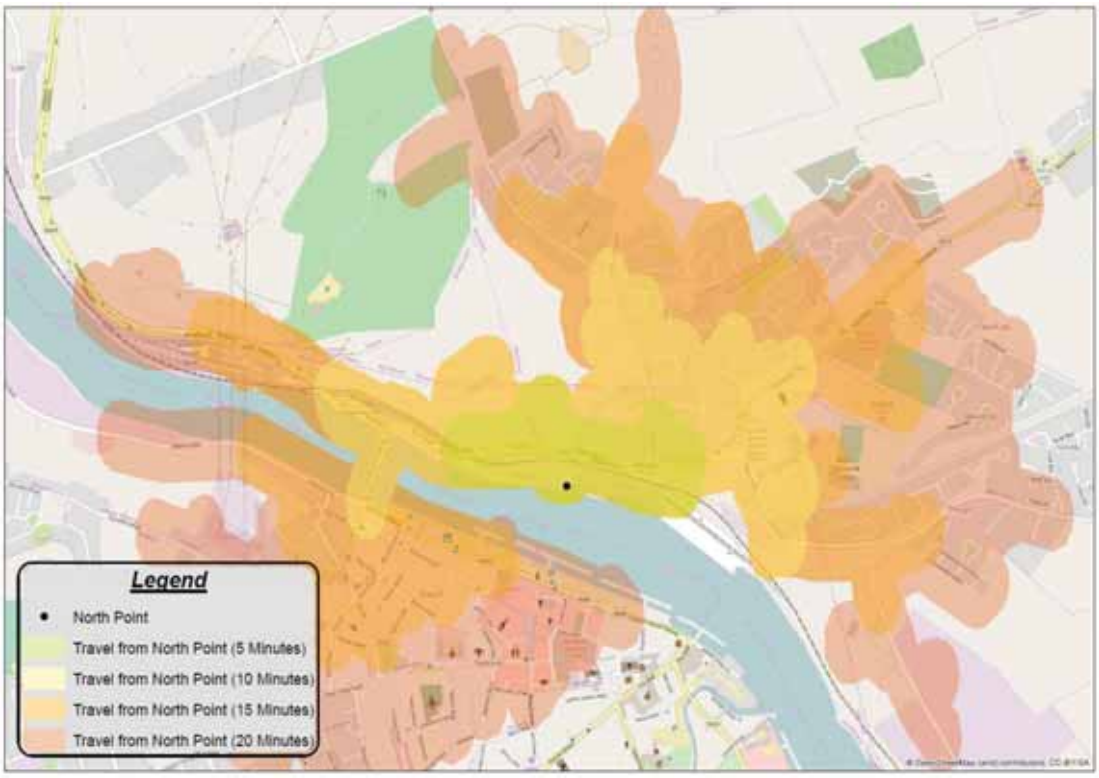
As described in Section 1.4 above, the proximity of the proposed SDZ to the city centre is advantageous in terms of encouraging high uptake of pedestrian and cycle modes where the proposed new sustainable transport bridge will integrate the North Quays redevelopment with the City Centre and provide significantly improved access between the City Centre and the surrounding areas including Ferrybank, Abbeylands and Rockshire to the City Centre.

The overall travel distances for pedestrians and cyclists between the City Centre and these residential areas will be reduced by up to 1km or equivalent to 12-14 minutes' walk or 5 minutes cycle. In additional to providing a much more direct access the proposed bridge and development of the North Quays site will also provide a much more coherent, attractive and comfortable route compared to the existing route via Rice Bridge and along Dock Road.

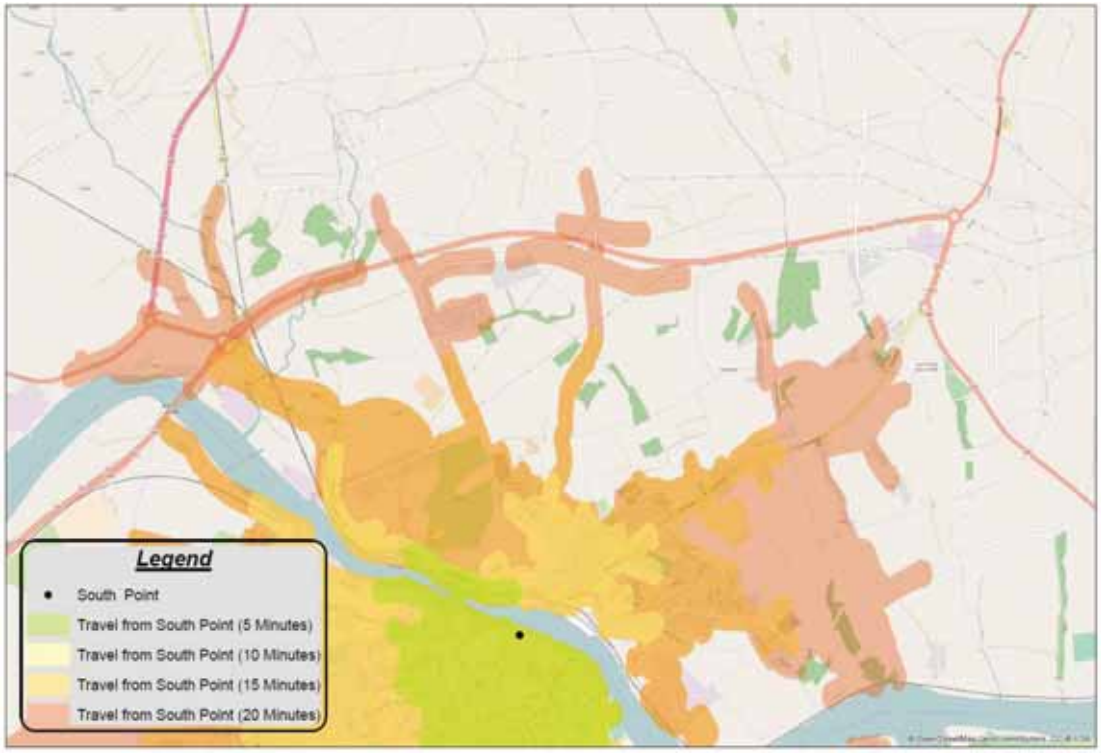
The improvement in walk and cycle accessibility is demonstrated in the isochrone maps below.



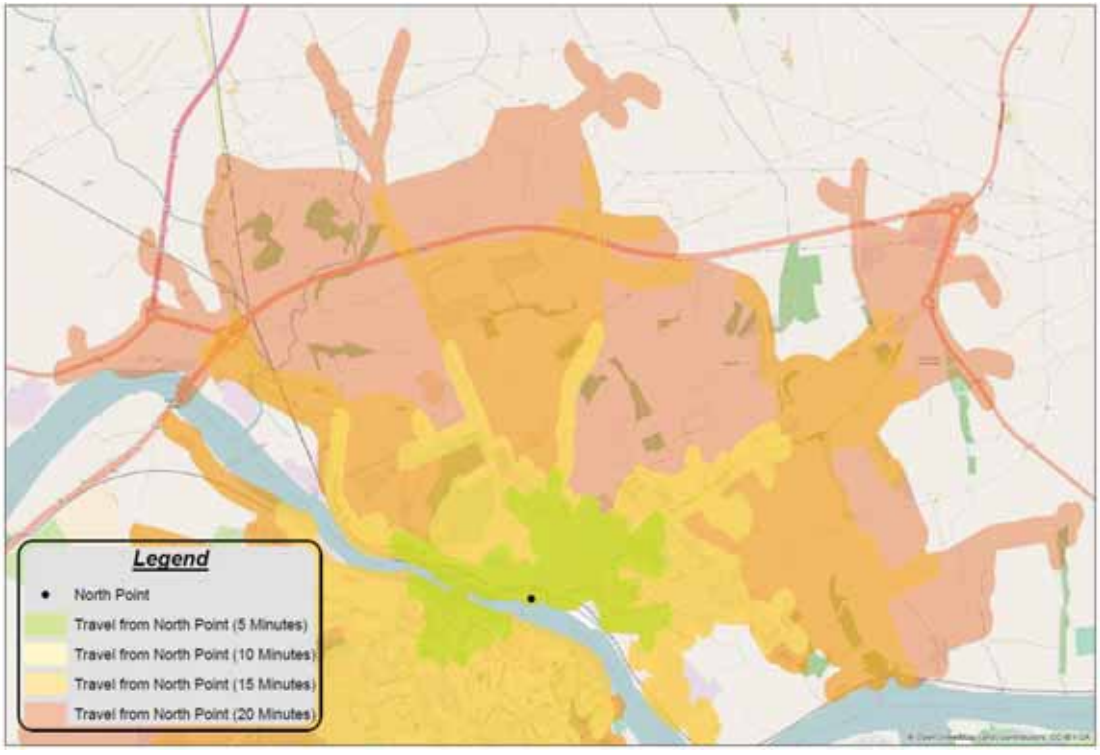
Walking Isochrone Map – Southern Landing Point



Walking Isochrone Map – Northern Landing Point



Cycling Isochrone Map – Southern Landing Point



Cycling Isochrone Map – Northern Landing Point

The potential mode change from car to walking and cycling is significant, where the current population for the areas north of the River Suir that is within walking catchment is approximately 450 people, and cycling catchment is approximately 6,700 people. The construction of the proposed new bridge would potentially increase the walking catchment from the City Centre to the areas north of the River Suir to include a population of approximately 4,000 people, and the cycling

catchment to include 7,400 people. Should there be a mode shift for these areas, equivalent to the areas south of the River Suir, this would equate to 1,300 few car trips at peak times. This potential reduction is traffic would more than offset the traffic generated by the proposed development.

7.3 Traffic Predictions for the Site

The proposed development will be accessed via two main access junctions, the western junction and eastern junction. The current plans provide a single access route to the various car parks without the means for traffic to choose which access route to use. As part of the design development, consideration may be given to providing an internal link road that allows traffic to access each of the car parks from either entrance thereby providing route choice and potential a better distribution of traffic. The volume of traffic accessing at each of these junctions is detailed in **Tables 7.3 and 7.4** below.

Table 7.3 Development Traffic Generation – Accessing via Western Junction

Development Type	AM Peak (8:00-9:00)		PM Peak (17:00-18:00)	
	Arrivals	Departures	Arrivals	Departures
Retail	35	14	97	116
Apartments	7	21	15	8
TOTAL	**42**	**36**	**112**	**124**

Table 7.4 Development Traffic Generation – Accessing via Eastern Junction

Development Type	AM Peak (8:00-9:00)		PM Peak (17:00-18:00)	
	Arrivals	Departures	Arrivals	Departures
Retail	35	14	97	116
Offices	184	30	17	163
Apartments	7	21	15	8
Hotel	22	30	41	32
Tourism (Conference / Leisure)	244	50	57	174
TOTAL	**492**	**145**	**227**	**492**

Access to the extended train station within the development site will bring traffic generated by the station into the development, and this has been included in the analysis. Assuming that the existing schedule of trains will remain the same in each scenario that is being considered, the extra traffic generated due to the train station relocation, along with the total traffic generated from each junction of the site, is outlined in **Table 7.5:**

Table 7.5 Total Traffic Generation per Junction

Site Traffic Generation	AM Peak (8:00-9:00)		PM Peak (17:00-18:00)	
	Arrivals	Departures	Arrivals	Departures
Western Access Junction – Dock Road / Former Hotel Site				
TRICS	42	36	112	124
Train Station	50	-	-	50
Total:	92	36	112	174
Eastern Access Junction – Abbey Road				
TRICS	492	145	227	492
Train Station	50	-	-	50
Total:	542	145	227	542

7.4 Traffic Assignments

The predicted turning movements for traffic generated by the development, and exiting the site via the proposed eastern and western junctions were generated using a combination of the ANPR survey data for the AM and PM Peak hour, and the TRICS data detailed above.

The directional split of the traffic generated from the site is determined to be as follows, in **Table 7.6**:

Table 7.6 Exit Turning Movements for Development Site

Exit Direction	AM Peak		PM Peak	
	%	(veh/hr)	%	(veh/hr)
Exit Point: Western Junction – Dock Road / Former Hotel Site				
R711 Dock Road (West)	58	21	47	81
R711 Dock Road (East)	39	14	51	89
Hotel Entrance	3	1	2	4
Exit Point: Eastern Junction - Abbey Road				
Abbey Road (South)	11	16	15	82
R711 Dock Road (East) via Abbey Road (North)	54	78	37	200
R711 Dock Road (West) via Abbey Road (North)	35	51	48	260

7.5 Traffic Growth

For the purposes of assessing the traffic impacts of the subject site the traffic survey baseline data has been factored up to an opening and design year using expansion factors taken from unit 5.5 'link-based traffic growth forecasting' within the Transport Infrastructure Ireland (TII) Project Appraisal Guidelines (PAG). This is a simplistic approach in the context of the local impact of the proposed development and it is not feasible within the context of this evaluation to take account of more complex future development factors. A wider Strategic Transportation Assessment by Waterford City Council will be required to make provision for likely major urban growth of the northern area of the city suburbs in accordance with the forthcoming National Planning Framework. It is also does not take account of the likely traffic diversion to a proposed new downstream river crossing.

The opening year and design year have been taken as follows:

- Opening year: 2020
- Design year: 2035 (15 years after opening year)

Traffic growth is influenced by the geographical location of the site, as well as by the type of vehicles in question. Growth in heavy vehicles is dependent on different factors to that of growth of light vehicles; which requires that regional growth rates be calculated separately for different vehicle types. Assuming a "Central" (or medium) growth scenario, the following growth factors were determined for both the opening and the design year:

- Opening year (2020): *Growth Factor:* 1.032
- Design year (2035): *Growth Factor:* 1.169

Predicted turning counts at the two critical junctions, for the post development in the opening (2020) and design (2035) year, are shown in Figure 7.4 below.

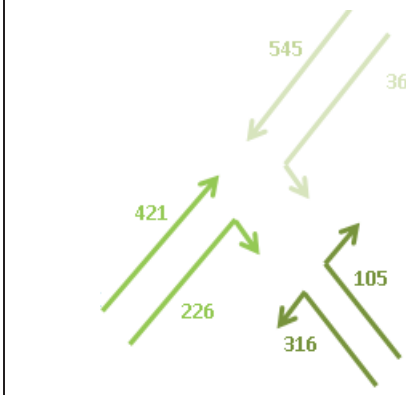
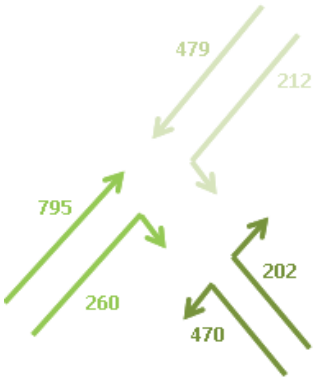
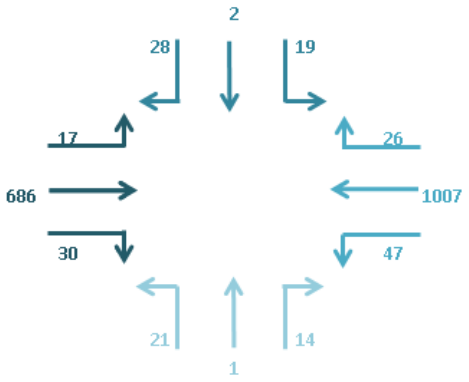
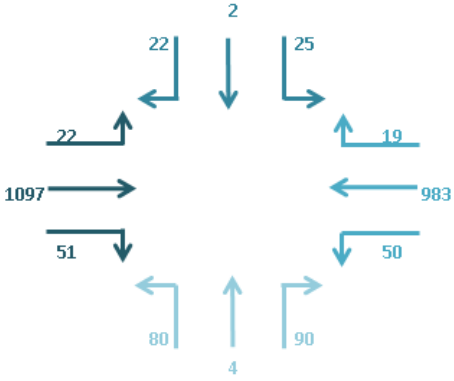
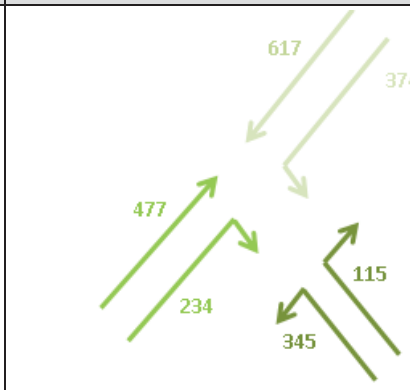
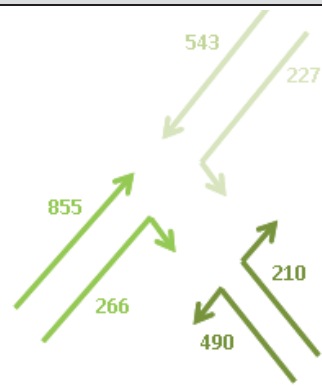
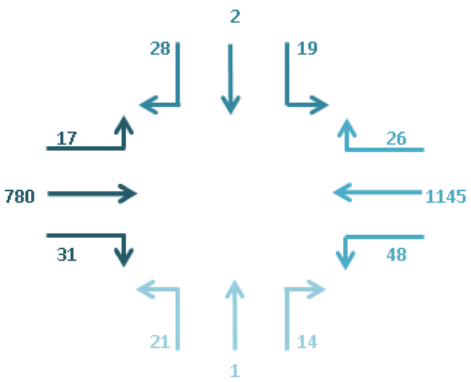
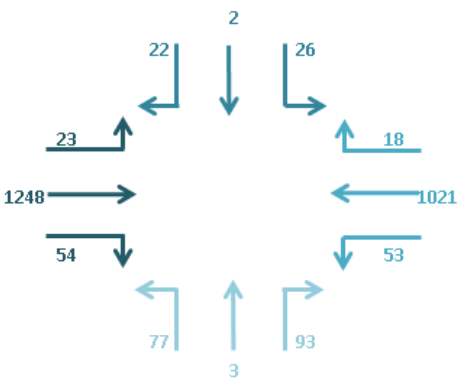
Post-Development Opening Year (2020)		
	AM Peak	**PM Peak**
Eastern Junction Upgraded Dock Road / Abbey Road		
Western Junction New Entrance at Dock Road / Former Hotel Site		
Post-Development Design Year (2035)		
	AM Peak	**PM Peak**
Eastern Junction Upgraded Dock Road / Abbey Road		
Western Junction New Entrance at Dock Road / Former Hotel Site		

Figure 7.4 **Post Development Opening (2019) and Design Year (2034) Junction Turning Movements**

8.0 TRAFFIC IMPACT ANALYSIS

Traffic Capacity Analysis was carried out on both the proposed western and eastern access junction to the development along with immediate adjacent junctions likely to be affected by the development.

8.1 Western Development Access Junction

Lin-Sig was used to analyse the capacity of, the proposed signalised 4-arm western access junction, which will be the new western entrance to the site on Dock Road at the junction of the former hotel site at Mountmisery. Lin-Sig software presents its outputs in terms of Degree of Saturation (DoS) and queuing delay. It is considered good practice to ensure the DoS on any arm of the junction should not exceed 90% as turbulent factors above that threshold may inhibit the optimal performance of the junction.

Analysis was carried out for the base year (2016); opening year (2020) and design year (2035) of the development. Results obtained are outlined in **Table 8.1** below:

Table 8.1: Lin-Sig analysis Results for the Western Site Entrance Junction at Dock Road

Scenario	Flow Time		DoS* (%)	Mean Max. Queue (pcu)
Base Year (2016)	AM Peak	08:00 – 09:00	43.5	7.1 (Dock Road (East), 'Ahead Left' arm)
	PM Peak	17:00 – 18:00	53.9	9.0 (Dock Road (West), 'Ahead Right' arm)
Opening Year (2020)	AM Peak	08:00 – 09:00	44.8	7.4 (Dock Road (East), 'Ahead Right' arm)
	PM Peak	17:00 – 18:00	54.5	9.3 (Dock Road (West), 'Ahead Right' arm)
Design Year (2035)	AM Peak	08:00 – 09:00	50.5	9.0 (Dock Road (East), 'Ahead Right' arm)
	PM Peak	17:00 – 18:00	58.4	11.2 (Dock Road (West), 'Ahead Right' arm)

DoS* - Degree of Saturation

The above results show that the proposed signalised junction at the western site entrance on Dock Road, operating on a 90 second cycle, has more than adequate capacity to accommodate the proposed development with a maximum Degree of Saturation of 58.4% and average maximum queue length of 11.2 pcu in the design year. This indicates that the subject junction could accommodate a greater portion of the overall development traffic, which will allow greater flexibility of route access.

The results of the above Lin-Sig analysis along with flow diagrams are provided in **Appendix D** to this report.

8.2 Upgraded Abbey Road / Dock Road Junction

It is proposed to upgrade the existing Dock Road/Abbey Road junction to the east of the development site to a three armed roundabout or signalised junction in order to provide extra capacity for the anticipated traffic to the eastern access point of the proposed development. As a high proportion of the traffic traversing the junction will be passing through on their route via Dock Road, a bypass slip lane has been

included for straight-ahead in the easterly direction. As this traffic will bypass the junction it has been excluded from the junction analysis.

It is intended to provide pedestrian and cyclist facilities around the perimeter of the roundabout. However, it is not proposed to provide crossing points at the roundabout itself due to the location of crossing facilities in close proximity, situated at the signalised Rockshire Road/Dock Road junction to the west of, and the controlled junction opposite the Church of the Sacred Heart to the east of the proposed roundabout in question. In the case of a signalised traffic junction, pedestrian crossing facilities will be provided.

ARCADY roundabout modelling software was used to assess the proposed roundabout at intersection of Abbey Road / Dock Road Junction, for the base year (2016), opening year (2020), and design year (2035) of the development. ARCADY presents its outputs in terms of Ratio of Flow to Capacity (RFC) and queuing delay. It is considered good practice to ensure the RFC on any arm of a roundabout should not exceed 0.850 (that is to say that the junction should not operate above 85% of its theoretical capacity) as turbulent factors above that threshold may inhibit the optimal performance of the junction.

The results of the ARCADY analysis for the base year, opening year, and design year are presented in **Table 8.2** below.

Table 8.2 ARCADY Results for the Upgraded Abbey Road/Dock Road Junction to the East of the Development Site

	AM Peak (08:00 – 09:00)				PM Peak (17:00 – 18:00)			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
Base Year (2016)								
Arm 1 – Abbey Road	0.36	2.83	0.26	A	0.70	3.44	0.41	A
Arm 2 – Dock Road (West)	0.24	2.15	0.19	A	0.40	2.52	0.28	A
Arm 3 – Dock Road (East)	0.86	3.18	0.46	A	0.55	2.69	0.36	A
Opening Year (2020)								
Arm 1 – Abbey Road	0.37	2.88	0.27	A	0.72	3.50	0.42	A
Arm 2 – Dock Road (West)	0.24	2.16	0.19	A	0.41	2.55	0.29	A
Arm 3 – Dock Road (East)	0.90	3.25	0.47	A	0.58	2.74	0.37	A
Design Year (2035)								
Arm 1 – Abbey Road	0.44	3.13	0.31	A	0.81	3.81	0.45	A
Arm 2 – Dock Road (West)	0.27	2.21	0.21	A	0.44	2.62	0.31	A
Arm 3 – Dock Road (East)	1.08	3.58	0.52	A	0.69	2.94	0.41	A

The results for the proposed roundabout junction at Dock Road / Abbey Road indicate that the junction will operate at 52% of its theoretical capacity and will be able to cater for the extra traffic generated as a result of the proposed development.

The results of the above ARCADY analysis along with flow diagrams are provided in **Appendix D** to this report.

8.3 Eastern Development Access Junction

ARCADY roundabout modelling software was used to assess the 4 arm proposed roundabout located on Abbey Road, which provides access to both the development site and Abbey Community College and other entrances. Analysis was carried out for the base year (2016); opening year (2020) and design year (2035) of the development.

ARCADY presents its outputs in terms of Ratio of Flow to Capacity (RFC) and queuing delay. It is considered good practice to ensure the RFC on any arm of a roundabout should not exceed 0.850 (that is to say that the junction should not operate above 85% of its theoretical capacity) as turbulent factors above that threshold may inhibit the optimal performance of the junction. The analysis results are detailed in **Table 8.3** below.

Table 8.3 ARCADY Results for the Eastern Site Access Roundabout at Abbey Road

	AM Peak (08:00 – 09:00)				PM Peak (17:00 – 18:00)			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
Base Year (2016)								
Arm 1 – Abbey Road (South)	0.83	8.71	0.46	A	0.34	5.13	0.26	A
Arm 2 – Site Entry arm	0.23	5.30	0.19	A	1.95	11.97	0.67	B
Arm 3 – Abbey Road (North)	0.62	3.47	0.38	A	0.45	3.14	0.31	A
Arm 4 – Abbey CC entry arm	0.22	5.58	0.18	A	0.03	4.91	0.03	A
Opening Year (2020)								
Arm 1 – Abbey Road (South)	0.88	8.95	0.47	A	0.35	5.17	0.26	A
Arm 2 – Site Entry arm	0.24	5.34	0.19	A	1.97	12.09	0.67	B
Arm 3 – Abbey Road (North)	0.63	3.49	0.39	A	0.46	3.17	0.31	A
Arm 4 – Abbey CC entry arm	0.22	5.61	0.18	A	0.03	4.94	0.03	A
Design Year (2035)								
Arm 1 – Abbey Road (South)	1.09	9.99	0.53	A	0.42	5.41	0.30	A
Arm 2 – Site Entry arm	0.24	5.51	0.20	A	2.07	12.73	0.68	B
Arm 3 – Abbey Road (North)	0.66	3.57	0.40	A	0.49	3.23	0.33	A
Arm 4 – Abbey CC entry arm	0.23	5.70	0.19	A	0.04	5.01	0.03	A

The results for the proposed roundabout junction on Abbey Road indicate that at maximum, the junction will operate at 68% of its theoretical capacity and will be able to cater for the extra traffic generated as a result of the proposed development.

The results of the above ARCADY analysis along with flow diagrams are provided in **Appendix D** to this report.

8.4 Rockshire Road Junction

Lin-Sig was used to analyse the effect of the traffic generated by the development on the capacity of, and potential delays occurring at, the existing signalised 4-arm Rockshire Road junction on the R711 Dock Road.

Table 8.4 Rockshire Road 2020 Traffic Levels

Traffic utilising Rockshire Road Junction in 2020 Opening Year					
AM Peak Hour (08:00 – 09:00)			PM Peak Hour (17:00 – 18:00)		
Scenario	**Traffic No's**	**% difference**	**Scenario**	**Traffic No's**	**% difference**
Scenario 1: development **has not** occurred	1778 pcu	17.04% increase	Scenario 1: development **has not** occurred	2046 pcu	23.7% increase
Scenario 2: development **has** occurred	2081 pcu		Scenario 2: development **has** occurred	2530 pcu	

The output of the Lin-Sig software is presented in terms of Degree of Saturation (DoS) and queuing delay. Again, it is considered good practice to ensure that the DoS on any arm of the junction does not exceed 90% as turbulent factors above that threshold may inhibit the optimal performance of the junction.

Analysis was carried out for the base year (2016) and opening year (2019) of the junction without development traffic, followed by the base year (2016), opening year (2019) and design year (2034) with development traffic included. A summary of the results obtained are outlined in **Table 8.5** below:

Table 8.5 Lin-Sig Analysis Results for the Existing Rockshire Road Junction of Dock Road

Scenario	Flow Time		DoS* (%)	Mean Max. Queue (pcu)
Base Year (2016) ***without*** development	AM Peak	08:00 – 09:00	78.1	17.0 (Dock Road (West) Entry 'Ahead, Left' arm)
	PM Peak	17:00 – 18:00	80.4	15.4 (Dock Road (East) Entry 'Ahead, Right' arm)
Opening Year (2020) ***without*** development	AM Peak	08:00 – 09:00	83.6	22.5 (Dock Road (West) Entry 'Ahead, Left' arm)
	PM Peak	17:00 – 18:00	82.6	16.3 (Dock Road (East) Entry 'Ahead, Right' arm)
Opening Year (2020) ***with*** development	AM Peak	08:00 – 09:00	86.9	18.9 (Rockshire Road Entry 'Right, Left, Ahead' arm)
	PM Peak	17:00 – 18:00	89.2	21.1 (Dock Road (West) 'Entry, Ahead, Left' arm)
Design Year (2035) ***without*** development	AM Peak	08:00 – 09:00	94.0	30.8 (Dock Road (West) 'Entry, Ahead, Left' arm)
	PM Peak	17:00 – 18:00	85.4	21.0 (Dock Road (East) Entry 'Ahead, Right' arm)
Design Year (2035) ***with*** development	AM Peak	08:00 – 09:00	93.3	23.4 (Rockshire Road Entry 'Right, Left, Ahead' arm)
	PM Peak	17:00 – 18:00	87.6	22.9 (Dock Road (East) Entry 'Ahead, Right' arm)

DoS* - Degree of Saturation

The above results show that considering the extra traffic generated by the development, the existing signalised junction at Rockshire Road, operating on a 120 second cycle, will slightly exceed capacity by 3.3% in the Design Year of 2034 due to general traffic growth along the R711 route towards Waterford City Centre, and without a new eastern orbital relief road and bridge downstream of the city centre.

The maximum degree of saturation of the junction in the design year, assuming that development does not take place, is higher than the scenario in which development takes place, and the maximum queue on an arm is higher also. However, the overall junction would be operating more smoothly across the other arms.

In reality, the vehicular traffic figures will be lower when active and public transport modes are taken into consideration, as well as implementation of the wider transportation objectives in the Waterford City Development Plan.

8.5 Rice Bridge Roundabout

ARCADY roundabout modelling software was used to analyse the effect of the traffic generated by the development on the capacity of, and potential delays occurring at, the existing Rice Bridge Roundabout junction, located to the west of the development site.

Table **8.6** below describes the traffic levels traversing the junction in 2020, the opening year, assuming that the development does not occur, and also assuming that it does, and that a proportionate amount of the extra traffic generated by the development uses the junction. It is apparent that the development will cause a 7.4% increase in traffic using the roundabout in the AM Peak, and a 9% increase in the PM Peak.

Table 8.6 Rice Bridge Roundabout 2020 Traffic Levels

Traffic utilising Rice Bridge Roundabout in 2020 Opening Year					
AM Peak Hour (08:00 – 09:00)			**PM Peak Hour (17:00 – 18:00)**		
Scenario	**Traffic No's**	**% difference**	**Scenario**	**Traffic No's**	**% difference**
Scenario 1: development **has not** occurred	3236 pcu	7.4% increase	Scenario 1: development **has not** occurred	3470 pcu	8.8% increase
Scenario 2: development **has** occurred	3474 pcu		Scenario 2: development **has** occurred	3775 pcu	

The output of ARCADY is presented in terms of Ratio of Flow to Capacity (RFC) and queuing delay. It is considered good practice to ensure the RFC on any arm of a roundabout should not exceed 0.850 (that is to say that the junction should not operate above 85% of its theoretical capacity) as turbulent factors above that threshold may inhibit the optimal performance of the junction.

ARCADY Analysis was carried out for the base year (2016) and opening year (2020) of the junction without development traffic, followed by the base year (2016), opening year (2020) and design year (2035) with development traffic included. The results are presented in **Table 8.7** below

Table 8.7 ARCADY Results for the Rice Bridge Roundabout Junction

	AM Peak (08:00 – 09:00)				PM Peak (17:00 – 18:00)			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
*Base Year (2016) **without** development*								
Arm 1 – R711 Dock Road	2.07	8.46	0.68	A	0.79	3.43	0.44	A
Arm 2 – R680 Rice Bridge	0.40	1.92	0.29	A	1.40	3.30	0.58	A
Arm 3 – R448	3.77	9.23	0.79	A	0.77	4.38	0.44	A
*Opening Year (2020) **without** development*								
Arm 1 – R711 Dock Road	2.48	9.85	0.72	A	0.85	3.57	0.46	A
Arm 2 – R680 Rice Bridge	0.42	1.95	0.30	A	1.52	3.47	0.60	A
Arm 3 – R448	4.60	11.00	0.83	B	0.84	4.66	0.46	A
*Opening Year (2020) **with** development*								
Arm 1 – R711 Dock Road	8.00	26.36	0.90	D	1.76	5.36	0.64	A
Arm 2 – R680 Rice Bridge	0.44	1.98	0.31	A	1.12	2.93	0.53	A
Arm 3 – R448	4.88	11.65	0.84	B	0.84	4.66	0.46	A
*Design Year (2035) **without** development*								
Arm 1 – R711 Dock Road	7.55	27.63	0.90	D	1.16	4.30	0.54	A
Arm 2 – R680 Rice Bridge	0.51	2.08	0.34	A	2.17	4.38	0.69	A
Arm 3 – R448	18.36	39.60	0.97	E	1.31	6.40	0.57	A
*Design Year (2035) **with** development*								
Arm 1 – R711 Dock Road	77.29	186.60	1.13	F	2.11	6.22	0.68	A
Arm 2 – R680 Rice Bridge	0.53	2.10	0.35	A	2.20	4.45	0.69	A
Arm 3 – R448	21.45	45.49	0.98	E	1.31	6.40	0.57	A

8.6 Traffic Analysis Conclusion

The above results highlight the need for a significant mode shift in Waterford from private car to walking, cycling and an upgraded public transport system, as well as the diversion of some traffic to a proposed new downstream river crossing as provided for in the Waterford City Development Plan.

By providing a sustainable transport bridge from Ferrybank to the City Centre the proposed development should encourage a significant modal shift towards walking and cycling from the northern suburbs to the city and thus reduce the traffic volume crossing by Rice Bridge.

At present Rice Bridge forms a bottleneck on the connection from the northern suburban area to the city centre and impedes the provision of an efficient local public transport service. The proposed Waterford North Quays SDZ provides an opportunity to bypass Rice Bridge on a more direct public sustainable transport link in future if an additional public transport only bridge is provided at the eastern end of the site across the river to Reginald's Tower. The site design facilitates such a future link.

APPENDIX A
Train Timetables

ROD
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Comhairle Cathrach
& Contae Phort Láirge
Waterford City
& County Council

Baile Átha Cliath/Port Láirge - Cluain Meala - Gabhal Luimnigh - Gaillimh/Corcaigh/Baile Átha Cliath - Luan go Satharn (gan saoire phoiblí san áireamh) - Bailí ó 20.11.2016 go bhfógrófar a mhalairt

Dublin/Waterford - Clonmel - Limerick Jctn. - Galway/Cork/Dublin - Monday to Saturday (excluding public holidays) - Valid from 20.11.2016 until further notice

★ *Connections to Tralee available.*

1 First Class 2 Standard Class

✕ Restaurant Car or Buffet Bar (Mon to Fri only) ☕ Snacks/Drinks

F First Class on Friday Only.

M First Class Monday to Friday Only

B Bus Link (Route 145) to/from Dublin City Centre L LUAS Tram Link to/from Dublin City Centre

A Bus Link (Route 747) to Dublin Airport P Bus Link (Routes 226/226A) to Cork Airport. T Bus Link (Route 205) to U.C.C. and C.I.T.

🚲 Limited Bicycle accommodation, check www.irishrail.ie. Station platform gates will close 2 minutes prior to departure. Passengers should allow 1 hour transfer time between Connolly and Heuston Stations, when using LUAS or bus services.

NO SERVICE: will operate between Limerick Jctn. and Waterford on Sundays and Public Holidays.		2 MON/SAT	M 2 ✕ ☕ MON/SAT	1 2 ☕ MON/SAT	2 MON/SAT	2 MON/SAT	2 MON/SAT	2 ☕ MON/SAT	2 MON/SAT	1 2 ☕ MON/SAT	1 2 ✕ ☕ MON/SAT	2 MON/SAT	2 MON/SAT
DUBLIN Heuston B L A	**Dep**	....	....	08.00	....	....	....	13.15	....	....	17.00	....	....
Athy	**Dep**	..	..	..	..	..	..	13.58	..	..	..	..	..
Carlow	**Dep**	....	....	....	....	....	....	14.12	....	....	....	....	....
Muine Bheag	**Dep**	..	..	..	..	..	..	14.24	..	..	..	..	..
Kilkenny MacDonagh	**Dep**	....	....	....	....	....	....	14.46	....	....	....	....	....
Thomastown	**Dep**	..	..	..	..	..	..	14.56	..	..	..	..	..
WATERFORD Plunkett	**Dep**	07.20	....	....	....	....	....	15.25	16.25	....	....	....	....
Carrick-on-Suir	**Dep**	07.45	..	..	..	..	..	..	16.50	..	..	..	..
Clonmel	**Dep**	08.08	....	....	....	....	....	....	17.13	....	....	....	....
Cahir	**Dep**	08.25	..	..	..	..	..	..	17.30	..	..	..	..
Tipperary	**Dep**	08.47	....	....	....	....	....	....	17.51	....	....	....	....
Limerick Junction	**Dep**	09.00	09.15	09.33	09.40	..	..	..	18.05	18.17	18.27	18.34	..
LIMERICK Colbert	**Arr**	....	....	....	10.14	....	....	....	....	....	....	18.59	....
LIMERICK Colbert	**Dep**	..	..	..	..	12.30	14.20	..	..	..	..	..	19.45
Sixmilebridge	**Dep**	....	....	....	....	12.51	14.41	....	....	....	....	....	20.06
ENNIS	**Arr**	..	..	..	..	13.09	14.57	..	..	..	..	..	20.23
Gort	**Dep**	....	....	....	....	....	15.20	....	....	....	....	....	20.47
Ardrahan	**Dep**	..	..	..	..	..	15.29	..	..	..	..	..	20.56
Craughwell	**Dep**	....	....	....	....	....	15.37	....	....	....	....	....	21.04
Athenry	**Dep**	..	..	..	..	..	15.53	..	..	..	..	..	21.18
Oranmore	**Dep**	....	....	....	....	....	16.03	....	....	....	....	....	21.29
GALWAY Ceannt	**Arr**	..	..	..	..	..	16.12	..	..	..	..	..	21.40
Charleville	**Dep**	....	....	....	....	....	....	....	....	....	....	....	....
Mallow	**Dep**	..	..	10.07★	..	..	..	..	..	..	19.00★	..	..
CORK Kent P T	**Arr**	....	....	10.35	....	....	....	....	....	....	19.30	....	....
DUBLIN Heuston B L A	**Arr**	..	10.47	..	..	..	..	..	..	20.00	..	..	..

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Gabhal Luimnigh - Cluain Meala - Port Láirge - Luan go Satharn (gan saoire phoiblí san áireamh)
Limerick Jctn. - Clonmel Waterford - Monday to Saturday (excluding public holidays)

Baile Átha Cliath/Corcaigh/Gaillimh - Gabhal Luimnigh - Cluain Meala - Port Láirge/ Baile Átha Cliath - Luan go Satharn (gan saoire phoiblí san áireamh) - Bailí ó 20.11.2016 go bhfógrófar a mhalairt

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NO SERVICE: will operate between Limerick Jctn. and Waterford on Sundays and Public Holidays.			2 MON/SAT	M 2 ✕ ☕ MON/SAT	2 MON/SAT	2 ☕ MON/SAT	1 2 ☕ MON/SAT	2 MON/SAT	2 ☕ MON/SAT	2 MON/SAT	2 MON/SAT	1 2 ☕ MON/SAT	1 2 ✕ ☕ MON/SAT	2 MON/SAT
DUBLIN Heuston	B L A	**Dep**	....	....	....	....	08.00	....	....	....	....	....	17.00	....
CORK Kent	P T	**Dep**	08.00	..	..	..	..	..	..	..	..	17.20	..	..
Mallow		**Dep**	08.25	08.36★	....	....	....	....	....	....	....	17.41★	....	....
Charleville		**Dep**	..	08.52	..	..	..	..	..	..	..	..	..	..
GALWAY Ceannt		**Dep**	....	....	06.20	....	....	....	....	13.45	....	....	....	....
Oranmore		**Dep**	..	..	06.28	..	..	..	..	13.54	..	..	..	..
Athenry		**Dep**	....	....	06.41	....	....	....	....	14.06	....	....	....	....
Craughwell		**Dep**	..	..	06.50	..	..	..	..	14.14	..	..	..	..
Ardrahan		**Dep**	....	....	06.59	....	....	....	....	14.23	....	....	....	....
Gort		**Dep**	..	..	07.16	..	..	..	..	14.32	..	..	..	..
ENNIS		**Dep**	....	....	07.45	....	....	....	....	15.00	....	....	....	....
Sixmilebridge		**Dep**	..	..	08.01	..	..	..	..	15.16	..	..	..	..
LIMERICK Colbert		**Dep**	....	....	08.25	08.55	....	....	....	15.39	17.45	....	....	....
Limerick Junction		**Dep**	..	09.15	..	09.21	09.33	09.45	..	..	18.11	18.17	18.27	18.40
Tipperary		**Dep**	....	....	....	....	....	09.57	....	....	....	....	....	18.52
Cahir		**Dep**	..	..	..	..	..	10.20	..	..	..	..	..	19.15
Clonmel		**Dep**	....	....	....	....	....	10.37	....	....	....	....	....	19.32
Carrick-on-Suir		**Dep**	..	..	..	..	..	11.01	..	..	..	..	..	19.56
WATERFORD Plunkett		**Dep**	....	....	....	....	....	11.26	13.05	....	....	....	....	20.20
Thomastown		**Dep**	..	..	..	..	..	..	13.24	..	..	..	..	..
Kilkenny MacDonagh		**Dep**	....	....	....	....	....	....	13.43	....	....	....	....	....
Muine Bheag		**Dep**	..	..	..	..	..	..	13.57	..	..	..	..	..
Carlow		**Dep**	....	....	....	....	....	....	14.11	....	....	....	....	....
Athy		**Dep**	..	..	..	..	..	..	14.23	..	..	..	..	..
DUBLIN Heuston	B L A	**Arr**	....	10.47	....	10.59	....	....	15.15	....	....	20.00	....	....

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F First Class on Friday Only.

M First Class Monday to Friday Only

B Bus Link (Route 145) to/from Dublin City Centre L LUAS Tram Link to/from Dublin City Centre

A Bus Link (Route 747) to Dublin Airport P Bus Link (Routes 226/226A) to Cork Airport. T Bus Link (Route 205) to U.C.C. and C.I.T.

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		2	2	2★	2★	2	2	2	2	2
		MON/ SAT	MON/ SAT	MON/ SAT	MON/ SAT	FRI ONLY	MON/ SAT	MON/ SAT	MON/ SAT	MON/ FRI
DUBLIN Heuston B L A	**Dep**	07.25	10.15	13.15	15.10	16.15	16.40	17.35	18.35	20.15
Park West & Cherry Orchard	**Dep**	..	..	..	..	..	..	..	..	20.23
Clondalkin Fonthill	**Dep**	....	....	....	....	....	....	....	....	20.27
Adamstown	**Dep**	..	..	..	..	..	..	..	..	20.32
Hazelhatch & Celbridge	**Dep**	....	....	....	....	....	16.55	....	....	20.37
Sallins & Naas	**Dep**	..	..	..	..	..	17.04	17.53	..	20.46
Newbridge	**Dep**	07.47	....	....	15.33	....	....	....	18.58	20.55
Kildare	**Dep**	07.53	10.42	..	15.39	..	17.17	18.06	19.05	21.01
Athy	**Dep**	08.15	10.59	13.58	15.56	17.02	17.35	18.25	19.23	21.16
CARLOW	**Arr**	08.26	11.11	14.10	16.07	17.13	17.47	18.36	19.35	21.28
CARLOW	**Dep**	08.26	11.11	14.12	16.07	17.14	17.47	18.37	19.39	....
Muine Bheag (Bagenalstown)	**Dep**	08.43	11.22	14.24	16.19	..	17.59	18.48	19.50	..
Kilkenny	**Arr**	09.01	11.40	14.41	16.36	....	18.17	19.06	20.08	....
Kilkenny	**Dep**	09.05	11.45	14.46	16.40	..	18.21	19.10	20.13	..
Thomastown	**Dep**	09.16	11.55	14.56	16.51	....	18.31	19.21	20.23	....
WATERFORD Plunkett	**Arr**	09.40	12.20	15.25	17.15	18.10	19.00	19.46	20.48	..

		2	2	2	2
		SUN ONLY	SUN ONLY	SUN ONLY	SUN ONLY
DUBLIN Heuston B L A	**Dep**	09.10	14.10	17.45	18.40
Park West & Cherry Orchard	**Dep**	..	..	..	..
Clondalkin Fonthill	**Dep**	....	....	....	....
Adamstown	**Dep**	..	..	..	..
Hazelhatch & Celbridge	**Dep**	....	....	....	....
Sallins & Naas	**Dep**	..	..	..	..
Newbridge	**Dep**	09.33	14.32	18.07	....
Kildare	**Dep**	09.40	14.39	18.14	19.08
Athy	**Dep**	09.57	14.58	18.32	19.27
CARLOW	**Arr**	10.09	15.10	18.44	19.39
CARLOW	**Dep**	10.11	15.10	18.44	19.39
Muine Bheag (Bagenalstown)	**Dep**	10.25	15.22	18.58	19.51
Kilkenny	**Arr**	10.43	15.41	19.17	20.09
Kilkenny	**Dep**	10.47	15.46	19.21	20.13
Thomastown	**Dep**	10.58	15.56	19.32	20.24
WATERFORD Plunkett	**Arr**	11.20	16.20	19.56	20.50

★ **Consumption of alcohol is NOT permitted on this train on Fridays. Passengers under the influence of alcohol WILL NOT be allowed on board and Passengers who engage in unruly behaviour will be removed from the train.**

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B Bus Link (Route 145) to/from Dublin City Centre L LUAS Tram Link to/from Dublin City Centre A Bus Link (Route 747) to Dublin Airport
Limited Bicycle accommodation, check www.irishrail.ie. Station platform gates will close 2 minutes prior to departure.
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Port Láirge - BÁC - Luan go Domhnach (gan saoire phoiblí san áireamh)
Waterford - Dublin - Monday to Sunday (excluding public holidays)

		2 MON/ FRI	2 MON/ SAT	2 MON/ SAT	2 MON/ SAT	2 MON/ SAT	2 MON/ SAT	2 MON/ SAT	2 FRI & SAT ONLY	2 MON/ SAT	2 MON/ FRI
WATERFORD Plunkett	**Dep**	. . . .	06.00	07.10	07.50	11.00	13.05	14.50	16.00	18.25	. . . .
Thomastown	**Dep**	. .	06.19	. .	08.09	11.19	13.24	15.11	. .	18.46	. .
Kilkenny	**Arr**	. . . .	06.33	. . . .	08.24	11.34	13.39	15.25	. . . .	19.00	. . . .
Kilkenny	**Dep**	. .	06.37	. .	08.28	11.41	13.43	15.30	. .	19.02	. .
Muine Bheag (Bagenalstown)	**Dep**	. . . .	06.51	. . . .	08.46	11.55	13.57	15.45	. . . .	19.21	. . . .
CARLOW	**Arr**	. .	07.03	07.59	08.57	12.07	14.09	15.58	16.51	19.33	. .
CARLOW	**Dep**	06.30	07.03	07.59	08.58	12.07	14.11	16.09	16.52	19.35	21.35
Athy	**Dep**	06.41	07.15	08.12	09.10	12.19	14.23	16.20	17.04	19.49	21.45
Kildare	**Dep**	06.58	07.34	. . . .	09.28	12.37	14.41	16.35	17.21	20.09	22.00
Newbridge	**Dep**	07.04	07.41	08.34	. .	12.43	14.48	. .	. .	. .	22.06
Sallins & Naas	**Dep**	07.13	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	22.13
Hazelhatch & Celbridge	**Dep**	07.21	. .	. .	. .	. .	. .	. .	. .	. .	22.21
Adamstown	**Dep**	07.26	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	22.26
Clondalkin Fonthill	**Dep**	. .	. .	. .	. .	. .	. .	. .	. .	. .	22.30
Park West & Cherry Orchard	**Dep**	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	22.34
DUBLIN Heuston B L A	**Arr**	07.43	08.08	09.01	10.00	13.10	15.15	17.06	17.50	20.40	22.45

		2 SUN ONLY	2★ SUN ONLY	2★ SUN ONLY	2★ SUN ONLY
WATERFORD Plunkett	**Dep**	09.05	12.40	15.10	18.05
Thomastown	**Dep**	09.24	12.59	15.29	18.24
Kilkenny	**Arr**	09.39	13.14	15.45	18.39
Kilkenny	**Dep**	09.43	13.18	15.49	18.43
Muine Bheag (Bagenalstown)	**Dep**	09.57	13.31	16.03	18.57
CARLOW	**Arr**	10.09	13.43	16.14	19.08
CARLOW	**Dep**	10.10	13.43	16.14	19.08
Athy	**Dep**	10.24	13.55	16.26	19.26
Kildare	**Dep**	10.42	14.16	16.44	19.45
Newbridge	**Dep**	10.49	14.23	16.51	19.52
Sallins & Naas	**Dep**	. . . .	. . . .	. . . .	. . . .
Hazelhatch & Celbridge	**Dep**	. .	. .	. .	. .
Adamstown	**Dep**	. . . .	. . . .	. . . .	. . . .
Clondalkin Fonthill	**Dep**	. .	. .	. .	. .
Park West & Cherry Orchard	**Dep**	. . . .	. . . .	. . . .	. . . .
DUBLIN Heuston B L A	**Arr**	11.16	14.50	17.20	20.20

★ **Consumption of alcohol is NOT permitted on this train on Sundays. Passengers under the influence of alcohol WILL NOT be allowed on board and Passengers who engage in unruly behaviour will be removed from the train.**

1 First Class 2 Standard Class ✕ Restaurant Car or Buffet Bar (Mon to Fri only) Snacks/Drinks
B Bus Link (Route 145) to/from Dublin City Centre L LUAS Tram Link to/from Dublin City Centre A Bus Link (Route 747) to Dublin Airport
Limited Bicycle accommodation, check www.irishrail.ie. Station platform gates will close 2 minutes prior to departure.
Passengers should allow 1 hour transfer time between Connolly and Heuston Stations, when using LUAS or bus services.

Iarnród Éireann
Irish Rail

RG '...it's easier on-board'

follow us on ....

APPENDIX B

Bus Routes and Timetables

ROD
ROUGHAN & O'DONOVAN

Comhairle Cathrach
& Contae Phort Láirge
Waterford City
& County Council

Buses Serving Waterford Bus Station

Arrival Time	Service Provider	Route No.	Origin	Days of Service
13:10	*Bus Éireann*	73	Athlone Bus Station	Monday - Saturday
18:55		73	Athlone Bus Station	Monday - Saturday
23:00		73	Longford Rail Station	Sunday
08:30	*Bus Éireann*	355	Cahir	Monday - Saturday
09:50		355	Cahir	Monday - Saturday
12:50		355	Cahir	Monday - Saturday
14:20		355	Clonmel	Monday - Saturday
15:50		355	Clonmel	Monday - Saturday
18:20		355	Clonmel	Monday - Saturday
21:30		355	Cahir	Monday - Saturday
12:50		355	Cahir	Sunday
15:50		355	Clonmel	Sunday
21:30		355	Cahir	Sunday
08:00	*Bus Éireann*	360a	Tramore	Monday - Friday
08:15		360	Tramore	Monday - Friday
09:00		360a	Tramore	Monday - Friday
09:15		360	Tramore	Monday - Friday
09:45		360	Tramore	Monday - Friday
Every 30mins until 19:45		360	Tramore	Monday - Friday
19:45		360	Tramore	Monday - Friday
19:58		360	Tramore	Monday - Friday
20:58		360	Tramore	Monday - Friday
21:58		360	Tramore	Monday - Friday
22:58		360	Tramore	Monday - Friday
23:58		360	Tramore	Monday - Friday
08:45		360	Tramore	Saturday
Every 30 mins until 19:45		360	Tramore	Saturday
19:45		360	Tramore	Saturday
19:58		360	Tramore	Saturday
20:58		360	Tramore	Saturday
21:58		360	Tramore	Saturday
22:58		360	Tramore	Saturday
23:58		360	Tramore	Saturday
08:58		360	Tramore	Sunday
09:58		360	Tramore	Sunday
10:58		360	Tramore	Sunday
11:58		360	Tramore	Sunday

Arrival Time	Service Provider	Route No.	Origin	Days of Service
12:58		360	Tramore	Sunday
13:58		360	Tramore	Sunday
14:45		360	Tramore	Sunday
Every 30mins until 19:15		360	Tramore	Sunday
19:15		360	Tramore	Sunday
19:58		360	Tramore	Sunday
20:58		360	Tramore	Sunday
21:58		360	Tramore	Sunday
22:58		360	Tramore	Sunday
23:58		360	Tramore	Sunday
08:20	*BÉ*	362	Dungarvan	Monday - Saturday
11:05	*BÉ*	365	Thomastown	Thursday
15:00		365	Thomastown	Thursday
17:25	*BÉ*	366	Lismore	Sunday
08:30	*Bus Éireann*	370	Duncannon	Monday - Saturday
08:30		370	Rosslare Europort	Monday - Saturday
13:55		370	Wellington Bridge	Monday - Saturday
16:05		370	Rosslare Europort	Monday - Saturday
17:55		370	Wellington Bridge	Monday - Saturday
19:40	*BÉ*	372	Wexford	Monday - Friday
10:00	*Bus Éireann Expressway*	4	Dublin	Monday - Sunday
12:00		4	Dublin	Monday - Sunday
12:45		4	Dublin	Monday - Sunday
14:00		4	Dublin	Monday - Sunday
16:15		4	Dublin	Monday - Sunday
16:45		4	Dublin	Monday - Sunday
18:00		4	Dublin	Monday - Saturday
18:15		4	Dublin	Monday - Sunday
20:00		4	Dublin	Monday - Sunday
22:00		4	Dublin	Sunday only
22:15		4	Dublin	Monday - Sunday
23:45		4	Dublin	Monday - Sunday
00:55		4	Dublin	Monday - Sunday
02:10		4	Dublin	Monday - Sunday

Arrival Time	Service Provider	Route No.	Origin	Days of Service
08:40	*Bus Éireann Expressway*	40	Rosslare Europort	Sunday
08:45		40	Rosslare Europort	Monday - Saturday
10:20		40	Rosslare Europort	Monday - Saturday
14:25		40	Rosslare Europort	Monday - Sunday
16:05		40	Rosslare Europort	Monday - Sunday
18:20		40	Rosslare Europort	Monday - Sunday
18:25		40	Wexford	Monday - Saturday
20:20		40	Rosslare Europort	Monday - Sunday
10:55		40	Cork	Monday - Saturday
11:55		40	Tralee	Monday - Saturday
11:55		40	Cork	Sunday
12:55		40	Tralee	Monday - Saturday
12:55		40	Cork	Sunday
13:55		40	Tralee	Monday - Saturday
14:55		40	Tralee	Monday - Saturday
14:55		40	Cork	Sunday
15:55		40	Tralee	Monday - Sunday
16:55		40	Tralee	Monday - Saturday
16:55		40	Cork	Sunday
17:55		40	Tralee	Monday - Sunday
18:55		40	Tralee	Monday - Sunday
19:55		40	Cork	Monday - Sunday
20:55		40	Tralee	Monday - Sunday
21:55		40	Cork	Monday - Sunday
22:55		40	Tralee	Monday - Sunday
10:50	*Bus Éireann Expressway*	55	Limerick bus station	Monday - Saturday
11:50		55	Limerick bus station	Monday - Sunday
13:50		55	Limerick bus station	Monday - Sunday
14:50		55	Limerick bus station	Monday - Sunday
16:50		55	Limerick bus station	Monday - Sunday
18:50		55	Limerick bus station	Monday - Sunday
19:50		55	Limerick bus station	Monday - Sunday
20:50		55	Limerick bus station	Monday - Sunday
22:50		55	Limerick bus station	Monday - Sunday

Departure Time	Service Provider	Route No.	Destination	Days of Service
09:40	*Bus Éireann*	73	Athlone Bus Station	Monday - Saturday
15:15		73	Athlone Bus Station	Monday - Saturday
12:15		73	Longford Rail Station	Sunday
06:40	*Bus Éireann*	355	Cahir	Monday - Saturday
09:40		355	Cahir	Monday - Saturday
11:40		355	Clonmel	Monday - Saturday
13:40		355	Clonmel	Monday - Saturday
16:10		355	Clonmel	Monday - Saturday
17:40		355	Carrick on Suir	Monday - Saturday
18:40		355	Cahir	Monday - Saturday
09:40		355	Cahir	Sunday
13:40		355	Clonmel	Sunday
17:40		355	Cahir	Sunday
06:30	*Bus Éireann*	360	Tramore	Monday - Friday
Every 30mins until 19:00		360/360a	Tramore	Monday - Friday
19:00		360	Tramore	Monday - Friday
20:00		360	Tramore	Monday - Friday
21:00		360	Tramore	Monday - Friday
22:00		360	Tramore	Monday - Friday
23:00		360	Tramore	Monday - Friday
07:30		360	Tramore	Saturday
Every 30mins until 19:00		360	Tramore	Saturday
19:00		360	Tramore	Saturday
20:00		360	Tramore	Saturday
21:00		360	Tramore	Saturday
22:00		360	Tramore	Saturday
23:00		360	Tramore	Saturday
08:00		360	Tramore	Sunday
09:00		360	Tramore	Sunday
10:00		360	Tramore	Sunday
11:00		360	Tramore	Sunday
12:00		360	Tramore	Sunday
13:00		360	Tramore	Sunday
Every 30mins until 18:00		360	Tramore	Sunday
18:00		360	Tramore	Sunday
19:00		360	Tramore	Sunday
20:00		360	Tramore	Sunday
21:00		360	Tramore	Sunday
22:00		360	Tramore	Sunday

Departure Time	Service Provider	Route No.	Destination	Days of Service
23:00		360	Tramore	Sunday
16:30	BÉ	362	Dungarvan	Monday - Saturday
09:30	BÉ	365	Thomastown	Thursday
13:30		365	Thomastown	Thursday
10:00	Bus Éireann	370	Rosslare Europort	Monday - Saturday
11:20		370	Wellington Bridge	Monday - Saturday
15:20		370	Wellington Bridge	Monday - Saturday
17:30		370	Rosslare Europort	Monday - Saturday
18:00		370	Duncannon	Monday - Saturday
17:40	BÉ	372	Wexford	Monday - Friday
02:00	Bus Éireann Expressway	4	Dublin	Monday - Sunday
05:00		4	Dublin	Monday - Sunday
06:00		4	Dublin	Monday - Sunday
07:00		4	Dublin	Monday - Sunday
09:00		4	Dublin	Monday - Sunday
10:00		4	Dublin	Monday - Sunday
11:00		4	Dublin	Monday - Sunday
13:00		4	Dublin	Monday - Sunday
15:00		4	Dublin	Monday - Sunday
17:00		4	Dublin	Monday - Sunday
18:00		4	Dublin	Monday - Sunday
19:30		4	Dublin	Sunday only
20:00		4	Dublin	Monday - Sunday
08:00	Bus Éireann Expressway	40	Cork	Monday - Saturday
09:00		40	Tralee	Monday - Saturday
09:00		40	Cork	Sunday
10:00		40	Tralee	Monday - Sunday
11:00		40	Tralee	Monday - Sunday
12:00		40	Tralee	Monday - Saturday
13:00		40	Tralee	Monday - Sunday
14:00		40	Tralee	Monday - Sunday
15:00		40	Tralee	Monday - Sunday
16:00		40	Cork	Monday - Sunday
17:00		40	Cork	Sunday

Departure Time	Service Provider	Route No.	Destination	Days of Service
18:00		40	Tralee	Monday - Sunday
19:30		40	Cork	Monday - Sunday
21:00		40	Cork	Monday - Sunday
07:00		40	Rosslare Europort	Monday - Sunday
09:00		40	Wexford	Monday - Saturday
11:30		40	Rosslare Europort	Monday - Saturday
13:15		40	Rosslare Europort	Monday - Sunday
15:00		40	Rosslare Europort	Sunday
16:30		40	Wexford	Monday - Sunday
19:30		40	Rosslare Europort	Monday - Sunday
07:40	*Bus Éireann Expressway*	55	Limerick bus station	Monday - Saturday
08:40		55	Limerick bus station	Monday - Sunday
10:40		55	Limerick bus station	Monday - Sunday
12:40		55	Limerick bus station	Monday - Sunday
14:40		55	Limerick bus station	Sunday
15:40		55	Limerick bus station	Sunday
16:40		55	Limerick bus station	Monday - Sunday
17:40		55	Limerick bus station	Monday - Saturday
18:40		55	Limerick bus station	Sunday
20:50		55	Limerick bus station	Monday - Sunday

APPENDIX C
Trip Generation Data

ROD
ROUGHAN & O'DONOVAN

Comhairle Cathrach
& Contae Phort Láirge
Waterford City
& County Council

Waterford North Quays Traffic Data

Development Details			*Trics Information*											
Development Type	Development		TRICS Land Use	AM Peak (8:00-9:00)						PM Peak (17:00-18:00)					
				Arrival			Departure			Arrival			Departure		
	Scale	Unit		Rate	Unit	Vehicles	Rate	Unit	Vehicles	Rate	Unit	Vehicles	Rate	Unit	Vehicles
Retail	40000	m2	Retail - Mixed Shopping Malls	0.173	veh/100sqm	69	0.072	veh/100sqm	29	0.485	veh/100sqm	194	0.581	veh/100sqm	232
Offices	10000	m2	Employment - Office	1.841	veh/100sqm	184	0.301	veh/100sqm	30	0.17	veh/100sqm	17	1.626	veh/100sqm	163
Apartments	300	units	Residential - Flats Privately Owned	0.048	veh/1dwelling	14	0.142	veh/1dwelling	43	0.101	veh/1dwelling	30	0.05	veh/1dwelling	15
Hotel	200	bedrooms	Hotel	0.11	veh/1bedroom	22	0.148	veh/1bedroom	30	0.204	veh/1bedroom	41	0.159	veh/1bedroom	32
Tourism (Conference/Leisure)	20000	m2	Leisure - Exhibition Centre	1.221	veh/100sqm	244	0.25	veh/100sqm	50	0.284	veh/100sqm	57	0.868	veh/100sqm	174
TOTAL						**534**			**181**			**339**			**615**

TRICS Descriptions

01 - Retail

01/I – Shopping Centre (local shops) (GDO use class A1)

A collection of small local shops within close proximity, possibly with shared parking facilities. Would include a superstore with accompanying small shops if the small shops exceed 15% of the total floor space of the site. If the shops are within one building include as 01/M. If the separate shops are superstores include as 01/J or 01/K. Trip rates are calculated by Gross Floor Area, Retail Floor Area, or Employees.

01/M – Mixed Shopping Malls (GDO use class A1)

A collection of shops within a single building, possibly with shared parking facilities. Would include a superstore with accompanying small shops if the small shops exceed 15% of the total floor space of the site. If the shops are not all within one building include as 01/I. If the separate shops are superstores include as 01/J or 01/K. Trip rates are calculated by Gross Floor Area, Retail Floor Area, or Employees.

02 - Employment

02/A – Office (GDO use class B1)

Single office building. May include a number of different organisations within the same building. If there is more than one building, then only include if the buildings belong to the same organisation. If there are different buildings for separate organisations then include as 02/B. Trip rates are calculated by Gross Floor Area, or Employees.

03 - Residential

03/C – Flats Privately Owned (GDO use class C3)

Housing developments where at least 75% of households are privately owned. Of the total number of units, 75% must also be flats (sum of flats in blocks and "split" houses), with no more than 25% of the total units being "non-split" houses. Includes properties that are privately owned and then privately rented. Trip rates are calculated by Site Area, Dwellings, Housing Density, or Total Bedrooms.

03/D – Affordable/Local Authority Flats (GDO use class C3)

Housing developments where at least 75% of households are non-privately owned. Of the total number of units, 75% must also be flats (sum of flats in blocks and "split" houses), with no more than 25% of the total units being "non-split" houses. "Non-privately owned" may be council rented or housing association rented/part-owned. Trip rates are calculated by Site Area, Dwellings, Housing Density, or Total Bedrooms.

06 - Hotel, Food and Drink

06/A – Hotel (GDO use class C1)

Hotels, guest houses and B&B's. Trip rates are calculated by Gross Floor Area, Bedrooms, or Employees.

07 - Leisure

07/S – Exhibition Centre (GDO use class D1)

Dedicated centre for hosting exhibitions and conferences. Trip rates are calculated by Gross Floor Area, Site Area, Employees, or Parking Spaces.

Calculation Reference: AUDIT-357901-170504-0553

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 01 - RETAIL
Category : M - MIXED SHOPPING MALLS

VEHICLES

Selected regions and areas:

05	**EAST MIDLANDS**		
	DS	DERBYSHIRE	1 days
08	**NORTH WEST**		
	LC	LANCASHIRE	1 days
14	**LEINSTER**		
	KK	KILKENNY	1 days
17	**ULSTER (NORTHERN IRELAND)**		
	AN	ANTRIM	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Gross floor area
Actual Range:	13556 to 37000 (units: sqm)
Range Selected by User:	482 to 37000 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/00 to 15/12/12

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Wednesday	2 days
Thursday	1 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	4 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centre	1
Edge of Town Centre	1
Edge of Town	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	2
Built-Up Zone	1
High Street	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

A1	4 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

15,001 to 20,000	2 days
20,001 to 25,000	1 days
25,001 to 50,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

75,001 to 100,000	1 days
125,001 to 250,000	3 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	4 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Petrol filling station:

Included in the survey count	0 days
Excluded from count or no filling station	4 days

This data displays the number of surveys within the selected set that include petrol filling station activity, and the number of surveys that do not.

Travel Plan:

Not Known	1 days
No	3 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 **AN-01-M-01** **SHOPPING MALL** **ANTRIM**
BALLYCLARE ROAD
GLENGORMLEY
BELFAST
Edge of Town
Residential Zone
Total Gross floor area: 13556 sqm
Survey date: FRIDAY *14/06/02* *Survey Type: MANUAL*

2 **DS-01-M-01** **SHOPPING CENTRE** **DERBYSHIRE**
PARK FARM DRIVE
ALLESTREE
DERBY
Edge of Town
Residential Zone
Total Gross floor area: 18500 sqm
Survey date: WEDNESDAY *19/09/12* *Survey Type: MANUAL*

3 **KK-01-M-01** **SHOPPING MALL** **KILKENNY**
CASTLECOMER ROAD

KILKENNY
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 18600 sqm
Survey date: THURSDAY *27/11/08* *Survey Type: MANUAL*

4 **LC-01-M-01** **SHOPPING CENTRE** **LANCASHIRE**
LUNE STREET

PRESTON
Town Centre
High Street
Total Gross floor area: 37000 sqm
Survey date: WEDNESDAY *09/05/12* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
DL-01-M-01	0
DL-01-M-02	0
ES-01-M-02	re

TRIP RATE for Land Use 01 - RETAIL/M - MIXED SHOPPING MALLS

VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

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	18600	0.011	1	18600	0.000	1	18600	0.011
07:00 - 08:00	2	18550	0.156	2	18550	0.051	2	18550	0.207
08:00 - 09:00	3	24700	0.173	3	24700	0.072	3	24700	0.245
09:00 - 10:00	4	21914	0.455	4	21914	0.170	4	21914	0.625
10:00 - 11:00	4	21914	0.504	4	21914	0.345	4	21914	0.849
11:00 - 12:00	4	21914	0.589	4	21914	0.400	4	21914	0.989
12:00 - 13:00	4	21914	0.618	4	21914	0.605	4	21914	1.223
13:00 - 14:00	4	21914	0.578	4	21914	0.645	4	21914	1.223
14:00 - 15:00	4	21914	0.567	4	21914	0.590	4	21914	1.157
15:00 - 16:00	4	21914	0.516	4	21914	0.564	4	21914	1.080
16:00 - 17:00	4	21914	0.525	4	21914	0.588	4	21914	1.113
17:00 - 18:00	4	21914	0.485	4	21914	0.581	4	21914	1.066
18:00 - 19:00	4	21914	0.496	4	21914	0.526	4	21914	1.022
19:00 - 20:00	**3**	**16885**	**0.695**	3	16885	0.837	3	16885	1.532
20:00 - 21:00	2	16028	0.636	**2**	**16028**	**1.226**	**2**	**16028**	**1.862**
21:00 - 22:00	1	18500	0.022	1	18500	0.086	1	18500	0.108
22:00 - 23:00	1	18500	0.016	1	18500	0.032	1	18500	0.048
23:00 - 24:00									
Total Rates:			7.042			7.318			14.360

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

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

Parameter summary

Trip rate parameter range selected:	13556 - 37000 (units: sqm)
Survey date date range:	01/01/00 - 15/12/12
Number of weekdays (Monday-Friday):	4
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	3

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

Calculation Reference: AUDIT-357901-170504-0541

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : A - OFFICE

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	HC	HAMPSHIRE	1 days
03	**SOUTH WEST**		
	DC	DORSET	1 days
04	**EAST ANGLIA**		
	CA	CAMBRIDGESHIRE	1 days
	SF	SUFFOLK	1 days
10	**WALES**		
	SW	SWANSEA	1 days
13	**MUNSTER**		
	CR	CORK	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 6483 to 11664 (units: sqm)
Range Selected by User: 6000 to 14000 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/07 to 23/06/14

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Thursday	2 days
Friday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	6 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town Centre	3
Edge of Town	3

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Commercial Zone	3
Development Zone	1
Built-Up Zone	1
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category

Filtering Stage 3 selection:

Use Class:

B1	6 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

5,001 to 10,000	2 days
10,001 to 15,000	2 days
15,001 to 20,000	1 days
25,001 to 50,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	1 days
125,001 to 250,000	5 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

1.1 to 1.5	4 days
1.6 to 2.0	2 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	2 days
No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 **CA-02-A-04** **OFFICE** **CAMBRIDGESHIRE**
BRETTON WAY

PETERBOROUGH
Edge of Town
Commercial Zone
Total Gross floor area: 6483 sqm
Survey date: THURSDAY *20/10/11* *Survey Type: MANUAL*

2 **CR-02-A-01** **STATISTICS OFFICES** **CORK**
MAHON CRESCENT

CORK
Edge of Town
No Sub Category
Total Gross floor area: 8600 sqm
Survey date: MONDAY *23/06/14* *Survey Type: MANUAL*

3 **DC-02-A-09** **COUNCIL OFFICES** **DORSET**
THE GROVE

DORCHESTER
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 11664 sqm
Survey date: MONDAY *28/11/11* *Survey Type: MANUAL*

4 **HC-02-A-09** **ERICSON** **HAMPSHIRE**
MAPLEWOOD
CHINEHAM BUSINESS PARK
BASINGSTOKE
Edge of Town
Commercial Zone
Total Gross floor area: 9000 sqm
Survey date: THURSDAY *22/11/07* *Survey Type: MANUAL*

5 **SF-02-A-02** **OFFICES** **SUFFOLK**
BATH STREET

IPSWICH
Edge of Town Centre
Commercial Zone
Total Gross floor area: 6505 sqm
Survey date: FRIDAY *19/07/13* *Survey Type: MANUAL*

6 **SW-02-A-01** **OFFICES** **SWANSEA**
LANGDON ROAD

SWANSEA
Edge of Town Centre
Development Zone
Total Gross floor area: 6630 sqm
Survey date: FRIDAY *25/10/13* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
CI-02-A-02	population
CN-02-A-02	population
DL-02-A-04	Population
GC-02-A-01	Population
GC-02-A-02	Population
MS-02-A-01	Population
TW-02-A-03	Population
WM-02-A-02	Population
WM-02-A-03	Population

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

VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	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									
06:30 - 07:00									
07:00 - 07:30	6	8147	0.205	6	8147	0.016	6	8147	0.221
07:30 - 08:00	6	8147	0.826	6	8147	0.137	6	8147	0.963
08:00 - 08:30	6	8147	0.914	6	8147	0.123	6	8147	1.037
08:30 - 09:00	**6**	**8147**	**0.927**	6	8147	0.178	**6**	**8147**	**1.105**
09:00 - 09:30	6	8147	0.816	6	8147	0.149	6	8147	0.965
09:30 - 10:00	6	8147	0.552	6	8147	0.162	6	8147	0.714
10:00 - 10:30	6	8147	0.299	6	8147	0.178	6	8147	0.477
10:30 - 11:00	6	8147	0.270	6	8147	0.110	6	8147	0.380
11:00 - 11:30	6	8147	0.217	6	8147	0.182	6	8147	0.399
11:30 - 12:00	6	8147	0.205	6	8147	0.170	6	8147	0.375
12:00 - 12:30	6	8147	0.149	6	8147	0.143	6	8147	0.292
12:30 - 13:00	6	8147	0.192	6	8147	0.262	6	8147	0.454
13:00 - 13:30	6	8147	0.254	6	8147	0.241	6	8147	0.495
13:30 - 14:00	6	8147	0.231	6	8147	0.168	6	8147	0.399
14:00 - 14:30	6	8147	0.278	6	8147	0.143	6	8147	0.421
14:30 - 15:00	6	8147	0.180	6	8147	0.180	6	8147	0.360
15:00 - 15:30	6	8147	0.123	6	8147	0.215	6	8147	0.338
15:30 - 16:00	6	8147	0.106	6	8147	0.309	6	8147	0.415
16:00 - 16:30	6	8147	0.115	6	8147	0.673	6	8147	0.788
16:30 - 17:00	6	8147	0.108	6	8147	0.708	6	8147	0.816
17:00 - 17:30	6	8147	0.092	**6**	**8147**	**1.004**	6	8147	1.096
17:30 - 18:00	6	8147	0.078	6	8147	0.622	6	8147	0.700
18:00 - 18:30	6	8147	0.047	6	8147	0.565	6	8147	0.612
18:30 - 19:00	6	8147	0.008	6	8147	0.182	6	8147	0.190
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			7.192			6.820			14.012

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

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

Parameter summary

Trip rate parameter range selected:	6483 - 11664 (units: sqm)
Survey date date range:	01/01/07 - 23/06/14
Number of weekdays (Monday-Friday):	6
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	9

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

Calculation Reference: AUDIT-357901-170504-0504

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : C - FLATS PRIVATELY OWNED

VEHICLES

Selected regions and areas:

01	**GREATER LONDON**		
	KI	KINGSTON	1 days
	KN	KENSINGTON AND CHELSEA	1 days
02	**SOUTH EAST**		
	SC	SURREY	1 days
08	**NORTH WEST**		
	GM	GREATER MANCHESTER	1 days
15	**GREATER DUBLIN**		
	DL	DUBLIN	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of dwellings
Actual Range: 132 to 372 (units:)
Range Selected by User: 100 to 530 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/07 to 25/06/14

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	2 days
Thursday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centre	1
Edge of Town Centre	3
Edge of Town	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	2
Built-Up Zone	1
No Sub Category	2

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

C3	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

15,001 to 20,000	1 days
20,001 to 25,000	1 days
25,001 to 50,000	2 days
50,001 to 100,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

250,001 to 500,000	1 days
500,001 or More	4 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	3 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 **DL-03-C-07** **BLOCKS OF FLATS** **DUBLIN**
SANDYFORD ROAD
DUNDRUM
DUBLIN
Edge of Town
No Sub Category
Total Number of dwellings: 372
Survey date: TUESDAY *11/05/10* *Survey Type: MANUAL*

2 **GM-03-C-02** **BLOCK OF FLATS** **GREATER MANCHESTER**
WHITWORTH STREET W.

MANCHESTER
Town Centre
Built-Up Zone
Total Number of dwellings: 154
Survey date: THURSDAY *13/10/11* *Survey Type: MANUAL*

3 **KI-03-C-02** **BLOCK OF FLATS** **KINGSTON**
SOPWITH WAY

KINGSTON UPON THAMES
Edge of Town Centre
No Sub Category
Total Number of dwellings: 132
Survey date: MONDAY *14/06/10* *Survey Type: MANUAL*

4 **KN-03-C-02** **BLOCK OF FLATS** **KENSINGTON AND CHELSEA**
BECKFORD CLOSE

SOUTH KENSINGTON
Edge of Town Centre
Residential Zone
Total Number of dwellings: 294
Survey date: TUESDAY *15/06/10* *Survey Type: MANUAL*

5 **SC-03-C-01** **FLATS** **SURREY**
HEATHCOTE ROAD

CAMBERLEY
Edge of Town Centre
Residential Zone
Total Number of dwellings: 140
Survey date: MONDAY *21/07/08* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

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

VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	5	218	0.023	5	218	0.100	5	218	0.123
08:00 - 09:00	5	218	0.048	**5**	**218**	**0.142**	5	218	0.190
09:00 - 10:00	5	218	0.047	5	218	0.065	5	218	0.112
10:00 - 11:00	5	218	0.031	5	218	0.036	5	218	0.067
11:00 - 12:00	5	218	0.044	5	218	0.034	5	218	0.078
12:00 - 13:00	5	218	0.035	5	218	0.045	5	218	0.080
13:00 - 14:00	5	218	0.040	5	218	0.048	5	218	0.088
14:00 - 15:00	5	218	0.039	5	218	0.045	5	218	0.084
15:00 - 16:00	5	218	0.056	5	218	0.049	5	218	0.105
16:00 - 17:00	5	218	0.057	5	218	0.044	5	218	0.101
17:00 - 18:00	5	218	0.101	5	218	0.050	5	218	0.151
18:00 - 19:00	**5**	**218**	**0.106**	5	218	0.087	**5**	**218**	**0.193**
19:00 - 20:00	1	294	0.071	1	294	0.058	1	294	0.129
20:00 - 21:00	1	294	0.054	1	294	0.034	1	294	0.088
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.752			0.837			1.589

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

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

Parameter summary

Trip rate parameter range selected:	132 - 372 (units:)
Survey date date range:	01/01/07 - 25/06/14
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

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

Calculation Reference: AUDIT-357901-170504-0547

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 06 - HOTEL, FOOD & DRINK
Category : A - HOTELS

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	BU	BUCKINGHAMSHIRE	1 days
03	**SOUTH WEST**		
	WL	WILTSHIRE	1 days
05	**EAST MIDLANDS**		
	DS	DERBYSHIRE	1 days
09	**NORTH**		
	TV	TEES VALLEY	1 days
12	**CONNAUGHT**		
	GA	GALWAY	1 days
14	**LEINSTER**		
	KK	KILKENNY	1 days
	WT	WESTMEATH	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of bedrooms
Actual Range: 127 to 213 (units:)
Range Selected by User: 125 to 275 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/07 to 27/11/13

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Tuesday	2 days
Wednesday	2 days
Thursday	2 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	7 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centre	4
Edge of Town Centre	1
Edge of Town	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Commercial Zone	2
Residential Zone	1
Built-Up Zone	2
Out of Town	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

C1	6 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

5,001 to 10,000	3 days
15,001 to 20,000	3 days
25,001 to 50,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	1 days
25,001 to 50,000	1 days
50,001 to 75,000	1 days
75,001 to 100,000	2 days
250,001 to 500,000	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	5 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	7 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 **BU-06-A-01** **HOLIDAY INN** **BUCKINGHAMSHIRE**
NEW ROAD

AYLESBURY
Edge of Town
Out of Town
Total Number of bedrooms: 139
Survey date: THURSDAY *03/12/09* *Survey Type: MANUAL*

2 **DS-06-A-02** **JURY'S INN** **DERBYSHIRE**
KING STREET

DERBY
Town Centre
Commercial Zone
Total Number of bedrooms: 213
Survey date: TUESDAY *19/07/11* *Survey Type: MANUAL*

3 **GA-06-A-01** **JURY'S INN** **GALWAY**
QUAY STREET
SPANISH ARCH
GALWAY
Town Centre
Built-Up Zone
Total Number of bedrooms: 130
Survey date: TUESDAY *05/05/09* *Survey Type: MANUAL*

4 **KK-06-A-02** **HOTEL** **KILKENNY**
COLLEGE ROAD

KILKENNY
Edge of Town
Residential Zone
Total Number of bedrooms: 138
Survey date: FRIDAY *21/11/08* *Survey Type: MANUAL*

5 **TV-06-A-04** **THISTLE** **TEES VALLEY**
FRY STREET

MIDDLESBROUGH
Town Centre
Commercial Zone
Total Number of bedrooms: 132
Survey date: THURSDAY *03/10/13* *Survey Type: MANUAL*

6 **WL-06-A-02** **HOLIDAY INN EXPRESS** **WILTSHIRE**
BRIDGE STREET

SWINDON
Town Centre
Built-Up Zone
Total Number of bedrooms: 134
Survey date: WEDNESDAY *27/11/13* *Survey Type: MANUAL*

7 **WT-06-A-01** **HOTEL** **WESTMEATH**
NORTHGATE STREET

ATHLONE
Edge of Town Centre
No Sub Category
Total Number of bedrooms: 127
Survey date: WEDNESDAY *20/06/07* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
DL-06-A-02	Population
GR-06-A-02	Population
GR-06-A-03	Population
HK-06-A-01	Population
HK-06-A-02	Population
HO-06-A-02	Population

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

VEHICLES

Calculation factor: 1 BEDRMS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. BEDRMS	Trip Rate	No. Days	Ave. BEDRMS	Trip Rate	No. Days	Ave. BEDRMS	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	7	145	0.085	7	145	0.089	7	145	0.174
08:00 - 09:00	7	145	0.110	7	145	0.148	7	145	0.258
09:00 - 10:00	7	145	0.143	7	145	0.126	7	145	0.269
10:00 - 11:00	7	145	0.098	7	145	0.101	7	145	0.199
11:00 - 12:00	7	145	0.081	7	145	0.118	7	145	0.199
12:00 - 13:00	7	145	0.119	7	145	0.107	7	145	0.226
13:00 - 14:00	7	145	0.130	7	145	0.129	7	145	0.259
14:00 - 15:00	7	145	0.101	7	145	0.134	7	145	0.235
15:00 - 16:00	7	145	0.108	7	145	0.113	7	145	0.221
16:00 - 17:00	7	145	0.148	7	145	0.122	7	145	0.270
17:00 - 18:00	**7**	**145**	**0.204**	**7**	**145**	**0.159**	**7**	**145**	**0.363**
18:00 - 19:00	7	145	0.172	7	145	0.138	7	145	0.310
19:00 - 20:00	7	145	0.146	7	145	0.105	7	145	0.251
20:00 - 21:00	7	145	0.065	7	145	0.069	7	145	0.134
21:00 - 22:00	7	145	0.048	7	145	0.059	7	145	0.107
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.758			1.717			3.475

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

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

Parameter summary

Trip rate parameter range selected:	127 - 213 (units:)
Survey date date range:	01/01/07 - 27/11/13
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	7

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

Calculation Reference: AUDIT-357901-170504-0516

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 07 - LEISURE
Category : S - EXHIBITION CENTRE

VEHICLES

Selected regions and areas:

01	**GREATER LONDON**		
	CN	CAMDEN	1 days
06	**WEST MIDLANDS**		
	SH	SHROPSHIRE	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	NY	NORTH YORKSHIRE	1 days
08	**NORTH WEST**		
	GM	GREATER MANCHESTER	1 days
11	**SCOTLAND**		
	FI	FIFE	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Filtering Stage 2 selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Gross floor area
Actual Range:	1350 to 30000 (units: sqm)
Range Selected by User:	1000 to 35000 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/00 to 22/10/14

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Tuesday	1 days
Thursday	2 days
Friday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centre	1
Edge of Town Centre	1
Edge of Town	3

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	1
Built-Up Zone	1
Out of Town	2
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Filtering Stage 3 selection:

Use Class:

D1	3 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	1 days
10,001 to 15,000	2 days
50,001 to 100,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	1 days
75,001 to 100,000	1 days
100,001 to 125,000	1 days
125,001 to 250,000	1 days
500,001 or More	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.5 or Less	1 days
1.1 to 1.5	4 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	5 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 **CN-07-S-01** **EXHIBITION CENTRE** **CAMDEN**
STORE STREET

CAMDEN
Town Centre
Built-Up Zone
Total Gross floor area: 4500 sqm
Survey date: THURSDAY *08/11/07* *Survey Type: MANUAL*

2 **FI-07-S-01** **CONFERENCE CEN.** **FIFE**
HAWKCRAIG ROAD

ABERDOUR
Edge of Town
Out of Town
Total Gross floor area: 1350 sqm
Survey date: TUESDAY *24/06/08* *Survey Type: MANUAL*

3 **GM-07-S-01** **CONFERENCE CENTRE** **GREATER MANCHESTER**
HUDDERSFIELD ROAD
SCOUTHEAD
OLDHAM
Edge of Town
Out of Town
Total Gross floor area: 2100 sqm
Survey date: FRIDAY *24/05/13* *Survey Type: MANUAL*

4 **NY-07-S-01** **EXHIBITION CEN.** **NORTH YORKSHIRE**
WETHERBY ROAD

HARROGATE
Edge of Town
Residential Zone
Total Gross floor area: 6044 sqm
Survey date: FRIDAY *13/10/06* *Survey Type: MANUAL*

5 **SH-07-S-01** **EXHIBITION CENTRE** **SHROPSHIRE**
SAINT QUENTIN GATE

TELFORD
Edge of Town Centre
No Sub Category
Total Gross floor area: 30000 sqm
Survey date: THURSDAY *27/04/06* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 07 - LEISURE/S - EXHIBITION CENTRE

VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

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	3	12465	0.246	3	12465	0.080	3	12465	0.326
08:00 - 09:00	**5**	**8799**	**1.221**	5	8799	0.150	5	8799	1.371
09:00 - 10:00	5	8799	0.918	5	8799	0.164	5	8799	1.082
10:00 - 11:00	5	8799	0.641	5	8799	0.189	5	8799	0.830
11:00 - 12:00	5	8799	0.698	5	8799	0.320	5	8799	1.018
12:00 - 13:00	5	8799	0.611	5	8799	0.382	5	8799	0.993
13:00 - 14:00	5	8799	0.396	5	8799	0.439	5	8799	0.835
14:00 - 15:00	5	8799	0.311	5	8799	0.618	5	8799	0.929
15:00 - 16:00	5	8799	0.323	5	8799	1.116	5	8799	1.439
16:00 - 17:00	5	8799	0.255	**5**	**8799**	**1.407**	**5**	**8799**	**1.662**
17:00 - 18:00	5	8799	0.284	5	8799	0.868	5	8799	1.152
18:00 - 19:00	4	10474	0.222	4	10474	0.339	4	10474	0.561
19:00 - 20:00	3	12465	0.166	3	12465	0.206	3	12465	0.372
20:00 - 21:00	2	18022	0.094	2	18022	0.200	2	18022	0.294
21:00 - 22:00	2	18022	0.058	2	18022	0.153	2	18022	0.211
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			6.444			6.631			13.075

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

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

Parameter summary

Trip rate parameter range selected:	1350 - 30000 (units: sqm)
Survey date date range:	01/01/00 - 22/10/14
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

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

APPENDIX D
Junction Analysis Results

ROD
ROUGHAN & O'DONOVAN

Comhairle Cathrach
& Contae Phort Láirge
Waterford City
& County Council

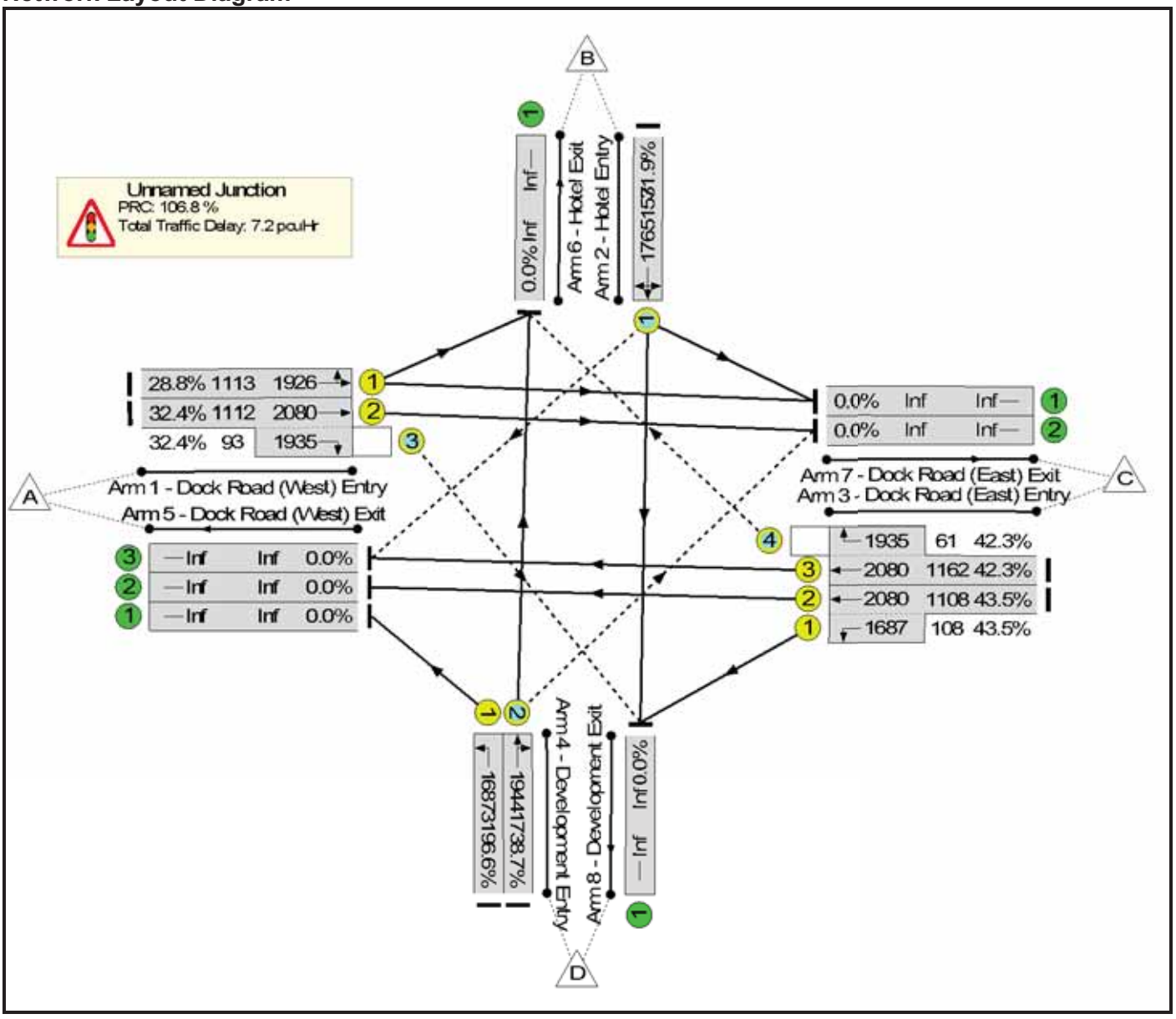
Basic Results Summary

User and Project Details

Project:	**Waterford North Quays**
Title:	**16.169**
Location:	
File name:	Western Junction - updated flows -140617.lsg3x
Author:	CR
Company:	ROD
Address:	D18
Notes:	

Scenario 1: 'Base Year (2016)' (FG1: 'AM PEAK (Base Year)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16.169	-	-	-		-	-	-	-	-	-	**43.5%**	**42**	**55**	**1**	**7.2**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**43.5%**	**42**	**55**	**1**	**7.2**	-	-
1/1	Dock Road (West) Entry Left Ahead	U	A		1	51	-	321	1926	1113	28.8%	-	-	-	1.1	11.9	4.2
1/2+1/3	Dock Road (West) Entry Ahead Right	U+O	A	B	1	51	4	390	2080:1935	1112+93	32.4 : 32.4%	27	2	1	1.3	12.0	4.7
2/1	Hotel Entry Right Left Ahead	O	C		1	7	-	50	1765	157	31.9%	0	28	0	0.8	55.3	1.4
3/2+3/1	Dock Road (East) Entry Ahead Left	U	D	E	1	52	0	529	2080:1687	1108+108	43.5 : 43.5%	-	-	-	1.8	12.4	7.1
3/3+3/4	Dock Road (East) Entry Ahead Right	U+O	D	F	1	52	4	518	2080:1935	1162+61	42.3 : 42.3%	15	11	0	1.8	12.6	7.2
4/1	Development Entry Left	U	H		1	16	-	21	1687	319	6.6%	-	-	-	0.2	36.1	0.5
4/2	Development Entry Ahead Right	O	G		1	7	-	15	1944	173	8.7%	0	14	0	0.2	49.2	0.4

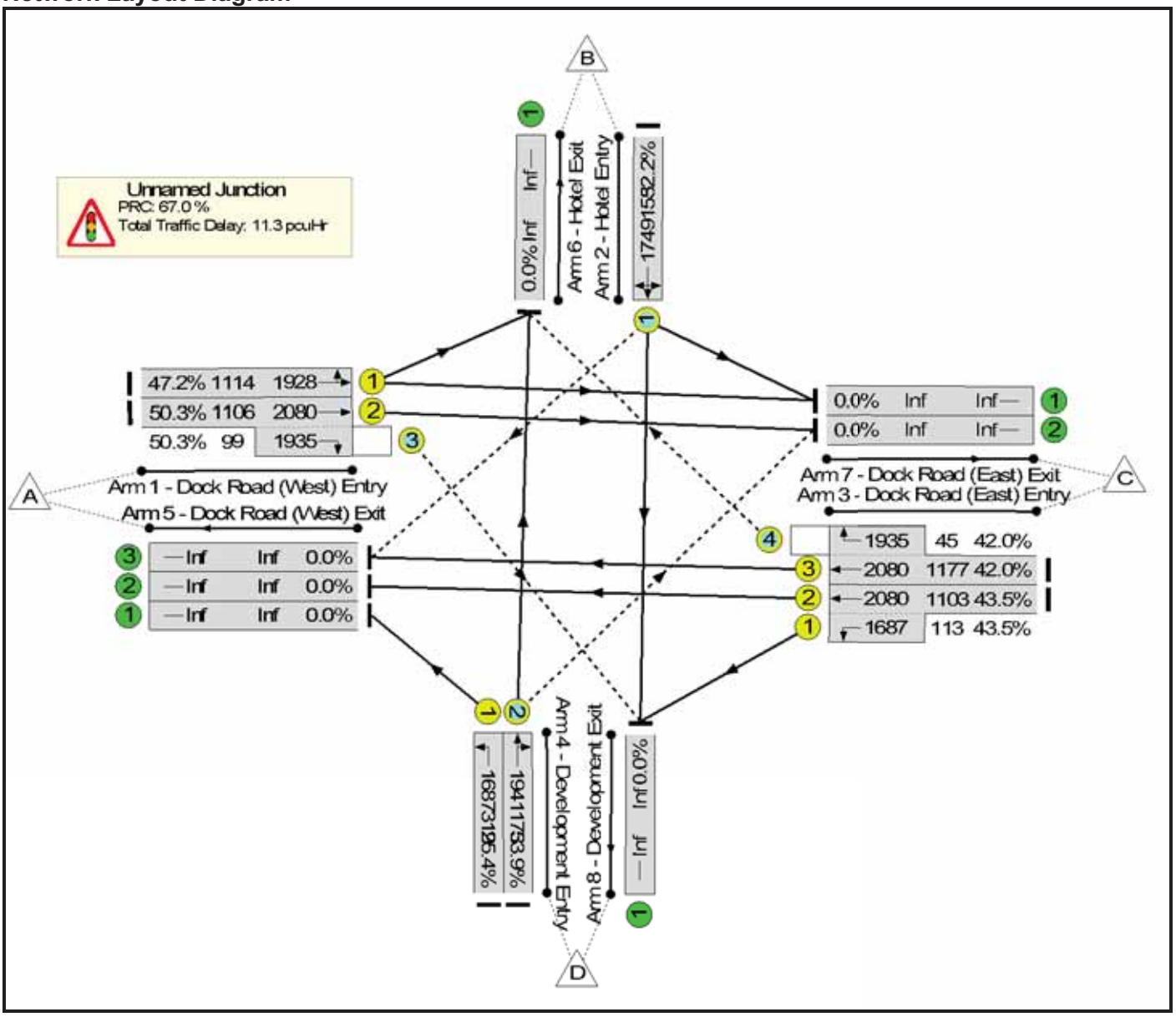
C1 PRC for Signalled Lanes (%): 106.8 Total Delay for Signalled Lanes (pcuHr): 7.18 Cycle Time (s): 90

PRC Over All Lanes (%): 106.8 Total Delay Over All Lanes(pcuHr): 7.18

Basic Results Summary

Scenario 2: 'Base Year (2016)' (FG2: 'PM PEAK (BASE YEAR)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16.169	-	-	-		-	-	-	-	-	-	**53.9%**	**56**	**124**	**1**	**11.3**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**53.9%**	**56**	**124**	**1**	**11.3**	-	-
1/1	Dock Road (West) Entry Left Ahead	U	A		1	51	-	526	1928	1114	47.2%	-	-	-	2.1	14.1	8.0
1/2+1/3	Dock Road (West) Entry Ahead Right	U+O	A	B	1	51	4	607	2080:1935	1106+99	50.3 : 50.3%	45	4	1	2.4	14.1	9.0
2/1	Hotel Entry Right Left Ahead	O	C		1	7	-	50	1749	155	32.2%	0	23	0	0.8	55.5	1.4
3/2+3/1	Dock Road (East) Entry Ahead Left	U	D	E	1	52	0	529	2080:1687	1103+113	43.5 : 43.5%	-	-	-	1.8	12.4	6.9
3/3+3/4	Dock Road (East) Entry Ahead Right	U+O	D	F	1	52	4	513	2080:1935	1177+45	42.0 : 42.0%	11	8	0	1.8	12.6	7.2
4/1	Development Entry Left	U	H		1	16	-	81	1687	319	25.4%	-	-	-	0.9	38.7	1.9
4/2	Development Entry Ahead Right	O	G		1	7	-	93	1941	173	53.9%	0	89	0	1.6	61.6	2.8

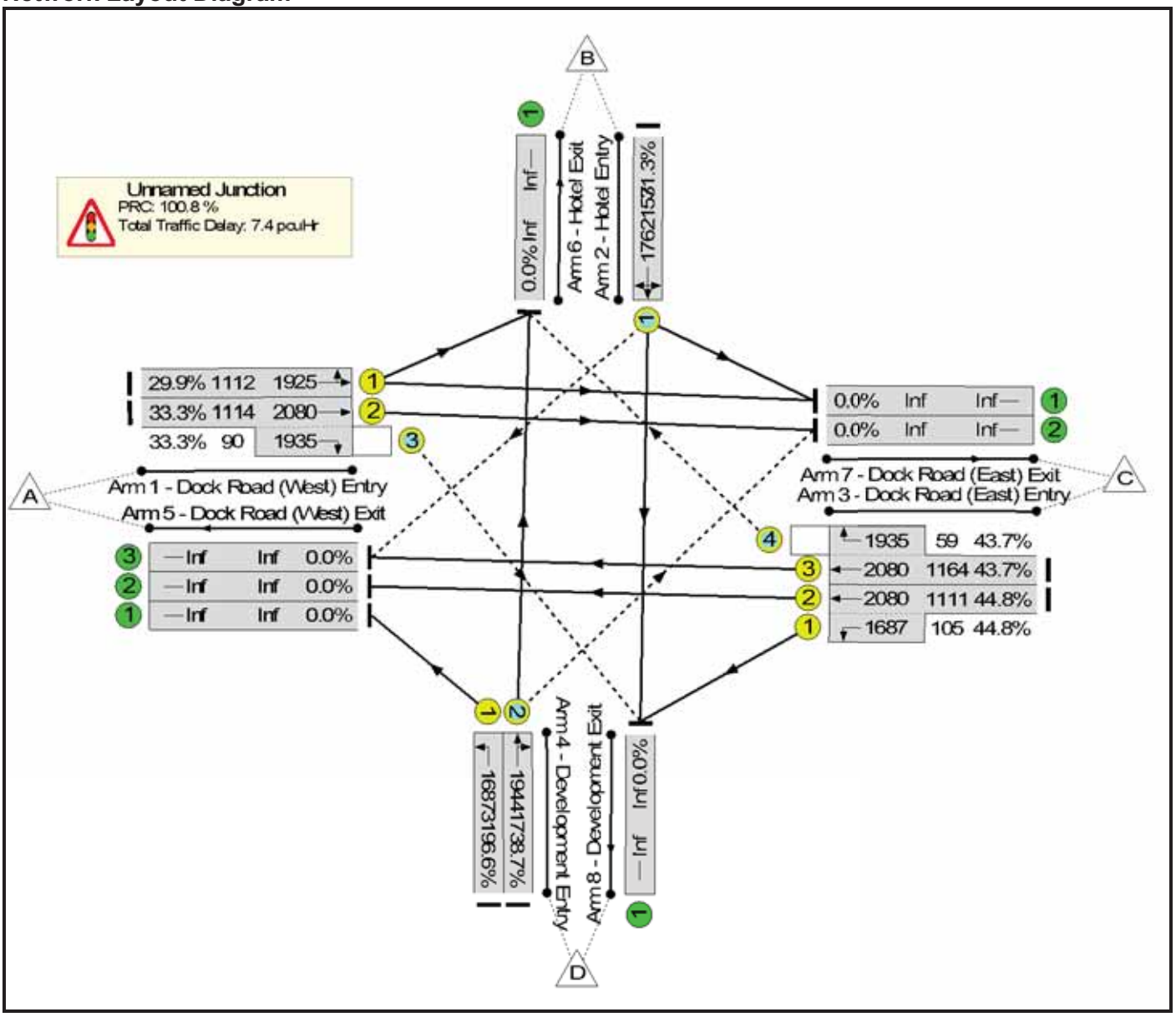
C1 PRC for Signalled Lanes (%): 67.0 Total Delay for Signalled Lanes (pcuHr): 11.30 Cycle Time (s): 90

PRC Over All Lanes (%): 67.0 Total Delay Over All Lanes(pcuHr): 11.30

Basic Results Summary

Scenario 3: 'Opening Year (2019)' (FG3: 'AM PEAK (Opening Year)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16.169	-	-	-		-	-	-	-	-	-	**44.8%**	**43**	**55**	**1**	**7.4**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**44.8%**	**43**	**55**	**1**	**7.4**	-	-
1/1	Dock Road (West) Entry Left Ahead	U	A		1	51	-	332	1925	1112	29.9%	-	-	-	1.1	12.0	4.4
1/2+1/3	Dock Road (West) Entry Ahead Right	U+O	A	B	1	51	4	401	2080:1935	1114+90	33.3 : 33.3%	27	2	1	1.3	12.1	5.0
2/1	Hotel Entry Right Left Ahead	O	C		1	7	-	49	1762	157	31.3%	0	28	0	0.8	55.1	1.4
3/2+3/1	Dock Road (East) Entry Ahead Left	U	D	E	1	52	0	545	2080:1687	1111+105	44.8 : 44.8%	-	-	-	1.9	12.6	7.4
3/3+3/4	Dock Road (East) Entry Ahead Right	U+O	D	F	1	52	4	535	2080:1935	1164+59	43.7 : 43.7%	16	10	0	1.9	12.8	7.4
4/1	Development Entry Left	U	H		1	16	-	21	1687	319	6.6%	-	-	-	0.2	36.1	0.5
4/2	Development Entry Ahead Right	O	G		1	7	-	15	1944	173	8.7%	0	14	0	0.2	49.2	0.4

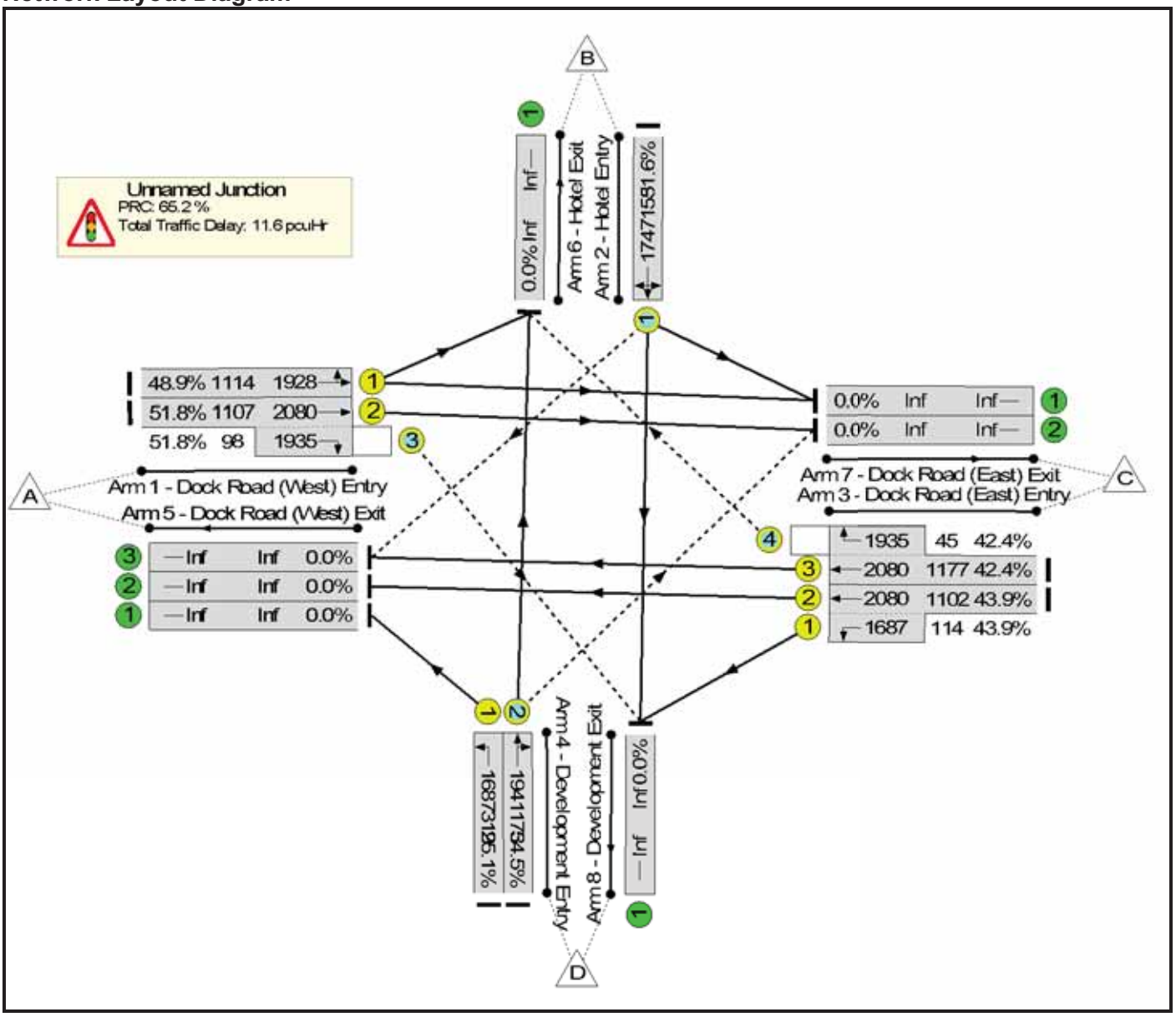
C1 PRC for Signalled Lanes (%): 100.8 Total Delay for Signalled Lanes (pcuHr): 7.43 Cycle Time (s): 90

PRC Over All Lanes (%): 100.8 Total Delay Over All Lanes(pcuHr): 7.43

Basic Results Summary

Scenario 4: 'Opening Year (2019)' (FG4: 'PM PEAK (Opening Year)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16.169	-	-	-		-	-	-	-	-	-	**54.5%**	**57**	**124**	**1**	**11.6**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**54.5%**	**57**	**124**	**1**	**11.6**	-	-
1/1	Dock Road (West) Entry Left Ahead	U	A		1	51	-	545	1928	1114	48.9%	-	-	-	2.2	14.3	8.4
1/2+1/3	Dock Road (West) Entry Ahead Right	U+O	A	B	1	51	4	625	2080:1935	1107+98	51.8 : 51.8%	46	4	1	2.5	14.4	9.3
2/1	Hotel Entry Right Left Ahead	O	C		1	7	-	49	1747	155	31.6%	0	22	0	0.8	55.3	1.4
3/2+3/1	Dock Road (East) Entry Ahead Left	U	D	E	1	52	0	534	2080:1687	1102+114	43.9 : 43.9%	-	-	-	1.9	12.5	7.1
3/3+3/4	Dock Road (East) Entry Ahead Right	U+O	D	F	1	52	4	518	2080:1935	1177+45	42.4 : 42.4%	11	8	0	1.8	12.7	7.2
4/1	Development Entry Left	U	H		1	16	-	80	1687	319	25.1%	-	-	-	0.9	38.6	1.9
4/2	Development Entry Ahead Right	O	G		1	7	-	94	1941	173	54.5%	0	90	0	1.6	61.9	2.8

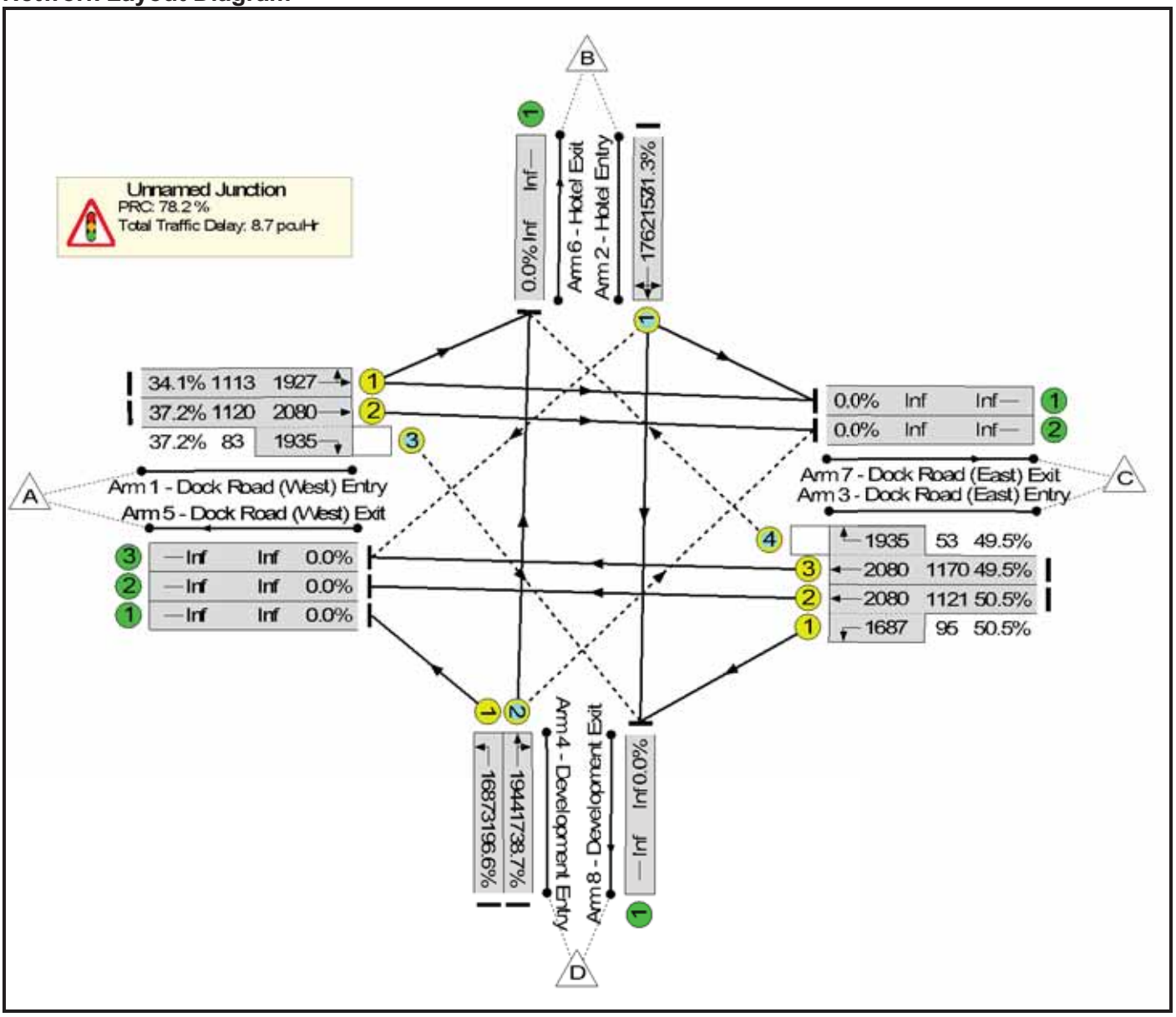
C1 PRC for Signalled Lanes (%): 65.2 Total Delay for Signalled Lanes (pcuHr): 11.57 Cycle Time (s): 90

PRC Over All Lanes (%): 65.2 Total Delay Over All Lanes(pcuHr): 11.57

Basic Results Summary

Scenario 5: 'Design Year (2034)' (FG5: 'AM PEAK (Design Year)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16.169	-	-	-		-	-	-	-	-	-	**50.5%**	**45**	**53**	**1**	**8.7**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**50.5%**	**45**	**53**	**1**	**8.7**	-	-
1/1	Dock Road (West) Entry Left Ahead	U	A		1	51	-	380	1927	1113	34.1%	-	-	-	1.3	12.5	5.2
1/2+1/3	Dock Road (West) Entry Ahead Right	U+O	A	B	1	51	4	448	2080:1935	1120+83	37.2 : 37.2%	28	2	1	1.6	12.7	5.9
2/1	Hotel Entry Right Left Ahead	O	C		1	7	-	49	1762	157	31.3%	0	28	0	0.8	55.1	1.4
3/2+3/1	Dock Road (East) Entry Ahead Left	U	D	E	1	52	0	614	2080:1687	1121+95	50.5 : 50.5%	-	-	-	2.3	13.5	9.0
3/3+3/4	Dock Road (East) Entry Ahead Right	U+O	D	F	1	52	4	605	2080:1935	1170+53	49.5 : 49.5%	17	9	0	2.3	13.6	9.0
4/1	Development Entry Left	U	H		1	16	-	21	1687	319	6.6%	-	-	-	0.2	36.1	0.5
4/2	Development Entry Ahead Right	O	G		1	7	-	15	1944	173	8.7%	0	14	0	0.2	49.2	0.4

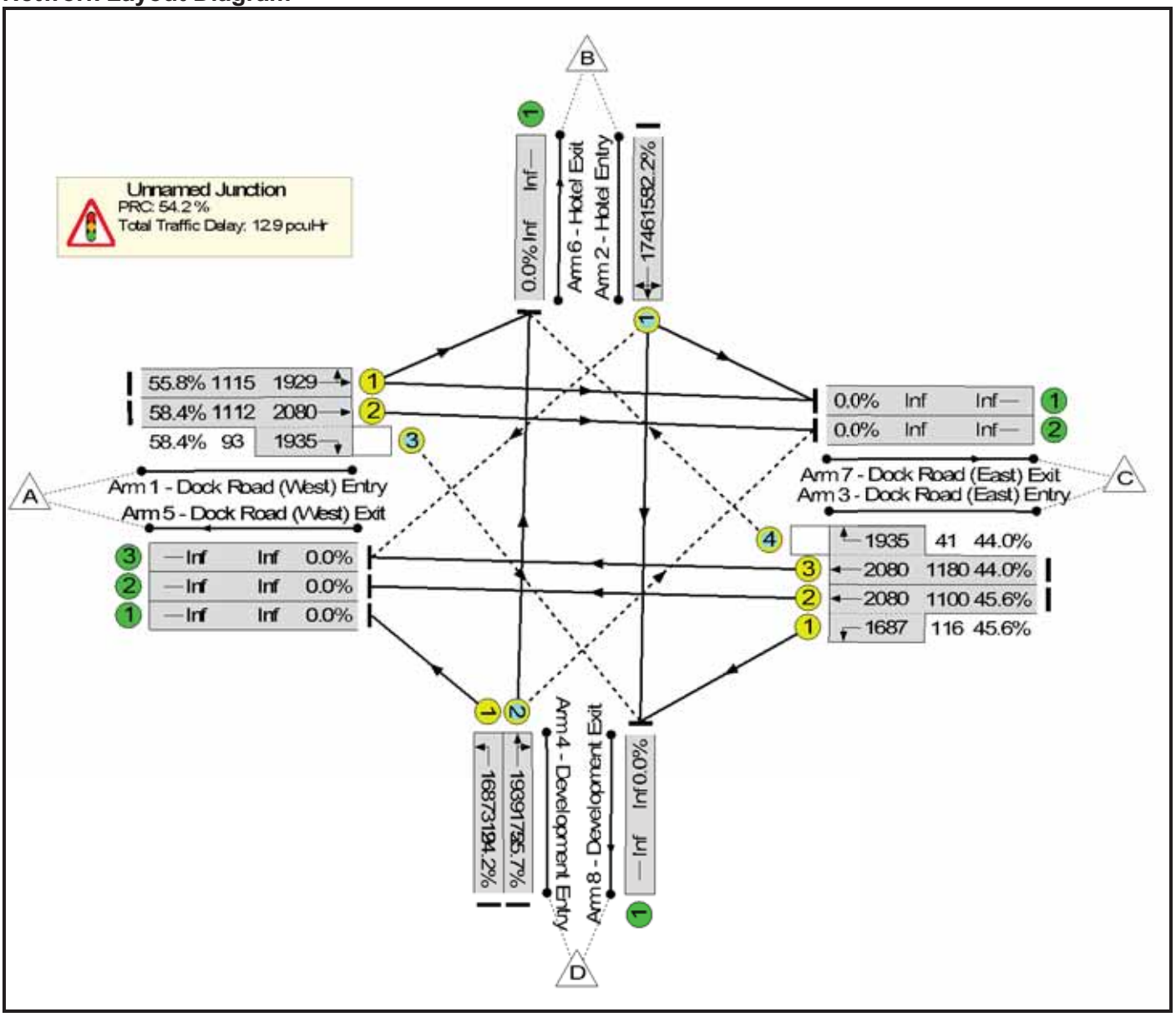
C1 PRC for Signalled Lanes (%): 78.2 Total Delay for Signalled Lanes (pcuHr): 8.65 Cycle Time (s): 90

PRC Over All Lanes (%): 78.2 Total Delay Over All Lanes(pcuHr): 8.65

Basic Results Summary

Scenario 6: 'Design Year (2034)' (FG6: 'PM PEAK (Design Year)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16.169	-	-	-		-	-	-	-	-	-	**58.4%**	**60**	**126**	**1**	**12.9**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**58.4%**	**60**	**126**	**1**	**12.9**	-	-
1/1	Dock Road (West) Entry Left Ahead	U	A		1	51	-	622	1929	1115	55.8%	-	-	-	2.7	15.5	10.3
1/2+1/3	Dock Road (West) Entry Ahead Right	U+O	A	B	1	51	4	703	2080:1935	1112+93	58.4 : 58.4%	49	4	1	3.0	15.5	11.2
2/1	Hotel Entry Right Left Ahead	O	C		1	7	-	50	1746	155	32.2%	0	22	0	0.8	55.5	1.4
3/2+3/1	Dock Road (East) Entry Ahead Left	U	D	E	1	52	0	555	2080:1687	1100+116	45.6 : 45.6%	-	-	-	2.0	12.7	7.4
3/3+3/4	Dock Road (East) Entry Ahead Right	U+O	D	F	1	52	4	537	2080:1935	1180+41	44.0 : 44.0%	11	7	0	1.9	13.0	7.5
4/1	Development Entry Left	U	H		1	16	-	77	1687	319	24.2%	-	-	-	0.8	38.5	1.8
4/2	Development Entry Ahead Right	O	G		1	7	-	96	1939	172	55.7%	0	93	0	1.7	62.5	2.9

C1 PRC for Signalled Lanes (%): 54.2 Total Delay for Signalled Lanes (pcuHr): 12.87 Cycle Time (s): 90

PRC Over All Lanes (%): 54.2 Total Delay Over All Lanes(pcuHr): 12.87

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.3.332 [14595,13/11/2013]

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 E-mail: software@trl.co.uk Web: http://www.trlsoftware.co.uk

Filename: 16169 DR-AR JCT Base&Design&Opening years - updated flow 14062017.arc8
Path: P:\Proj\2016\16169\16169-14-CALCS\Traffic\arcady
Report generation date: 14/06/2017 17:01:35

Summary of junction performance

	AM Peak				PM Peak			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - 2016 - Base Year							
Arm 1	0.36	2.83	0.26	A	0.70	3.44	0.41	A
Arm 2	0.24	2.15	0.19	A	0.40	2.52	0.28	A
Arm 3	0.86	3.18	0.46	A	0.55	2.69	0.36	A
	A1 - 2019 - Opening Year							
Arm 1	0.37	2.88	0.27	A	0.72	3.50	0.42	A
Arm 2	0.24	2.16	0.19	A	0.41	2.55	0.29	A
Arm 3	0.90	3.25	0.47	A	0.58	2.74	0.37	A
	A1 - 2034 - Design Year							
Arm 1	0.44	3.13	0.31	A	0.81	3.81	0.45	A
Arm 2	0.27	2.21	0.21	A	0.44	2.62	0.31	A
Arm 3	1.08	3.58	0.52	A	0.69	2.94	0.41	A

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - 2016 - Base Year, AM Peak " model duration: 07:45 - 09:15
"D2 - 2016 - Base Year, PM Peak" model duration: 16:45 - 18:15
"D3 - 2019 - Opening Year, AM Peak" model duration: 07:45 - 09:15
"D4 - 2019 - Opening Year, PM Peak" model duration: 16:45 - 18:15
"D5 - 2034 - Design Year, AM Peak" model duration: 07:45 - 09:15
"D6 - 2034 - Design Year, PM Peak" model duration: 16:45 - 18:15

Run using Junctions 8.0.3.332 at 14/06/2017 17:01:28

File summary

File Description

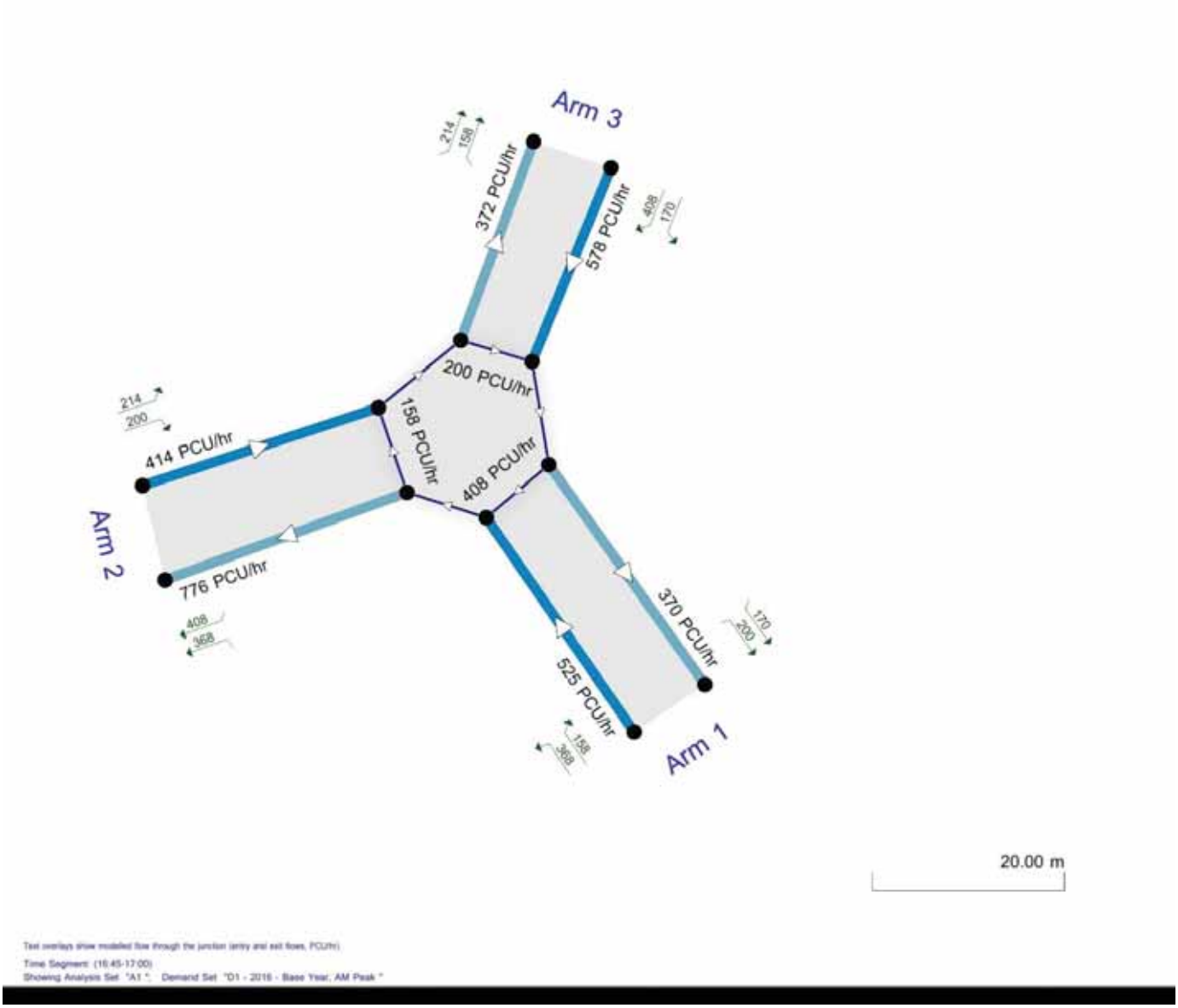
Title	Waterford NQ
Location	Dock Road / Abbey Road
Site Number	
Date	29/05/2017
Version	
Status	Planning
Identifier	
Client	
Jobnumber	16.169
Enumerator	
Description	Base Year

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

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



The junction diagram reflects the last run of ARCADY.

(Default Analysis Set) - 2016 - Base Year, AM Peak

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2016 - Base Year, AM Peak	2016 - Base Year	AM Peak		ONE HOUR	07:45	09:15	90	15		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
Dock Road / Abbey Road junction	Roundabout	1,2,3			2.87	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Abbey Road	
2	R711 Dock Road West	
3	(untitled)	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.00	7.30	4.50	20.00	34.00	35.00	
2	6.50	7.00	26.00	93.00	34.00	35.00	
3	7.30	7.50	12.40	51.50	34.00	35.00	

Pedestrian Crossings

Arm	Crossing Type
1	None
2	None
3	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.741	2157.818
2		(calculated)	(calculated)	0.752	2156.646
3		(calculated)	(calculated)	0.778	2298.030

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

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	412.00	100.000
2	ONE HOUR	✓	360.00	100.000
3	ONE HOUR	✓	886.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	309.000	103.000
	2	224.000	0.000	136.000
	3	358.000	528.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.75	0.25
	2	0.62	0.00	0.38
	3	0.40	0.60	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.26	2.83	0.36	A
2	0.19	2.15	0.24	A
3	0.46	3.18	0.86	A

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	310.18	309.38	396.45	0.00	1864.16	0.166	0.20	2.314	A
2	271.03	270.44	77.34	0.00	2098.46	0.129	0.15	1.969	A
3	667.03	665.26	168.27	0.00	2167.05	0.308	0.44	2.393	A

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	370.38	370.15	474.31	0.00	1806.49	0.205	0.26	2.506	A
2	323.63	323.49	92.54	0.00	2087.03	0.155	0.18	2.041	A
3	796.50	795.91	201.28	0.00	2141.35	0.372	0.59	2.674	A

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	453.62	453.23	580.70	0.00	1727.68	0.263	0.35	2.825	A
2	396.37	396.16	113.31	0.00	2071.41	0.191	0.24	2.148	A
3	975.50	974.43	246.50	0.00	2106.16	0.463	0.86	3.178	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	453.62	453.62	581.33	0.00	1727.21	0.263	0.36	2.826	A
2	396.37	396.37	113.40	0.00	2071.33	0.191	0.24	2.148	A
3	975.50	975.49	246.63	0.00	2106.06	0.463	0.86	3.183	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	370.38	370.77	475.29	0.00	1805.76	0.205	0.26	2.510	A
2	323.63	323.84	92.69	0.00	2086.91	0.155	0.18	2.043	A
3	796.50	797.56	201.50	0.00	2141.18	0.372	0.60	2.680	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	310.18	310.41	397.86	0.00	1863.12	0.166	0.20	2.320	A
2	271.03	271.17	77.60	0.00	2098.27	0.129	0.15	1.970	A
3	667.03	667.62	168.73	0.00	2166.69	0.308	0.45	2.402	A

(Default Analysis Set) - 2016 - Base Year, PM Peak

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2016 - Base Year, PM Peak	2016 - Base Year	PM Peak		ONE HOUR	16:45	18:15	90	15		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
Dock Road / Abbey Road junction	Roundabout	1,2,3			2.91	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Abbey Road	
2	R711 Dock Road West	
3	(untitled)	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.00	7.30	4.50	20.00	34.00	35.00	
2	6.50	7.00	26.00	93.00	34.00	35.00	
3	7.30	7.50	12.40	51.50	34.00	35.00	

Pedestrian Crossings

Arm	Crossing Type
1	None
2	None
3	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.741	2157.818
2		(calculated)	(calculated)	0.752	2156.646
3		(calculated)	(calculated)	0.778	2298.030

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

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	666.00	100.000
2	ONE HOUR	✓	513.00	100.000
3	ONE HOUR	✓	672.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	466.000	200.000
	2	256.000	0.000	257.000
	3	208.000	464.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.70	0.30
	2	0.50	0.00	0.50
	3	0.31	0.69	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.41	3.44	0.70	A
2	0.28	2.52	0.40	A
3	0.36	2.69	0.55	A

Main Results for each time segment

Main results: (16:45-17:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	501.40	499.97	348.48	0.00	1899.70	0.264	0.36	2.570	A
2	386.21	385.28	150.14	0.00	2043.70	0.189	0.23	2.169	A
3	505.92	504.69	192.27	0.00	2148.37	0.235	0.31	2.189	A

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	598.72	598.24	416.88	0.00	1849.03	0.324	0.48	2.878	A
2	461.18	460.93	179.65	0.00	2021.49	0.228	0.29	2.306	A
3	604.11	603.75	230.01	0.00	2118.99	0.285	0.40	2.376	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	733.28	732.40	510.45	0.00	1779.72	0.412	0.70	3.434	A
2	564.82	564.42	219.94	0.00	1991.19	0.284	0.39	2.523	A
3	739.89	739.27	281.66	0.00	2078.78	0.356	0.55	2.686	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	733.28	733.27	510.87	0.00	1779.41	0.412	0.70	3.440	A
2	564.82	564.82	220.20	0.00	1990.99	0.284	0.40	2.523	A
3	739.89	739.88	281.86	0.00	2078.63	0.356	0.55	2.688	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	598.72	599.59	417.54	0.00	1848.54	0.324	0.48	2.886	A
2	461.18	461.57	180.06	0.00	2021.19	0.228	0.30	2.310	A
3	604.11	604.72	230.34	0.00	2118.74	0.285	0.40	2.380	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	501.40	501.88	349.58	0.00	1898.88	0.264	0.36	2.577	A
2	386.21	386.46	150.72	0.00	2043.26	0.189	0.23	2.172	A
3	505.92	506.28	192.86	0.00	2147.91	0.236	0.31	2.193	A

(Default Analysis Set) - 2019 - Opening Year, AM Peak

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2019 - Opening Year, AM Peak	2019 - Opening Year	AM Peak		ONE HOUR	07:45	09:15	90	15		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
Dock Road / Abbey Road junction	Roundabout	1,2,3			2.92	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Abbey Road	
2	R711 Dock Road West	
3	(untitled)	

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)	Exit Only
1	7.00	7.30	4.50	20.00	34.00	35.00	
2	6.50	7.00	26.00	93.00	34.00	35.00	
3	7.30	7.50	12.40	51.50	34.00	35.00	

Pedestrian Crossings

Arm	Crossing Type
1	None
2	None
3	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.741	2157.818
2		(calculated)	(calculated)	0.752	2156.646
3		(calculated)	(calculated)	0.778	2298.030

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

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	421.00	100.000
2	ONE HOUR	✓	366.00	100.000
3	ONE HOUR	✓	906.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	316.000	105.000
	2	226.000	0.000	140.000
	3	361.000	545.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.75	0.25
	2	0.62	0.00	0.38
	3	0.40	0.60	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.27	2.88	0.37	A
2	0.19	2.16	0.24	A
3	0.47	3.25	0.90	A

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	316.95	316.13	409.20	0.00	1854.71	0.171	0.21	2.338	A
2	275.54	274.94	78.84	0.00	2097.33	0.131	0.15	1.975	A
3	682.08	680.25	169.77	0.00	2165.88	0.315	0.46	2.420	A

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	378.47	378.23	489.57	0.00	1795.18	0.211	0.27	2.540	A
2	329.03	328.88	94.33	0.00	2085.68	0.158	0.19	2.049	A
3	814.48	813.86	203.08	0.00	2139.95	0.381	0.61	2.713	A

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	463.53	463.12	599.37	0.00	1713.85	0.270	0.37	2.878	A
2	402.97	402.76	115.50	0.00	2069.75	0.195	0.24	2.159	A
3	997.52	996.39	248.70	0.00	2104.44	0.474	0.90	3.246	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	463.53	463.53	600.05	0.00	1713.35	0.271	0.37	2.879	A
2	402.97	402.97	115.61	0.00	2069.68	0.195	0.24	2.159	A
3	997.52	997.51	248.83	0.00	2104.34	0.474	0.90	3.251	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	378.47	378.88	490.62	0.00	1794.41	0.211	0.27	2.545	A
2	329.03	329.24	94.49	0.00	2085.56	0.158	0.19	2.049	A
3	814.48	815.60	203.30	0.00	2139.78	0.381	0.62	2.720	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	316.95	317.20	410.68	0.00	1853.62	0.171	0.21	2.344	A
2	275.54	275.69	79.11	0.00	2097.13	0.131	0.15	1.977	A
3	682.08	682.71	170.23	0.00	2165.52	0.315	0.46	2.430	A

(Default Analysis Set) - 2019 - Opening Year, PM Peak

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2019 - Opening Year, PM Peak	2019 - Opening Year	PM Peak		ONE HOUR	16:45	18:15	90	15		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
Dock Road / Abbey Road junction	Roundabout	1,2,3			2.96	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Abbey Road	
2	R711 Dock Road West	
3	(untitled)	

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)	Exit Only
1	7.00	7.30	4.50	20.00	34.00	35.00	
2	6.50	7.00	26.00	93.00	34.00	35.00	
3	7.30	7.50	12.40	51.50	34.00	35.00	

Pedestrian Crossings

Arm	Crossing Type
1	None
2	None
3	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.741	2157.818
2		(calculated)	(calculated)	0.752	2156.646
3		(calculated)	(calculated)	0.778	2298.030

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

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	672.00	100.000
2	ONE HOUR	✓	525.00	100.000
3	ONE HOUR	✓	691.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	470.000	202.000
	2	260.000	0.000	265.000
	3	212.000	479.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.70	0.30
	2	0.50	0.00	0.50
	3	0.31	0.69	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.42	3.50	0.72	A
2	0.29	2.55	0.41	A
3	0.37	2.74	0.58	A

Main Results for each time segment

Main results: (16:45-17:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	505.92	504.46	359.73	0.00	1891.36	0.267	0.36	2.593	A
2	395.25	394.29	151.64	0.00	2042.57	0.194	0.24	2.183	A
3	520.22	518.95	195.27	0.00	2146.03	0.242	0.32	2.213	A

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	604.11	603.62	430.35	0.00	1839.05	0.328	0.49	2.912	A
2	471.96	471.71	181.45	0.00	2020.15	0.234	0.30	2.324	A
3	621.19	620.81	233.61	0.00	2116.19	0.294	0.41	2.407	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	739.89	738.97	526.94	0.00	1767.50	0.419	0.72	3.496	A
2	578.04	577.62	222.13	0.00	1989.54	0.291	0.41	2.549	A
3	760.81	760.16	286.06	0.00	2075.36	0.367	0.58	2.735	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	739.89	739.88	527.38	0.00	1767.17	0.419	0.72	3.503	A
2	578.04	578.03	222.40	0.00	1989.33	0.291	0.41	2.550	A
3	760.81	760.80	286.26	0.00	2075.20	0.367	0.58	2.738	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	604.11	605.02	431.06	0.00	1838.53	0.329	0.49	2.922	A
2	471.96	472.38	181.87	0.00	2019.83	0.234	0.31	2.326	A
3	621.19	621.84	233.94	0.00	2115.93	0.294	0.42	2.411	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	505.92	506.42	360.88	0.00	1890.51	0.268	0.37	2.603	A
2	395.25	395.51	152.23	0.00	2042.13	0.194	0.24	2.186	A
3	520.22	520.61	195.87	0.00	2145.56	0.242	0.32	2.217	A

(Default Analysis Set) - 2034 - Design Year, AM Peak

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2034 - Design Year, AM Peak	2034 - Design Year	AM Peak		ONE HOUR	07:45	09:15	90	15		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
Dock Road / Abbey Road junction	Roundabout	1,2,3			3.17	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Abbey Road	
2	R711 Dock Road West	
3	(untitled)	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.00	7.30	4.50	20.00	34.00	35.00	
2	6.50	7.00	26.00	93.00	34.00	35.00	
3	7.30	7.50	12.40	51.50	34.00	35.00	

Pedestrian Crossings

Arm	Crossing Type
1	None
2	None
3	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.741	2157.818
2		(calculated)	(calculated)	0.752	2156.646
3		(calculated)	(calculated)	0.778	2298.030

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

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	460.00	100.000
2	ONE HOUR	✓	393.00	100.000
3	ONE HOUR	✓	991.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	345.000	115.000
	2	234.000	0.000	159.000
	3	374.000	617.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.75	0.25
	2	0.60	0.00	0.40
	3	0.38	0.62	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.31	3.13	0.44	A
2	0.21	2.21	0.27	A
3	0.52	3.58	1.08	A

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	346.31	345.37	463.20	0.00	1814.71	0.191	0.24	2.449	A
2	295.87	295.21	86.34	0.00	2091.69	0.141	0.16	2.004	A
3	746.08	743.98	175.78	0.00	2161.21	0.345	0.52	2.537	A

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	413.53	413.24	554.20	0.00	1747.31	0.237	0.31	2.698	A
2	353.30	353.14	103.31	0.00	2078.93	0.170	0.20	2.085	A
3	890.89	890.14	210.27	0.00	2134.36	0.417	0.71	2.892	A

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	506.47	505.95	678.43	0.00	1655.29	0.306	0.44	3.130	A
2	432.70	432.46	126.49	0.00	2061.49	0.210	0.26	2.209	A
3	1091.11	1089.66	257.49	0.00	2097.60	0.520	1.08	3.567	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	506.47	506.46	679.32	0.00	1654.63	0.306	0.44	3.134	A
2	432.70	432.70	126.62	0.00	2061.39	0.210	0.27	2.210	A
3	1091.11	1091.09	257.64	0.00	2097.49	0.520	1.08	3.576	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	413.53	414.04	555.57	0.00	1746.30	0.237	0.31	2.702	A
2	353.30	353.54	103.51	0.00	2078.78	0.170	0.21	2.086	A
3	890.89	892.33	210.50	0.00	2134.17	0.417	0.72	2.901	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	346.31	346.61	464.99	0.00	1813.39	0.191	0.24	2.454	A
2	295.87	296.03	86.65	0.00	2091.46	0.141	0.17	2.004	A
3	746.08	746.84	176.26	0.00	2160.83	0.345	0.53	2.546	A

(Default Analysis Set) - 2034 - Design Year, PM Peak

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2034 - Design Year, PM Peak	2034 - Design Year	PM Peak		ONE HOUR	16:45	18:15	90	15		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
Dock Road / Abbey Road junction	Roundabout	1,2,3			3.15	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Abbey Road	
2	R711 Dock Road West	
3	(untitled)	

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)	Exit Only
1	7.00	7.30	4.50	20.00	34.00	35.00	
2	6.50	7.00	26.00	93.00	34.00	35.00	
3	7.30	7.50	12.40	51.50	34.00	35.00	

Pedestrian Crossings

Arm	Crossing Type
1	None
2	None
3	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.741	2157.818
2		(calculated)	(calculated)	0.752	2156.646
3		(calculated)	(calculated)	0.778	2298.030

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

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	700.00	100.000
2	ONE HOUR	✓	551.00	100.000
3	ONE HOUR	✓	770.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	490.000	210.000
	2	266.000	0.000	285.000
	3	227.000	543.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.70	0.30
	2	0.48	0.00	0.52
	3	0.29	0.71	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.45	3.81	0.81	A
2	0.31	2.62	0.44	A
3	0.41	2.94	0.69	A

Main Results for each time segment

Main results: (16:45-17:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	527.00	525.42	407.76	0.00	1855.79	0.284	0.39	2.702	A
2	414.82	413.80	157.63	0.00	2038.07	0.204	0.25	2.215	A
3	579.70	578.22	199.77	0.00	2142.53	0.271	0.37	2.299	A

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	629.29	628.72	487.82	0.00	1796.48	0.350	0.54	3.081	A
2	495.34	495.06	188.62	0.00	2014.75	0.246	0.32	2.368	A
3	692.21	691.75	238.99	0.00	2112.00	0.328	0.49	2.535	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	770.71	769.62	597.28	0.00	1715.40	0.449	0.81	3.803	A
2	606.66	606.21	230.89	0.00	1982.95	0.306	0.44	2.615	A
3	847.79	846.97	292.65	0.00	2070.23	0.410	0.69	2.941	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	770.71	770.70	597.85	0.00	1714.98	0.449	0.81	3.811	A
2	606.66	606.66	231.21	0.00	1982.71	0.306	0.44	2.615	A
3	847.79	847.78	292.87	0.00	2070.06	0.410	0.69	2.944	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	629.29	630.37	488.72	0.00	1795.82	0.350	0.54	3.091	A
2	495.34	495.79	189.11	0.00	2014.38	0.246	0.33	2.372	A
3	692.21	693.02	239.35	0.00	2111.72	0.328	0.49	2.540	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	527.00	527.57	409.13	0.00	1854.77	0.284	0.40	2.713	A
2	414.82	415.10	158.27	0.00	2037.58	0.204	0.26	2.218	A
3	579.70	580.17	200.40	0.00	2142.04	0.271	0.37	2.305	A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.3.332 [14595,13/11/2013]

Filename: 16160 Eastern Entrance junction.arc8
Path: P:\Proj\2016\16169\16169-14-CALCS\Traffic\arcady
Report generation date: 26/06/2017 10:31:42

Summary of junction performance

	AM Peak				PM Peak			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - 2016 (Base Year)							
Arm 1	0.83	8.71	0.46	A	0.34	5.13	0.26	A
Arm 2	0.23	5.30	0.19	A	1.95	11.97	0.67	B
Arm 3	0.62	3.47	0.38	A	0.45	3.14	0.31	A
Arm 4	0.22	5.58	0.18	A	0.03	4.91	0.03	A
	A1 - 2019 (Opening Year)							
Arm 1	0.88	8.95	0.47	A	0.35	5.17	0.26	A
Arm 2	0.24	5.34	0.19	A	1.97	12.09	0.67	B
Arm 3	0.63	3.49	0.39	A	0.46	3.17	0.31	A
Arm 4	0.22	5.61	0.18	A	0.03	4.94	0.03	A
	A1 - 2034 (Design Year)							
Arm 1	1.09	9.99	0.53	A	0.42	5.41	0.30	A
Arm 2	0.24	5.51	0.20	A	2.07	12.73	0.68	B
Arm 3	0.66	3.57	0.40	A	0.49	3.23	0.33	A
Arm 4	0.23	5.70	0.19	A	0.04	5.01	0.03	A

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - 2016 (Base Year), AM Peak " model duration: 07:45 - 09:15
"D2 - 2016 (Base Year), PM Peak" model duration: 16:45 - 18:15
"D3 - 2019 (Opening Year), AM Peak" model duration: 07:45 - 09:15
"D4 - 2019 (Opening Year), PM Peak" model duration: 16:45 - 18:15
"D5 - 2034 (Design Year), AM Peak" model duration: 07:45 - 09:15
"D6 - 2034 (Design Year), PM Peak" model duration: 16:45 - 18:15

Run using Junctions 8.0.3.332 at 26/06/2017 10:31:39

File summary

File Description

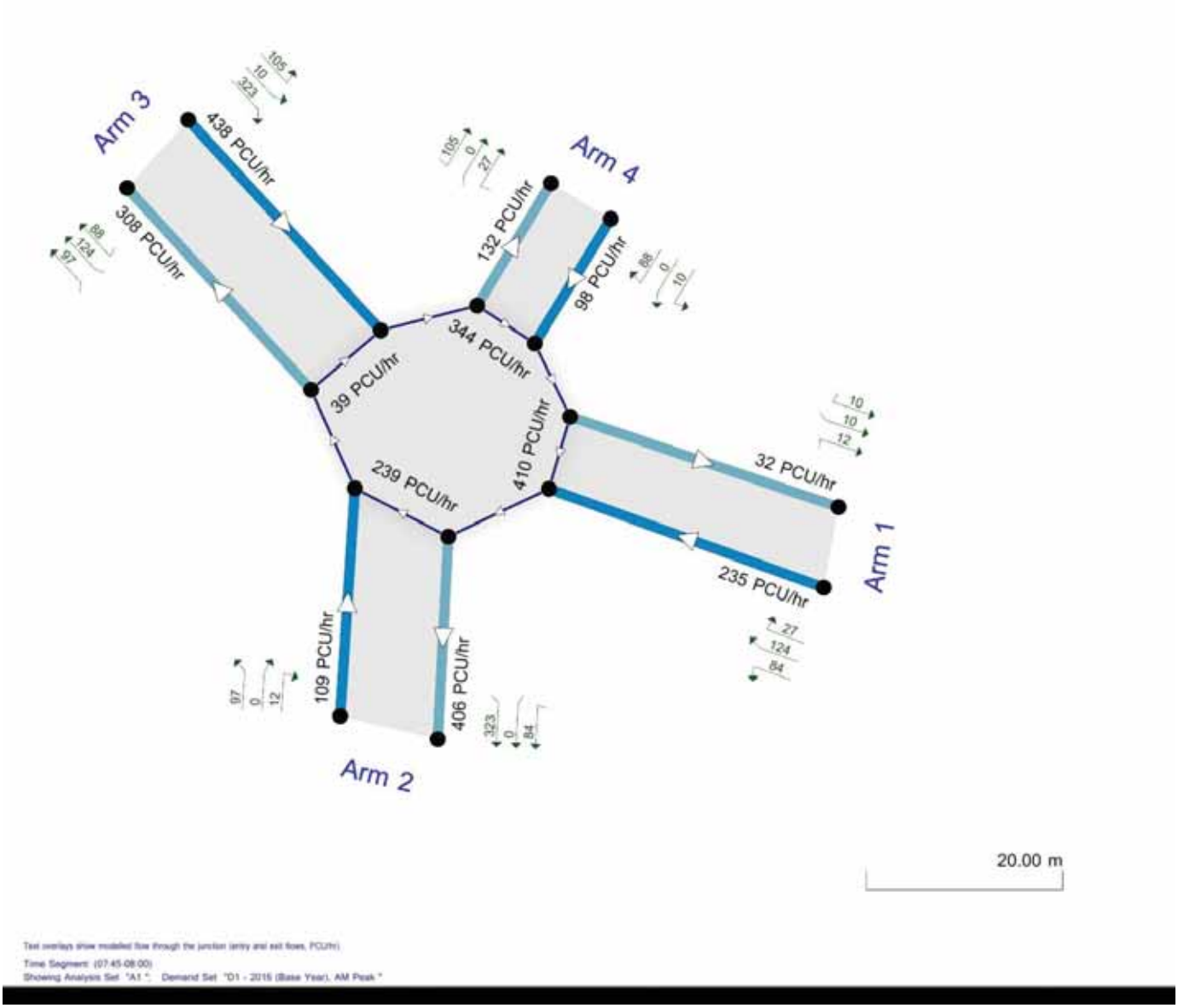
Title	Waterford NQ
Location	Exit Junction onto Abbey Road
Site Number	
Date	23/06/2017
Version	
Status	Planning
Identifier	
Client	
Jobnumber	16.169
Enumerator	
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

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



The junction diagram reflects the last run of ARCADY.

(Default Analysis Set) - 2016 (Base Year), AM Peak

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2016 (Base Year), AM Peak	2016 (Base Year)	AM Peak		ONE HOUR	07:45	09:15	90	15		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
(untitled)	Roundabout	1,2,3,4			5.33	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	(untitled)	Abbey Road South
2	Development	
3	(untitled)	Abbey Road North
4	(untitled)	Abbey Community College

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	3.50	3.90	1.24	12.18	34.00	35.00	
2	3.25	4.40	2.10	16.00	34.00	53.00	
3	7.00	7.00	0.00	10.25	34.00	72.00	
4	3.50	4.35	2.39	9.78	34.00	52.00	

Pedestrian Crossings

Arm	Crossing Type
1	None
2	None
3	None
4	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.509	1065.536
2		(calculated)	(calculated)	0.484	1009.066
3		(calculated)	(calculated)	0.597	1713.228
4		(calculated)	(calculated)	0.478	1030.457

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

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	314.00	100.000
2	ONE HOUR	✓	145.00	100.000
3	ONE HOUR	✓	583.00	100.000
4	ONE HOUR	✓	131.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	0.000	112.000	166.000	36.000
	2	16.000	0.000	129.000	0.000
	3	13.000	430.000	0.000	140.000
	4	14.000	0.000	117.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	0.00	0.36	0.53	0.11
	2	0.11	0.00	0.89	0.00
	3	0.02	0.74	0.00	0.24
	4	0.11	0.00	0.89	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To			
		1	2	3	4
From	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

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To			
		1	2	3	4
From	1	0.000	0.000	0.000	0.000
	2	0.000	0.000	0.000	0.000
	3	0.000	0.000	0.000	0.000
	4	0.000	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.46	8.71	0.83	A
2	0.19	5.30	0.23	A
3	0.38	3.47	0.62	A
4	0.18	5.58	0.22	A

Main Results for each time segment

Main results: (07:45-08:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	236.40	234.88	410.32	0.00	856.61	0.276	0.38	5.776	A
2	109.16	108.61	238.73	0.00	893.43	0.122	0.14	4.584	A
3	438.91	437.52	38.91	0.00	1690.01	0.260	0.35	2.872	A
4	98.62	98.11	344.44	0.00	865.87	0.114	0.13	4.686	A

Main results: (08:00-08:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	282.28	281.70	491.32	0.00	815.37	0.346	0.52	6.739	A
2	130.35	130.21	286.27	0.00	870.40	0.150	0.18	4.862	A
3	524.11	523.71	46.66	0.00	1685.39	0.311	0.45	3.099	A
4	117.77	117.62	412.31	0.00	833.44	0.141	0.16	5.027	A

Main results: (08:15-08:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	345.72	344.53	601.56	0.00	759.23	0.455	0.82	8.656	A
2	159.65	159.42	350.25	0.00	839.41	0.190	0.23	5.293	A
3	641.89	641.23	57.09	0.00	1679.17	0.382	0.62	3.467	A
4	144.23	144.00	504.84	0.00	789.23	0.183	0.22	5.578	A

Main results: (08:30-08:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	345.72	345.69	602.25	0.00	758.88	0.456	0.83	8.711	A
2	159.65	159.64	351.20	0.00	838.95	0.190	0.23	5.299	A
3	641.89	641.89	57.25	0.00	1679.07	0.382	0.62	3.470	A
4	144.23	144.23	505.36	0.00	788.98	0.183	0.22	5.583	A

Main results: (08:45-09:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	282.28	283.45	492.43	0.00	814.80	0.346	0.54	6.789	A
2	130.35	130.58	287.73	0.00	869.69	0.150	0.18	4.871	A
3	524.11	524.76	46.91	0.00	1685.24	0.311	0.45	3.105	A
4	117.77	117.99	413.15	0.00	833.04	0.141	0.17	5.037	A

Main results: (09:00-09:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	236.40	237.00	412.24	0.00	855.63	0.276	0.39	5.824	A
2	109.16	109.31	240.68	0.00	892.48	0.122	0.14	4.598	A
3	438.91	439.32	39.23	0.00	1689.82	0.260	0.35	2.879	A
4	98.62	98.77	345.88	0.00	865.18	0.114	0.13	4.699	A

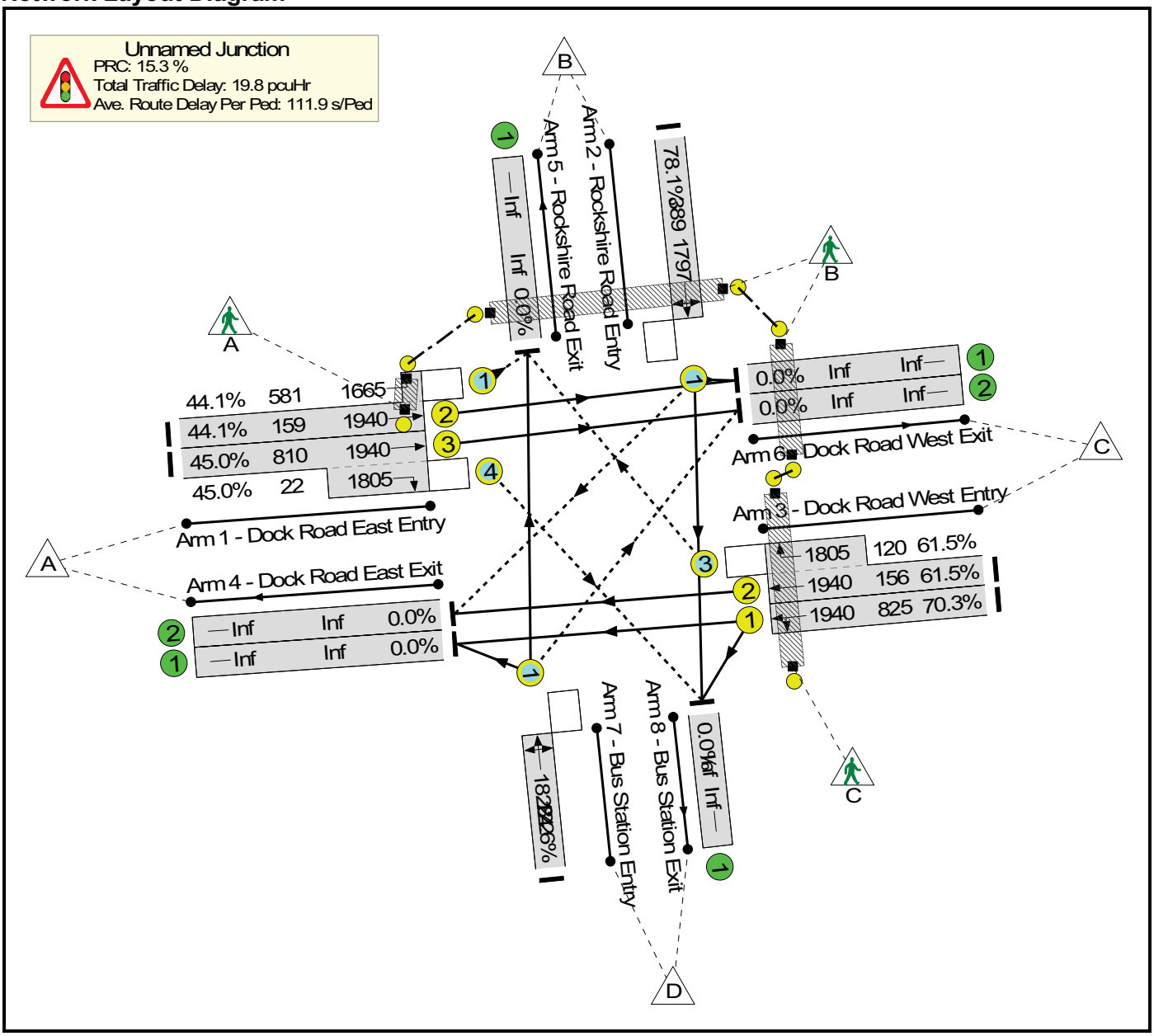
Basic Results Summary

User and Project Details

Project:	**Waterford North Quays**
Title:	**16169.109**
Location:	
File name:	16169 Rockshire Road junction.lsg3x
Author:	CR
Company:	ROD
Address:	D18
Notes:	

Scenario 1: 'Base Year (2016), without development' (FG1: 'AM Peak (Base Year, without devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**78.1%**	**0**	**605**	**10**	**19.8**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**78.1%**	**0**	**605**	**10**	**19.8**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	50	0	326	1940:1665	159+581	44.1 : 44.1%	0	252	4	2.6	28.4	7.7
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	50:12	-	374	1940:1805	810+22	45.0 : 45.0%	0	10	0	3.0	29.0	9.0
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	25	-	304	1797	389	78.1%	0	261	4	5.5	64.6	11.3
3/1	Dock Road West Entry Ahead Left	U	E		1	50	-	580	1940	825	70.3%	-	-	-	5.7	35.6	17.0
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	50:7	-	170	1940:1805	156+120	61.5 : 61.5%	0	73	1	2.5	52.2	3.2
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	30	1828	122	24.6%	0	10	0	0.6	72.7	1.1
Ped Link: P1	Unnamed Ped Link	-	H		1	17	-	200	-	10200	2.0%	-	-	-	2.2	39.8	6.1
Ped Link: P2	Unnamed Ped Link	-	I		1	49	-	200	-	29400	0.7%	-	-	-	2.8	50.1	6.0
Ped Link: P3	Unnamed Ped Link	-	J		1	12	-	200	-	7200	2.8%	-	-	-	3.7	65.8	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	48	-	200	-	28800	0.7%	-	-	-	0.7	12.0	5.2

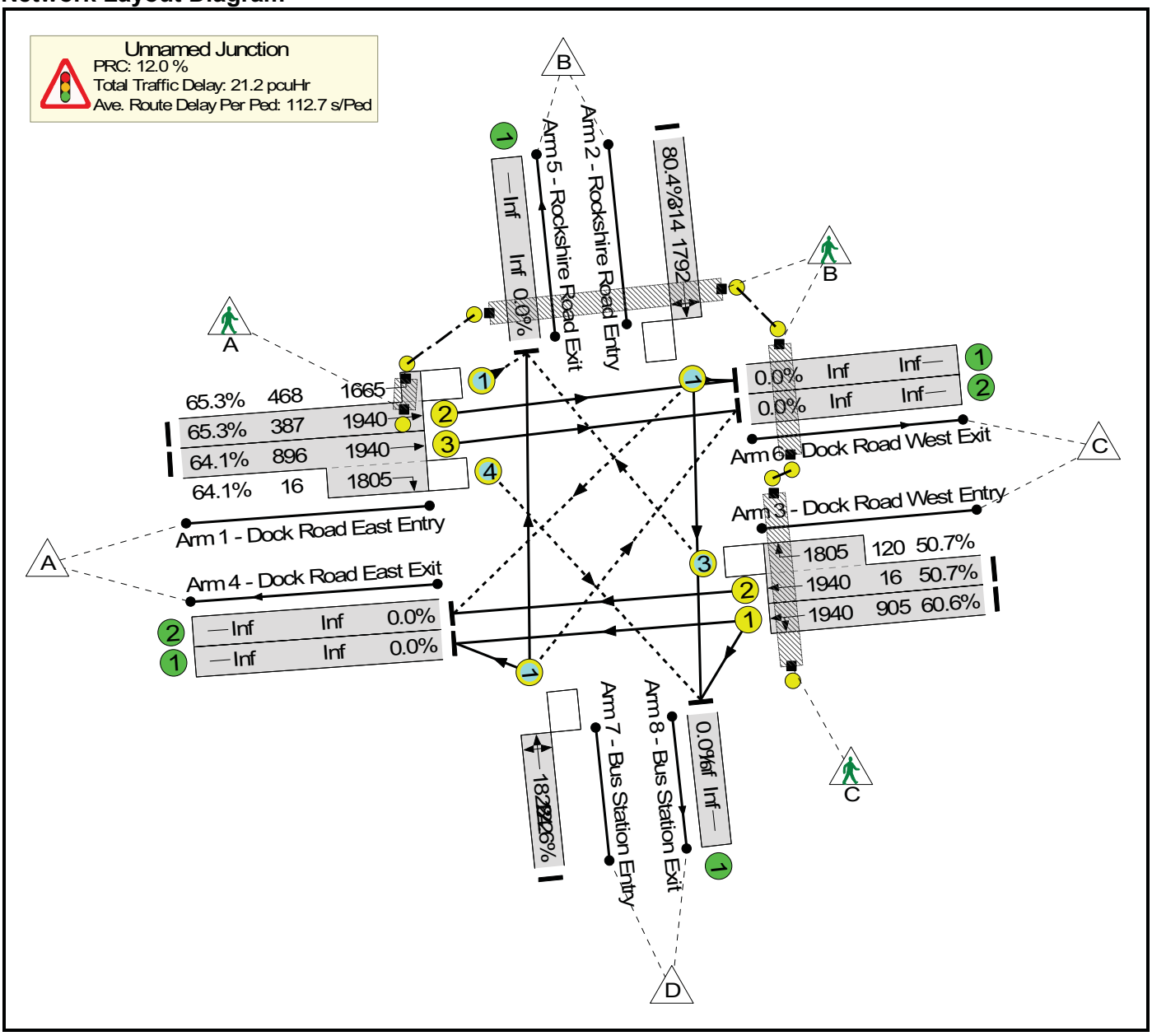
C1 PRC for Signalled Lanes (%): 15.3 Total Delay for Signalled Lanes (pcuHr): 19.84 Cycle Time (s): 120

PRC Over All Lanes (%): 15.3 Total Delay Over All Lanes(pcuHr): 19.84

Basic Results Summary

Scenario 2: 'Base Year (2016), without development' (FG2: 'PM Peak (Base Year, without devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

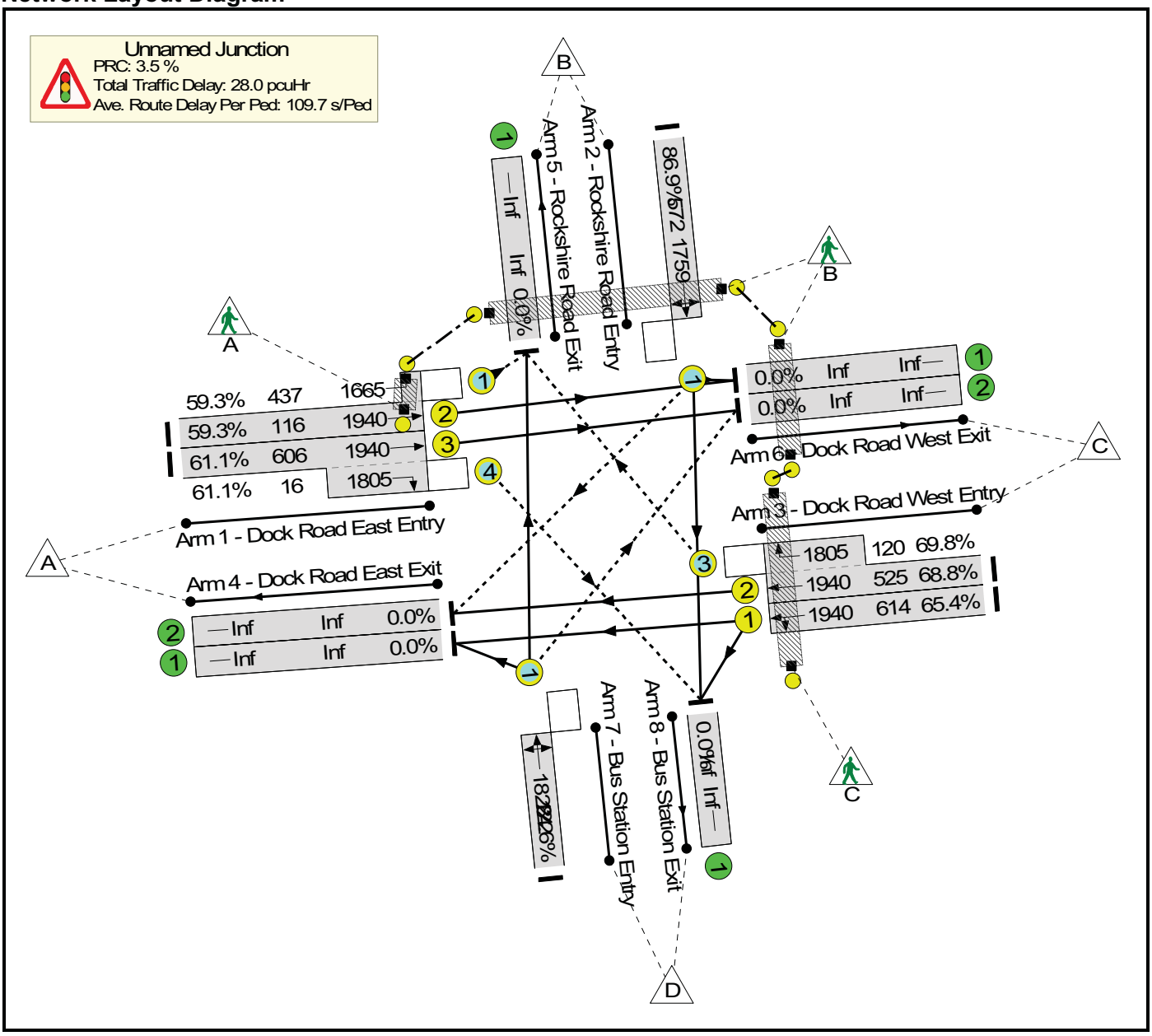
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**80.4%**	**0**	**583**	**10**	**21.2**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**80.4%**	**0**	**583**	**10**	**21.2**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	55	0	559	1940:1665	387+468	65.3 : 65.3%	0	301	5	4.6	29.7	14.1
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	55:12	-	584	1940:1805	896+16	64.1 : 64.1%	0	10	0	4.9	30.1	15.4
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	20	-	252	1792	314	80.4%	0	203	3	5.3	75.0	10.0
3/1	Dock Road West Entry Ahead Left	U	E		1	55	-	549	1940	905	60.6%	-	-	-	4.4	28.8	14.3
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	55:7	-	69	1940:1805	16+120	50.7 : 50.7%	0	60	1	1.5	76.3	2.5
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	30	1828	122	24.6%	0	10	0	0.6	72.7	1.1
Ped Link: P1	Unnamed Ped Link	-	H		1	17	-	200	-	10200	2.0%	-	-	-	2.3	41.8	6.1
Ped Link: P2	Unnamed Ped Link	-	I		1	54	-	200	-	32400	0.6%	-	-	-	2.5	45.7	5.9
Ped Link: P3	Unnamed Ped Link	-	J		1	12	-	200	-	7200	2.8%	-	-	-	3.8	68.0	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	43	-	200	-	25800	0.8%	-	-	-	0.8	13.6	5.3

C1 PRC for Signalled Lanes (%): 12.0 Total Delay for Signalled Lanes (pcuHr): 21.21 Cycle Time (s): 120
PRC Over All Lanes (%): 12.0 Total Delay Over All Lanes(pcuHr): 21.21

Basic Results Summary

Scenario 3: 'Base Year (2016), with development' (FG7: 'AM Peak (Base Year, with devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**86.9%**	**0**	**645**	**11**	**28.0**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**86.9%**	**0**	**645**	**11**	**28.0**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	37	0	328	1940:1665	116+437	59.3 : 59.3%	0	255	4	3.8	42.1	9.6
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	37:12	-	380	1940:1805	606+16	61.1 : 61.1%	0	10	0	4.5	42.4	11.3
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	38	-	497	1759	572	86.9%	0	288	5	8.3	60.4	18.5
3/1	Dock Road West Entry Ahead Left	U	E		1	37	-	402	1940	614	65.4%	-	-	-	4.9	43.7	12.4
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	37:7	-	445	1940:1805	525+120	68.8 : 69.8%	0	83	1	5.9	47.5	12.7
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	30	1828	122	24.6%	0	10	0	0.6	72.7	1.1
Ped Link: P1	Unnamed Ped Link	-	H		1	17	-	200	-	10200	2.0%	-	-	-	1.9	34.5	6.1
Ped Link: P2	Unnamed Ped Link	-	I		1	36	-	200	-	21600	0.9%	-	-	-	3.4	62.0	6.2
Ped Link: P3	Unnamed Ped Link	-	J		1	12	-	200	-	7200	2.8%	-	-	-	3.3	59.7	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	61	-	200	-	36600	0.5%	-	-	-	0.5	8.4	4.8

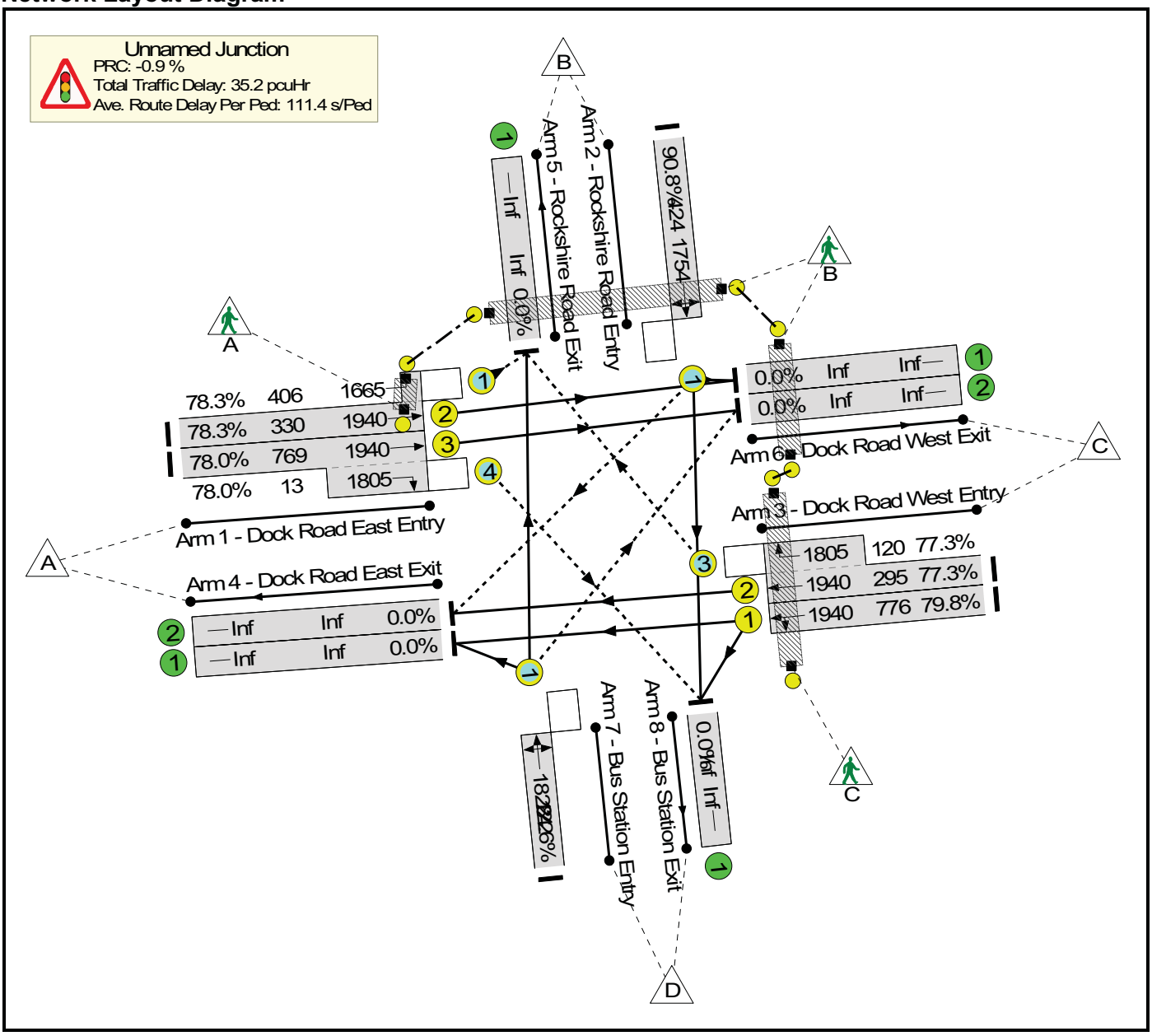
C1 PRC for Signalled Lanes (%): 3.5 Total Delay for Signalled Lanes (pcuHr): 28.00 Cycle Time (s): 120

PRC Over All Lanes (%): 3.5 Total Delay Over All Lanes(pcuHr): 28.00

Basic Results Summary

Scenario 4: 'Base Year (2016), with development' (FG8: 'PM Peak (Base Year, with devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

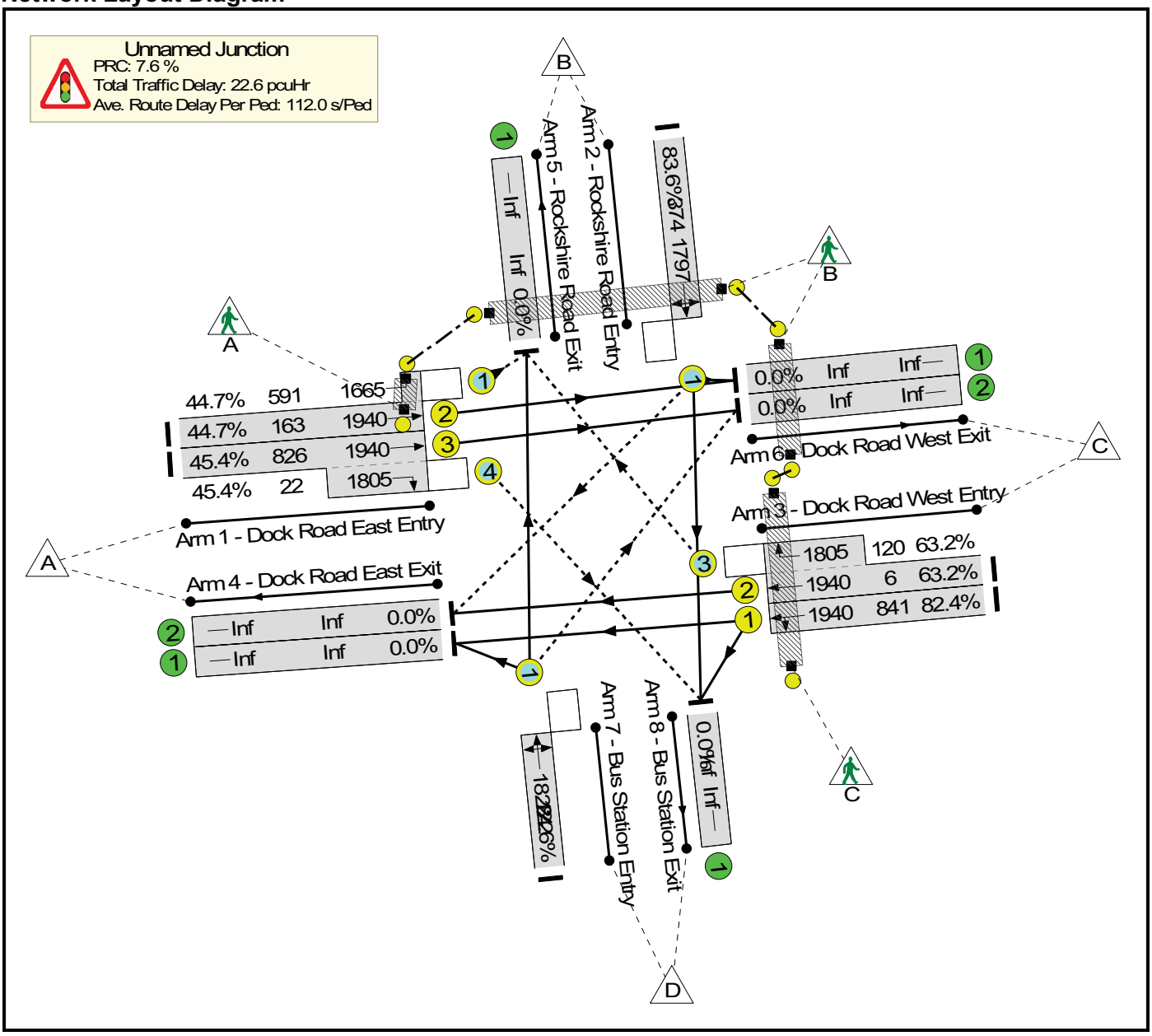
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**90.8%**	**0**	**625**	**12**	**35.2**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**90.8%**	**0**	**625**	**12**	**35.2**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	47	0	576	1940:1665	330+406	78.3 : 78.3%	0	313	5	6.7	41.6	17.6
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	47:12	-	610	1940:1805	769+13	78.0 : 78.0%	0	10	0	7.1	41.8	19.3
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	28	-	385	1754	424	90.8%	0	203	3	8.8	82.5	16.5
3/1	Dock Road West Entry Ahead Left	U	E		1	47	-	619	1940	776	79.8%	-	-	-	7.4	42.9	20.0
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	47:7	-	321	1940:1805	295+120	77.3 : 77.3%	0	90	3	4.6	51.8	6.9
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	30	1828	122	24.6%	0	10	0	0.6	72.7	1.1
Ped Link: P1	Unnamed Ped Link	-	H		1	17	-	200	-	10200	2.0%	-	-	-	2.1	38.6	6.1
Ped Link: P2	Unnamed Ped Link	-	I		1	46	-	200	-	27600	0.7%	-	-	-	2.9	52.8	6.0
Ped Link: P3	Unnamed Ped Link	-	J		1	12	-	200	-	7200	2.8%	-	-	-	3.6	64.5	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	51	-	200	-	30600	0.7%	-	-	-	0.6	11.1	5.1

C1 PRC for Signalled Lanes (%): -0.9 Total Delay for Signalled Lanes (pcuHr): 35.16 Cycle Time (s): 120
PRC Over All Lanes (%): -0.9 Total Delay Over All Lanes(pcuHr): 35.16

Basic Results Summary

Scenario 5: 'Opening Year (2019), without development' (FG3: 'AM Peak (Opening Year, without devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

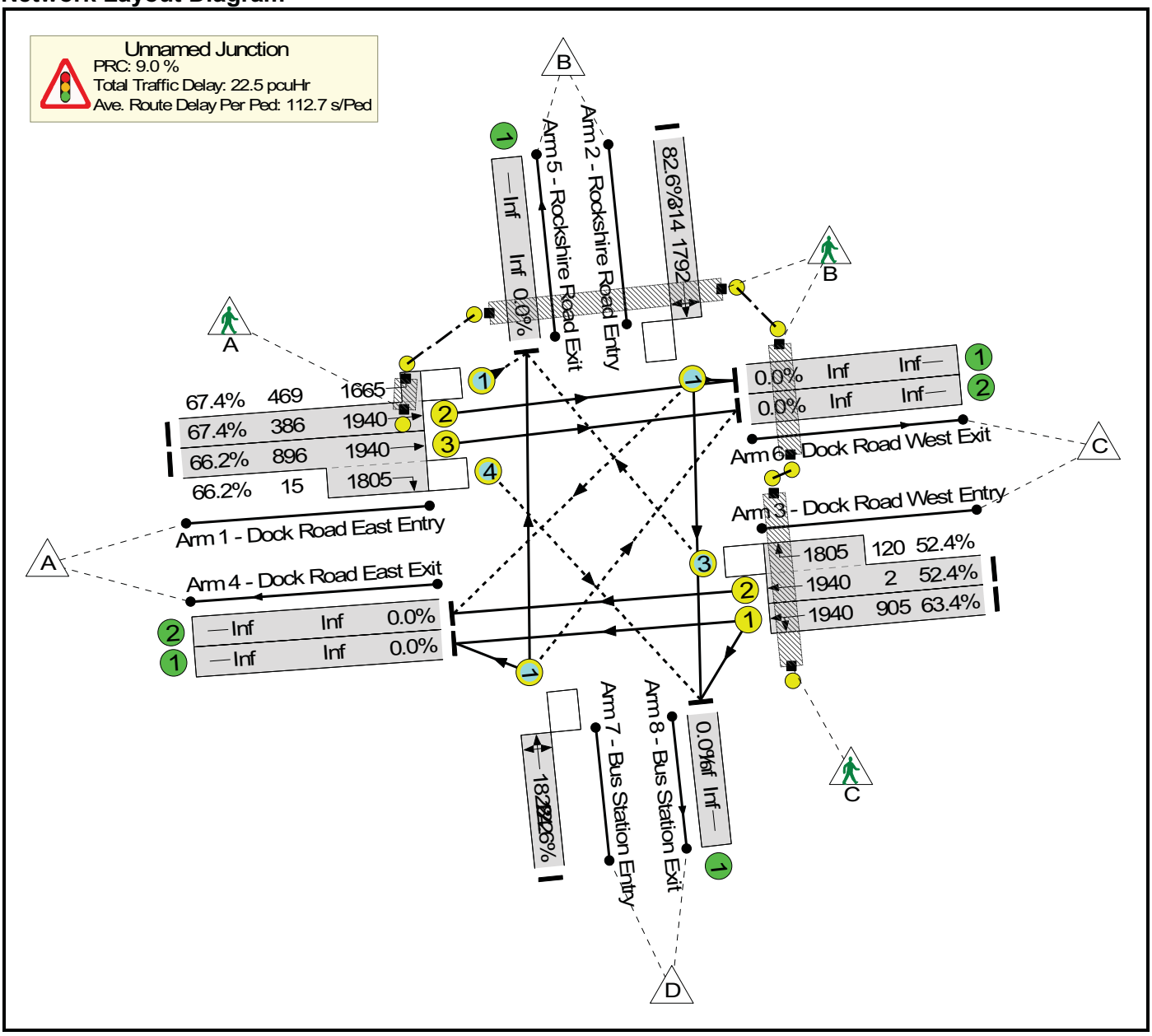
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**83.6%**	**0**	**622**	**11**	**22.6**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**83.6%**	**0**	**622**	**11**	**22.6**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	51	0	337	1940:1665	163+591	44.7 : 44.7%	0	260	4	2.6	27.8	7.9
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	51:12	-	385	1940:1805	826+22	45.4 : 45.4%	0	10	0	3.0	28.4	9.3
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	24	-	313	1797	374	83.6%	0	268	5	6.3	72.8	12.4
3/1	Dock Road West Entry Ahead Left	U	E		1	51	-	693	1940	841	82.4%	-	-	-	8.0	41.8	22.5
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	51:7	-	80	1940:1805	6+120	63.2 : 63.2%	0	75	1	2.0	90.1	3.3
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	30	1828	122	24.6%	0	10	0	0.6	72.7	1.1
Ped Link: P1	Unnamed Ped Link	-	H		1	17	-	200	-	10200	2.0%	-	-	-	2.2	40.2	6.1
Ped Link: P2	Unnamed Ped Link	-	I		1	50	-	200	-	30000	0.7%	-	-	-	2.7	49.2	6.0
Ped Link: P3	Unnamed Ped Link	-	J		1	12	-	200	-	7200	2.8%	-	-	-	3.7	66.3	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	47	-	200	-	28200	0.7%	-	-	-	0.7	12.3	5.2

C1 PRC for Signalled Lanes (%): 7.6 Total Delay for Signalled Lanes (pcuHr): 22.62 Cycle Time (s): 120
PRC Over All Lanes (%): 7.6 Total Delay Over All Lanes(pcuHr): 22.62

Basic Results Summary

Scenario 6: 'Opening Year (2019), without development' (FG4: 'PM Peak (Opening Year, without devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**82.6%**	**0**	**601**	**10**	**22.5**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**82.6%**	**0**	**601**	**10**	**22.5**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	55	0	576	1940:1665	386+469	67.4 : 67.4%	0	311	5	4.9	30.4	14.9
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	55:12	-	603	1940:1805	896+15	66.2 : 66.2%	0	10	0	5.2	30.8	16.3
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	20	-	259	1792	314	82.6%	0	208	4	5.6	78.3	10.5
3/1	Dock Road West Entry Ahead Left	U	E		1	55	-	574	1940	905	63.4%	-	-	-	4.7	29.6	15.2
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	55:7	-	64	1940:1805	2+120	52.4 : 52.4%	0	62	1	1.5	83.9	2.6
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	30	1828	122	24.6%	0	10	0	0.6	72.7	1.1
Ped Link: P1	Unnamed Ped Link	-	H		1	17	-	200	-	10200	2.0%	-	-	-	2.3	41.8	6.1
Ped Link: P2	Unnamed Ped Link	-	I		1	54	-	200	-	32400	0.6%	-	-	-	2.5	45.7	5.9
Ped Link: P3	Unnamed Ped Link	-	J		1	12	-	200	-	7200	2.8%	-	-	-	3.8	68.0	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	43	-	200	-	25800	0.8%	-	-	-	0.8	13.6	5.3

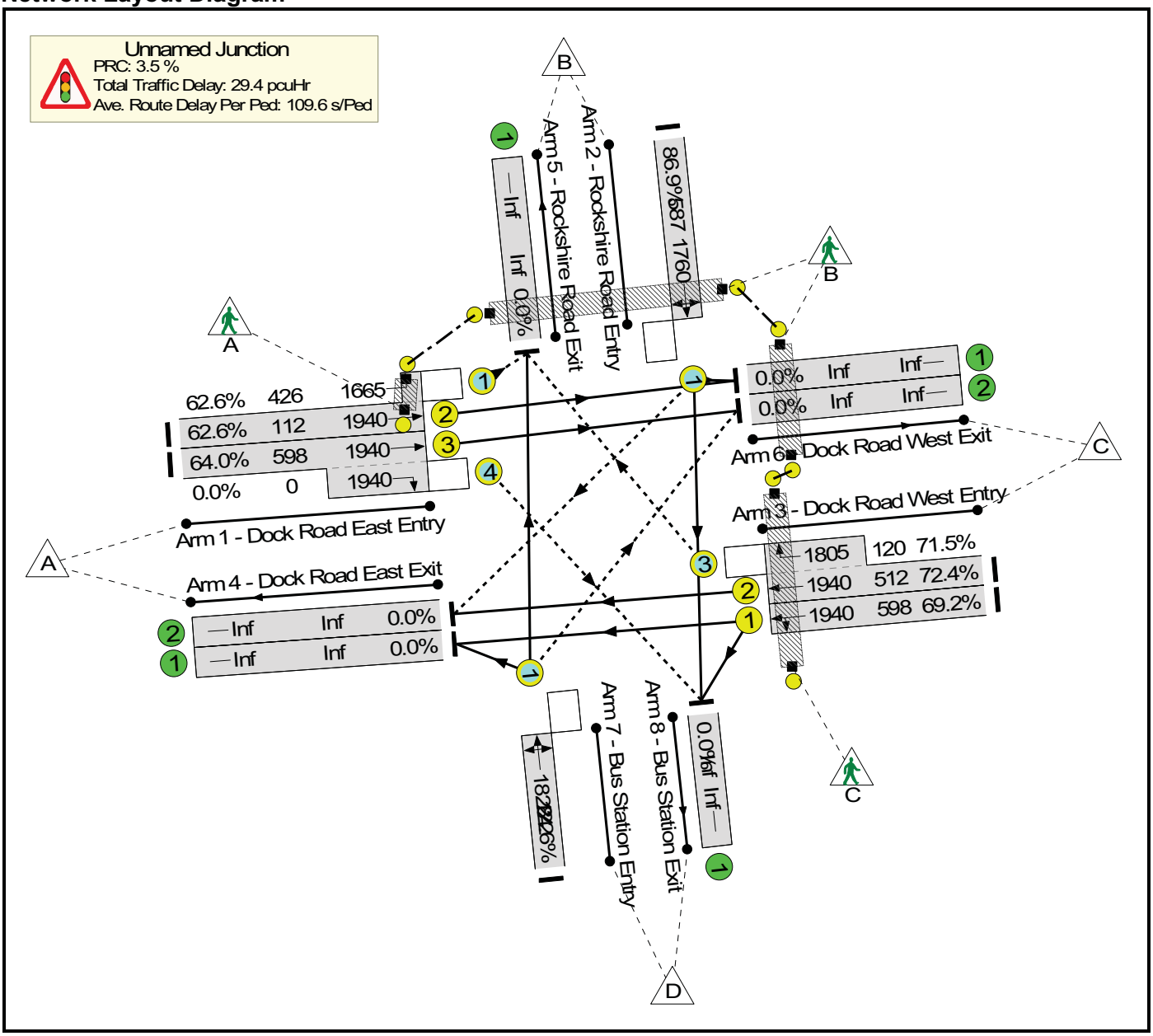
C1 PRC for Signalled Lanes (%): 9.0 Total Delay for Signalled Lanes (pcuHr): 22.47 Cycle Time (s): 120

PRC Over All Lanes (%): 9.0 Total Delay Over All Lanes(pcuHr): 22.47

Basic Results Summary

Scenario 7: 'Opening Year (2019), with development' (FG9: 'AM Peak (Opening Year, with devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**86.9%**	**0**	**657**	**11**	**29.4**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**86.9%**	**0**	**657**	**11**	**29.4**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	36	0	337	1940:1665	112+426	62.6 : 62.6%	0	263	4	4.1	44.1	10.1
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	36:12	-	383	1940:1940	598+0	64.0 : 0.0%	0	0	0	4.7	44.1	11.8
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	39	-	510	1760	587	86.9%	0	300	5	8.4	59.3	18.9
3/1	Dock Road West Entry Ahead Left	U	E		1	36	-	414	1940	598	69.2%	-	-	-	5.3	46.2	13.2
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	36:7	-	457	1940:1805	512+120	72.4 : 71.5%	0	85	1	6.3	49.6	13.5
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	30	1828	122	24.6%	0	10	0	0.6	72.7	1.1
Ped Link: P1	Unnamed Ped Link	-	H		1	17	-	200	-	10200	2.0%	-	-	-	1.9	34.0	6.1
Ped Link: P2	Unnamed Ped Link	-	I		1	35	-	200	-	21000	1.0%	-	-	-	3.5	63.0	6.2
Ped Link: P3	Unnamed Ped Link	-	J		1	12	-	200	-	7200	2.8%	-	-	-	3.3	59.1	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	62	-	200	-	37200	0.5%	-	-	-	0.5	8.2	4.8

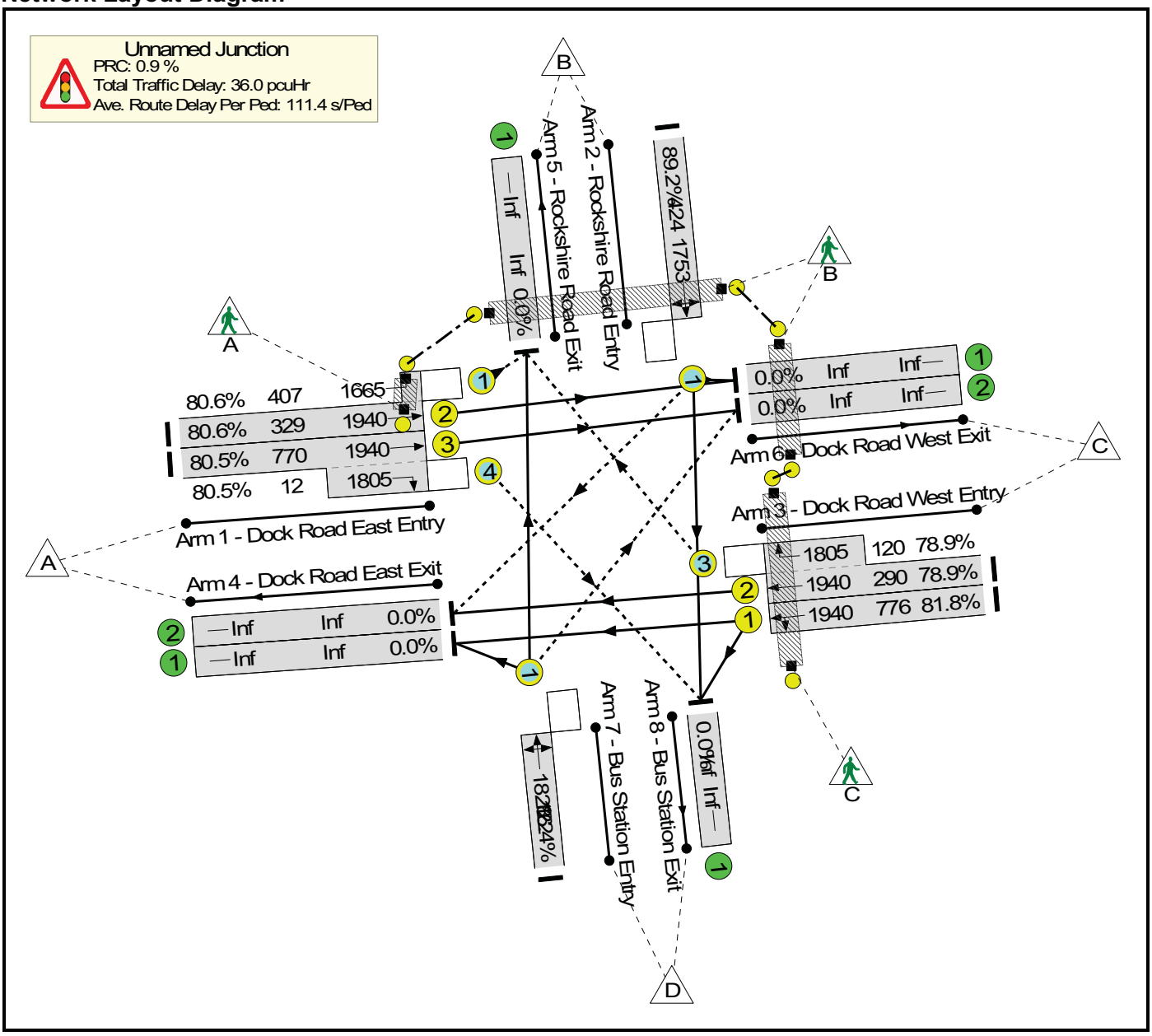
C1 PRC for Signalled Lanes (%): 3.5 Total Delay for Signalled Lanes (pcuHr): 29.43 Cycle Time (s): 120

PRC Over All Lanes (%): 3.5 Total Delay Over All Lanes(pcuHr): 29.43

Basic Results Summary

Scenario 8: 'Opening Year (2019), with development' (FG10: 'PM Peak (Opening Year, with devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

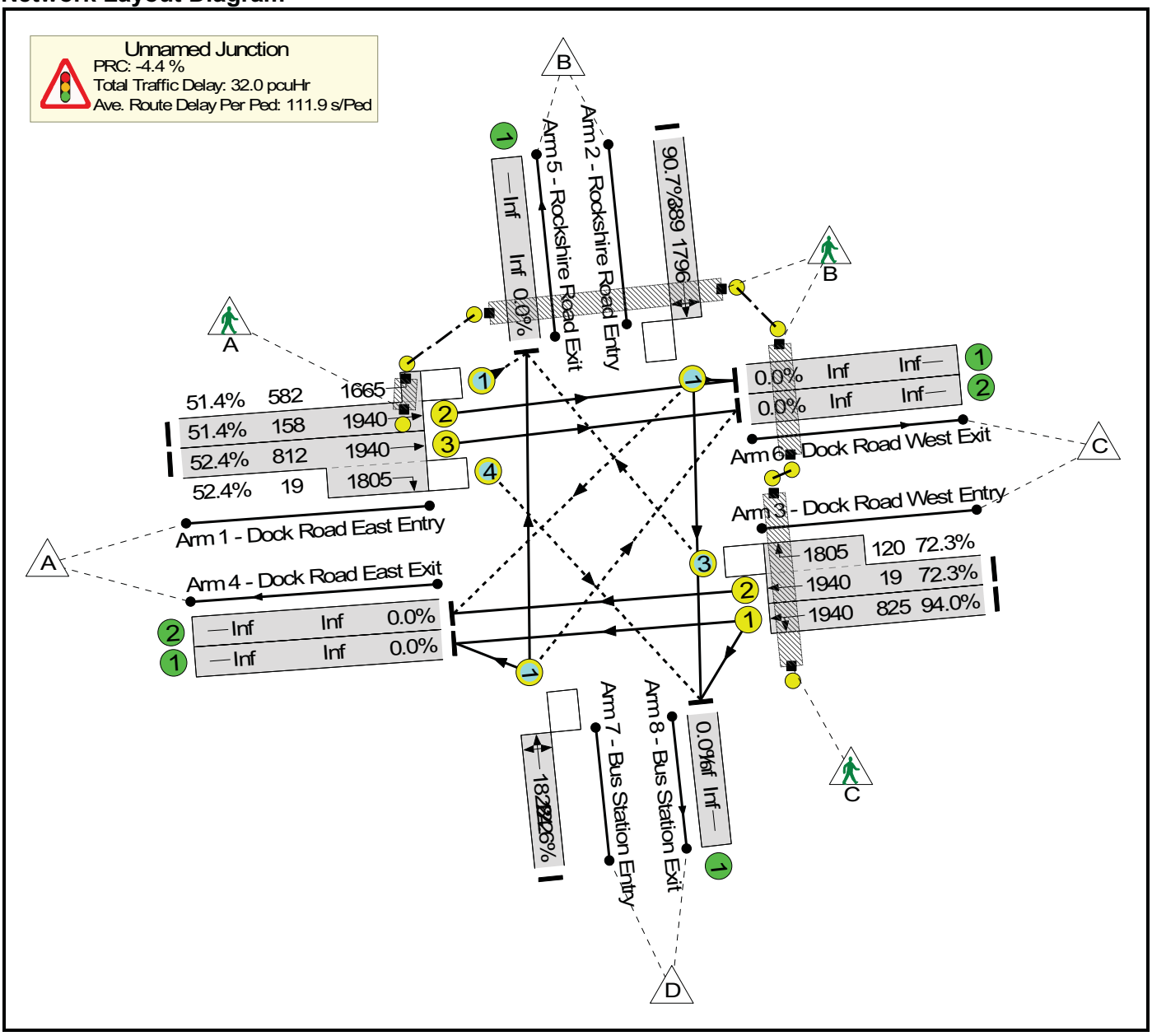
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**89.2%**	**0**	**616**	**14**	**36.0**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**89.2%**	**0**	**616**	**14**	**36.0**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	47	0	593	1940:1665	329+407	80.6 : 80.6%	0	323	5	7.1	43.3	18.5
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	47:12	-	630	1940:1805	770+12	80.5 : 80.5%	0	10	0	7.6	43.5	20.5
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	28	-	378	1753	424	89.2%	0	194	3	8.2	78.1	15.8
3/1	Dock Road West Entry Ahead Left	U	E		1	47	-	635	1940	776	81.8%	-	-	-	7.8	44.5	21.1
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	47:7	-	324	1940:1805	290+120	78.9 : 78.9%	0	90	5	4.8	53.5	7.1
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	20	1828	122	16.4%	0	0	0	0.4	70.5	0.7
Ped Link: P1	Unnamed Ped Link	-	H		1	17	-	200	-	10200	2.0%	-	-	-	2.1	38.6	6.1
Ped Link: P2	Unnamed Ped Link	-	I		1	46	-	200	-	27600	0.7%	-	-	-	2.9	52.8	6.0
Ped Link: P3	Unnamed Ped Link	-	J		1	12	-	200	-	7200	2.8%	-	-	-	3.6	64.5	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	51	-	200	-	30600	0.7%	-	-	-	0.6	11.1	5.1

C1 PRC for Signalled Lanes (%): 0.9 Total Delay for Signalled Lanes (pcuHr): 36.00 Cycle Time (s): 120
PRC Over All Lanes (%): 0.9 Total Delay Over All Lanes(pcuHr): 36.00

Basic Results Summary

Scenario 9: 'Design Year (2034), without development' (FG5: 'AM Peak (Design Year, without devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**94.0%**	**0**	**703**	**12**	**32.0**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**94.0%**	**0**	**703**	**12**	**32.0**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	50	0	380	1940:1665	158+582	51.4 : 51.4%	0	294	5	3.2	30.0	9.4
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	50:12	-	436	1940:1805	812+19	52.4 : 52.4%	0	10	0	3.7	30.5	11.1
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	25	-	353	1796	389	90.7%	0	304	5	8.5	86.6	15.4
3/1	Dock Road West Entry Ahead Left	U	E		1	50	-	775	1940	825	94.0%	-	-	-	13.4	62.1	30.8
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	50:7	-	101	1940:1805	19+120	72.3 : 72.3%	0	86	1	2.6	93.8	4.1
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	30	1828	122	24.6%	0	10	0	0.6	72.7	1.1
Ped Link: P1	Unnamed Ped Link	-	H		1	17	-	200	-	10200	2.0%	-	-	-	2.2	39.8	6.1
Ped Link: P2	Unnamed Ped Link	-	I		1	49	-	200	-	29400	0.7%	-	-	-	2.8	50.1	6.0
Ped Link: P3	Unnamed Ped Link	-	J		1	12	-	200	-	7200	2.8%	-	-	-	3.7	65.8	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	48	-	200	-	28800	0.7%	-	-	-	0.7	12.0	5.2

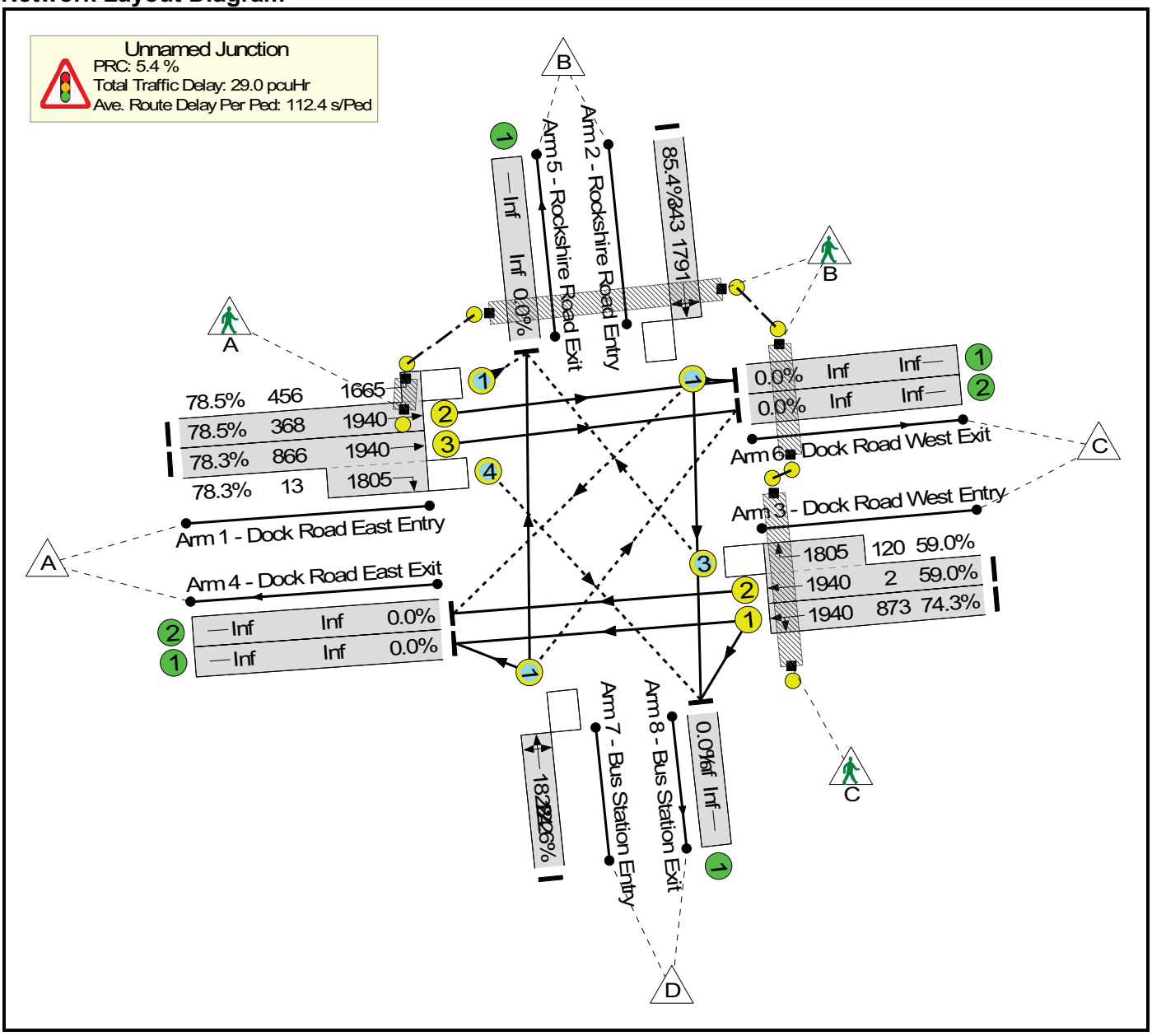
C1 PRC for Signalled Lanes (%): -4.4 Total Delay for Signalled Lanes (pcuHr): 31.95 Cycle Time (s): 120

PRC Over All Lanes (%): -4.4 Total Delay Over All Lanes(pcuHr): 31.95

Basic Results Summary

Scenario 10: 'Design Year (2034), without development' (FG6: 'PM Peak (Design Year, without devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

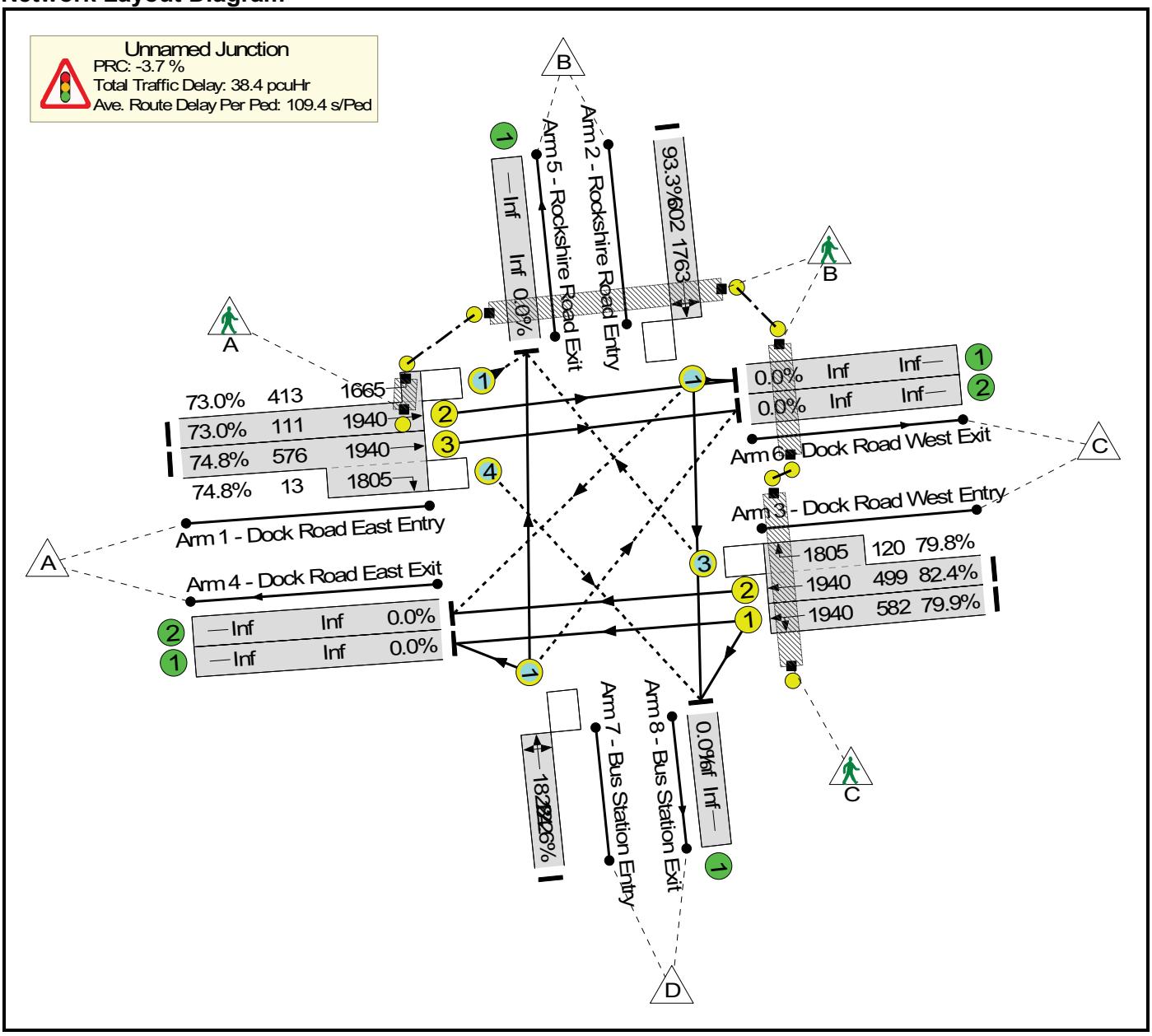
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**85.4%**	**0**	**678**	**11**	**29.0**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**85.4%**	**0**	**678**	**11**	**29.0**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	53	0	647	1940:1665	368+456	78.5 : 78.5%	0	352	6	6.7	37.1	19.1
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	53:12	-	688	1940:1805	866+13	78.3 : 78.3%	0	10	0	7.2	37.5	21.0
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	22	-	293	1791	343	85.4%	0	237	4	6.5	79.3	12.0
3/1	Dock Road West Entry Ahead Left	U	E		1	53	-	649	1940	873	74.3%	-	-	-	6.3	35.2	19.3
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	53:7	-	72	1940:1805	2+120	59.0 : 59.0%	0	70	1	1.8	88.9	3.0
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	30	1828	122	24.6%	0	10	0	0.6	72.7	1.1
Ped Link: P1	Unnamed Ped Link	-	H		1	17	-	200	-	10200	2.0%	-	-	-	2.3	41.0	6.1
Ped Link: P2	Unnamed Ped Link	-	I		1	52	-	200	-	31200	0.6%	-	-	-	2.6	47.4	6.0
Ped Link: P3	Unnamed Ped Link	-	J		1	12	-	200	-	7200	2.8%	-	-	-	3.7	67.2	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	45	-	200	-	27000	0.7%	-	-	-	0.7	13.0	5.3

C1 PRC for Signalled Lanes (%): 5.4 Total Delay for Signalled Lanes (pcuHr): 29.02 Cycle Time (s): 120
PRC Over All Lanes (%): 5.4 Total Delay Over All Lanes(pcuHr): 29.02

Basic Results Summary

Scenario 11: 'Design Year (2034), with development' (FG11: 'AM Peak (Design Year, with devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

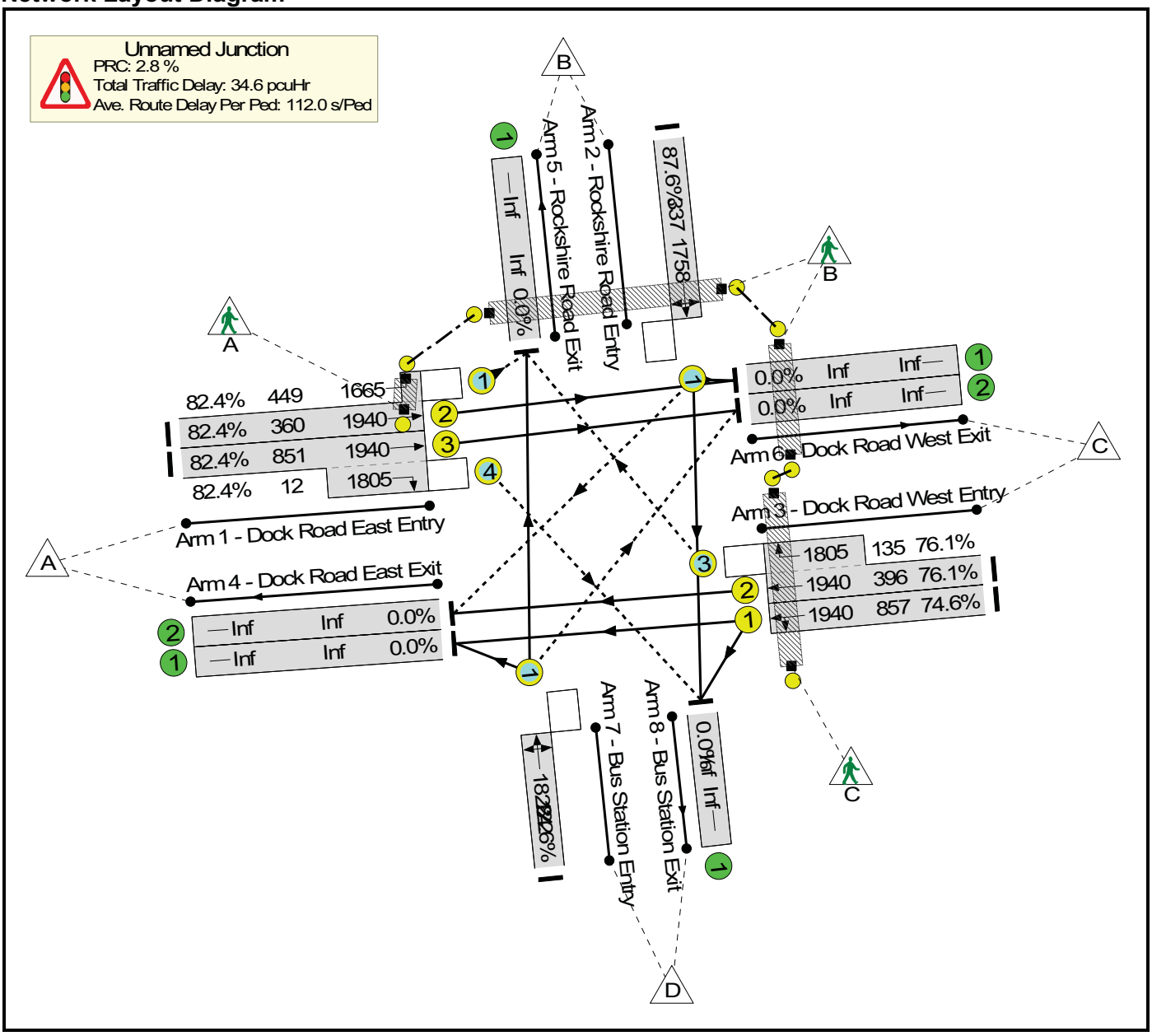
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**93.3%**	**0**	**754**	**17**	**38.4**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**93.3%**	**0**	**754**	**17**	**38.4**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	35	0	383	1940:1665	111+413	73.0 : 73.0%	0	297	5	5.3	49.8	12.4
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	35:12	-	441	1940:1805	576+13	74.8 : 74.8%	0	10	0	6.1	49.9	14.6
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	40	-	562	1763	602	93.3%	0	347	6	11.4	73.3	23.4
3/1	Dock Road West Entry Ahead Left	U	E		1	35	-	465	1940	582	79.9%	-	-	-	6.9	53.6	16.1
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	35:7	-	507	1940:1805	499+120	82.4 : 79.8%	0	90	6	8.0	56.8	16.5
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	30	1828	122	24.6%	0	10	0	0.6	72.7	1.1
Ped Link: P1	Unnamed Ped Link	-	H		1	17	-	200	-	10200	2.0%	-	-	-	1.9	33.6	6.1
Ped Link: P2	Unnamed Ped Link	-	I		1	34	-	200	-	20400	1.0%	-	-	-	3.6	63.9	6.2
Ped Link: P3	Unnamed Ped Link	-	J		1	12	-	200	-	7200	2.8%	-	-	-	3.3	58.6	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	63	-	200	-	37800	0.5%	-	-	-	0.4	7.9	4.8

C1 PRC for Signalled Lanes (%): -3.7 Total Delay for Signalled Lanes (pcuHr): 38.37 Cycle Time (s): 120
PRC Over All Lanes (%): -3.7 Total Delay Over All Lanes(pcuHr): 38.37

Basic Results Summary

Scenario 12: 'Design Year (2034), with development' (FG12: 'PM Peak (Design Year, with devt.)', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: 16169.109	-	-	-		-	-	-	-	-	-	**87.6%**	**0**	**644**	**11**	**34.6**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**87.6%**	**0**	**644**	**11**	**34.6**	-	-
1/2+1/1	Dock Road East Entry Left Ahead	U+O	A	B	1	52	0	667	1940:1665	360+449	82.4 : 82.4%	0	364	6	7.6	40.8	20.7
1/3+1/4	Dock Road East Entry Ahead Right	U+O	A C		1	52:13	-	711	1940:1805	851+12	82.4 : 82.4%	0	10	0	8.1	41.1	22.9
2/1	Rockshire Road Entry Right Left Ahead	O	D		1	22	-	295	1758	337	87.6%	0	159	3	6.9	84.5	12.6
3/1	Dock Road West Entry Ahead Left	U	E		1	52	-	639	1940	857	74.6%	-	-	-	6.4	36.0	19.0
3/2+3/3	Dock Road West Entry Ahead Right	U+O	E F		1	52:8	-	404	1940:1805	396+135	76.1 : 76.1%	0	101	2	5.0	44.3	8.8
7/1	Bus Station Entry Left Ahead Right	O	G		1	7	-	30	1828	122	24.6%	0	10	0	0.6	72.7	1.1
Ped Link: P1	Unnamed Ped Link	-	H		1	18	-	200	-	10800	1.9%	-	-	-	2.2	40.2	6.0
Ped Link: P2	Unnamed Ped Link	-	I		1	51	-	200	-	30600	0.7%	-	-	-	2.7	48.3	6.0
Ped Link: P3	Unnamed Ped Link	-	J		1	13	-	200	-	7800	2.6%	-	-	-	3.7	66.1	6.5
Ped Link: P4	Unnamed Ped Link	-	K		1	45	-	200	-	27000	0.7%	-	-	-	0.7	13.4	5.3

C1 PRC for Signalled Lanes (%): 2.8 Total Delay for Signalled Lanes (pcuHr): 34.57 Cycle Time (s): 120

PRC Over All Lanes (%): 2.8 Total Delay Over All Lanes(pcuHr): 34.57

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.3.332 [14595,13/11/2013]

For sales and distribution information, program advice and maintenance, contact TRL:
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Filename: 16169 Rice Bridge Roundabout 7th July.arc8
Path: P:\Proj\2016\16169\16169-14-CALCS\Traffic\arcady
Report generation date: 07/07/2017 12:35:49

Summary of junction performance

	AM Peak				PM Peak			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	A1 - 2016 - Base Year - a) without development							
Arm 1	2.07	8.46	0.68	A	0.79	3.43	0.44	A
Arm 2	0.40	1.92	0.29	A	1.40	3.30	0.58	A
Arm 3	3.77	9.23	0.79	A	0.77	4.38	0.44	A
	A1 - 2016 - Base Year - b) with development							
Arm 1	5.44	18.22	0.85	C	1.70	5.18	0.63	A
Arm 2	0.42	1.95	0.30	A	1.42	3.36	0.59	A
Arm 3	3.97	9.72	0.80	A	0.77	4.38	0.44	A
	A1 - 2019 - Opening Year - a) without development							
Arm 1	2.48	9.85	0.72	A	0.85	3.57	0.46	A
Arm 2	0.42	1.95	0.30	A	1.52	3.47	0.60	A
Arm 3	4.60	11.00	0.83	B	0.84	4.66	0.46	A
	A1 - 2019 - Opening Year - b) with development							
Arm 1	8.00	26.36	0.90	D	1.76	5.36	0.64	A
Arm 2	0.44	1.98	0.31	A	1.12	2.93	0.53	A
Arm 3	4.88	11.65	0.84	B	0.84	4.66	0.46	A
	A1 - 2034 - Design Year - a) without development							
Arm 1	7.55	27.63	0.90	D	1.16	4.30	0.54	A
Arm 2	0.51	2.08	0.34	A	2.17	4.38	0.69	A
Arm 3	18.36	39.60	0.97	E	1.31	6.40	0.57	A
	A1 - 2034 - Design Year - b) with development							
Arm 1	77.29	186.60	1.13	F	2.11	6.22	0.68	A
Arm 2	0.53	2.10	0.35	A	2.20	4.45	0.69	A
Arm 3	21.45	45.49	0.98	E	1.31	6.40	0.57	A

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - 2016 - Base Year - a) without development, AM Peak" model duration: 07:45 - 09:15
"D2 - 2016 - Base Year - a) without development, PM Peak" model duration: 16:45 - 18:15
"D3 - 2016 - Base Year - b) with development, AM Peak" model duration: 07:45 - 09:15
"D4 - 2016 - Base Year - b) with development, PM Peak" model duration: 16:45 - 18:15
"D5 - 2019 - Opening Year - b) with development, AM Peak" model duration: 07:45 - 09:15
"D6 - 2019 - Opening Year - b) with development, PM Peak" model duration: 16:45 - 18:15
"D7 - 2034 - Design Year - b) with development, AM Peak" model duration: 07:45 - 09:15
"D8 - 2034 - Design Year - b) with development, PM Peak" model duration: 16:45 - 18:15
"D9 - 2019 - Opening Year - a) without development, AM Peak" model duration: 07:45 - 09:15
"D10 - 2019 - Opening Year - a) without development, PM Peak" model duration: 16:45 - 18:15
"D11 - 2034 - Design Year - a) without development, AM Peak" model duration: 07:45 - 09:15
"D12 - 2034 - Design Year - a) without development, PM Peak " model duration: 16:45 - 18:15

Run using Junctions 8.0.3.332 at 07/07/2017 12:35:46

File summary

File Description

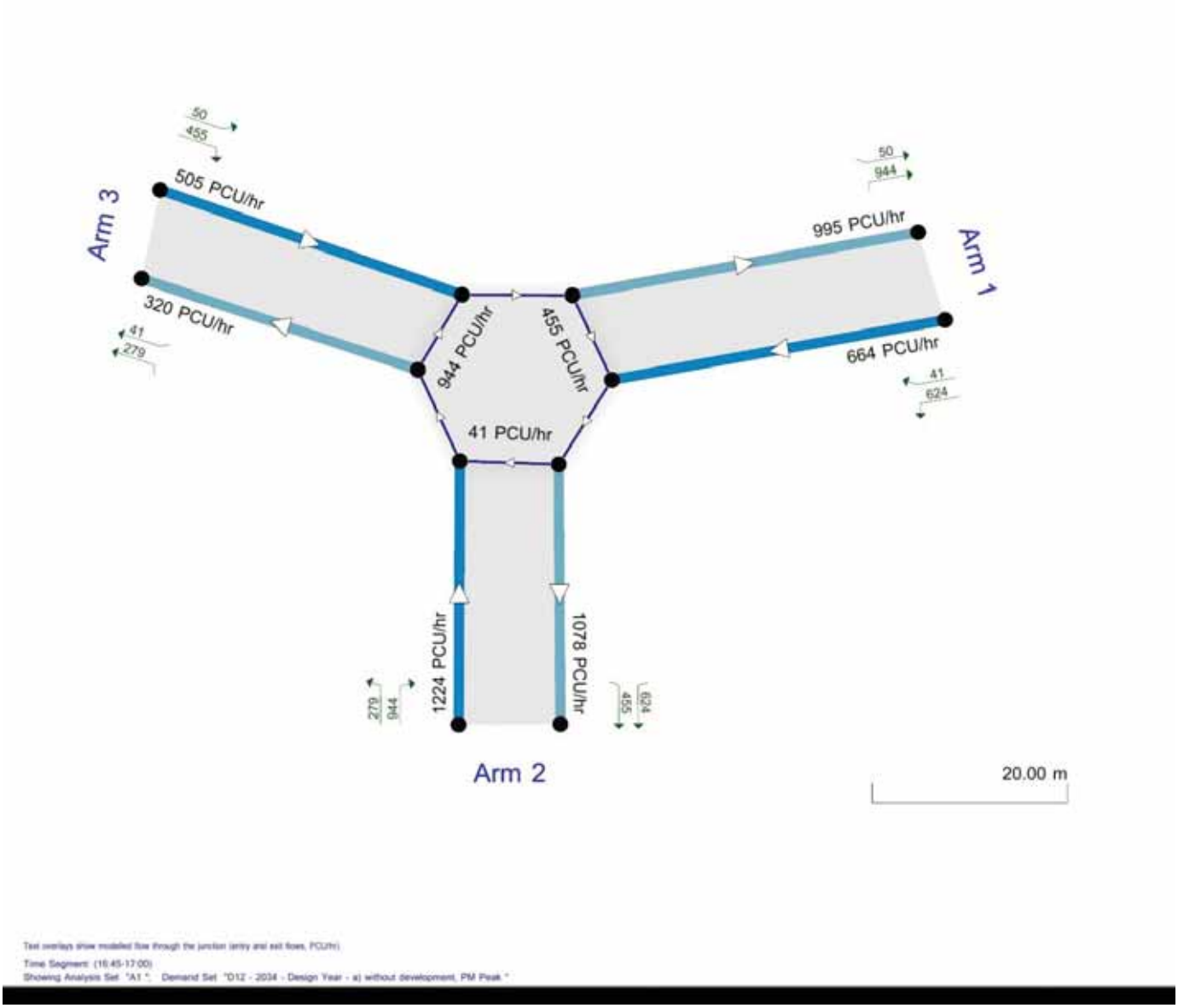
Title	Waterford NQ
Location	Rice Bridge Junction
Site Number	
Date	19/06/2017
Version	
Status	Planning
Identifier	
Client	
Jobnumber	16.169
Enumerator	
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

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



The junction diagram reflects the last run of ARCADY.

(Default Analysis Set) - 2034 - Design Year - a) without development, PM Peak

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2034 - Design Year - a) without development, PM Peak	2034 - Design Year - a) without development	PM Peak		ONE HOUR	16:45	18:15	90	15		

Junction Network

Junctions

Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
(untitled)	Roundabout	1,2,3			4.78	A

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	R711 Dock Road East	
2	R680 Rice Bridge	
3	R448	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.00	9.50	9.42	34.06	43.69	63.00	
2	7.30	9.40	30.00	27.76	43.69	41.00	
3	7.25	8.00	11.13	23.00	43.69	36.00	

Pedestrian Crossings

Arm	Crossing Type
1	None
2	None
3	None

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.720	2291.925
2		(calculated)	(calculated)	0.814	2664.824
3		(calculated)	(calculated)	0.755	2349.265

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

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	ONE HOUR	✓	885.00	100.000
2	ONE HOUR	✓	1630.00	100.000
3	ONE HOUR	✓	673.00	100.000

Turning Proportions

Turning Counts or Proportions (PCU/hr) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	831.000	54.000
	2	1258.000	0.000	372.000
	3	67.000	606.000	0.000

Turning Proportions (PCU) - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.00	0.94	0.06
	2	0.77	0.00	0.23
	3	0.10	0.90	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		1	2	3
From	1	1.000	1.000	1.000
	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		1	2	3
From	1	0.000	0.000	0.000
	2	0.000	0.000	0.000
	3	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.54	4.30	1.16	A
2	0.69	4.38	2.17	A
3	0.57	6.40	1.31	A

Main Results for each time segment

Main results: (16:45-17:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	666.27	664.23	454.62	0.00	1964.48	0.339	0.51	2.769	A
2	1227.15	1223.67	40.53	0.00	2631.82	0.466	0.87	2.550	A
3	506.67	504.88	944.41	0.00	1635.94	0.310	0.45	3.173	A

Main results: (17:00-17:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	795.60	794.78	543.96	0.00	1900.13	0.419	0.72	3.255	A
2	1465.34	1463.80	48.49	0.00	2625.33	0.558	1.25	3.095	A
3	605.01	604.10	1129.73	0.00	1495.96	0.404	0.67	4.032	A

Main results: (17:15-17:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	974.40	972.67	664.99	0.00	1812.96	0.537	1.15	4.275	A
2	1794.66	1791.07	59.35	0.00	2616.49	0.686	2.15	4.342	A
3	740.99	738.51	1382.31	0.00	1305.18	0.568	1.29	6.325	A

Main results: (17:30-17:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	974.40	974.37	667.17	0.00	1811.39	0.538	1.16	4.300	A
2	1794.66	1794.60	59.45	0.00	2616.41	0.686	2.17	4.380	A
3	740.99	740.93	1385.03	0.00	1303.12	0.569	1.31	6.403	A

Main results: (17:45-18:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	795.60	797.32	547.01	0.00	1897.93	0.419	0.73	3.277	A
2	1465.34	1468.91	48.65	0.00	2625.20	0.558	1.27	3.124	A
3	605.01	607.49	1133.68	0.00	1492.98	0.405	0.69	4.078	A

Main results: (18:00-18:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	666.27	667.11	457.07	0.00	1962.71	0.339	0.52	2.782	A
2	1227.15	1228.73	40.71	0.00	2631.67	0.466	0.88	2.568	A
3	506.67	507.61	948.31	0.00	1632.99	0.310	0.45	3.203	A

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