Project

White Pines East Residential Development, Stocking Avenue, Dublin 16

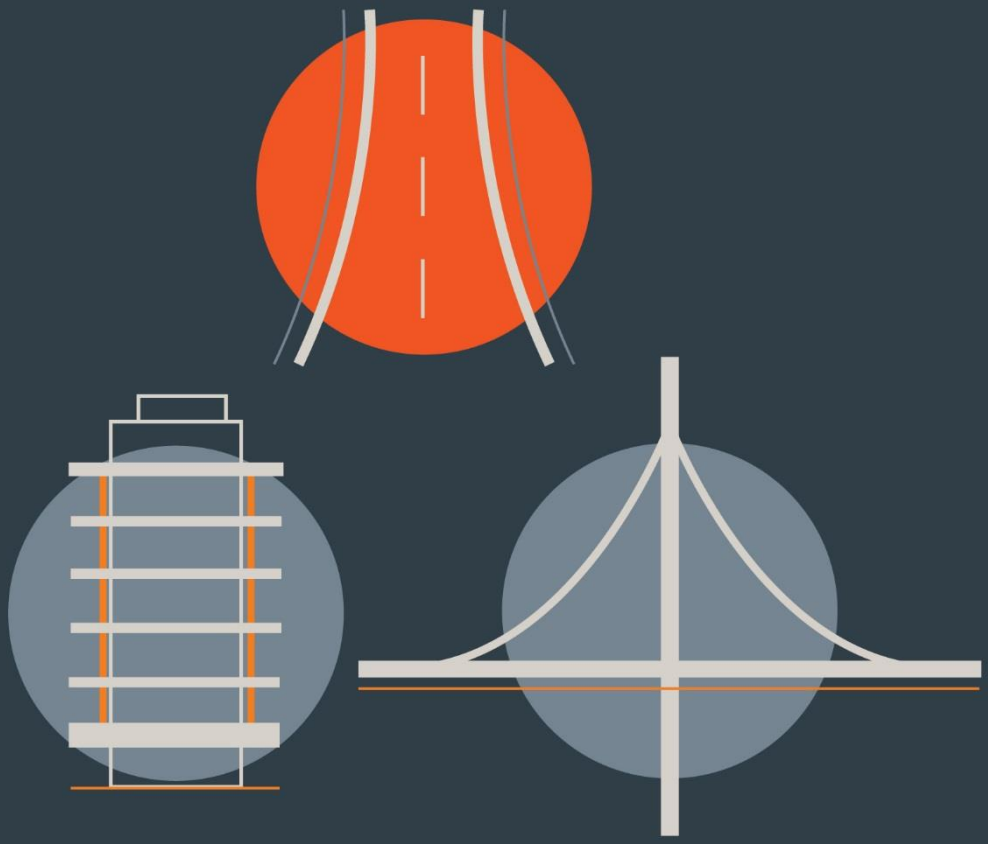
Report Title

Traffic and Transport Assessment Report

Client

Ardstone Homes Limited

TRANSPORTATION



DBFL CONSULTING ENGINEERS

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APPENDICES

1.0 INTRODUCTION

1.1 BACKGROUND

1.1.1 DBFL Consulting Engineers (DBFL) has been commissioned by Ardstone Homes Limited to compile a Traffic and Transport Assessment (TTA) for a proposed residential development on a greenfield site located at Stocking Avenue, Dublin 16, Co. Dublin.

1.1.2 The proposal is for a residential development of 241 units, 5 apartment blocks and three duplex blocks, located on lands to the northeast of the Stocking Avenue / White Pines Way / White Pines Crescent roundabout in Woodstown, Dublin, comprising 93 no. 1-bed units and 148 no. 2-bed units. The development also comprises 204 no. car parking spaces and 401 no. cycle parking spaces and will be accessed via Stocking Avenue located to the south of the subject development site. The development also includes a community centre of approx. 552 sqm.

1.1.3 The report has been produced to address any potential concerns that the local planning authority may have pertaining to the level of influence of the proposed development upon the local transportation system.

1.1.4 During the development of this report, traffic turning count surveys that were undertaken at key junctions in the vicinity of the site were used to analyse existing traffic movement patterns across the local road network. This information has been supplemented with data obtained from site audits of the local road network, subsequently enabling the identification of existing local travel characteristics and an appreciation of the local receiving environment from a transportation perspective.

1.2 SCOPE

1.2.1 The purpose of this TTA is to quantify the existing transport environment and to detail the results of assessment work undertaken to identify the potential level of any transport impact generated as a result of the proposed development. The scope of the assessment covers transport and related sustainability issues including means of vehicular access, pedestrian, cyclist and local public transport connections. The principal objective of the report is to quantify any level of impact across the local road network and subsequently ascertain both the existing and future operational performance of the local road network.

1.3 METHODOLOGY

1.3.1 Our approach to the study accords with policy and guidance both at a national and local level. Accordingly, the adopted methodology responds to best practices, current and emerging guidance, exemplified by a series of publications, all of which advocate this method of analysis. Key publications consulted include;

- '*Traffic and Transport Assessment Guidelines*' (May 2014) National Road Authority;
- *'Traffic Management Guidelines'* Dublin Transportation Office & Department of the Environment and Local Government (May 2003);
- *'Guidelines for Traffic Impact Assessments'* The Institution of Highways and Transportation; and
- South Dublin County Council Development Plan 2016-2022.

1.3.2 Our methodology incorporated a number of key inter-related stages, including;

- **Background Review:** This important exercise incorporated three parallel tasks which included (a) an examination of the local regulatory and development management documentation; (b) an analysis of previous 'transport' related, strategic and site specific studies of development and transport infrastructure proposals across the Ballycullen area and (c) a review of planning applications to establish the legal status of various third party development schemes that were either considered within the strategic 'transport' studies or which have emerged and received full planning permission since.
- **Site Audit**: A site audit was undertaken to quantify existing road network issues and identify local infrastructure characteristics, in addition to establishing the level of accessibility to the site in terms of walking, cycling and public transport. An inventory of the local road network was also developed during this stage of the assessment.
- **Traffic Counts**: Traffic counts surveys were analysed with the objective of establishing local traffic characteristics in the immediate area of the proposed development.

- **Trip Generation**: A trip generation exercise has been carried out to establish the potential level of vehicle trips generated by the proposed development.

- **Trip Distribution:** Based upon both the existing and future network characteristics, a distribution exercise has been undertaken to assign site generated vehicle trips across the local road network.

- **Network Analysis:** Further to quantifying the predicted impact of vehicle movements across the local road network for the adopted site access strategy more detailed computer simulations have been undertaken to assess the operational performance of key junctions in the post development 2022, 2027 and 2037 development scenarios.

1.4 REPORT STRUCTURE

1.4.1 As introduced above, this TTA seeks to clarify the potential level of influence generated by the proposed development upon the local road network and subsequently ascertain the existing and future operational performance of the local transport system. The structure of the report responds to the various stages of this exercise including the key tasks summarised below.

1.4.2 **Chapter 2** of this report describes the existing conditions at the proposed development location and surrounding area, whilst **Chapter 3** provides a summary of the relevant transport policies that influence the design and appraisal of the subject residential proposal.

1.4.3 A description of the proposed development scheme is described in **Chapter 4** whilst **Chapter 5** outlines the trip generation exercise carried out and the adopted methodology for applying growth factors to establish design year network traffic flows and the predicted scale of impact upon the local road network.

1.4.4 The operational performance of the key junction is assessed for the 2022 Opening Year and the 2027 (Opening Year +5 years) and the 2037 (Opening Year +15 years) Horizon Years are summarised within **Chapter 6**.

1.4.5 The main conclusions and recommendations derived from the analysis are summarised in **Chapter 7**.

2.0 RECEIVING ENVIRONMENT

2.1 LAND USE

2.1.1 The subject site is located on a greenfield area within the Woodtown suburb of South Dublin. The site lies within the Ballycullen-Oldcourt Local Area Plan (LAP) lands. The subject site predominantly comprises greenfield site and is zoned as Objective RES-N which aims "*To provide for new residential communities in accordance with approved area plans*" within the 2016-2022 South Dublin County Development Plan as shown in **Figure 2.1**.

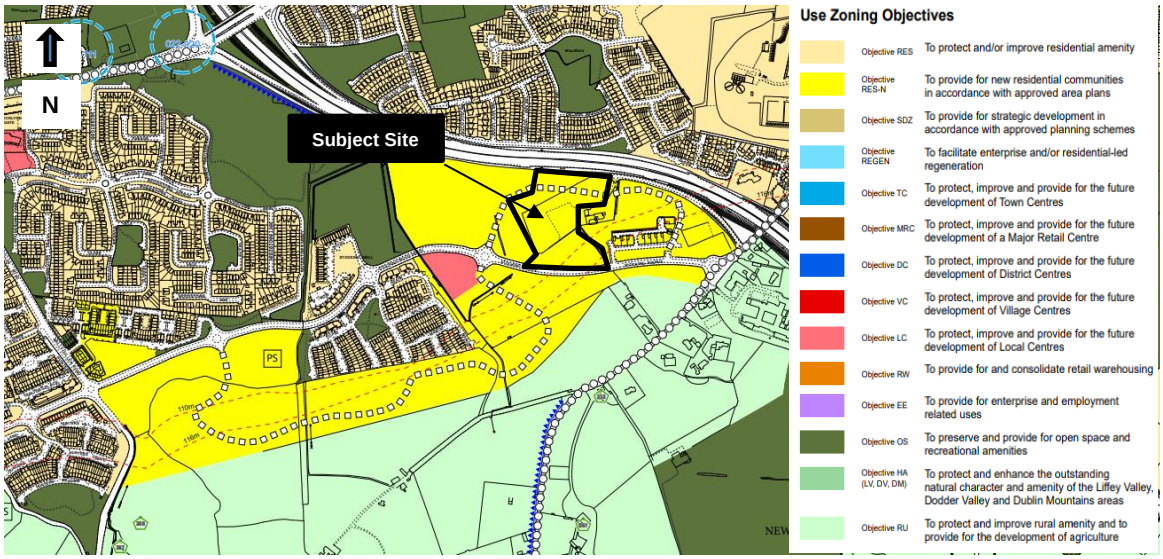


Figure 2.1: South Dublin County Council Zoning Objectives

2.2 LOCATION

2.2.1 The subject site is located approximately 11km south-west of Dublin City Centre, 5km south-east from Tallaght Town Centre and offers good access to the M50 Motorway, via Junction 12, located to the north-west of the site.

2.2.2 The general location of the subject site in relation to the surrounding road network is illustrated in below in **Figure 2.2,** while **Figure 2.3** indicatively shows the extent of the subject site boundary and neighbouring lands.

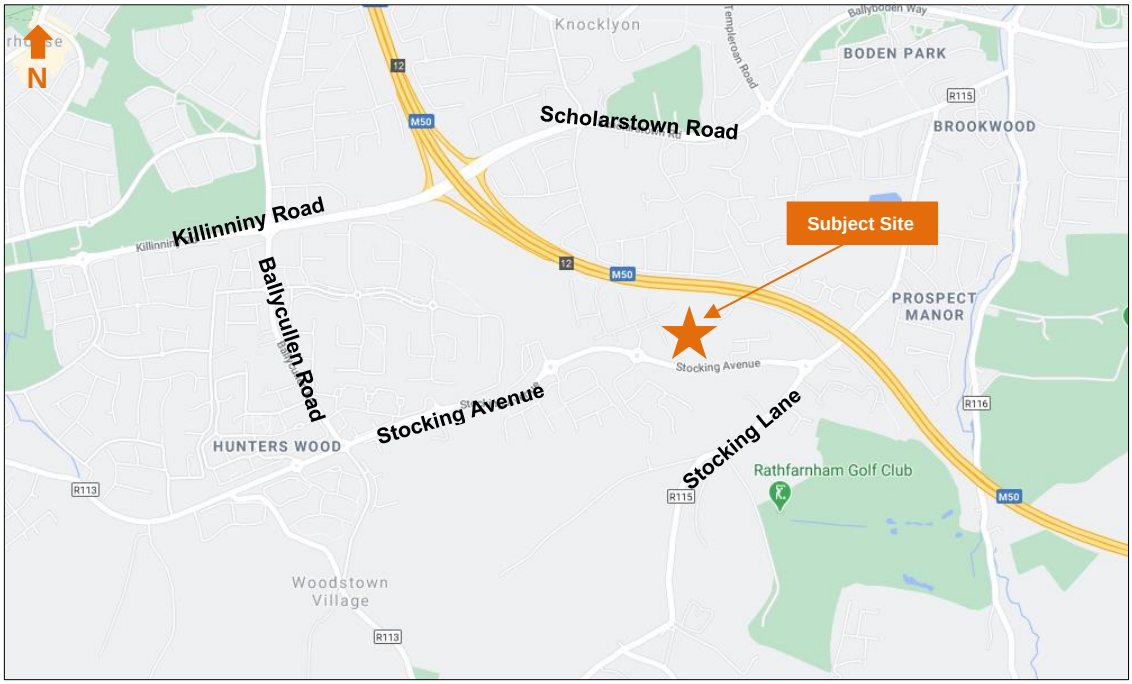


Figure 2.2: Site Location (Source: www.google.ie/maps)

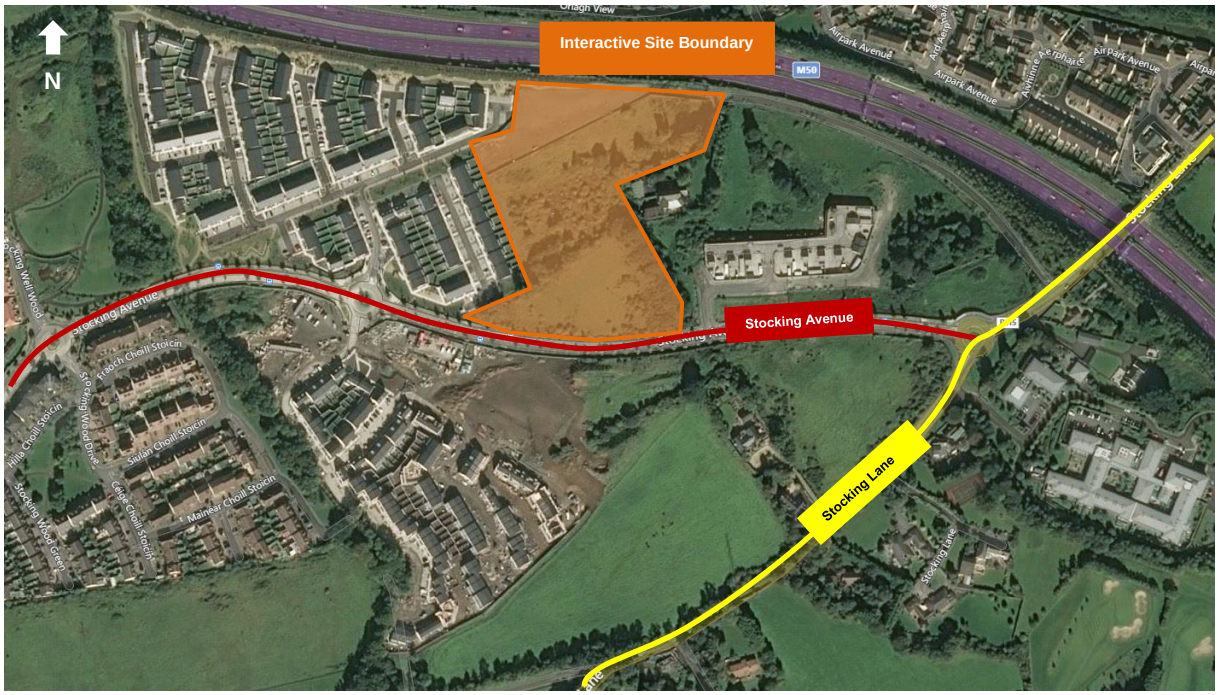


Figure 2.3: Indicative Site Boundary (Source: www.google.ie/maps)

2.2.3 The subject site is bound to the south by Stocking Avenue and to the west by the residential development of White Pines Way. The site is situated in close proximity to the established residential area of Stocking Wood and Stocking Well to the west as well as Woodstown Village, Knocklyon which is approximately 1.8km north-west of the development site.

2.3 LOCAL AMENITIES

2.3.1 The proposed development site is well placed in terms of proximity to local amenities including schools such as Edmondstown National School, Rockbrook Park School, St Colmcille's Community School, Sancta Maria College, Ballyroan Boys National School, Scoil Naomh Padraig, Colaiste Eanna C.B.S, Firhouse Educate Together National School, South Dublin Music School, Firhouse Community College and Holy Rosary Primary School. Additionally, the site is also conveniently situated close to Woodstown Shopping Centre and LIDL approximately 1.8km to the north-west.

2.3.2 In terms of leisure facilities, the subject site is approximately 950m and 2.3km to the east of Rathfarnham and Edmondstown Golf Clubs respectively, while Firhouse Community & Leisure Club is situated approximately 2.5km west of the development site. There are a number of health care facilities in close proximity to the site, including medical clinics in Woodtown village centre and Ballycullen west of the development, while the Bloomfield Health Service is located in the vicinity of the development to the east. **Figure 2.4** below show indicatively the subject site's location in relation to the aforementioned local amenities. There is a proposed retail unit, White Pines Retail, that is currently under construction and when completed will be situated approximately 100m west of the development site.

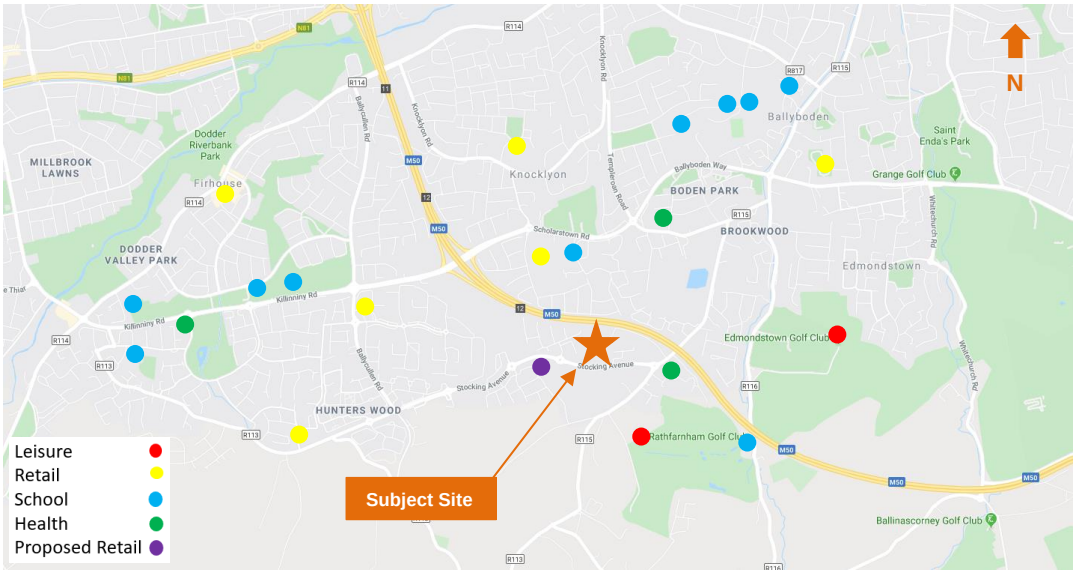


Figure 2.4: Subject Site Area Local Amenities

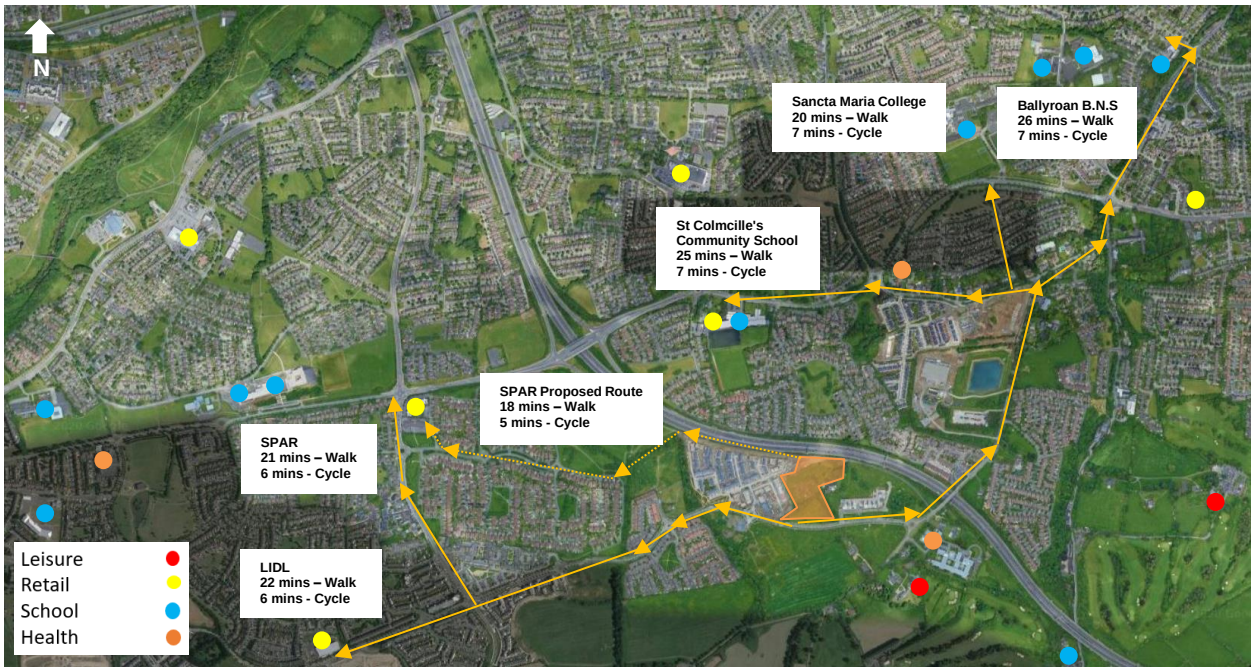


Figure 2.5: Subject Site Area Local Amenities

2.4 EXISTING TRANSPORTATION INFRASTRUCTURE

Road Network

2.4.1 Stocking Avenue runs in an east-west direction along the southern site boundary, comprising a two-way single lane carriageway with 3.75m wide traffic lanes in both directions in the vicinity of the site. Stocking Avenue is subject to a speed limit of 50kph with street lighting provided on both sides and traffic calming features in the form of road humps located at intervals along the carriageway.

2.4.2 Stocking Avenue connects to a four-arm roundabout junction with Stocking Lane (R115) approximately 300m to the east to the development site.

2.4.3 Approximately 1.2km to the west of the subject site, Stocking Avenue connects to a roundabout junction with Hunters Road and Ballycullen Road, which provides onward connections to the M50 Motorway Junction 12 north-west of the site. The M50 Motorway provides strategic network access across the Greater Dublin Area and onward links to the M1 Motorway Northbound and the M11 Motorway Southbound, via Blanchardstown and Sandyford.

2.4.4 Stocking Lane (R115) extends from Stocking Avenue junction in both northern and southern directions, towards the city centre of Dublin (via Ballyboden) and the Dublin Mountains, respectively.

2.4.5 Ballycullen Road extends from the roundabout with Stocking Avenue north towards Firhouse Road (R114). It crosses Killinniny Road (R113) at a 4-arm signalized junction, continuing east onto R113, then changing to St. Colmcille's Way where access is provided to the M50 (northbound and southbound) via Junction 12, while to the west access can be gained to Tallaght and south west Dublin.

2.4.6 **Figure 2.6** below illustrates the location of the subject site within the context of the existing road network.

Figure 2.6: Existing Road Network (Source: www.google.ie/maps)

Existing Pedestrian and Cycling Facilities

2.4.7 A segregated cycle track and footpath is provided on both sides of Stocking Avenue between the development site and the Stocking Lane/Stocking Avenue junction to the east. Similarly, to the west of the development site a segregated cycle track and footpath are provided on both sides of Stocking Avenue, up to the junction with Ballycullen Road and Hunters Road, as shown in **Figure 2.7** and **Figure 2.8** below.

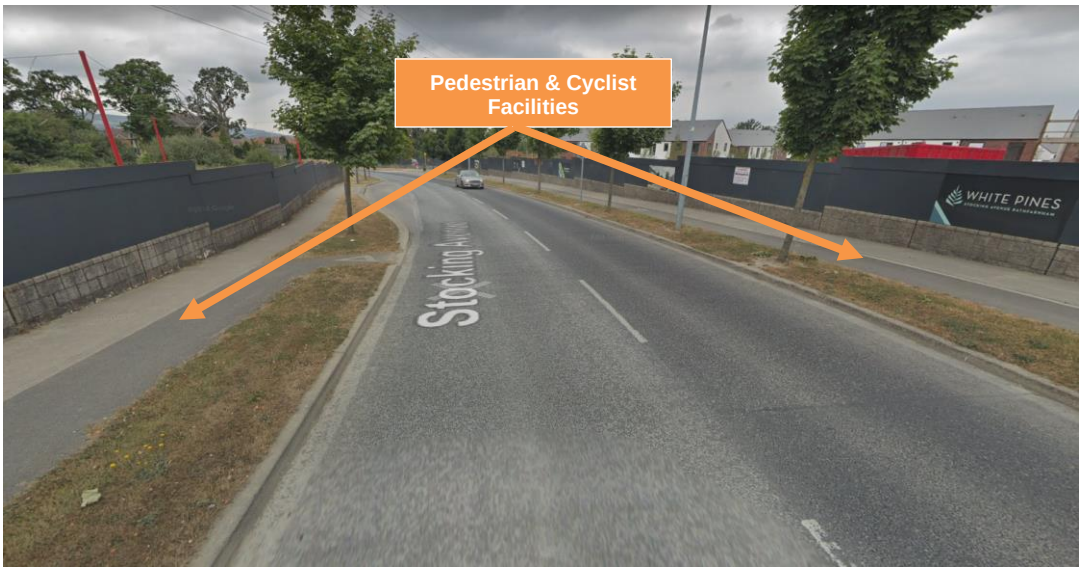


Figure 2.7: Pedestrian/Cycle Facilities on Stocking Avenue Looking West

Figure 2.8: Stocking Avenue Looking East

2.4.8 In addition to the aforementioned cycle facilities on Stocking Avenue, a segregated southbound cycle tracks is provided on Ballycullen Road, as shown in **Figure 2.9**, while northbound cyclists are required to use the northbound bus lane.

Figure 2.9: Cycling Facilities on Ballycullen Road

2.4.9 The Stocking Avenue/White Pines Way/White Pines Crescent Roundabout was upgraded as part of the planning application SD14A/0222, to better reflect DMURS guidelines, providing a safer environment for pedestrians and cyclists while also reducing traffic speeds (i.e. the shared pedestrian/cycle crossings were widened, while the carriageway widths and circulating width around the roundabout were reduced).

2.4.10 Furthermore, there are a variety of cycle facilities available on the surrounding network as illustrated below in **Figure 2.10** which illustrates the National Transport Authorities' (NTA) Greater Dublin Area Existing Cycle Facilities (2013).

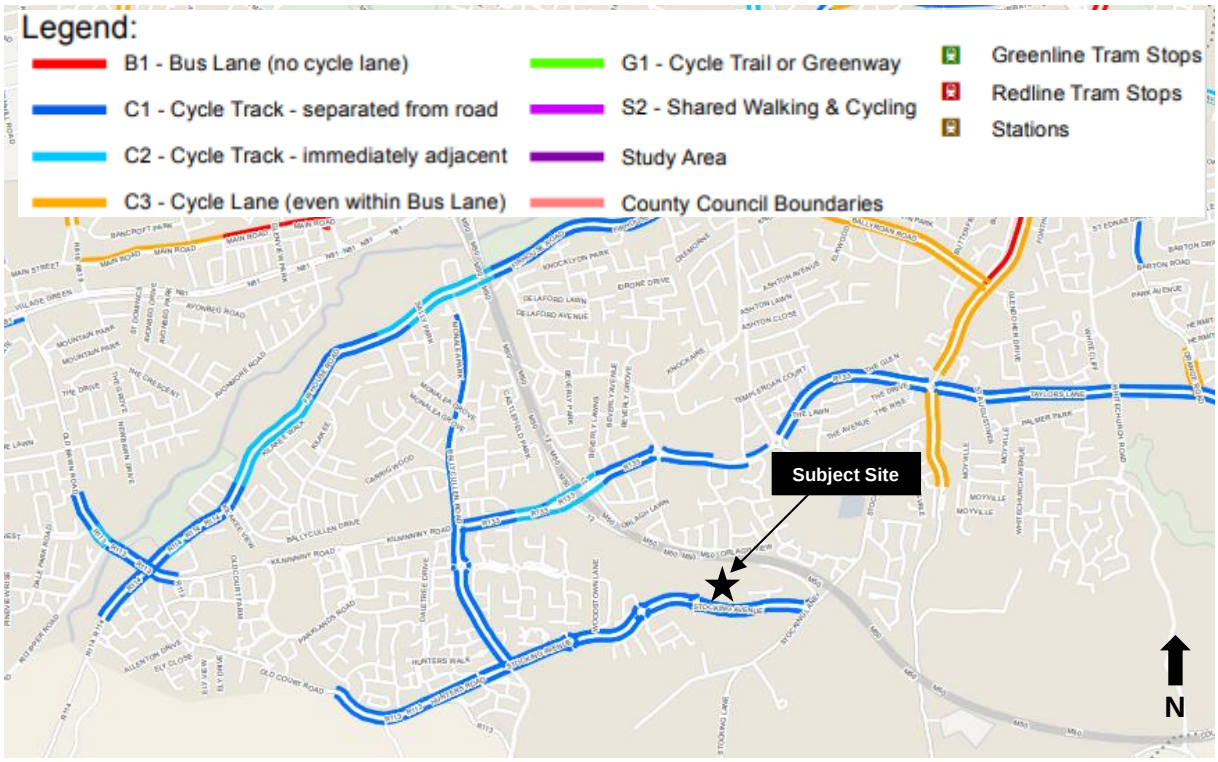


Figure 2.10: Existing Cycle Facilities (Extract of Sheet E6 GDA Cycle Network Plan)

Site Accessibility - Walking

2.4.11 Existing walking time isochrones from the development site are shown in Figure 2.11, which illustrates the high levels of accessibility for pedestrians walking to/from the site. The walking time isochrones illustrates that food supermarkets and St Colmcille's Community School are within a **30 minute** walking distance, and Sancta Maria College, Ballyroan Boys National School, Scoil Naomh Padraig and Colaiste Eanna C.B.S are within a **45 minute** walking distance.

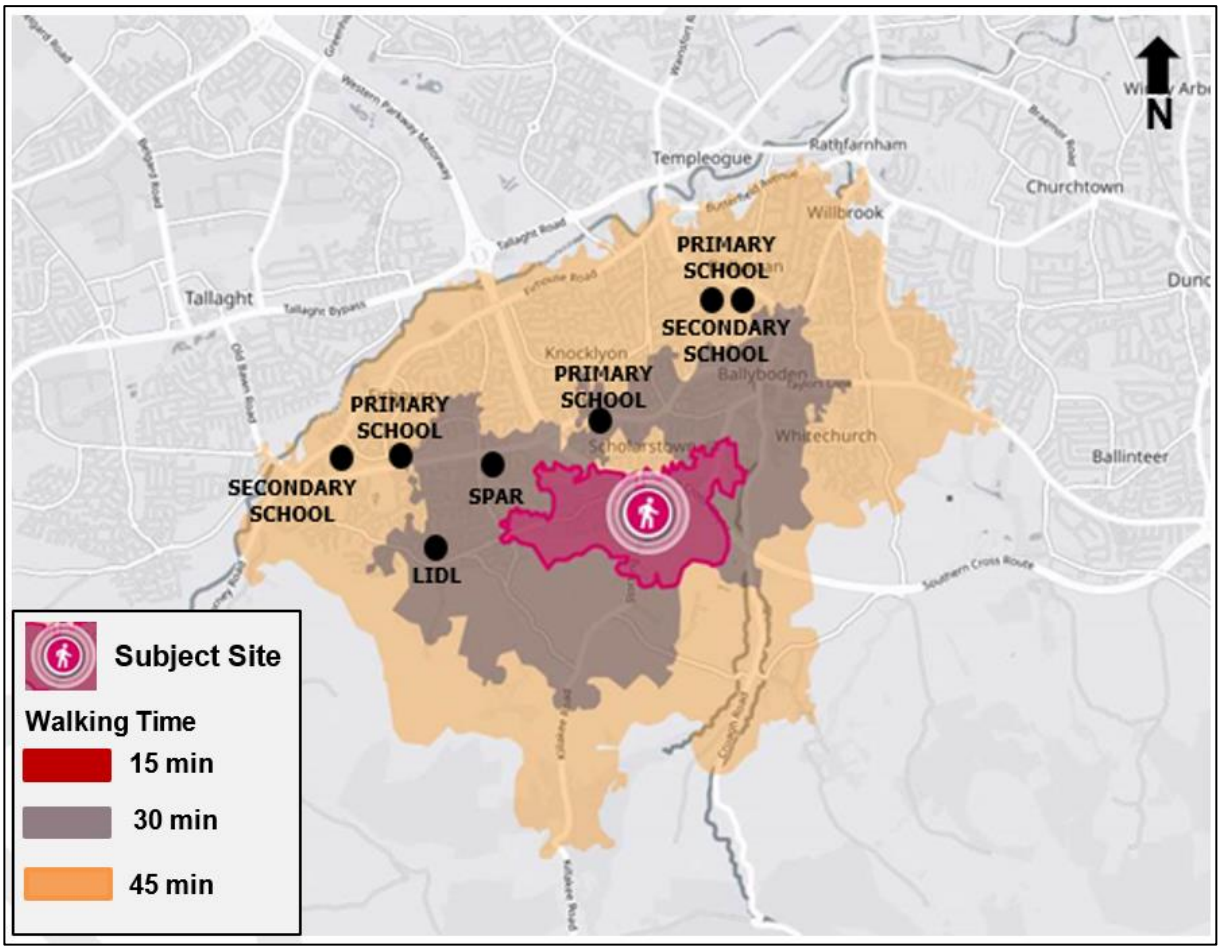


Figure 2.11: Walking Isochrones from the Subject Development Site (Source: Traveltime.com)

Site Accessibility - Cycling

2.4.12 The cycling time isochrones from the development site were created and are shown in **Figure 2.12** below, which illustrates that Tallaght is within a **15 minute** cycling distance from the subject site, whereas, Rathfarnham, Dundrum, Saggart are within a **30 minute** cycling distance and Brittas, Clondalkin, Sandyford, Blackrock and Dublin City Centre are within a **45 minute** cycling distance from the proposed development site entrance.

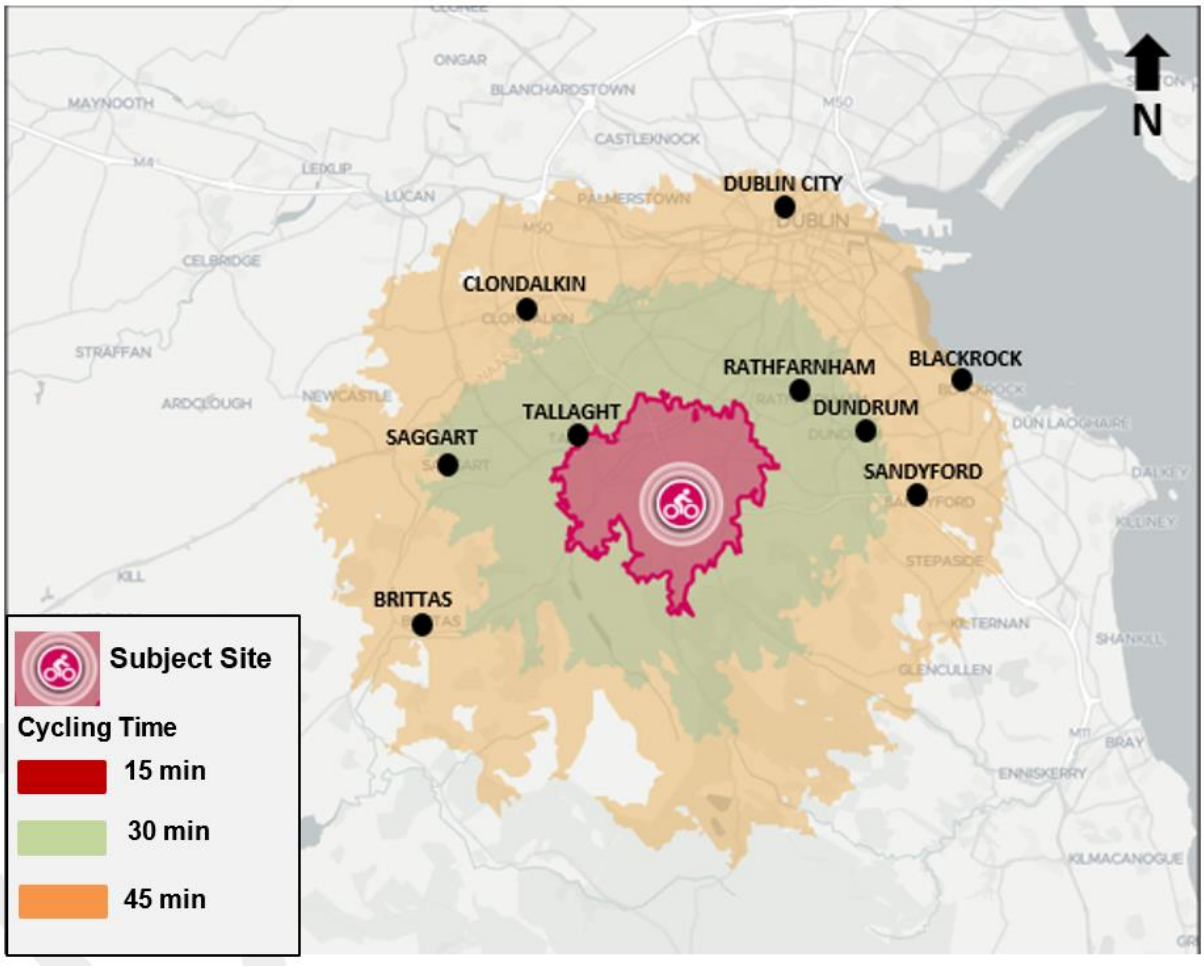


Figure 2.12: Cycling Isochrones from the Subject Development Site (Source: Traveltime.com)

Site Accessibility – Public Transport & Walking

2.4.13 Regarding public transport accessibility, the subject site currently benefits from bus services in close proximity to the site as outlined in the provious section. In order to obtain reaslistic journey times, the following maps give travel times during AM peak time hours, in this case 8.00 on a Tuesday. The public transport time isochrones from the development site were created and are shown in **Figure 2.13** below, illustrates that Tallaght, Rathfarnham, Rathmines and Portobello are within a **30 minute** public transport distance and Crumlin, Dundrum and Dublin City Centre are within a **45 minute** public transport distance from the proposed development site entrance.

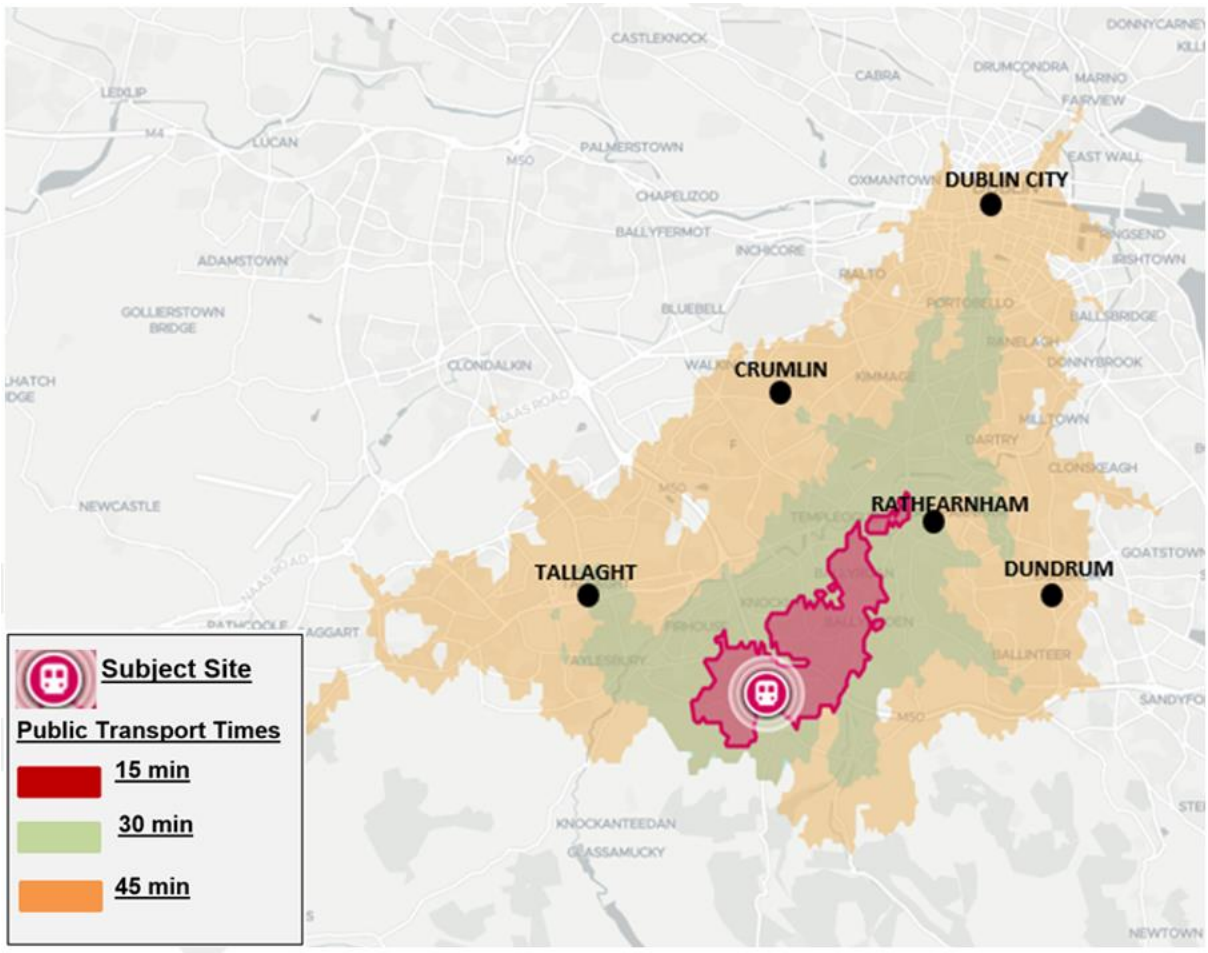


Figure 2.13: Public Transport Isochrones from the Subject Development Site (Source: Traveltime.com)

Public Transport – Bus

2.4.14 Dublin Bus Route 15b travels along Stocking Avenue with bus stops located to the south boundary of the site along Stocking Avenue (approx. 1min walking). Dublin Bus Route 15 travels along Ballycullen Road with bus stop facilities available approximately 1.2km to the west of the subject site. Dublin Bus Route 65b travels along Ballycullen Road with bus stop facilities available approximately 2.0km to the northwest of the subject site. Go Ahead Bus Route 161 travels along Edmondstown Road with bus stop facilities available approximately 1.2km to the east of the subject site. Go Ahead Bus Route 175 travels along Scholarstown Road with bus stop facilities available approximately 1.8km to the northwest of the subject site. **Figure 2.14** below provides details of the above bus routes and the closest bus stop opportunities available to the subject development site.

Figure 2.14: Existing Dublin Bus Routes and walking distance from Bus Stops
(Source: www.google.ie/maps)

2.4.15 All of the routes operate daily as summarised in **Table 2.1**. Route 15b, which travels along Stocking Avenue directly passing the subject development site provides convenient connections to and from Rathfarnham, Rathgar, City Centre and Grand Canal Dock. Additional areas can be accessed via the number 15 route with connections to/from Knocklyon, Templeogue, Rathgar, City Centre, Fairview, Coolock and Clongriffin available. Route 65b offers connections to/from the City Centre, Rathmines, Terenure, Templeogue, Old Bawn and Citywest. Route 161 offers connections to/from Dundrum, Nutgrove, Ballyboden and Rockbrook. Route 175 offers connections to/from Citywest, Old Bawn, Marley Park, Dundrum and UCD.

Route Number	Route	Monday – Friday	Saturday	Sunday
15	Clongriffin - Ballycullen Rd	8 - 12	15	15
15b	Grand Canal Dock (Benson St.) - Stocking Ave	15	15	20 - 30
65b	Poolbeg St. - Citywest	60	60	60
161	Dundrum - Rockbrook	8 Times Daily	-	-
175	Kingswood Ave. - UCD	20 -30	40 - 60	60

Table 2.1: Dublin Bus Service Average Frequency (In minutes)

2.5 ROAD SAFETY RECORD

2.5.1 With the objective of ascertaining the road safety record of the immediate routes leading to/from the subject site, the collision statistics as detailed on the Road Safety Authority's (RSA) website (www.rsa.ie) have been examined. The RSA website includes basic information relating to reported collisions over the most recent twelve-year period, from 2005 to 2016 inclusive.

2.5.2 The RSA database records detail where collision events has been officially recorded such as when the Garda being present to formally record details of the incident.

2.5.3 **Table 2.2** below summarises the RSA Collision Data in the vicinity of the proposed development.

2.5.4 The review of the RSA data reveals that the local road network exhibits a good safety record considering the volume of traffic traveling across the local road network as only one minor incident has been recorded in the vicinity of the subject site.

Figure 2.15: Collision Records - (Source: www.rsa.ie**)**

2.5.5 In summary the review confirms that no significant incident trends or significant safety concerns are evident across the local road network.

Ref	Severity	Year	Vehicle	Circumstances	Day	Time	Casualty
1	Minor	2008	Car	Single vehicle only	Sun	1900-2300	1

Table 2.2: Collision Records - (Source: www.rsa.ie**)**

2.6 EMERGING TRANSPORT DEVELOPMENTS (LAP & NATIONAL POLICY)

Ballycullen-Oldcourt Local Area Plan Transport Initiatives

2.6.1 The Ballycullen-Oldcourt LAP (2014) includes proposals for the provision of road infrastructure upgrades along with upgraded/new pedestrian and cycle facilities within the LAP area as shown in **Figure 2.16** and summarised as follows:

- Roundabouts along Stocking Avenue to be upgraded to signal controlled junctions;
- The construction of the "Oldcourt Main Link Street" which will serve the subject development and future developments within the Oldcourt Lands. It will connect Bohernabreena Road to the west with Oldcourt Road to the east;
- Pedestrian/Cycle Connections linking the subject site with the neighbouring residential areas to the west; and
- Pedestrian Crossing facilities at various locations along Stocking Avenue.

2.6.2 It is noted that the Stocking Avenue roundabout, located to the southwest of the site is indicated in the LAP to be removed or signalised. However, this roundabout was upgraded as part of the planning application SD14A/0222, to better reflect DMURS guidelines, providing a safer environment for pedestrians and cyclists while also reducing traffic speeds. Based on discussions with SDCC Roads Department throughout the pre-planning stages, it is understood that the roundabout would not be removed/signalised in the near future.

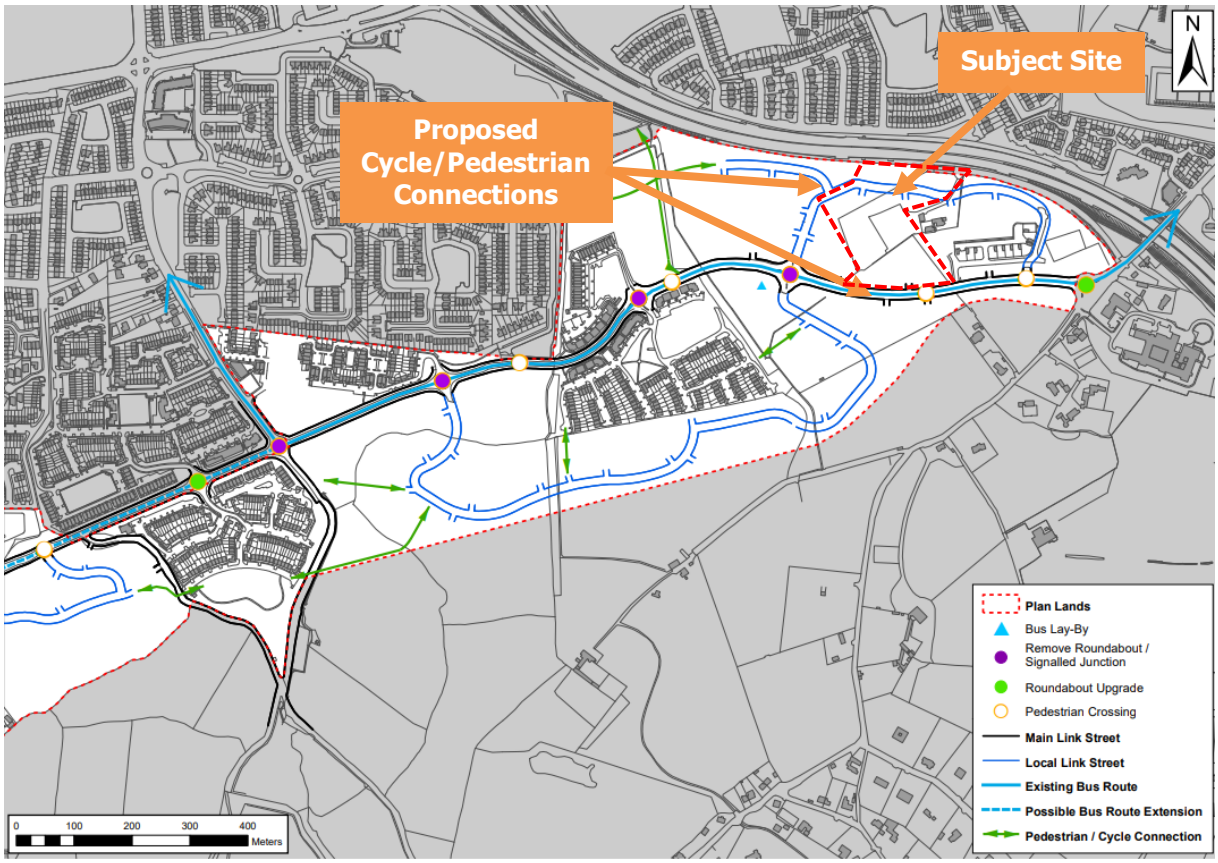


Figure 2.16: Infrastructure Proposals (Extract from Ballycullen – Oldcourt LAP)

GDA Cycle Network Plan (2013)

2.6.3 The subject site is located within the "Dublin South West Sector" as outlined within the Greater Dublin Area Cycle Network Plan (2013). The Sector "*extends outward from the twin corridors of Camden Street and Clanbrassil Street in the city centre, through the inner suburbs of Rathmines and Harold's Cross, to serve the areas of Terenure, Kimmage, Walkinstown, Tallaght, Firhouse and Rathfarnham.*"

2.6.4 There is a feeder route proposed along Stocking Avenue which will provide a connection to Secondary Route SO6 to the west and Secondary Route 10 to the east.

2.6.5 As mentioned in Chapter 2.4, there are currently segregated cycle tracks on both sides of Stocking Avenue from Stocking Lane junction to Dodderbrook.

2.6.6 According to the GDA, the proposals include upgrades to the Orbital Cycle Route SO6 between Scholarstown and Old Bawn via the Ballycullen area and upgrades to the Radial Cycle Route 10 along from Portobello Bridge on the Grand Canal along Rathmines Road and Rathgar Road to Terenure Cross.

2.6.7 In the vicinity of the subject site, the Plan proposes the following route additions as indicated on **Figure 2.17** below:

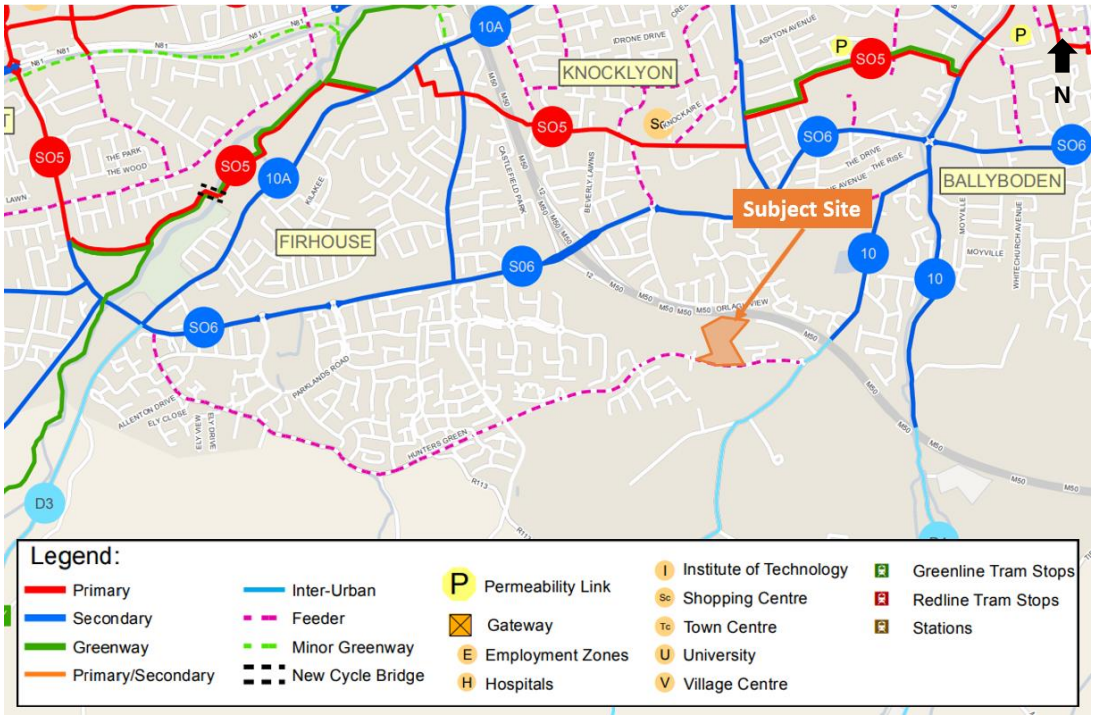


Figure 2.17: Proposed Cycle Routes
(Extract of Sheet N6 GDA Cycle Network Plan 2013)

BusConnects

2.6.8 The National Transport Authority (NTA) has developed a strategic transport plan, known as *BusConnects*, which will transform and overhaul the current bus network to provide a more efficient network. The proposed network will deliver the 'next generation' of bus corridors on the busiest routes and redesign routes with the aim of offering fast, predictable and reliable bus journeys.

2.6.9 Under the BusConnects proposals, the following routes will serve Ballycullen and the subject site and are shown below in **Figure 2.18**:

- A1 Route – Ballycullen - Beaumont
- 85 Route – Tallaght – Parnell Square

2.6.10 The number 85 bus route, proposed under BusConnects, runs from Tallaght to the City Centre via Ballyboden, Rathfarnham, Harold's Cross and on to Parnell Square. This route is proposed to operate with a frequency of 10-15 minutes along Stocking Avenue and is directly adjacent the subject development site (approx. 1 min walk). This new bus route provides the subject development site with direct access to Tallaght, a proposed transport hub/key interchange between several radial and orbital services, along with the LUAS Red Line which offers an alternative means of travelling to the city centre.

2.6.11 The A1 bus route runs from Ballycullen to Beaumont via City Centre. This route is proposed to run along Ballycullen Road, approximately 1.2km west of the subject development, with services proposed to operate with a 10-15 minute frequency.

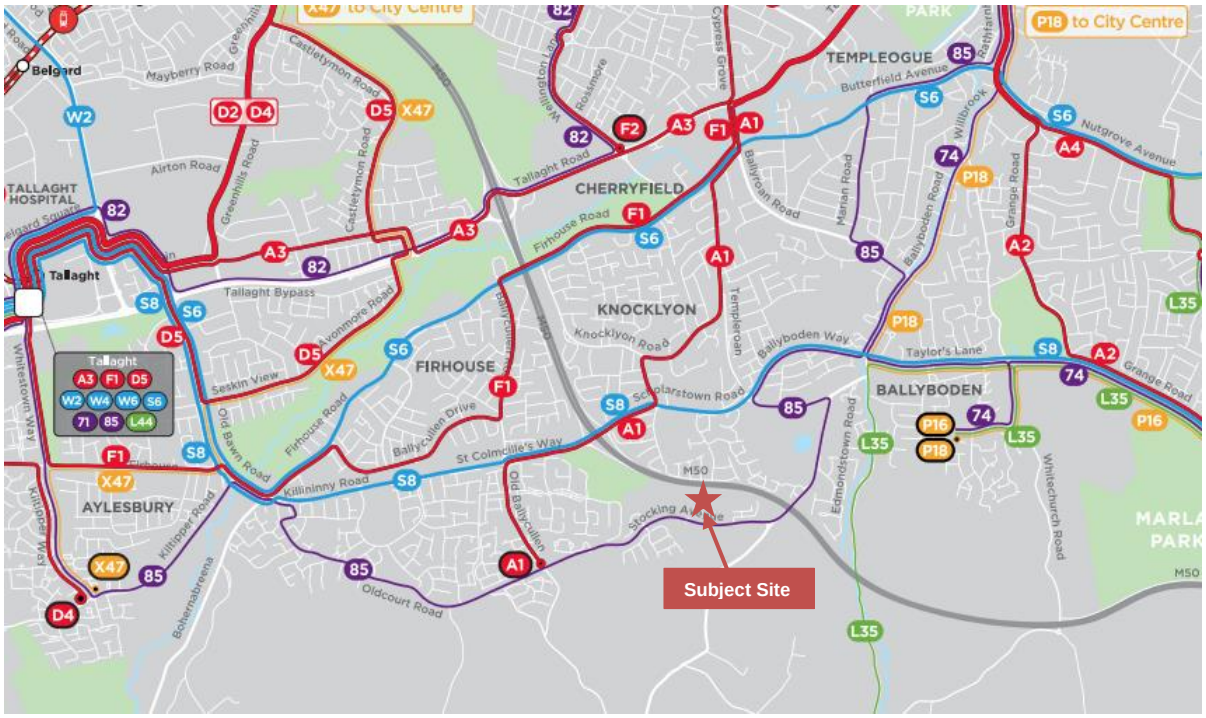
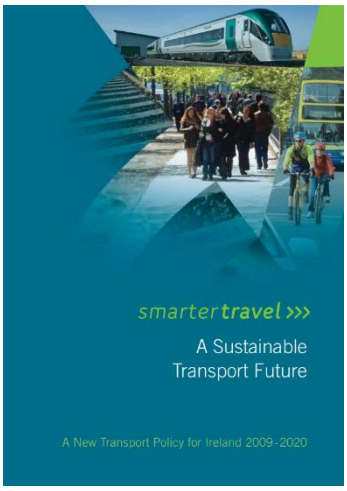


Figure 2.18: Proposed Public Transport Routes (Source: www.busconnects.ie)

3.0 POLICY FRAMEWORK

3.1 SMARTER TRAVEL – A SUSTAINABLE TRANSPORT FUTURE



3.1.1 *Smarter Travel* was published in 2009 by the Department of Transport which represents the national policy documentation outlining a broad vision for the future and establishes objectives and targets for transport. The document examines past trends in population and economic growth and transport concluding that these trends are unsustainable into the future.

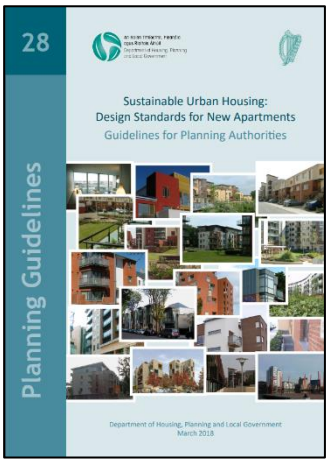
3.1.2 In order to address the unsustainable nature of current travel behaviour, *Smarter Travel* sets down a number of key goals and targets for 2020 - including:

- Total vehicle km travelled by car will not significantly increase;
- Work-related commuting by car will be reduced from 65% to 45%;
- 10% of all trips will be by cycling; and
- The efficiency of the transport system will be significantly improved.

3.1.3 The document recognises that these are ambitious targets, and outlines a suite of 49 actions required to achieve these targets – summarised under the following four main headings:

- Actions aimed at reducing distances travelled by car and the use of fiscal measures to discourage use of the car;
- Actions aimed at ensuring that alternatives to the car are more widely available;
- Actions aimed at improving fuel efficiency of motorized travel; and
- Actions aimed at strengthening institutional arrangements to deliver the targets.

3.2 SUSTAINABLE URBAN HOUSING: DESIGN STANDARDS FOR NEW APARTMENTS – MARCH 2018



3.2.1 This guideline document was produced by the Department of Housing, Planning and Local Government and was updated with the latest version in March 2018. The purpose of this document is to set out standards for apartment development, mainly in response to circumstances that had arisen whereby some local authority standards were at odds with national guidance.

3.2.2 With the demand for housing increasing, this means that there is a need for an absolute minimum of 275,000 new homes in Ireland's cities by 2040. It is therefore critical to ensure that apartment living is an increasingly attractive and desirable housing option for a range of household types and tenures.

3.2.3 These Guidelines apply to all housing developments that include apartments that may be made available for sale, whether for owner occupation or for individual lease. They also apply to housing developments that include apartments that are built specifically for rental purposes, whether as 'build to rent' or as 'shared accommodation'.

3.2.4 Cycling provides a flexible, efficient and attractive transport option for urban living and these guidelines require that this transport mode is fully integrated into the design and operation of all new apartment development schemes.

3.2.5 The quantum of car parking or the requirement for any such provision for apartment developments will vary, having regard to the types of location in cities and towns that may be suitable for apartment development, broadly based on proximity and accessibility criteria. There are three types of locations set out that will determine the level of parking provided. The **Central and/or Accessible Urban Locations** comprise of apartments in more central locations that are well served by public transport. These locations have a default policy for car parking provision to be minimised, substantially reduced or wholly eliminated in certain circumstances. The **Intermediate Urban Locations** comprise of apartments in suburban/urban locations served by public transport or close to town centres or employments areas. These locations require that planning authorities must consider a reduced overall car parking standard and apply an appropriate maximum cap parking standard. **The Peripheral and/or Less Accessible Urban Locations** comprise of apartments located in

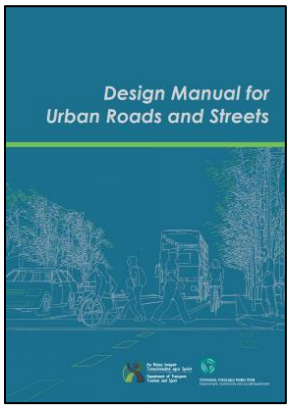
relatively peripheral or less accessible urban locations, one car parking space per unit, together with an element of visitor parking should generally be required.

3.2.6 It is considered that the subject development site is located within an **"Intermediate Urban Location"** as designated within the DHPLG standards, on the basis of the proximity to high frequency urban public transport stops.

3.2.7 The subject site is within walking distance (i.e. between 5-10 minutes or up to 1,000m) to/from a high frequency (i.e. min 10 minute peak hour frequency) urban bus service (15B bus route); and within easy walking distance (i.e. up to 5 minutes or 400-500m) to/from reasonably frequency (i.e. min 15 minute peak hour frequency) urban bus service, 15B stop is adjacent to the site.

3.2.8 For all types of location, where it is sought to eliminate or reduce car parking provision, it is necessary to ensure, where possible, the provision of an appropriate number of drop off, service, visitor parking spaces and parking for the mobility impaired. Provision is also to be made for alternative mobility solutions including facilities for car sharing club vehicles and cycle parking and secure storage.

3.3 DESIGN MANUAL FOR URBAN ROADS AND STREETS (DMURS) - 2019



3.3.1 DMURS provides guidance relating to the design of urban roads and streets. It presents a series of principles, approaches and standards that are necessary to achieve balanced, best practice design outcomes with regard to street networks and individual streets.

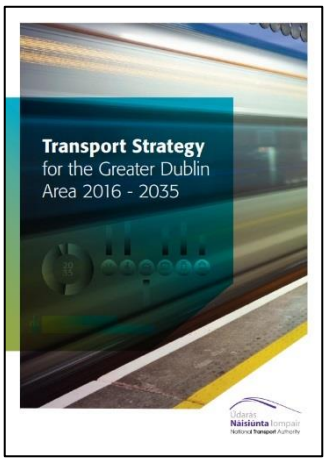
3.3.2 The manual places a significant emphasis on car dominance in Ireland and the implications this has had regarding the pedestrian and cycle environment. The document encourages more sustainable travel patterns and safer streets by proposing a hierarchy for user priorities. This hierarchy places pedestrians at the top, indicating that walking is the most sustainable form of transport and that by prioritizing pedestrians first, the number of short car journeys can be reduced and public transport made more accessible.

3.3.3 Second in the hierarchy are cyclists with public transport third in the hierarchy and private motor vehicles at the bottom. By placing private vehicles at the bottom of the hierarchy, the document indicates that there should be a balance on street networks and cars should no longer take priority over the needs of other users.

3.3.4 The manual emphasizes that narrow carriageways are one of the most effective design measures that calm traffic. Standard width of an arterial and link street is 3.25m, however, this may be reduced to 3m where lower design speeds are being applied. Desirable footpath widths are between 2m – 4m. The 2m width should be implemented to allow for low to moderate pedestrian activity. A 3m – 4m footpath should be implemented to allow for moderate to high pedestrian activity.

3.3.5 The focus of the manual is to create a place – based sustainable street network that balances the pedestrian and vehicle movements. The manual references the different types of street networks, including arterial streets, link streets, local streets, and highlights the importance of movement.

3.4 TRANSPORT STRATEGY FOR THE GREATER DUBLIN AREA 2016-2035



3.4.1 The Transport Strategy for the Greater Dublin Area 2016-2035 is a document compiled by the National Transport Authority which sets out the Strategic Transport Plan for the Greater Dublin Area for the period up to 2035. This sets out an integrated long-term strategy for the area and includes new public transport proposals such as DART and Luas expansion, BusConnects and also a new Metro route.

3.4.2 This document will influence transport planning across the region until 2035 and replaces 'A Platform for Change – An Integrated Transportation Strategy for the Greater Dublin Area 2000 to 2016'. It thereby underpins all transportation strategies, traffic management schemes and development plans prepared by South Dublin County Council during this timeframe.

3.4.3 The Strategy sets out a clear hierarchy of transport users, commencing with the sustainable modes of travel such as walking, cycling and public transport users at the very top of the hierarchy. The Strategy adopts the general principle that these users should have their safety and convenience needs considered first and that the hierarchy is applied where a large share of travel is (or could be) made by walking, cycling and public transport.

3.4.4 In addition to guiding the development of specific Strategy measures, the NTA encourages that the "transport user hierarchy should guide engineers, planners and urban designers on the order in which the needs of transport users should be considered in designing new developments or traffic schemes in the Greater Dublin Area."

3.5 SOUTH DUBLIN COUNTY DEVELOPMENT PLAN 2016-2022

3.5.1 The South Dublin County Development Plan 2016-2022 sets the broad development framework for the county and the development areas within its administrative boundary. In the context of the subject proposals, the following are the relevant transport and development policies and objectives set out in the plan: -

Transport & Mobility Policies

*"**Policy 1 – Overarching:** It is the policy of the Council to promote the sustainable development of the County through the creation of an integrated transport network that services the needs of communities and businesses."*

*"**Policy 2 – Public Transport:** It is the policy of the Council to promote the sustainable development of the County by supporting and guiding national agencies in delivering major improvements to the public transport network and to ensure existing and planned public transport services provide an attractive and convenient alternative to the car."*

*"**Policy 3 – Walking and Cycling:** It is the policy of the Council to re-balance movement priorities towards more sustainable modes of transportation by prioritising the development of walking and cycling facilities within a safe and traffic calmed street environment."*

*"**Policy 4 – Strategic Road and Street Network:** It is the policy of the Council to improve and expand the County-wide strategic road and street network to support economic development and provide access to new communities and development."*

Transport & Mobility Objectives

3.5.2 It is the policy of the Council to promote the sustainable development of the County through the creation of an integrated transport network and re-balance movement priorities toward sustainable modes of transportation, as set out in the following relevant objectives:

*"**TM1 Objective 3**: To focus on improvements to the local road and street network that will better utilise existing road space and encourage a transition towards more sustainable modes of transport, while also ensuring sufficient road capacity exists for the residual proportion of the trips which will continue to be taken by private vehicle."*

*"**TM1 Objective 4:** To prioritise new road construction that provides access to new communities and development areas and supports the economic development of the County."*

*"**TM3 Objective 2:** To ensure that connectivity for pedestrians and cyclists is maximised in new communities and improved within existing areas in order to maximise access to local shops, schools, public transport services and other amenities, while seeking to minimise opportunities for anti-social behaviour and respecting the wishes of local communities."*

Road and Street Proposals

3.5.3 South Dublin County Council (SDCC) is responsible for the management of the regional and local network within the county. SDCC lists proposals for the short and medium to long term development of the regional road network. The following are relevant schemes mentioned under SDCCs Six Year Road Programme to the subject scheme in the Oldcourt - Ballycullen Lands (**Table 3.1**):

Location	Description	Function
Ballycullen-Oldcourt Street Network	Various streets within the Ballycullen-Oldcourt LAP lands.	Formation of a strategic street network providing access throughout the site.
Ballyboden Road/ Stocking Lane (R115)	Upgrade of existing road.	To enhance pedestrian and cycling facilities and exploit the tourist potential of the route.
Killinniny Road	**Minor widening of the existing carriageway within the curtilage of the existing road.**	**To reduce delays to the M50 and create additional road space for the provision of dedicated bus and cycle lanes.**

Table 3.1: South Dublin County Council's Six Year Road Programme

3.6 BALLYCULLEN – OLDCOURT LOCAL AREA PLAN 2014

3.6.1 The subject site lies within the Ballycullen - Oldcourt Local Area Plan lands (**Figure 3.1**) and as such is governed by the specific policies and objectives outlined with the Ballycullen - Oldcourt Local Area Plan (2014).

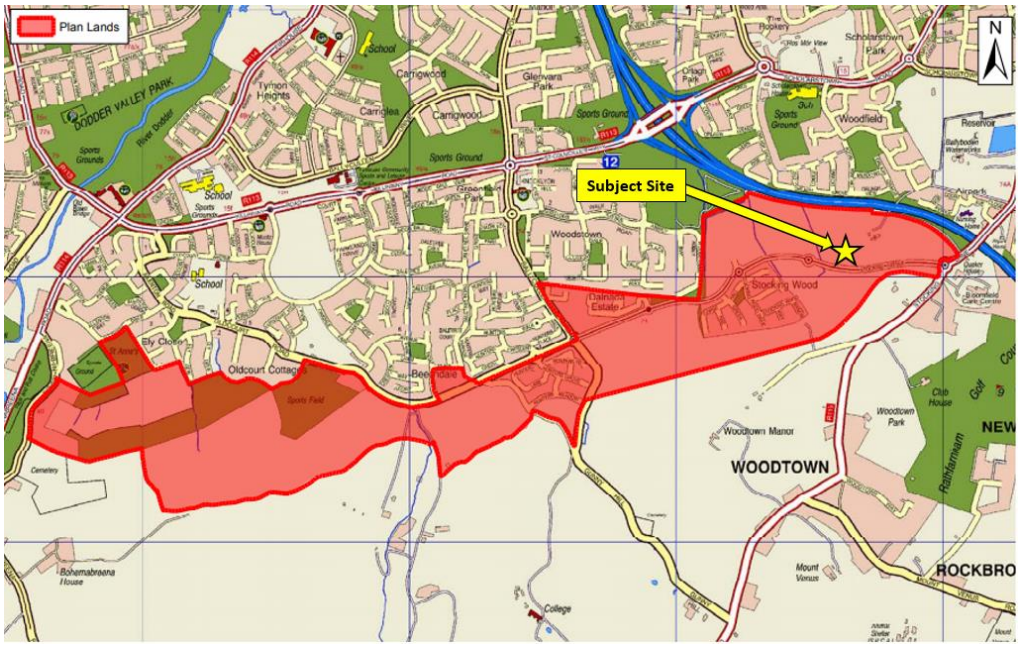


Figure 3.1: LAP Boundary (Extract of Fig 1.1 Ballycullen – Oldcourt LAP)

Accessibility and Movement

3.6.2 The Accessibility and Movement Strategy outlined within the LAP seeks to "*open up the Plan Lands with a clear hierarchy of integrated streets for universal movement including pedestrian, vehicular and cyclist activity and sets out a framework for such. This will comprise the upgrade of Stocking Avenue, Hunters Road and Oldcourt Road as a primary (Main Link) street for movement across the Plan Lands and to areas outside the Plan Lands.*" The LAP also states that planning permission was granted for "*approximately 1,800 dwellings on the eastern side of the Plan Lands between 2000 and 2012"* as indicated in **Figure 3.2.**

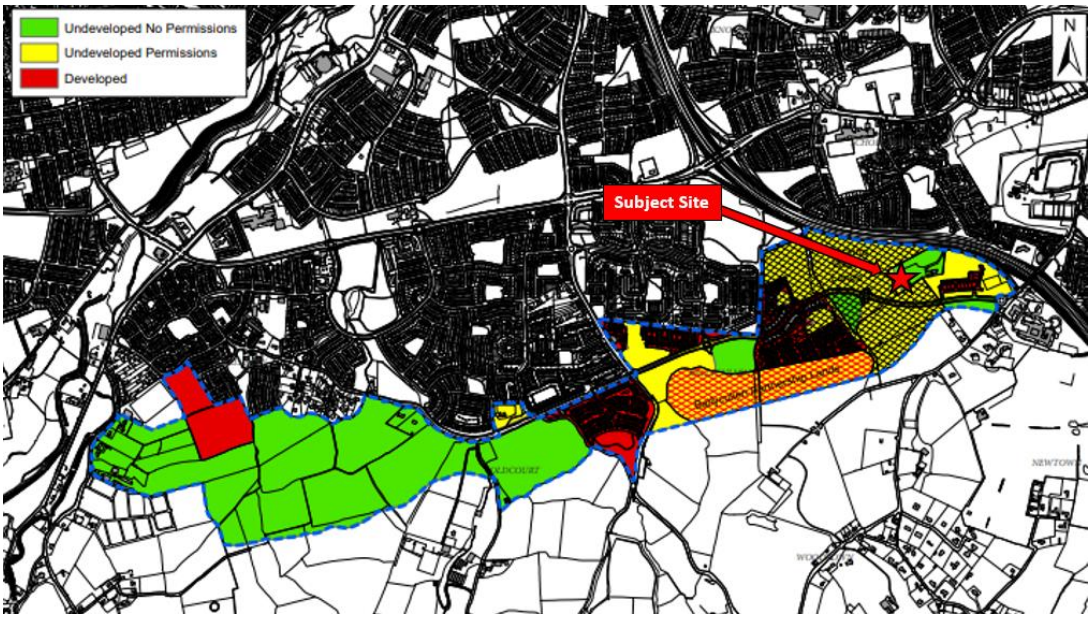


Figure 3.2: Development Status (Extract of Fig 1.1 Ballycullen – Oldcourt LAP)

Public Transport

3.6.3 With regards to public transport, the LAP states that "*Access to upgraded Main Link Streets (Stocking Avenue, Hunters Road, Oldcourt Road, and the new Main Link Street) will be prioritised in the form of direct pedestrian and cycle routes to help sustain and improve the relatively frequent public transport services on the eastern side of the Plan Lands and improve the viability of such services on the western side. This includes for the planned provision of bus lay-bys on the eastern and western sides of the Plan Lands.*"

Ballycullen-Oldcourt Local Area Plan Transport Initiatives

3.6.4 The Ballycullen-Oldcourt LAP (2014) includes proposals for the provision of road infrastructure upgrades along with upgraded/new pedestrian and cycle facilities within the LAP area as shown in **Figure 2.16** and summarised as follows:

- Roundabouts along Stocking Avenue to be upgraded to signal controlled junctions;
- The construction of the "Oldcourt Main Link Street" which will serve the subject development and future developments within the Oldcourt Lands. It will connect Bohernabreena Road to the west with Oldcourt Road to the east;
- Pedestrian/Cycle Connections linking the subject site with the neighbouring residential areas to the west; and
- Pedestrian Crossing facilities at various locations along Stocking Avenue.

3.6.5 It is noted that the Stocking Avenue roundabout, located to the southwest of the site is indicated in the LAP to be removed or signalised. However, this roundabout was upgraded as part of the planning application SD14A/0222, to better reflect DMURS guidelines, providing a safer environment for pedestrians and cyclists while also reducing traffic speeds. Based on discussions with SDCC Roads Department throughout the pre-planning stages, it is understood that the roundabout would not be removed/signalised in the near future.

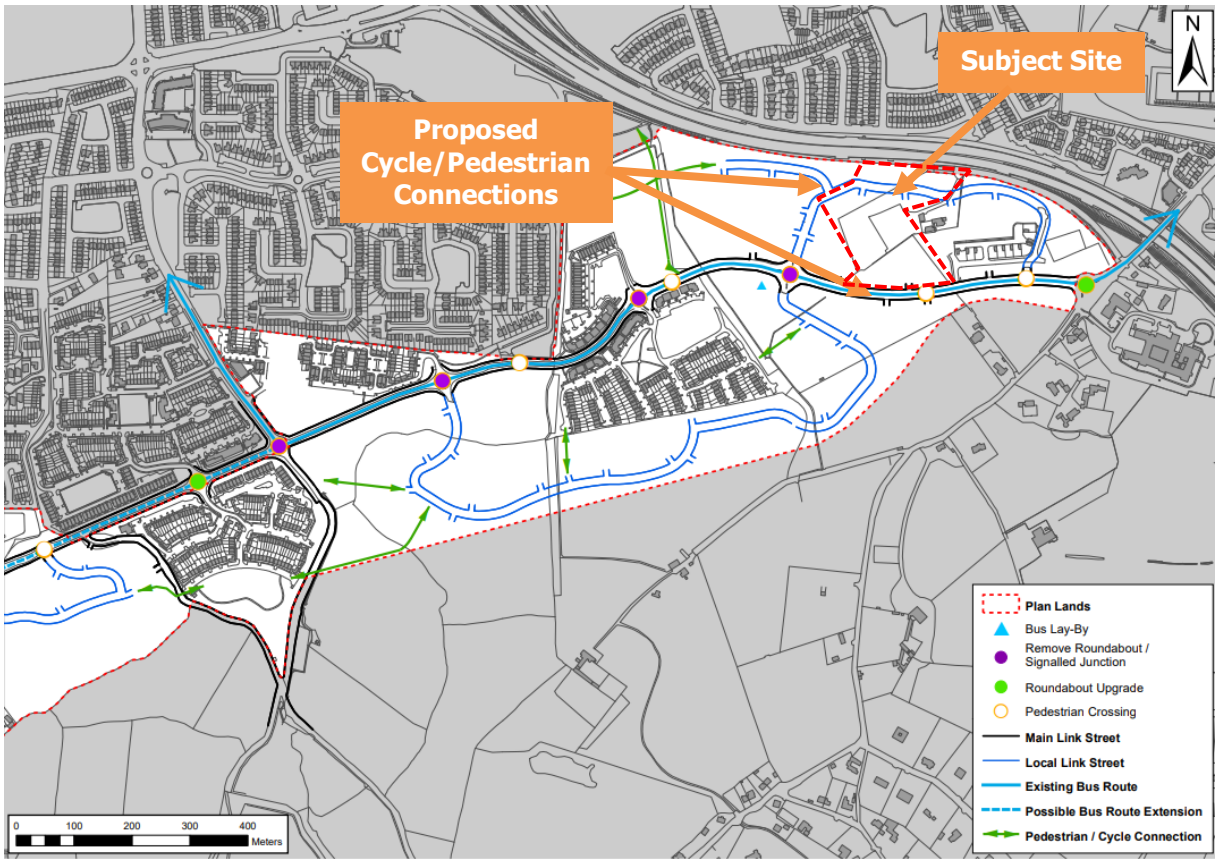


Figure 3.3: Infrastructure Proposals (Extract from Ballycullen – Oldcourt LAP)

4.0 CHARACTERISTICS OF PROPOSALS

4.1 OVERVIEW

4.1.1 The current subject proposals seek permission for the provision of a residential development of 241 units, in 5 no. apartment blocks and 3 no. duplex blocks, which includes 93 no. 1 Bed and 148 no. 2 bed units and a community centre. The subject development is located on lands to the northeast of the Stocking Avenue / White Pines Way / White Pines Crescent roundabout in Woodstown, Dublin. The subject development proposes a total of 204 no. car parking spaces and 401 no. cycle parking spaces. The development also includes a community building of approx. 552 sqm.

4.1.2 Further details of the development proposals including the site layout and internal transport network arrangements are illustrated in the scheme drawings as submitted with this planning application. **Figure 4.1** below illustrates the plan layout of the proposed residential development.

Figure 4.1: Proposed Development Layout

4.2 Vehicular/Pedestrian/Cycle Access Arrangements

4.2.1 The main vehicular access to/from the subject development will be provided via a new priority junction onto Stocking Avenue on the southern boundary of the site, as shown in **Figure 4.2** below. A ramp entry treatment will be provided to reduce vehicle speeds entering the development and while cyclists will be segregated from vehicular traffic through the junction, as shown in **Figure 4.3**. There will also be a secondary vehicular access to/from White Pines Way via a new priority junction on the north-western boundary of the site, which ties into White Pine North.

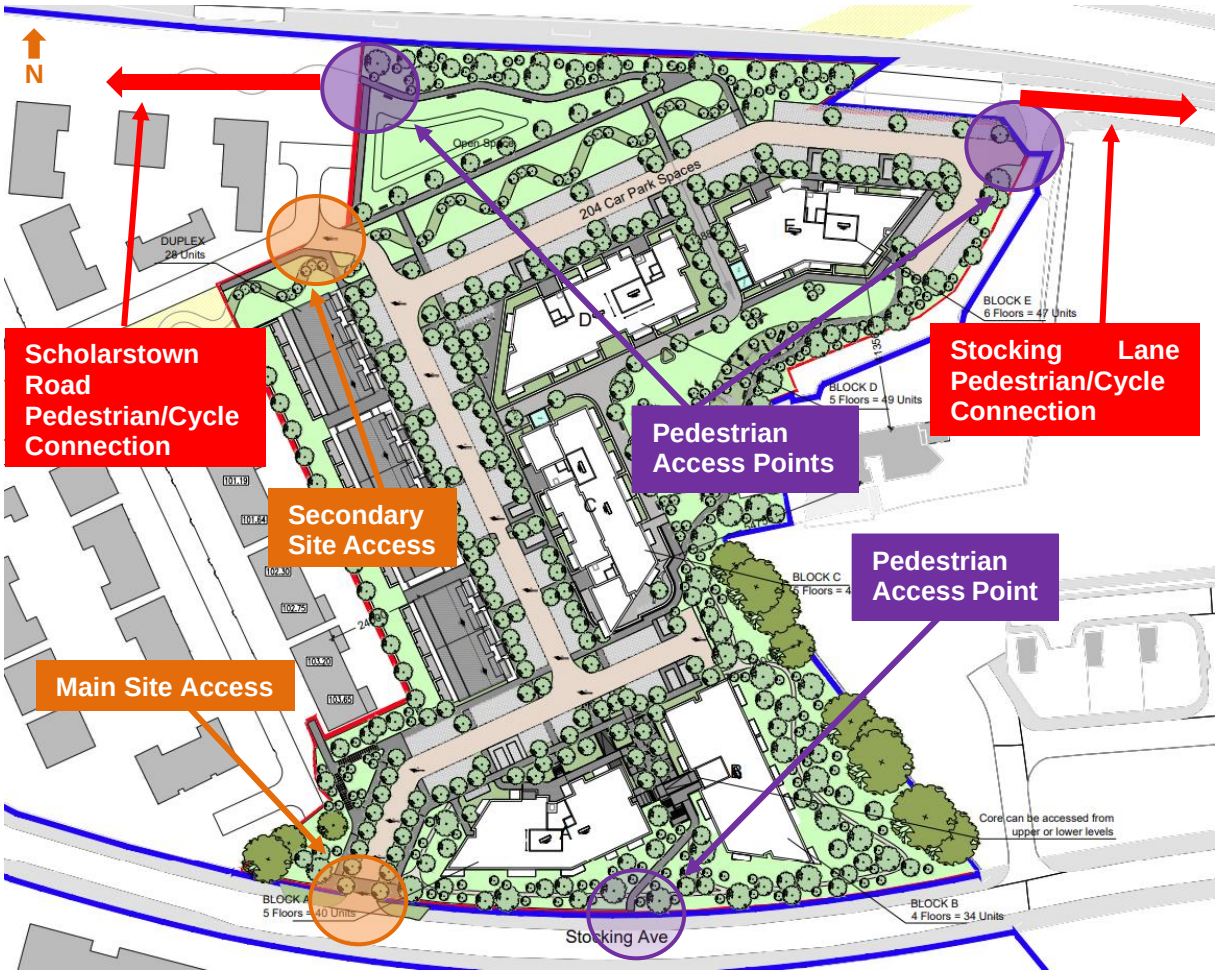


Figure 4.2: Proposed Site Access Locations

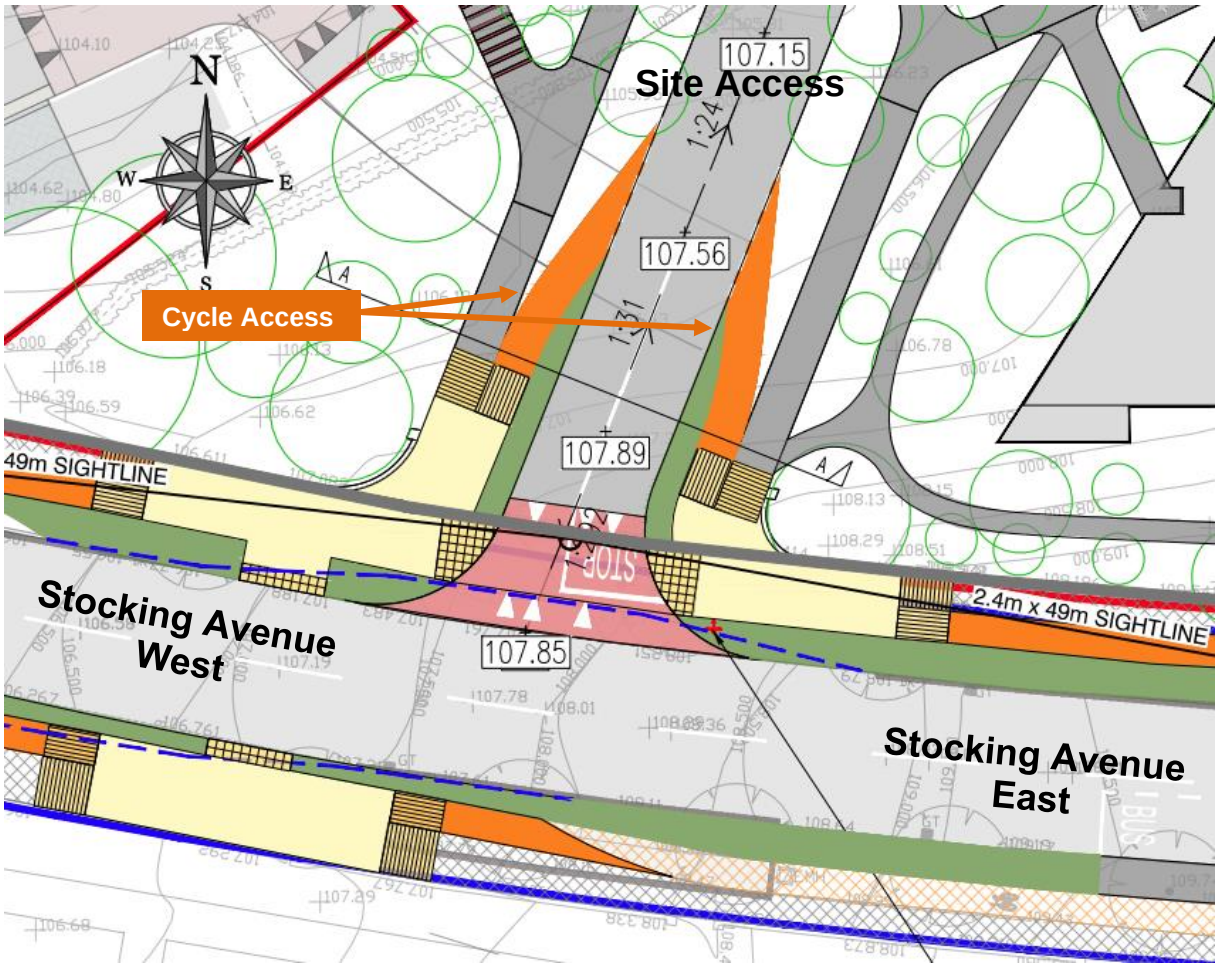


Figure 4.3: Main Site Access

4.2.2 These vehicular accesses will be accessible to both pedestrian and cyclists. There are additional pedestrian access points located to the south, providing access to Stocking Avenue, and to the north, providing access to the pedestrian/cycle connection, as shown in **Figure 4.2.** This pedestrian/cycle link provides connection to Stocking Lane and Scholarstown Road. These non-vehicular access points provide filtered permeability, ensuring shorter walking and cycling distances and increasing the attractiveness of these sustainable modes.

4.2.3 The internal street layout has been designed to respect the principles and guidance outlined within the Design Manual for Urban Roads and Streets (DMURS). The design of the internal streets will seek to provide self-regulating streets whilst respecting the important functions of both place and movement in a consistent and integrated contextual manner. Self-regulating streets aim to balance the functional needs of different users (vehicles, pedestrians and cyclists), enhance the sense of place and manage speed in a manner that does not rely on extensive regulatory controls and physical intrusive measures for enforcement.

4.2.4 Speeds within the development will be minimised through the inclusion of a number of vertical and horizontal control measures including;

- Tight corner radii;
- Narrow streets (generally 5.5m);
- Ramp entry treatment to the development from Stocking Avenue; and
- Short lengths of straight streets.

4.3 Cycle Parking Provision

4.3.1 In order to determine the appropriate level of cycle parking provision for the proposed development, reference should be made to both (i) the South Dublin County Council (SDCC) requirements; and (ii) the Department of Housing and Planning and Local Government(DHPLG) Government 'Sustainable Urban Housing: Design Standards for New Apartments' (SUHDS guidance 2018). The SDCC cycle parking standards are detailed in **Table 4.1** below: -

SDCC Cycle Parking Standards			
Category	**Land Use**	**Long Term**	**Short Term**
Accommodation	Residential Apartment	1 per 5 apartments	1 per 10 apartments
Civic, Community Centre, library	Community Centre	1 per 5 staff	1 per 100 sqm

Table 4.1: SDCC Cycle Parking Requirements

SDCC Cycle Parking Requirements

4.3.2 With reference to the **Table 4.1** above, the development is required to provide **50** long term cycle spaces for residents and **30** short term cycle spaces for visitors. This equates to a total cycle parking provision requirement of **80** cycle parking spaces in accordance with the SDCC Development standards. The SDCC cycle parking requirements are outlined in **Table 4.2**.

4.3.3 The SDCC bicycle parking standards are considered to be 'minimum' standards, whereas the DHPLG requirements are considered to be the substantial level of provision in situations where on-site car parking has been substantially or completely removed as permitted in certain situations by the corresponding DHPLG car parking guidance. It should be noted that the local authority may look more favourably on

the subject site development proposals if the development plan cycle parking requirements are exceeded in order to encourage more sustainable mode of travel.

Department of Housing, Planning and Local Government

4.3.4 The Department of Housing, Planning and Local Government 'Sustainable Urban Housing: Design Standards for New Apartments' (SUHDS guidance 2018) states the following requirements for cycle parking: -

- 1 cycle storage space per bedroom;
- 1 cycle storage space for studio units and
- 1 cycle space per two residential units for visitor parking.

4.3.5 In total, there are 241 residential apartment units proposed. Of these, there is proposed to be 93 No. 1-bedroom apartments and 148 No. 2-bedroom apartments. Therefore, the development is required to provide a total of **510** no. of cycle parking spaces based on the DHPLG guidelines. The SDCC cycle parking requirement for the development is proportionally low at **80** spaces whereas the DHPLG requirement is high at **510** cycle parking spaces. It is considered that a provision of cycle parking that is between the **SDCC guidelines (80 spaces)** and the **DHPLG guidelines (510 spaces)** is acceptable.

4.3.6 Therefore, the development proposes to provide a total of **401** cycle parking spaces with **339** of these proposed as long term parking for the residents and an additional **62** proposed as short term stay on the surface. The increased level of cycle parking spaces is proposed to encourage positive modal shift towards a more sustainable mode of travel. Moreover, future residents of the subject site will also be able to benefit from pedestrian/cycle facilities along most of the roads to/from the proposed development.

Standard/Proposed	Type	Apts	Community Centre	Sub Total
SDCC Standards	Short	24	6	30
	Long	48	2	50
	Total	**72**	**8**	**80**
SUHDS Standards	Short	121	-	121
	Long	389	-	389
	Total	**510**	**-**	**510**
Proposed	Short	57	5	62
	Long	337	2	339
	Total	**394**	**7**	**401**

Table 4.2: Comparison of Bicycle Parking Provision

Figure 4.4: Proposed Cycle Parking Locations

4.4 Vehicle Parking Requirement

SDCC Car Parking Requirements

4.4.1 Reference has been made to Table 11.24 of the South Dublin County Council Development Plan (2016-2022) which outlines the maximum car parking standards for the county.

4.4.2 The South Dublin County Council (SDCC) Development Plan 2016-2022 aims to take a "balanced approach to the provision of car parking with the aim of meeting the needs of businesses and communities whilst promoting a transition towards more sustainable forms of transportation." SDCC states that the number of spaces for a proposed site must not exceed the maximum provision. It also states that the "maximum provision should not be viewed as a target and a lower rate of parking may be acceptable". This depends on the environment of the proposed site and its future residents.

4.4.3 The SDCC Development Plan encourages that in order to decrease the number of car parks, the site would be in close proximity to public transport, that services around the residential development would fulfil occasional and day to day needs and that the journey residents would make to work would reduce significantly.

4.4.4 In terms of electric cars, the SDCC Development Plan also outlines that "all developments shall provide facilities for the charging of battery-operated cars at a rate of up to 10% of the total car parking spaces". The development has taken this into account, and it is proposed that electric vehicle spaces will be operational on the opening day of the development, therefore, this is in accordance with this requirement.

4.4.5 **Table 4.3** outlines the maximum car parking standards for the non-residential element of the proposed development.

4.4.6 The proposed development is considered to be located within Zone 2, which is ideally located within 400m of a high quality bus service. According to the SDCC Development Plan, High frequency routes are where buses operate with a minimum 10 minute frequency at peak times and a 20 minute off-peak frequency. The 15B bus is approximately 50m from the subject site and has a 10 minute frequency at peak times and a 15 minute off-peak frequency.

SDCC Maximum Car Parking Standards (Non - Residential)		
Category	**Land Use**	**Zone 2**
Civic, Community Centre , Library	Community Centre	1 space/50 sqm
Total Maximum Spaces Required		**11**

Table 4.3: SDCC Maximum Car Parking Standards (Non-Residential)

4.4.7 The SDCC Development Plan 2016-2022 gives standards for Car Parking for Apartments as set out below in **Table 4.4.** It outlines the maximum car parking standards for the residential element of the proposed development. The required parking is based on the number of proposed apartments on site.

SDCC Maximum Car Parking Standards (Residential)		
Dwelling Type	**No. of Bedrooms**	**Zone 2**
Apartment Duplex	1 Bed	0.75 space
	2 Bed	1 space
Total Maximum Spaces Required		**219**

Table 4.4: SDCC Development Plan Vehicle Parking Requirements

Department of Housing, Planning and Local Government

4.4.8 The Department of Housing, Planning and Local Government (DHPLG) has also mentions car parking, within the **'Intermediate Urban Locations'** section of the document 'Sustainable Urban Housing: Design Standards for New Apartments'. It states that "*In suburban/urban locations served by public transport or close to town centres or employment areas and particularly for housing schemes with more than 45 dwellings per hectare net (18 per acre), planning authorities must consider a reduced overall car parking standard and apply an appropriate maximum car parking standard."*

4.4.9 The proposed residential development is located within the 'Intermediate Urban Location' as classified within these guidelines. The document highlights that for new developments in these locations, **'the Planning Authority must consider a reduced overall car parking standard.'**

4.4.10 The residential development at Stocking Avenue would benefit from convenient bus linkages and cycle lanes. This is further justified by the proposed provision by BusConnects and the GDA Transport Strategy 2016 – 2035.

4.4.11 It is an objective for this development to reduce the need for commuters to travel by car and instead to avail of more sustainable modes of travel in line with current and future travel requirements as set out in recent policy documents within Ireland. It is

noted that the concept for car parking reduction in apartments is relatively new in Ireland and, therefore, proposals to implement a more sustainable approach for car parking may take time.

4.4.12 The development proposes to provide a total **194** no. residential car parking spaces (a ratio of 0.80 spaces per unit). The parking proposals are based on the above-mentioned standards/guidelines. These proposals are in line with relevant case studies undertaken as discussed above. It is also noted that recent planning applications under the Strategic Housing Development (SHD) proposals, have included for reduced car parking ratios which have been accepted by SDCC and ABP.

4.4.13 A Parking Strategy report has been prepared as part of this application and presents the rationale behind the identification of the quantum of vehicle parking (including mobility impaired parking) that is being proposed as part of the subject site development proposals. It should be read in conjunction with this document.

4.4.14 The SDCC Development Plan outlines that 5% of total car parking provision is allocated for Mobility Impaired spaces within the development. The development proposes a total of 11 mobility impaired spaces; therefore, this is in accordance with this requirement.

4.4.15 The SDCC Development Plan outlines that 10% of total car parking provision is allocated for Electric Vehicle spaces within the development. The development proposes a total of 21 electric vehicle spaces that will be operational on opening of the development, in accordance with SDCC requirements. The total 204 no. parking spaces will be provided with ESB ducting for future potential use by electric vehicles.

4.4.16 A total of 3 no. spaces have been allocated as 'Club Car' parking spaces.

4.4.17 A breakdown of allocation for car parking is shown in **Table 4.5** below. It is noted that the amenity area does not require any car parking, as this space is for use by the proposed residents only (i.e. ancillary) and therefore will not create any additional demand for car parking.

Unit Type	Parking Spaces
Apartments	194
Community Space	10
Total	**204**

Table 4.5: Parking Provision based on Relevant Standards

4.4.18 It is an objective for this development to reduce the need for commuters to travel by car and instead to avail of more sustainable modes of travel in line with current and future travel requirements as set out in recent policy documents within Ireland. It is noted that the concept for car parking reduction in apartments is relatively new in Ireland and, therefore, proposals to implement a more sustainable approach for car parking may take time.

4.4.19 Further details on the parking management regime proposed at the development site are provided in the *Parking Strategy* report prepared as part of this planning submission.

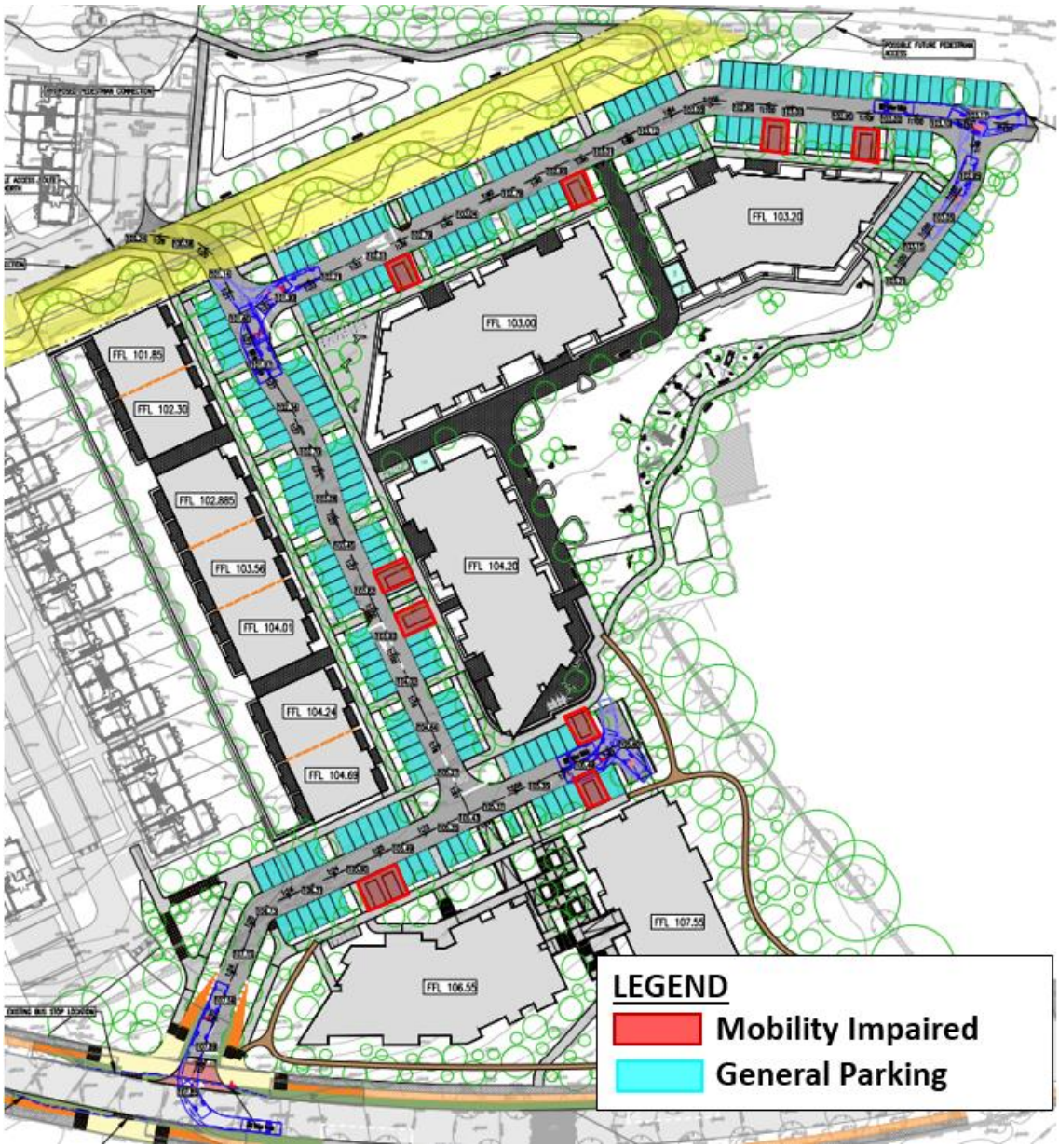


Figure 4.5: Proposed Car Parking Locations

4.5 INITIATIVES FOR SUSTAINABLE TRAVEL

4.5.1 Policy documents in Ireland, as referenced in Section 3 of this report, highlight the importance of travel by more sustainable means (Walking, Cycling, Public Transport) and that reduction in car use is key to the improvement of travel and mobility within the country. Promoting sustainable travel, therefore, is a vital element for this development.

4.5.2 It is acknowledged, however, that homeowners may require a vehicle of some sort for purposes other than commuting on an everyday basis and simply reducing car parking to 0.80 spaces per unit would not be realistic without implementing alternative measures to accommodate residents and visitors alike. Therefore, the following sustainable alternative arrangements have been proposed for the Build-to-Rent residents:

- Car Club (GoCar);
- Mobility Management Plan;
- Increased Cycle Parking;
- Parking Management;
- Sustainable Travel Initiatives.

Car Club

4.5.3 A Car Club provides its members with quick and easy access to a vehicle for short term hire. The GoCar is a well-established and successful car club operator in Dublin. This service has been recommended in recent developments as a means for car sharing where car parking is reduced. GoCar would provide a number of permanent vehicles within close proximity to the development or within the development itself where residents would have availability to use.

4.5.4 A recent survey undertaken by GoCar indicated that the main uses of the service was for day trips, family trips and big shopping trips. The survey also highlighted that the average use of a car was for 1 hour a day. GoCar also offer more favorable rates for long distance travel.

4.5.5 It is proposed to provide 3. No. car share spaces (e.g. GoCar or similar) within the development for residents to utilise.

4.5.6 The GoCar has given a letter of confirmation to provide its service for the proposed development site.

Mobility Management Plan

4.5.7 An outline Mobility Management Plan has been prepared as part of this application, within a separate document, and should be read in conjunction with this document. The MMP will be developed further at operation stage by the management company who will have a more active role than a management company from a traditional apartment development.

Increased Cycle Parking

4.5.8 Increasing cycle parking is an alternative measure when reducing car parking spaces. A total of 401 cycle spaces are proposed for this development with a total of 241 residential units being proposed. It is noted that the provision of cycle parking proposed within the development is more than adequate to accommodate residents and visitors to the site.

Sustainable Travel Initiatives

4.5.9 Section 2 of this report outlines the initiatives for sustainable travel that are proposed within close proximity of the development site such as BusConnects routes, the National Cycle Network routes as well as overall improvements to the walking and cycling network. These will provide additional enhancements for sustainable travel throughout the area.

4.6 PEDESTRIAN CONNECTIVITY

4.6.1 The Design Manual for Urban Roads and Streets (DMURS) identifies the importance of connectivity for pedestrians within residential areas. The document states 'The creation of vibrant and active places requires pedestrian activity. This in turn requires walkable street networks that can be easily navigated and are well connected.'

4.6.2 DMURS references that 'Sustainable neighbourhoods are areas where an efficient use of land, high quality urban design and effective integration in the provision of physical and social infrastructure such as public transport, schools, amenities and other facilities combine to create places people want to live in'.

4.6.3 The document highlights that residential locations that have been constructed in accordance with the principles of segregation, and that increase walking distances for residents, have a significant influence on mode choice as a lack of connectivity is one of the key factors that discourage people from walking.

4.6.4 The proposed development site will have excellent connectivity for pedestrians to access the residential units, with a number of connecting paths that route through the development. This enables pedestrians to route easily through the site with no barriers or segregated areas to hinder movement.

4.6.5 The proposed access points will be situated on Stocking Avenue to the south, White Pines Way and the pedestrian / cycle connection to the north of the development for pedestrians and cyclists.

5.0 TRIP GENERATION AND DISTRIBUTION

5.1 INTRODUCTION

5.1.1 The following paragraphs present the process by which the potential level of vehicle trips, associated with the future proposed development have been generated and subsequently assigned across the local road network. In order to assess the operation of the proposed road network and its future capacity, an excel based traffic model of the existing network and proposed links were created.

5.2 TRAFFIC SURVEYS

5.2.1 In order to establish the existing local road networks traffic characteristics and subsequently enable the identification of the potential impact of the proposed development, a number of traffic surveys were commissioned and undertaken by IDASO Ltd. in January 2020.

5.2.2 With the objective of quantifying the existing traffic movements across the local road network classified vehicle junction turning counts were conducted over a 12-hour survey period from 07:00 to 19:00 on Tuesday 21st January 2020 at the following three junctions;

- Stocking Lane / Stocking Avenue Roundabout;
- Stocking Avenue / White Pines Way / White Pines Park Roundabout; and
- Stocking Avenue / Stocking Well Row / Stocking Wood Roundabout.

5.2.3 The analysis of the survey results established that the local weekday AM and PM peak hours occurred between 07:30 - 08:30 and 17:00 – 18:00 respectively.

5.2.4 In order to analyse and assess the predicted traffic generation from the proposed development upon the local road network, an area wide excel based traffic model incorporating the aforementioned local junctions has been created. **Figure 5.1** illustrates the junctions surveyed and included in the traffic analysis. The recorded 2020 peak hour traffic flows at the study junctions are presented in **Appendix A.**

Figure 5.1: Junctions Surveyed

5.3 TRIP GENERATION

5.3.1 To estimate the potential level of vehicle trips that could be generated by the proposed development, reference has been made to the TRICS database. TRICS provides trip rate information for a variety of different land uses and development types, which can be applied to the subject development.

5.3.2 TRICS data is primarily UK based, although a number of Irish sites have recently been included and the number of Irish sites continues to expand. Nevertheless, we consider that TRICS will provide a reasonable indication of traffic generation from the proposed development.

5.3.3 Notwithstanding the above, internal research undertaken by TRICS has shown that there is no direct evidence of trip rate variation by country or region. The use of English, Scottish or Welsh data can be equally applicable to Ireland if users take into account important site selection filtering factors such as levels of population, location type, local public transport provision, and development size and car ownership level, amongst others.

5.3.4 Data supplied for inclusion in TRICS undergoes a procedure of validation testing, and there is no evidence from this procedure suggesting that data from Ireland bears any significant fundamental differences to that from the other countries included. Consequently, we consider that TRICS will provide a reasonable indication of traffic generation from the proposed development.

5.3.5 **Table 5.1** presents the predicted trip generation and the estimated traffic flows arriving and departing the proposed development during the morning and evening road network peak hour periods. The TRICs output data is provided within **Appendix B.**

Land Use	Unit	AM Peak Hour		PM Peak Hour	
		Arr	Dep	Arr	Dep
Apartment / Duplex	Per Unit	0.048	0.187	0.186	0.077
Community Centre	Per Hectare	11.319	1.429	6.176	10.000

Table 5.1: Proposed Development Trip Rates

5.3.6 The trips rates obtained from TRICS, were similar to trip rates used for the committed development (apartment units, ref. SD17A/0468), illustrated in **Table 5.3**.

5.3.7 The proposed residential development will be implemented in two different phases to provide an accurate representation of likely construction and occupational trends for a development of this size.

- 2022 Opening Year = 100 Residential Units
- 2027+ Years – Full Development = 241 Residential Units

5.3.8 Based on the above trip rates, potential peak hour vehicle traffic flow has been calculated for the proposed development. **Table 5.2** and **Table 5.3** summarises the predicted AM and PM peak hour traffic generated by the proposed development for the horizon years, that have been calculated based on the proposed development schedule.

Land Use	AM Peak Hour (07:30 – 08:30)			PM Peak Hour (17:00 – 18:00)		
	Arr	Dep	Two-way	Arr	Dep	Two-way
Apartment / Duplex (100 Units)	5	19	23	19	8	26
Community Centre	1	0	1	0	1	1

Table 5.2: Proposed Development Trips (2022 Opening Year)

Land Use	AM Peak Hour (07:30 – 08:30)			PM Peak Hour (17:00 – 18:00)		
	Arr	Dep	Two-way	Arr	Dep	Two-way
Apartment / Duplex (241 Units)	11	45	57	45	19	63
Community Centre	1	0	1	0	1	1

Table 5.3: Proposed Development Trips (2027 Interim Year & 2037 Horizon Year)

5.4 COMMITTED DEVELOPMENT

5.4.1 There are six committed developments in the vicinity of the subject site which hold planning permissions and one committed development that had not been granted planning permission yet. These may therefore have an impact on the capacity of the local road network influencing traffic flows and junction performances. The locations of these committed developments are illustrated in **Figure 5.2.**

5.4.2 Site 1 - The residential development (SD19A/0099) (**Stocking South**) site located to the south of the subject development site, was granted permission for 99 no. residential units. It is noted that this committed development has been completed and is currently being occupied. However, since it was not in place at the time the traffic surveys were undertaken, the predicted development traffic from this scheme has been included in the committed development vehicle trip generation calculations.

5.4.3 Site 2 - The neighbourhood centre development (SD19A/0345)(**Stocking Retail**) site located to the southwest of the subject development site, was granted permission for a retail unit (1,479m^2) and a crèche (385m^2) incorporating a community centre (192m^2).

5.4.4 Site 3 - The residential development (SD17A/0121) site located to the west of the subject development site, was granted permission for 133 no. residential units and a crèche. It is noted that this committed development has been completed and is currently being occupied. However, at the time the traffic survey, 40% of the site was occupied. Therefore, the remainder of the predicted trips from this scheme (60%) has been included in the committed development vehicle trip generation calculations.

5.4.5 Site 4 - The residential development (SD19A/0104) site located to the west of the subject development site, was granted permission for 24 no. residential units. It is noted that this committed development is currently under construction and since it was not in place at the time the traffic surveys were undertaken, the predicted development traffic from this scheme has been included in the committed development vehicle trip generation calculations.

5.4.6 Site 5 - The residential development (SD18A/0025) site located to the west of the subject development site, was granted permission for 83 no. residential units. It is noted that this committed development has been completed and is currently being occupied. However, at the time the traffic survey, 60% of the site was occupied. Therefore, the remainder of the predicted trips from this scheme (40%) has been included in the committed development vehicle trip generation calculations.

5.4.7 Site 6 - The residential development (SD17A/0468) site located to the west of the subject development site, was granted permission for 64 no. residential units.

5.4.8 Site 7 - The residential development (ABP-308642-20)(White Pine Central) site located to the south of the subject development site consists of 140 no. residential units. This development will be accessed via White Pines Crescent. This development is currently at pre-application stage, however, it has been included for robustness.

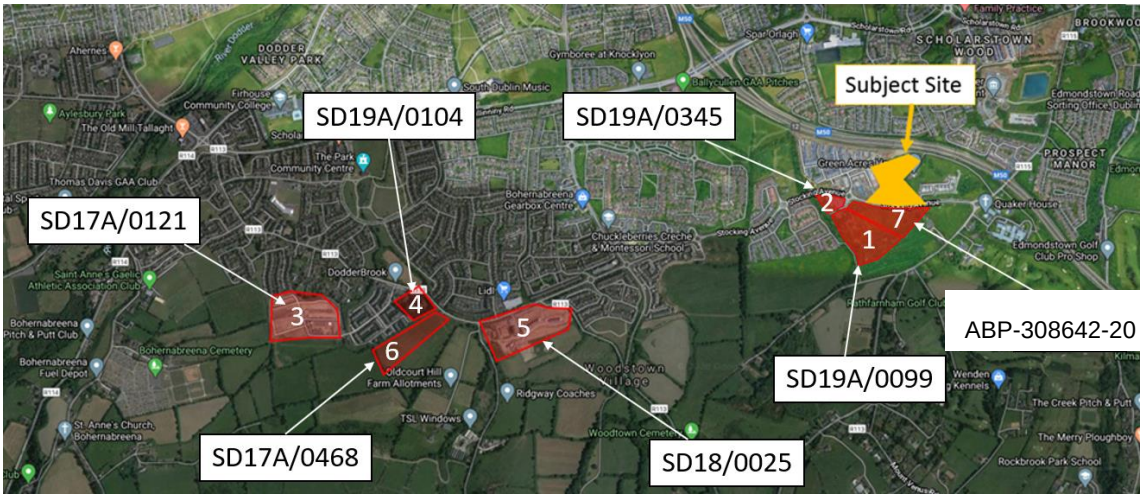


Figure 5.2: Committed Development Locations

Committed Development Trip Generation

5.4.9 In order to establish the potential quantum of vehicle traffic generated by the six identified committed developments, the South Dublin County Council's online planning system has been referenced and each third-party scheme's corresponding TTA report was obtained and reviewed. The vehicle trips derived from this exercise have been incorporated as committed development within the Excel based network traffic assignment model developed by DBFL for the subject development proposals.

5.4.10 **Table 5.3** presents the trips rates for the six committed developments, for both arrivals and departures during the morning and evening peak hour periods.

Reference No.	Units	Unit Type	AM Peak Hour		PM Peak Hour	
			Arr	Dep	Arr	Dep
SD19A/0099	99	Houses	0.154	0.364	0.326	0.266
SD17A/0121	133	Houses	0.093	0.287	0.310	0.095
SD19A/0104	24	Houses	0.123	0.340	0.345	0.215
SD18A/0025	83	Houses	0.140	0.400	0.390	0.240
SD19A/0345	1,479sqm	Retail	2.834	2.431	4.441	4.807
	577	Houses	3.272	2.344	2.459	3.078
SD17A/0468	50	Houses	0.134	0.376	0.360	0.215
	47	Apartments	0.050	0.194	0.183	0.070
ABP-308642-20	140	Apartments	0.048	0.187	0.186	0.077

Table 5.3: Committed Development Trip Rates

5.4.11 Based on the above trip rates, the corresponding forecast peak hour trip generation for the committed developments is presented in **Table 5.4** for the AM and PM peak hour arrivals and departures.

Reference No.	Units	Units Type	AM Peak Hour			PM Peak Hour		
			Arr	Dep	Two-way	Arr	Dep	Two-way
SD19A/0099	99	Houses	15	36	51	32	26	58
SD17A/0121	133	Houses	12	38	50	41	13	54
SD19A/0104	24	Houses	1	4	5	5	3	8
SD18A/0025	83	Houses	12	33	45	32	20	52
SD19A/0345	1,479	Retail	42	36	78	66	71	137
	577	Houses	19	14	32	14	18	32
SD17A/0468	50	Houses	7	19	28	18	11	29
	47	Apartments	2	9	11	9	3	12
ABP-308642-20	140	Apartments	7	26	32	25	11	36

Table 5.4: Proposed Committed Development Trips

5.5 TRIP DISTRIBUTION & ASSIGNMENT

Proposed Development Trip Distribution

5.5.1 The proposed distribution of the subject developments forecast generated vehicle movements as proposed by DBFL are presented in **Appendix B** of this report.

Committed Development Trip Distribution

5.5.2 Committed developments trip distribution has been determined from their relevant transportation assessments from South Dublin County Council's planning department and applied to the network according to each development's scheduled proposals. Accordingly, trip rate and distribution information applied to this assessment for committed developments has been carried out to the rates and figures previously accepted by South Dublin County Council, and An Bord Pleanála for SHD schemes.

5.6 TRAFFIC GROWTH

5.6.1 The TTA adopts an Opening Design year of 2022 and accordingly an Interim Year of 2027 (Opening Year +5 years) and a Future Year of 2037 (Opening Year + 15 years) as per Transport Infrastructure Ireland (TII) guidelines. To ensure a robust analysis of the impact of traffic upon the local road network we have adopted growth rates using the TII traffic projections. Table 6.2 (Unit 5.3 – Travel Demand Projections) within the TII Project Appraisal Guidelines provides Annual Growth Factors for the different regions within Ireland. The subject site lies within 'County – Dublin' with the growth factors as outlined within **Table 5.5** below.

County	Low Sensitivity Growth				Central Growth				High Sensitivity Growth			
	2016-2030		2030-2040		2016-2030		2030-2040		2016-2030		2030-2040	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
Dublin	1.0163	1.0303	1.0046	1.0123	1.0180	1.0317	1.0062	1.0139	1.0211	1.0348	1.0100	1.0170

Table 5.5: National Traffic Growth Forecasts: Annual Growth Factors (Extract from Table 6.2 PAG)

5.6.2 In order to provide a robust assessment DBFL have assumed 'Central Growth' rates for the adopted Opening Year of 2022 and Future Design Years of 2027 & 2037. As such, applying the annual factors as outlined in **Table 5.5** above, the following growth rates were adopted to establish corresponding 2022, 2027 and 2037 baseline network flows:-

- 2020 to 2022 – 1.0363 (3.63%);

- 2020 to 2027 – 1.1330 (13.30%); and
- 2020 to 2037 – 1.2482 (24.82%).

5.6.3 It is noted that the TII Project Appraisal Guidelines states that *"the central growth rates are intended for use in project appraisal with the low and high growth rates to be used as sensitivity tests for economic and environmental impacts."* The assumption of any background traffic growth (let alone 25% increase) in the current climate is highly conservative.

5.7 ASSESSMENT SCOPE

Assessment Scenarios

5.7.1 Two different traffic scenarios have been assessed, namely (a) the 'Base' ("Do-Nothing") traffic characteristics and (b) the 'Post Development' ("Do-Something").

5.7.2 The "Do-Nothing" traffic scenario takes into account the potential level of traffic that could be generated by the 'Committed Developments' in addition to the existing flows travelling across the network.

5.7.3 The proposed development traffic flows are then added to the network's "Do-Nothing" (Base + Committed Development) traffic flows to establish the new 'Post Development' traffic flows. In summary the following scenarios are considered: -

Do Nothing

- A1 – 2022 Base Flows + Committed Developments
- A2 – 2027 Base Flows + Committed Developments
- A3 – 2037 Base Flows + Committed Developments

Do Something

- B1 – 2022 Do Nothing (A1) + Proposed Development Flows
- B2 – 2027 Do Nothing (A2) + Proposed Development Flows
- B3 – 2037 Do Nothing (A2) + Proposed Development Flows

Assessment Period

5.7.4 The AM and PM peak hour flows have been identified as occurring between 07:30 - 08:30 and 17:00 – 18:00 respectively. These peak hour periods form the basis of the 2022, 2027 and 2037 network assessments.

Network Vehicle Flows

5.7.5 The following Figures as included in **Appendix A** present the vehicle flows across the local road network for each of the adopted development scenarios: -

- **Figure 14** – 2022 Do-Nothing
- **Figure 15** – 2027 Do-Nothing
- **Figure 16** – 2037 Do-Nothing
- **Figure 17** – 2022 Do-Something
- **Figure 18** – 2027 Do-Something
- **Figure 19** – 2037 Do-Something

5.8 NETWORK IMPACT

5.8.1 The NRA/TII document entitled Traffic and Transport Assessment Guidelines (2014) provides thresholds in relation to the impact of a proposed development upon the local road network. It is considered material when the level of traffic it generates surpasses the thresholds of 10% and 5% on normal and congested networks respectively. When such levels of impact are generated a more detailed assessment should be undertaken to ascertain the specific impact upon the network's operational performance.

5.8.2 In accordance with the TII guidelines, we have undertaken an assessment to establish the potential level of impact upon the key junctions of the local road network. To enable this calculation to be undertaken we have based the analysis upon the 2022 Opening Year and the 2027 and 2037 Future Design Year scenarios.

5.8.3 **Table 5.7** details the specific scale of network impact predicted at each of the key local junctions (illustrated in **Figure 5.2**) during the 2022, 2027 and 2037 design years.

- **Junction 1** – Stocking Avenue / Stocking Well Row / Stocking Wood Roundabout
- **Junction 2** – Stocking Avenue / White Pines Way / White Pines Crescent Roundabout
- **Junction 3** – Stocking Avenue / Site Access Junction
- **Junction 4** – Stocking Avenue / Stocking Lane Roundabout

Junction No.	Junction	Design Year	Percentage Impact	
			AM Peak Hour	PM Peak Hour
1	Stocking Avenue / Stocking Well Row / Stocking Wood Roundabout	2022	1.5%	1.8%
		2027	3.3%	3.8%
		2037	3.0%	3.5%
2	Stocking Avenue / White Pines Way / White Pines Crescent Roundabout	2022	1.8%	1.9%
		2027	3.8%	4.1%
		2037	3.5%	3.8%
4	Stocking Avenue / Stocking Lane Roundabout	2022	1.5%	1.6%
		2027	3.2%	3.5%
		2037	2.9%	3.2%

Table 5.7: Proposed Developments Network Impact

5.8.4 **Table 5.7** indicates that the impact on the surrounding road network will be sub-threshold at junctions 1, 2 and 4. A maximum percentage impact of 3.8% is observed at Stocking Avenue / White Pines Way / White Pines Crescent Roundabout during the AM peak hour. The highest percentage impact for the PM peak hour is analysed to be 4.1%.

5.8.5 **Figure 5.3** below details the total amount of two-way vehicle trips that will pass through the key off-site junctions in the 2037 Future Design Year and the resulting percentage increase in traffic flows as a result of the traffic generated by the proposed development.

Figure 5.3: Increase in Vehicle Trips Generated Through Key Of-Site Junctions (2037)

5.8.6 Junction 1: Stocking Avenue / Stocking Well Row / Stocking Wood roundabout experiences an increase of 3.5% with 33 new vehicle trips generated in the PM peak hour.

5.8.7 Junction 2: Stocking Avenue / White Pines Way / White Pines Crescent roundabout experiences an increase of 3.8% with 36 new vehicle trips generated in the PM peak hour.

5.8.8 Junction 4: Stocking Lane / Stocking Avenue Roundabout, an increase of 3.2% is experienced in the PM peak hour with 31 new vehicle trips are generated.

5.8.9 As noted previously, these are below the TII threshold for assessment for normal and congested networks. As such the proposed development is not anticipated to have a material impact on the adjacent network and a more detailed traffic assessment of the surrounding junctions are not required.

5.8.10 A detailed assessment of the impact of the proposed development has been undertaken for the site access junction (Junction 3).

6.0 NETWORK ANALYSIS

6.1 INTRODUCTION

6.1.1 This network assessment considers the impact of the subject development only on the surrounding road network. The operational assessment of the local road network has been undertaken using the Transport Research Laboratory (TRL) computer packages PICADY for the priority junction.

6.1.2 For the PICADY analyses, a 90-minute AM and PM period has been simulated, from 07:15 to 08:45 and 16:45 to 18:15, respectively. For these junction analysis sets traffic flows were entered using an Origin-Destination table for the peak hours.

6.1.3 When considering priority junctions, a Ratio of Flow to Capacity (RFC) of greater than 85% (0.85) would indicate a junction to be approaching capacity, as operation above this RFC value is poor and the performance of the junction deteriorates quickly.

6.1.4 In order to analyse and assess the impact of the proposed development on the surrounding road network, a traffic model of the Site Access / Stocking Avenue junction was analysed for the following:

- 2022 Opening Year
- 2027 Interim Year (Opening Year +5 years)
- 2037 Future Horizon Year (Opening Year +15 years)

6.1.5 The following junction has been considered for further analysis as illustrated in **Figure 6.1**: -

- Junction 3: Site Access / Stocking Avenue Priority Controlled Junction

Figure 6.1: Junction Assessed

6.2 JUNCTION 3: SITE ACCESS / STOCKING AVENUE JUNCTION

6.2.1 The principal results of the operational assessment of this priority controlled junction during the weekday morning and evening peaks are summarised in Tables **6.1 to 6.3** below. The three arms were labelled as follows within the PICADY model:

Arm A: Stocking Avenue (West)
Arm B: Site Access
Arm C: Stocking Avenue (East)

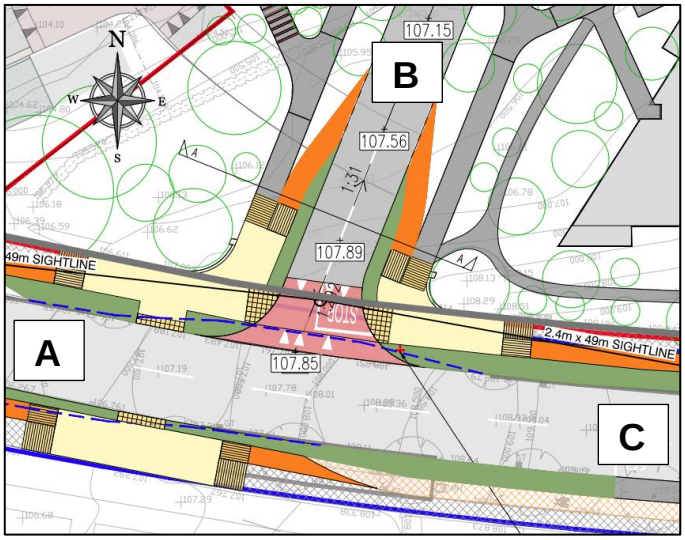


Figure 6.2: Site Access/Stocking Avenue Junction

2022 Opening Year

6.2.2 The 'Do-Something' 2022 AM peak hour PICADY results (**Table 6.1**) indicate that this junction is predicted to be operating well within capacity with a maximum RFC value of 0.05 and a maximum queue of 0.1 pcu's being recorded. The 'Do-Something' 2022 PM peak hour PICADY results indicate that this junction is predicted to be operating well within capacity with a maximum RFC value of 0.02 and a maximum queue of 0.0 pcu's being recorded.

Peak Hour	Stream	Do-Something		
		Queue (pcu)	Delay (s)	RFC
AM Peak	A	-	-	-
	B	0.1	9.74	0.05
	C	0.0	6.08	0.01
PM Peak	A	-	-	-
	B	0.0	8.41	0.02
	C	0.0	4.73	0.02

Table 6.1: 2022 Opening Year PICADY Analysis

2027 Opening Year

6.2.3 The 'Do-Something' 2027 AM peak hour PICADY results (**Table 6.2)** indicate that this junction is predicted to be operating well within capacity with a maximum RFC value of 0.12 and a maximum queue length of 0.1 pcu's being recorded. The 'Do-Something' 2027 PM peak hour PICADY results indicate that this junction is predicted to operate well within capacity with a maximum RFC value of 0.06 and a maximum queue length of 0.1 pcu's being recorded.

Peak Hour	Stream	Do-Something		
		Queue (pcu)	Delay (s)	RFC
AM Peak	A	-	-	-
	B	0.1	10.83	0.12
	C	0.0	6.10	0.02
PM Peak	A	-	-	-
	B	0.1	9.11	0.05
	C	0.1	4.73	0.06

Table 6.2: 2027 Opening Year PICADY Analysis

2037 Opening Year

6.2.4 The 'Do-Something' 2037 AM peak hour PICADY results (**Table 6.3**) indicate that this junction is predicted to be operating well within capacity with a maximum RFC value of 0.12 and a maximum queue length of 0.2 pcu's being recorded. The 'Do-Something' 2037 PM peak hour PICADY results indicate that this junction is predicted to operate well within capacity with a maximum RFC value of 0.06 and a maximum queue length of 0.1 pcu's being recorded.

Peak Hour	Stream	Do-Something		
		Queue (pcu)	Delay (s)	RFC
AM Peak	A	-	-	-
	B	0.2	11.28	0.12
	C	0.0	6.08	0.02
PM Peak	A	-	-	-
	B	0.1	9.36	0.05
	C	0.1	4.63	0.06

Table 6.3: 2037 Opening Year PICADY Analysis

6.2.5 A copy of the PICADY modelling outputs file can be found in **Appendix C**.

6.3 MITIGATION MEASURES

Mobility Management Plan (MMP)

6.3.1 A Mobility Management Plan (MMP) has been prepared by DBFL for this development and is submitted as part of this application. It should be read in conjunction with this document.

6.3.2 The MMP has been prepared to guide the delivery and management of a package of integrated initiatives which seek to encourage sustainable travel practices at the proposed residential development.

6.3.3 It is noted that a successfully implemented MMP can provide reductions in car usage, particularly influencing levels of single-occupancy car travel, with increased trips made by public transport, walking and cycling.

6.3.4 Within the MMP document, a number of 1 year to 5 year targets have been outlined with a specific objective of reducing single-occupancy car travel. The existing modal split within the area surrounding the proposed development (taken from the 2016 census data) has been used as a basis for these targets in order to outline a realistic target for the development. The 2016 Census data modal split as well as the 1st and 5 year targets proposed are outlined in **Table 6.13.**

Mode of Travel	Local Area Mode Split (Census, 2016)	MMP 1st Year Target (2021)	MMP 5-year Target (2026)
On Foot	11%	12%	12%
Bicycle	4%	6%	8%
Bus/Minibus/Coach	12%	14%	17%
Train/DART/LUAS	1%	1%	1%
Motorcycle/Scooter	1%	1%	1%
Car Driver	45%	40%	35%
Car Passenger	19%	20%	20%
Van	2%	2%	2%
Other (incl. lorry)	0%	0%	0%
Work mainly at/from home	2%	2%	2%
Not Stated	3%	2%	2%

Table 6.6: MMP Targets for Modal Split

6.3.5 The MMP also sets out a number of Actions and Targets to help achieve the modal split targets of increasing sustainable travel within the development. The document also provides mode specific ideas for sustainable travel promotion and requires that the document be actively managed and monitored within the development with yearly travel surveys undertaken by residents to determine the actual changes in travel behaviour.

Car Parking Strategy

6.3.6 A Car Parking Strategy document has been prepared by DBFL for this development and has been submitted as part of this application. It should be read in conjunction with this document.

6.3.7 This document has been prepared in order to present a rationale behind the identification of the quantum of vehicle parking and cycle parking proposed within the development. The document also sets out the management measures that will be deployed to allocate the use and control of parking provided at the proposed development site, and states that parking spaces for these units will be actively managed by the management company on the site.

6.3.8 The document highlights some of the initiatives that are proposed within the development to encourage alternative travel modes, such as the allocation of 3 GoCar spaces within the development that will accommodate residents as well as the provision of 401 cycle parking spaces.

6.3.9 It is felt that all of the above measures will help encourage the use of sustainable transport modes as a means of accessing the development rather than a reliance on the private vehicle which could potentially compromise the recent investment in infrastructure in the vicinity of the site.

7.0 CONSTRUCTION PHASE

7.1 OVERVIEW

7.1.1 In general, the impact of the construction period will be temporary in nature and less significant than the final post development operational stage.

7.1.2 All construction activities will be governed by a Construction Traffic Management Plan (CTMP), the details of which will be agreed with South Dublin County Council prior to the commencement of construction activities on site. The principal objective of the CTMP is to ensure that the impacts of all building activities generated during the construction phase upon the public (off-site), visitors to the subject site (on-site) and internal (on-site) workers environments, are fully considered and proactively managed/programmed thereby ensuring that safety is maintained at all times, disruption is minimised and undertaken within a controlled hazard free/minimised environment.

7.1.3 During the general excavation of the foundations there may be additional HGV movements from the site. All suitable material will be used for construction and fill activities where possible and appropriate. All spoil material will be removed to a registered landfill site which will be agreed in advance with South Dublin County Council.

7.1.4 In addition to the traffic generated by the disposal of surplus subsoil from the site, there will be traffic generated from deliveries of construction materials and equipment. It should be noted that construction traffic generated during the development works tends to be at off-peak hours. Such trips would generally be spread out over the full working day and are unlikely to be higher than the peak hour predicted for the operational stage.

7.1.5 Construction traffic will consist of the following categories:

- Private vehicles owned and driven by site construction staff and by full time supervisory staff.
- Excavation plant and dumper trucks involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready-mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

7.1.6 On-site employees will generally arrive before 08:00 and depart after 18:00, thus avoiding the evening peak hour traffic. It should be noted that a large proportion of construction workers would arrive in shared transport. Deliveries would arrive at a steady rate during the course of the day.

7.1.7 In the absence of a final construction programme it is difficult to assess the exact impact during the construction period. Nevertheless, the following estimates have been made in respect of the construction period impacts:

- Appropriate on-site parking and compounding will be provided to prevent overflow onto the local network.
- It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential.
- Delivery vehicles to and from the site will be spread across the course of the working day, therefore, the number of HGVs travelling during the peak hours will be relatively low.

7.1.8 Site offices and compound will be located within the site boundary. The site will be able to accommodate employee and visitor parking throughout the construction period. Initially, hard-standing parking areas will be provided and as the development progresses, employees will use constructed car-parking spaces, as they become available.

7.1.9 Finally, truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by South Dublin County Council will be adhered to.

8.0 SUMMARY AND CONCLUSION

8.1 OVERVIEW

8.1.1 DBFL Consulting Engineers (DBFL) have been commissioned by Ardstone Homes Limited to prepare a Traffic and Transport Assessment (TTA) for a proposed neighbourhood centre development on lands located at Stocking Avenue, Woodtown, Dublin 16.

8.1.2 The proposed development, located on lands north of Stocking Avenue, comprises 93 no. 1-bed units and 148 no. 2-bed units. The development also comprises 204 no. car parking spaces and 401 no. cycle parking spaces and will be accessed via Stocking Avenue located to the south of the subject development site. The development also includes a community centre of approx. 552 sqm.

8.1.3 The purpose of this TTA is to quantify the existing transport environment and to detail the results of assessment work undertaken to identify the potential level of transport impact generated as a result of the proposed development. Our methodology incorporated a number of key inter-related stages, including;

- Site Audit,
- Planning File Review,
- Policy Review,
- Commissioning and Analysis of Traffic Surveys,
- Trip Generation, Distribution and Assignment, and Network Impact
- Network Analysis.

8.1.4 As per best practice guidance this TTA has carried out a range of network assessments investigating different traffic conditions for an Opening Year of 2022, the Interim Year of 2027 and the Future Horizon Year of 2037.

8.2 SUMMARY

8.2.1 The findings of the analysis summarised within this Traffic and Transport Assessment are as follows:

- The subject site benefits from existing pedestrian and cycle facilities with a segregated footway and cycle track present on both sides of Stocking Avenue extending from Stocking Avenue / Stocking Lane Roundabout in the east to the junction with Ballycullen Road and Hunters Road to the west of the subject site.
- The Ballycullen-Oldcourt LAP (2014) includes proposals to provide a pedestrian and cycle connections linking the subject site to residential units to the west.
- The GDA Cycle Network Plan proposes a feeder route along Stocking Avenue which will provide a connection to Firhouse via the Secondary Route SO6 to the west and Ballyboden to the east via the Secondary Route 10.
- Under the BusConnects proposals, two new bus routes (Route A1 and Route 85) will serve Ballycullen. Route A1 will run from Ballycullen to Beaumont while Route 85 will run from Tallaght to Parnell Square.
- The proposed residential development will increase the population of the local area, which will support the existing bus services and will make further improvements to these services more viable. Occupiers of the development would place additional patronage on public transport, which should lead to increased investment and to the enhancement of public transport within the area.
- The subject scheme proposes to provide 204 no. car parking spaces. The total provision is less than the maximum required as per the SDCC Development Plan (230 no. car parking spaces). The proposed provision is considered appropriate based on the accessibility levels of the site and that the proposed development is anticipated serve the surrounding residential areas.
- In terms of cycle parking, the proposals provide 401 no. cycle parking spaces. The proposed number (401 spaces) is significantly above the SDCC guidelines (80 spaces) and is close to the DHPLG guidelines (510 spaces).
- The network impact analysis analysed the impact of the proposed development upon the local road network. The three key junctions that were

analysed were Stocking Avenue / Stocking Well Row / Stocking Wood Roundabout, Stocking Avenue / White Pines Way / White Pines Crescent Roundabout and Stocking Avenue / Stocking Lane Roundabout. The analysis demonstrated that the proposals will generate a sub-threshold impact upon all local key junctions.

8.2.2 **Figure 8.1** below details the total amount of two-way vehicle trips that will pass through the key off-site junctions in the 2037 Future Design Year and the resulting percentage increase in traffic flows as a result of the traffic generated by the proposed development.

Figure 8.1: Increase in Vehicle Trips Generated Through Key Of-Site Junctions (2037)

- Following a PICADY analysis on the Stocking Avenue / Site Access Priority Controlled Junction, results have shown that the junction will operate within capacity for both AM and PM peaks across all design years. It was observed that the junction operates within capacity for all design scenarios. The PICADY Analysis also showed an insignificant increase in RFC, max queue and delay in the 2037 "Do-Something" scenario, demonstrating the minimal impact of the proposed development on the adjoining road network.

8.3 CONCLUSION

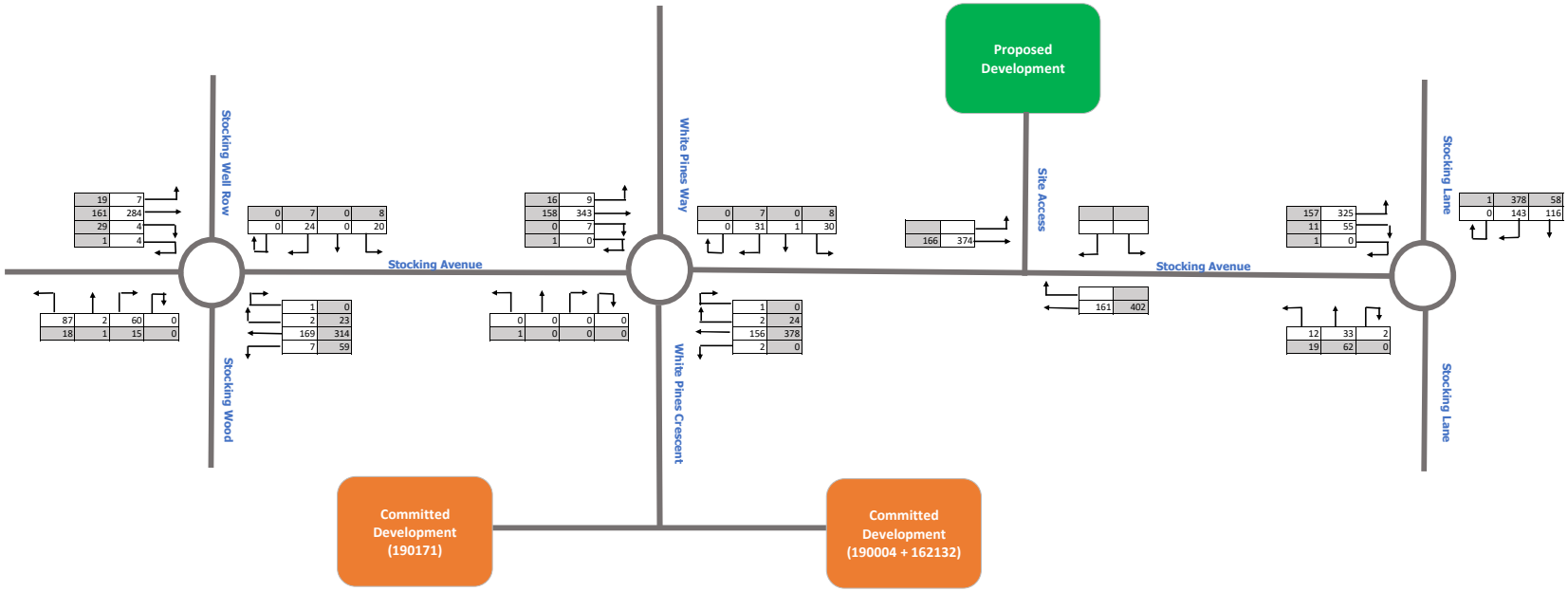
8.3.1 In conclusion, it is considered that the impact on the surrounding road network, as a result of the proposed development on the surrounding road network will be minimal. This is based on the anticipated levels of traffic generated by the proposed development and the information and analysis summarised in the above report.

8.3.2 It is concluded that the proposals represent a sustainable and practical approach to development on the subject lands and there are no traffic or transportation related reasons that should prevent the granting of planning permission for the proposed residential development.

APPENDICES

APPENDIX A

Traffic Flow Diagrams



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Project :
Proposed Residential Development at Stocking Avenue, Woodtown, Co. Dublin

DRG. Title :
Network Traffic Flows - Vehicles
2020 Base Flows

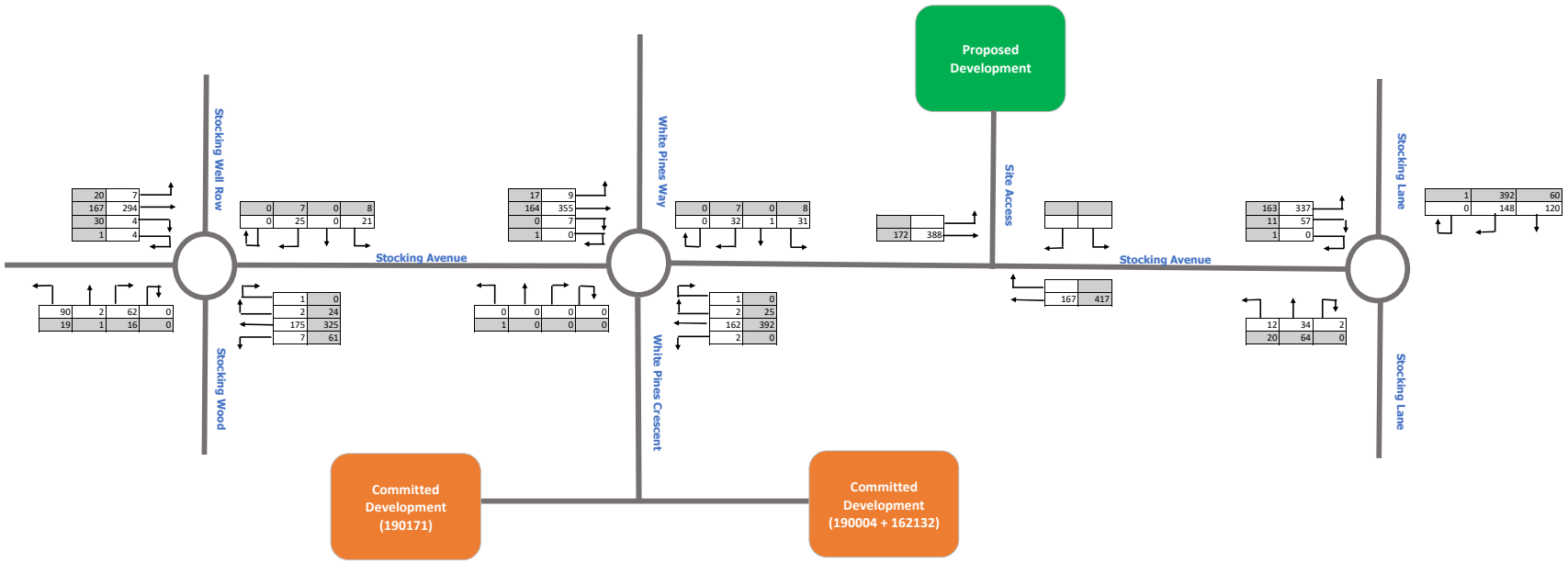
Key:
AM Peak Hour (07:30 to 08:30)
PM Peak Hour (17:00 to 18:00)

Dwn:	Ckd:	Date:
DG	MK	29/05/2020

Ref: p190230\calcs\excel\Traffic\ Traffic Model 01

Figure: 1

Rev: -



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DRG. Title :
Network Traffic Flows - Vehicles
2022 Base Flows

Key:
AM Peak Hour (07:30 to 08:30)
PM Peak Hour (17:00 to 18:00)

Dwn:	Ckd:	Date:
DG	MK	29/05/2020

Ref: p190230\calcs\excel\Traffic\ Traffic Model 01

Figure: 2

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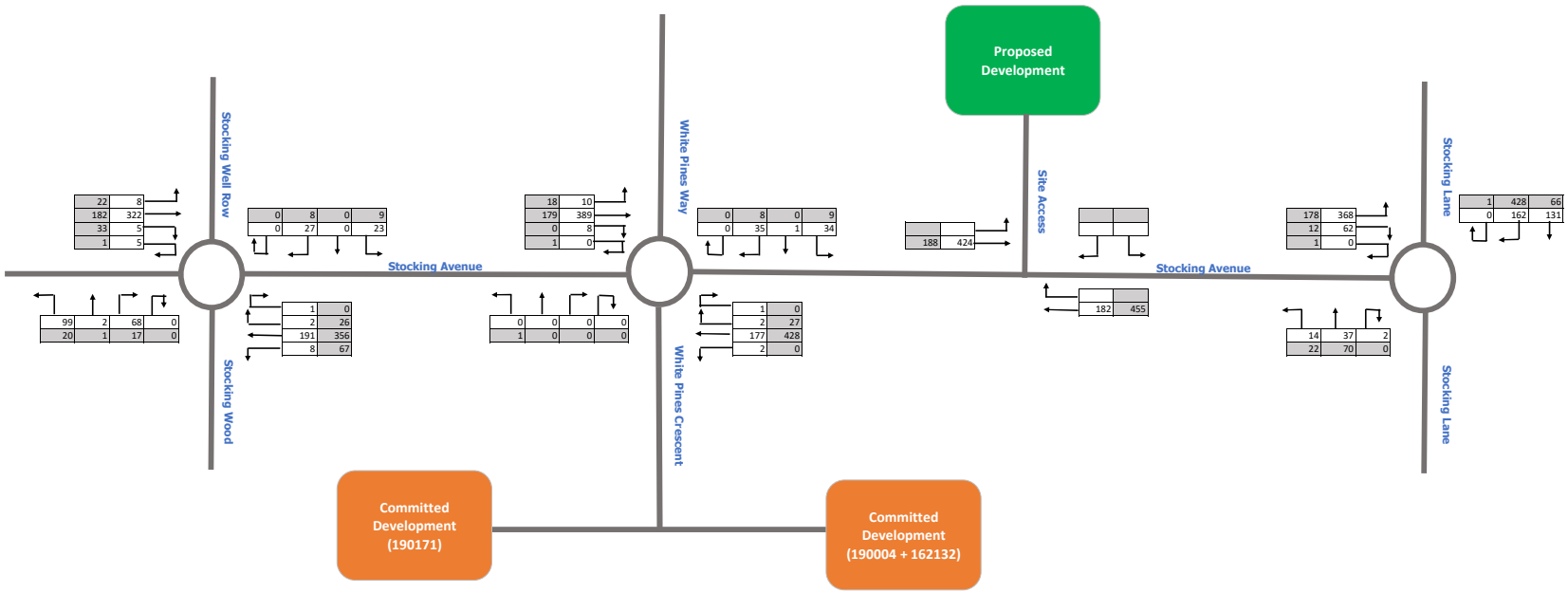

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DRG. Title :
Network Traffic Flows - Vehicles
2027 Base Flows

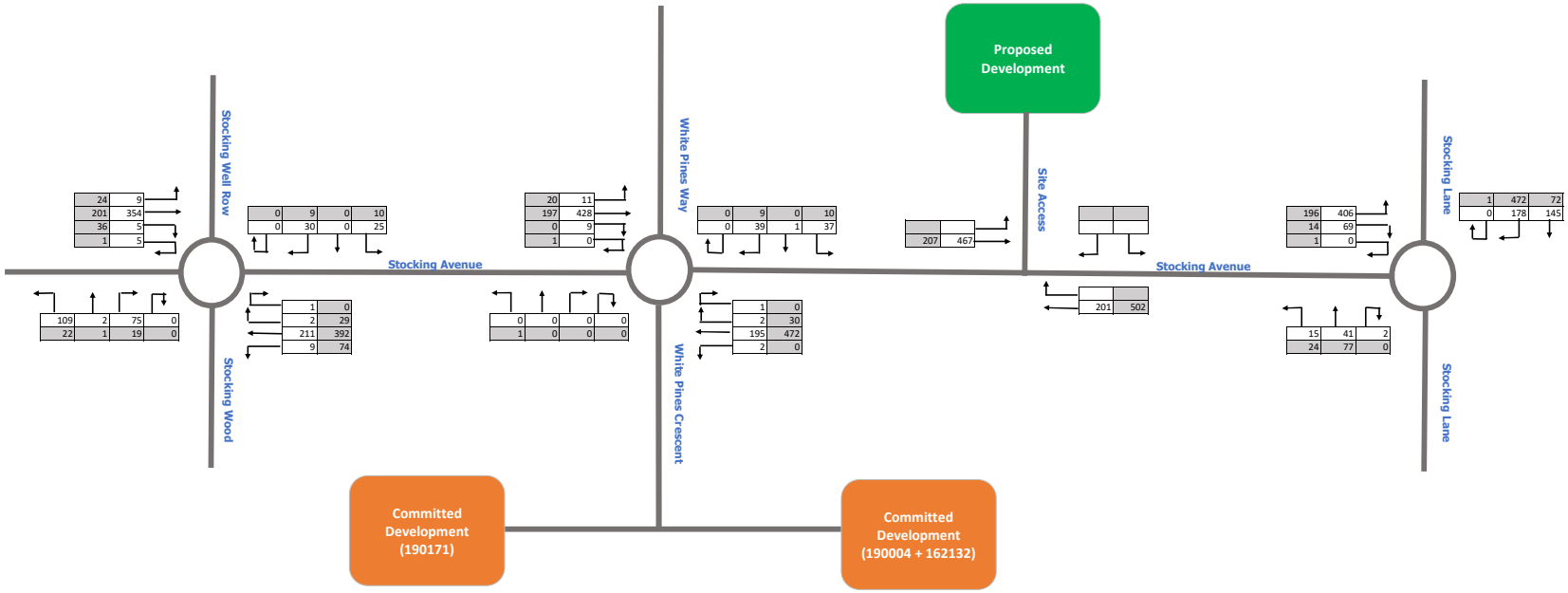
Key:
AM Peak Hour (07:30 to 08:30)
PM Peak Hour (17:00 to 18:00)

Dwn:	Ckd:	Date:
DG	MK	29/05/2020

Ref: p190230\calcs\excel\Traffic\ Traffic Model 01

Figure: 3

Rev: -



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DRG. Title :
Network Traffic Flows - Vehicles
2037 Base Flows

Key:
AM Peak Hour (07:30 to 08:30)
PM Peak Hour (17:00 to 18:00)

Dwn:	Ckd:	Date:
DG	MK	29/05/2020

Ref: p190230\calcs\excel\Traffic\ Traffic Model 01

Figure: 4

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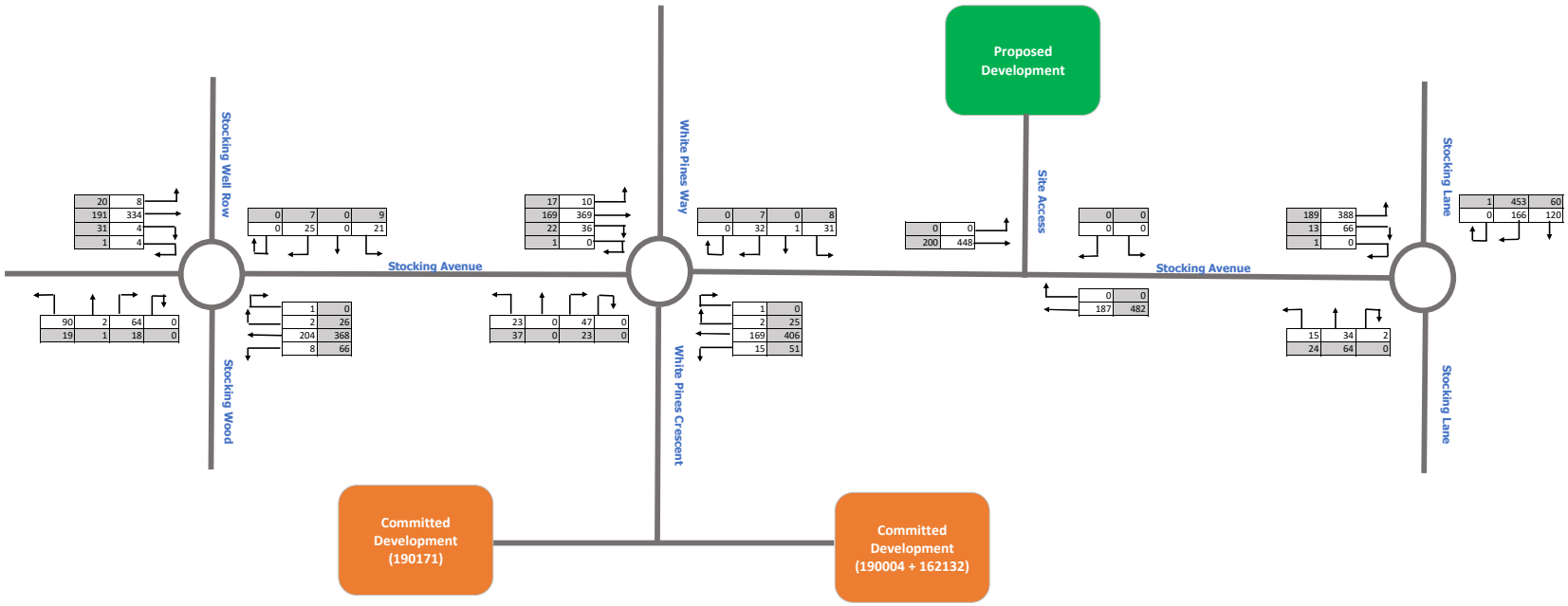

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DRG. Title :
Network Traffic Flows - Vehicles
Do Nothing 2022

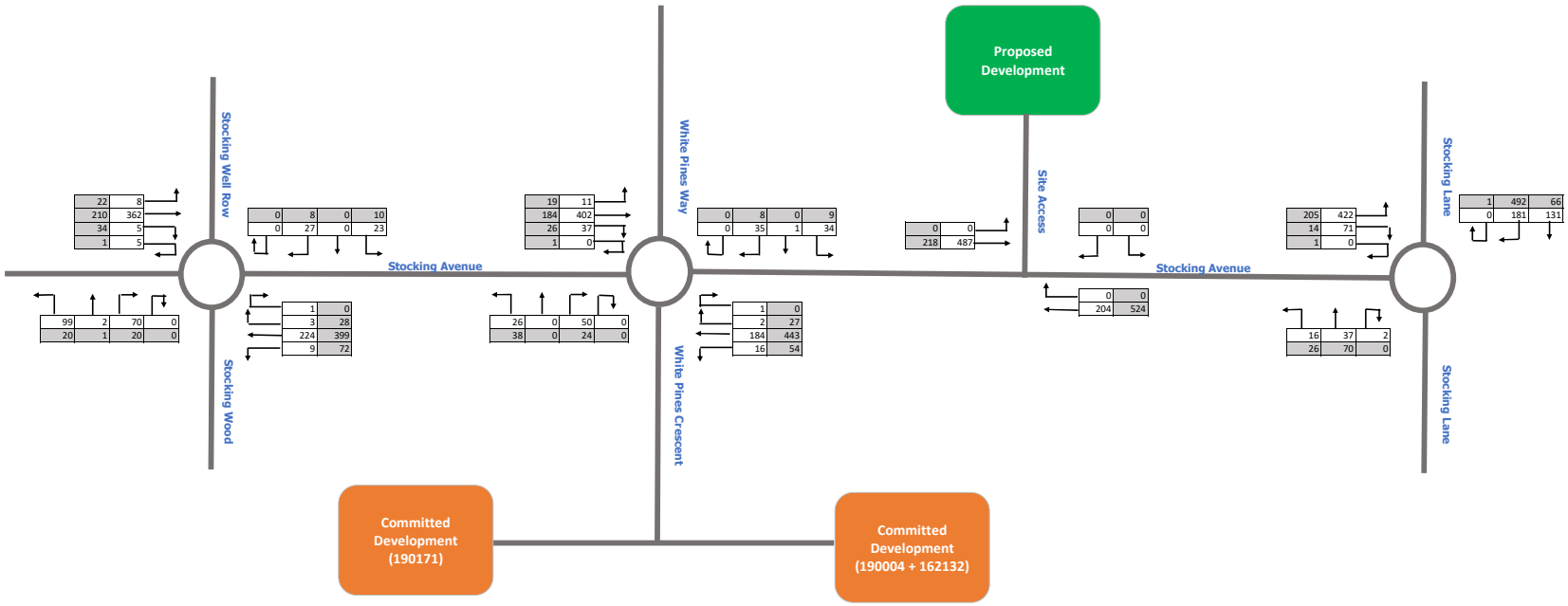
Key:
AM Peak Hour (07:30 to 08:30)
PM Peak Hour (17:00 to 18:00)

Dwn:	Ckd:	Date:
DG	MK	29/05/2020

Ref: p190230\calcs\excel\Traffic\ Traffic Model 01

Figure: 13

Rev: -



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DRG. Title :
Network Traffic Flows - Vehicles
Do Nothing 2027

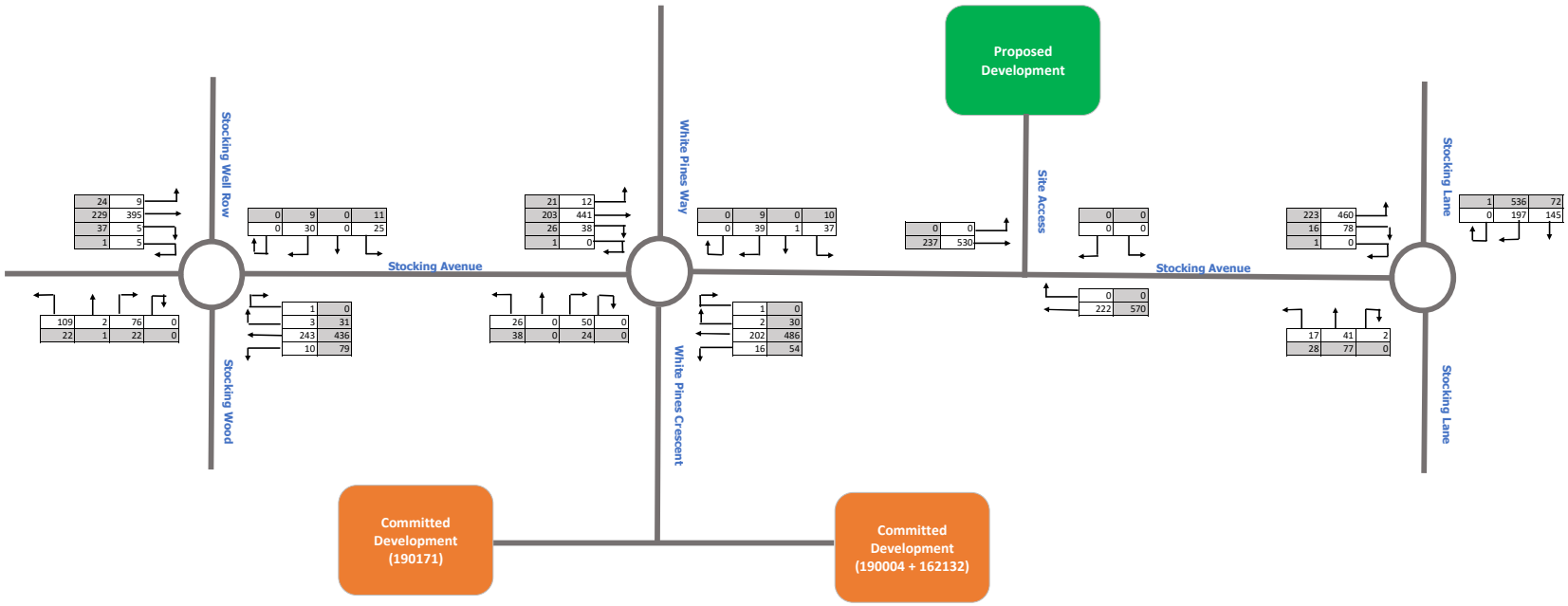
Key:
AM Peak Hour (07:30 to 08:30)
PM Peak Hour (17:00 to 18:00)

Dwn:	Ckd:	Date:
DG	MK	29/05/2020

Ref: p190230\calcs\excel\Traffic\ Traffic Model 01

Figure: 14

Rev: -



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DRG. Title :
Network Traffic Flows - Vehicles
Do Nothing 2037

Key:
AM Peak Hour (07:30 to 08:30)
PM Peak Hour (17:00 to 18:00)

Dwn:	Ckd:	Date:
DG	MK	29/05/2020

Ref: p190230\calcs\excel\Traffic\ Traffic Model 01

Figure: 15

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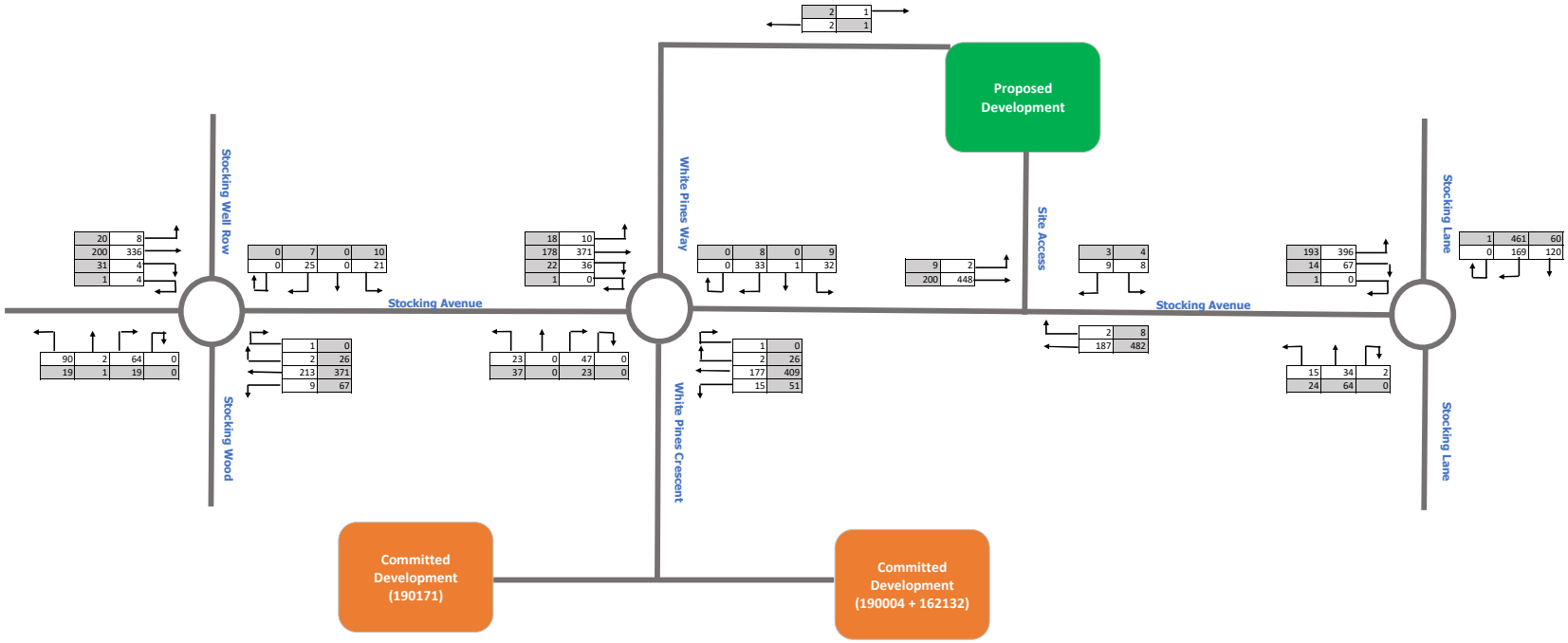

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DRG. Title :
Network Traffic Flows - Vehicles
Do Something 2022

Key:
AM Peak Hour (07:30 to 08:30)
PM Peak Hour (17:00 to 18:00)

Dwn:	Ckd:	Date:
DG	MK	29/05/2020

Ref: p190230\calcs\excel\Traffic\ Traffic Model 01

Figure: 16

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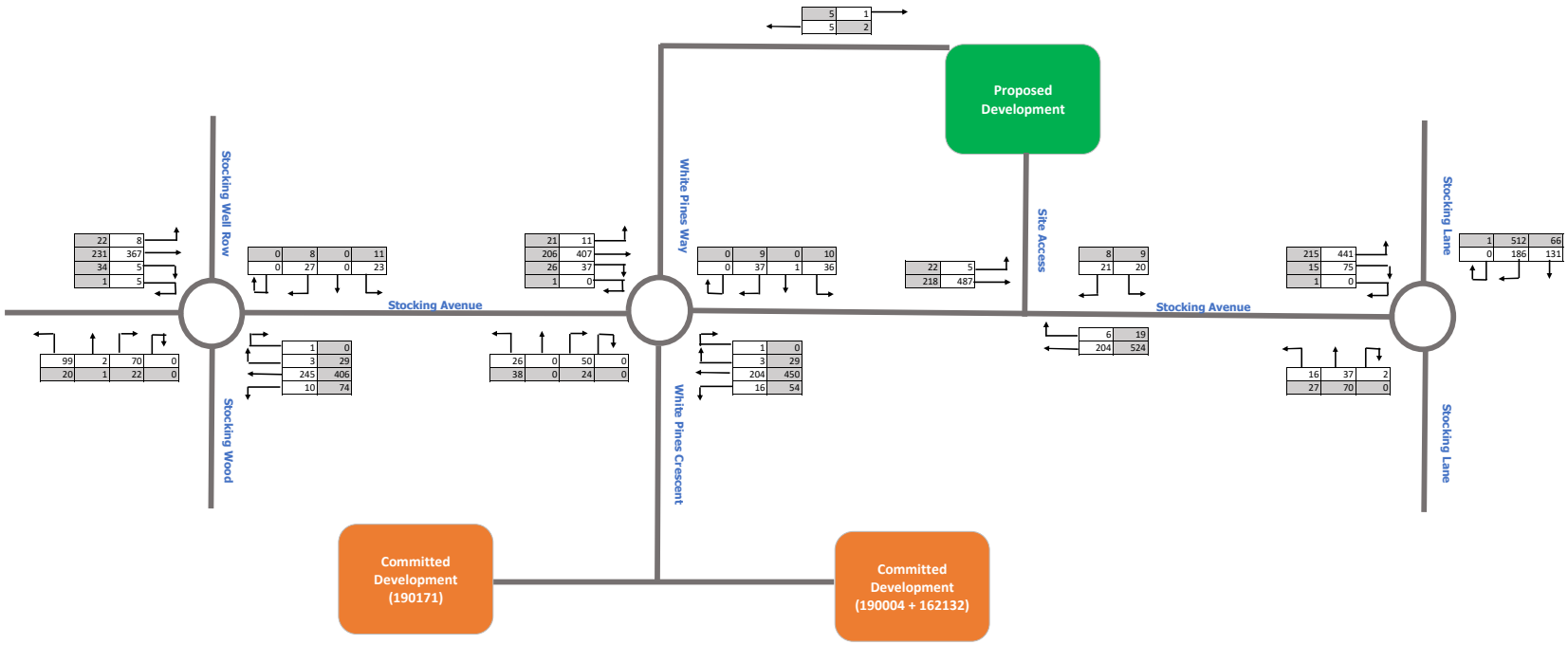

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DRG. Title :
Network Traffic Flows - Vehicles
Do Something 2027

Key:
AM Peak Hour (07:30 to 08:30)
PM Peak Hour (17:00 to 18:00)

Dwn:	Ckd:	Date:
DG	MK	29/05/2020

Ref: p190230\calcs\excel\Traffic\ Traffic Model 01

Figure: 17

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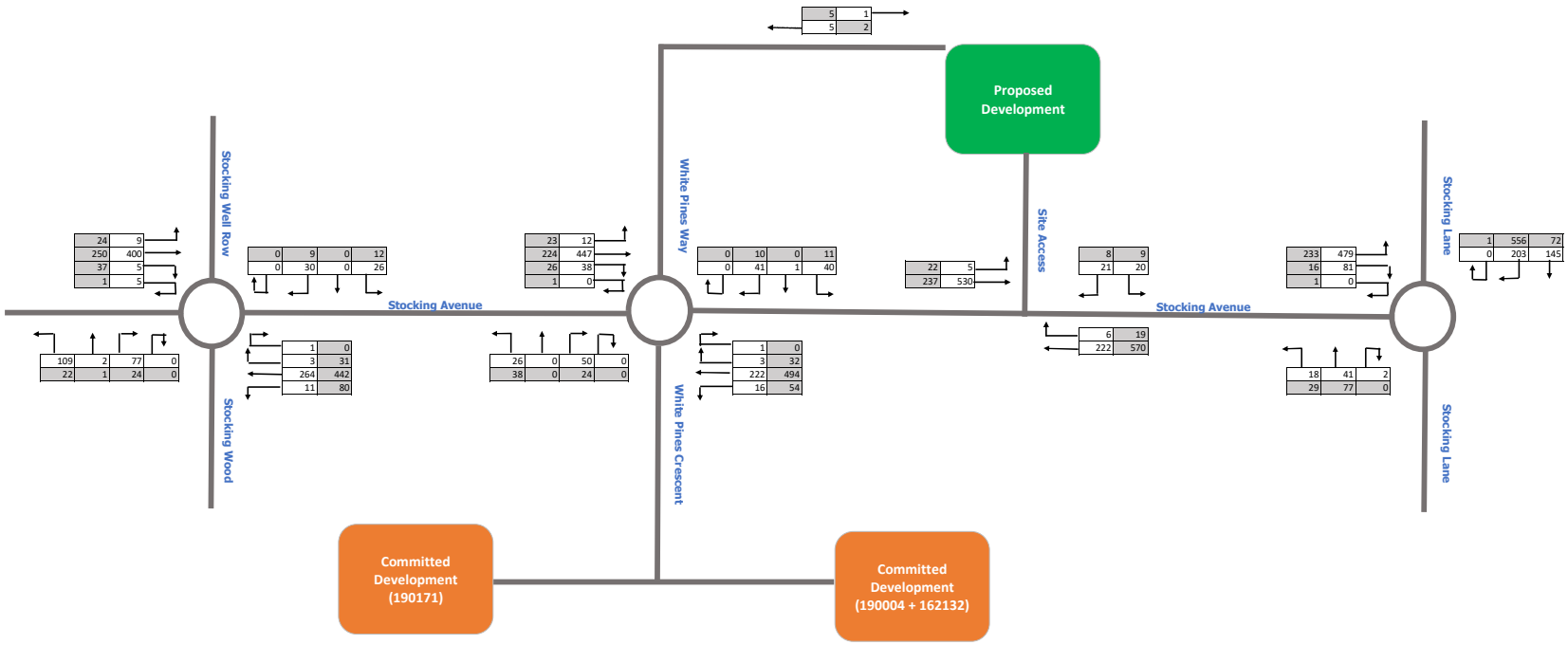

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DRG. Title :
Network Traffic Flows - Vehicles
Do Something 2037

Key:
AM Peak Hour (07:30 to 08:30)
PM Peak Hour (17:00 to 18:00)

Dwn:	Ckd:	Date:
DG	MK	29/05/2020

Ref: p190230\calcs\excel\Traffic\ Traffic Model 01

Figure: 18

Rev: -

APPENDIX B

TRICS Output Data

Calculation Reference: AUDIT-638801-210120-0120

TRIP RATE CALCULATION SELECTION PARAMETERS:

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

Selected regions and areas:

03	SOUTH WEST		
	DC	DORSET	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
	NF	NORFOLK	1 days
	SF	SUFFOLK	1 days
05	EAST MIDLANDS		
	DS	DERBYSHIRE	1 days
	NT	NOTTINGHAMSHIRE	2 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	RI	EAST RIDING OF YORKSHIRE	1 days
08	NORTH WEST		
	MS	MERSEYSIDE	2 days
09	NORTH		
	CB	CUMBRIA	2 days
11	SCOTLAND		
	EB	CITY OF EDINBURGH	1 days
	SR	STIRLING	1 days
12	CONNAUGHT		
	GA	GALWAY	1 days
13	MUNSTER		
	WA	WATERFORD	1 days
15	GREATER DUBLIN		
	DL	DUBLIN	5 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

Primary Filtering 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: No of Dwellings
Actual Range: 9 to 184 (units:)
Range Selected by User: 8 to 372 (units:)

Parking Spaces Range: All Surveys Included

Parking Spaces per Dwelling Range: All Surveys Included

Bedrooms per Dwelling Range: All Surveys Included

Percentage of dwellings privately owned: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 08/09/20

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	3 days
Tuesday	11 days
Wednesday	5 days
Thursday	1 days
Friday	2 days

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

Selected survey types:

Manual count	22 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:
Suburban Area (PPS6 Out of Centre) 17

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:

Development Zone	2
Residential Zone	15
No Sub Category	5

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.

Secondary Filtering selection:

Use Class:

C3	22 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 500m Range:
All Surveys Included
Population within 1 mile:

1,001 to 5,000	3 days
5,001 to 10,000	1 days
10,001 to 15,000	4 days
15,001 to 20,000	1 days
20,001 to 25,000	6 days
25,001 to 50,000	7 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	6 days
125,001 to 250,000	3 days
250,001 to 500,000	5 days
500,001 or More	6 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	9 days
1.1 to 1.5	13 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	22 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.

PTAL Rating:

No PTAL Present	22 days

This data displays the number of selected surveys with PTAL Ratings.

Covid-19 Restrictions	Yes	At least one survey within the selected data set was undertaken at a time of Covid-19 restrictions

LIST OF SITES relevant to selection parameters

1 AN-03-C-02 BLOCK OF FLATS ANTRIM
SUMMERHILL AVENUE
BELFAST
KNOCK
Edge of Town
Residential Zone
Total No of Dwellings: 22
Survey date: FRIDAY *28/11/14* *Survey Type: MANUAL*

2 CA-03-C-03 BLOCKS OF FLATS CAMBRIDGESHIRE
CROMWELL ROAD
CAMBRIDGE

Suburban Area (PPS6 Out of Centre)
No Sub Category
Total No of Dwellings: 82
Survey date: MONDAY *18/09/17* *Survey Type: MANUAL*

3 CB-03-C-02 BLOCK OF FLATS CUMBRIA
BRIDGE LANE
PENRITH

Edge of Town
No Sub Category
Total No of Dwellings: 35
Survey date: WEDNESDAY *11/06/14* *Survey Type: MANUAL*

4 CB-03-C-03 FLATS & BUNGALOWS CUMBRIA
LOUND STREET
KENDAL

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 33
Survey date: MONDAY *09/06/14* *Survey Type: MANUAL*

5 DC-03-C-02 FLATS IN BLOCKS DORSET
PALM COURT
WEYMOUTH
SPA ROAD
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 14
Survey date: FRIDAY *28/03/14* *Survey Type: MANUAL*

6 DL-03-C-11 BLOCK OF FLATS DUBLIN
WYCKHAM WAY
DUBLIN
DUNDRUM
Neighbourhood Centre (PPS6 Local Centre)
Residential Zone
Total No of Dwellings: 96
Survey date: TUESDAY *10/09/13* *Survey Type: MANUAL*

7 DL-03-C-12 BLOCK OF FLATS DUBLIN
BOOTERSTOWN AVENUE
DUBLIN

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 47
Survey date: TUESDAY *10/09/13* *Survey Type: MANUAL*

8 DL-03-C-14 BLOCKS OF FLATS DUBLIN
BALLINTEER ROAD
DUBLIN
DUNDRUM
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 140
Survey date: TUESDAY *10/09/13* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

9 DL-03-C-15 BLOCKS OF FLATS DUBLIN
MONKSTOWN ROAD
DUBLIN
MONKSTOWN
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 20
Survey date: WEDNESDAY *01/10/14* *Survey Type: MANUAL*

10 DL-03-C-16 BLOCKS OF FLATS DUBLIN
BOTANIC AVENUE
DUBLIN
DRUMCONDRA
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 31
Survey date: TUESDAY *22/11/16* *Survey Type: MANUAL*

11 DS-03-C-03 BLOCKS OF FLATS DERBYSHIRE
CAESAR STREET
DERBY

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 30
Survey date: WEDNESDAY *25/09/19* *Survey Type: MANUAL*

12 EB-03-C-01 BLOCKS OF FLATS CITY OF EDINBURGH
MYRESIDE ROAD
EDINBURGH
CRAIGLOCKHART
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 32
Survey date: TUESDAY *26/05/15* *Survey Type: MANUAL*

13 GA-03-C-01 FLATS GALWAY
BALLYLOUGHANE ROAD
GALWAY

Suburban Area (PPS6 Out of Centre)
No Sub Category
Total No of Dwellings: 34
Survey date: THURSDAY *31/10/13* *Survey Type: MANUAL*

14 MS-03-C-02 BLOCKS OF FLATS MERSEYSIDE
SOUTH FERRY QUAY
LIVERPOOL
BRUNSWICK DOCK
Suburban Area (PPS6 Out of Centre)
Development Zone
Total No of Dwellings: 184
Survey date: TUESDAY *13/11/18* *Survey Type: MANUAL*

15 MS-03-C-03 BLOCK OF FLATS MERSEYSIDE
MARINERS WHARF
LIVERPOOL
QUEENS DOCK
Suburban Area (PPS6 Out of Centre)
Development Zone
Total No of Dwellings: 9
Survey date: TUESDAY *13/11/18* *Survey Type: MANUAL*

16 NF-03-C-02 MIXED FLATS & HOUSES NORFOLK
HALL ROAD
NORWICH
LAKENHAM
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 82
Survey date: MONDAY *18/11/19* *Survey Type: MANUAL*

17 NT-03-C-01 HOUSES (SPLIT INTO FLATS) NOTTINGHAMSHIRE
LAWRENCE WAY
NOTTINGHAM

Suburban Area (PPS6 Out of Centre)
No Sub Category
Total No of Dwellings: 56
Survey date: TUESDAY *08/11/16* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

18 NT-03-C-02 HOUSES (SPLIT INTO FLATS) NOTTINGHAMSHIRE
CASTLE MARINA ROAD
NOTTINGHAM

Suburban Area (PPS6 Out of Centre)
No Sub Category
Total No of Dwellings: 135
Survey date: WEDNESDAY *09/11/16* *Survey Type: MANUAL*

19 RI-03-C-01 FLATS EAST RIDING OF YORKSHIRE
465 PRIORY ROAD
HULL

Edge of Town
Residential Zone
Total No of Dwellings: 20
Survey date: TUESDAY *13/05/14* *Survey Type: MANUAL*

20 SF-03-C-03 BLOCKS OF FLATS SUFFOLK
TOLLGATE LANE
BURY ST EDMUNDS

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 30
Survey date: WEDNESDAY *03/12/14* *Survey Type: MANUAL*

21 SR-03-C-03 BLOCK OF FLATS & TERRACED STIRLING
KERSEBONNY ROAD
STIRLING
CAMBUSBARRON
Edge of Town
Residential Zone
Total No of Dwellings: 82
Survey date: TUESDAY *01/09/20* *Survey Type: MANUAL*

22 WA-03-C-01 BLOCKS OF FLATS WATERFORD
UPPER YELLOW ROAD
WATERFORD

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 51
Survey date: TUESDAY *12/05/15* *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
TOTAL VEHICLES
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	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	22	58	0.040	22	58	0.157	22	58	0.197
08:00 - 09:00	22	58	0.055	22	58	0.217	22	58	0.272
09:00 - 10:00	22	58	0.074	22	58	0.111	22	58	0.185
10:00 - 11:00	22	58	0.058	22	58	0.081	22	58	0.139
11:00 - 12:00	22	58	0.064	22	58	0.076	22	58	0.140
12:00 - 13:00	22	58	0.083	22	58	0.089	22	58	0.172
13:00 - 14:00	22	58	0.073	22	58	0.085	22	58	0.158
14:00 - 15:00	22	58	0.089	22	58	0.077	22	58	0.166
15:00 - 16:00	22	58	0.113	22	58	0.065	22	58	0.178
16:00 - 17:00	22	58	0.126	22	58	0.078	22	58	0.204
17:00 - 18:00	22	58	0.186	22	58	0.077	22	58	0.263
18:00 - 19:00	22	58	0.160	22	58	0.096	22	58	0.256
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.121			1.209			2.330

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

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

Parameter summary

Trip rate parameter range selected:	9 - 184 (units:)
Survey date date range:	01/01/12 - 08/09/20
Number of weekdays (Monday-Friday):	22
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

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

Calculation Reference: AUDIT-638801-210120-0116

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 07 - LEISURE
Category : Q - COMMUNITY CENTRE
TOTAL VEHICLES

Selected regions and areas:

06	WEST MIDLANDS		
	SH	SHROPSHIRE	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	NY	NORTH YORKSHIRE	1 days
	WY	WEST YORKSHIRE	1 days
09	NORTH		
	TW	TYNE & WEAR	2 days
11	SCOTLAND		
	FA	FALKIRK	1 days
13	MUNSTER		
	LI	LIMERICK	1 days
15	GREATER DUBLIN		
	DL	DUBLIN	1 days
16	ULSTER (REPUBLIC OF IRELAND)		
	CV	CAVAN	1 days

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

Primary Filtering 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: Site area
Actual Range: 0.10 to 1.72 (units: hect)
Range Selected by User: 0.04 to 2.50 (units: hect)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 24/05/19

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
Wednesday	4 days
Thursday	1 days
Friday	2 days

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

Selected survey types:

Manual count	9 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:

Suburban Area (PPS6 Out of Centre)	3
Edge of Town	3
Neighbourhood Centre (PPS6 Local Centre)	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	6
Retail 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.

Secondary Filtering selection:

Use Class:

D1	1 days
D2	8 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 500m Range:

All Surveys Included

Population within 1 mile:

1,001 to 5,000	2 days
5,001 to 10,000	1 days
15,001 to 20,000	1 days
20,001 to 25,000	1 days
25,001 to 50,000	4 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	2 days
50,001 to 75,000	2 days
75,001 to 100,000	2 days
250,001 to 500,000	1 days
500,001 or More	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	6 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:

No	9 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.

PTAL Rating:

No PTAL Present	9 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 CV-07-Q-01 COMMUNITY CENTRE CAVAN
KILLYMOONEY DRIVE
CAVAN

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Site area: 1.72 hect
Survey date: WEDNESDAY 19/12/12 Survey Type: MANUAL

2 DL-07-Q-01 COMMUNITY CENTRE DUBLIN
BALLYBOUGH ROAD
DUBLIN
BALLYBOUGH
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Site area: 0.15 hect
Survey date: WEDNESDAY 23/11/16 Survey Type: MANUAL

3 FA-07-Q-02 COMMUNITY CENTRE FALKIRK
PARKHALL DRIVE
FALKIRK
MADDISTON
Edge of Town
Residential Zone
Total Site area: 0.28 hect
Survey date: MONDAY 03/06/13 Survey Type: MANUAL

4 LI-07-Q-01 COMMUNITY CENTRE LIMERICK
CASTLE OAKS VIEW
LIMERICK
DONOUGH O'MALLEY PARK
Edge of Town
Residential Zone
Total Site area: 0.41 hect
Survey date: WEDNESDAY 06/11/13 Survey Type: MANUAL

5 NY-07-Q-01 COMMUNITY CENTRE NORTH YORKSHIRE
SHUTE ROAD
CATTERRICK GARRISON

Neighbourhood Centre (PPS6 Local Centre)
No Sub Category
Total Site area: 0.10 hect
Survey date: WEDNESDAY 10/05/17 Survey Type: MANUAL

6 SH-07-Q-01 COMMUNITY CENTRE SHROPSHIRE
SOUTHGATE
TELFORD
SUTTON HILL
Edge of Town
Residential Zone
Total Site area: 0.15 hect
Survey date: THURSDAY 24/10/13 Survey Type: MANUAL

7 TW-07-Q-01 COMMUNITY CENTRE TYNE & WEAR
HIGH STREET
GATESHEAD
WREKENTON
Neighbourhood Centre (PPS6 Local Centre)
No Sub Category
Total Site area: 0.22 hect
Survey date: FRIDAY 04/10/13 Survey Type: MANUAL

8 TW-07-Q-03 COMMUNITY CENTRE TYNE & WEAR
ASKEW ROAD W
GATESHEAD
TEAMS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Site area: 0.33 hect
Survey date: FRIDAY 24/05/19 Survey Type: MANUAL

9 WY-07-Q-01 COMMUNITY CENTRE WEST YORKSHIRE
WATERLOO LANE
LEEDS
BRAMLEY
Neighbourhood Centre (PPS6 Local Centre)
Retail Zone
Total Site area: 0.14 hect
Survey date: MONDAY 19/10/15 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/Q - COMMUNITY CENTRE
TOTAL VEHICLES
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	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	4	0.22	11.494	4	0.22	0.000	4	0.22	11.494
08:00 - 09:00	9	0.39	11.143	9	0.39	2.857	9	0.39	14.000
09:00 - 10:00	9	0.39	13.143	9	0.39	6.571	9	0.39	19.714
10:00 - 11:00	9	0.39	5.429	9	0.39	6.286	9	0.39	11.715
11:00 - 12:00	9	0.39	6.857	9	0.39	7.714	9	0.39	14.571
12:00 - 13:00	9	0.39	8.571	9	0.39	9.429	9	0.39	18.000
13:00 - 14:00	9	0.39	8.000	9	0.39	8.857	9	0.39	16.857
14:00 - 15:00	9	0.39	5.143	9	0.39	3.714	9	0.39	8.857
15:00 - 16:00	9	0.39	8.000	9	0.39	9.714	9	0.39	17.714
16:00 - 17:00	8	0.43	4.118	8	0.43	10.294	8	0.43	14.412
17:00 - 18:00	8	0.43	6.176	8	0.43	10.000	8	0.43	16.176
18:00 - 19:00	7	0.44	10.423	7	0.44	7.166	7	0.44	17.589
19:00 - 20:00	6	0.44	9.398	6	0.44	12.030	6	0.44	21.428
20:00 - 21:00	6	0.44	7.143	6	0.44	13.158	6	0.44	20.301
21:00 - 22:00	4	0.17	0.000	4	0.17	1.515	4	0.17	1.515
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			115.038			109.305			224.343

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:	0.10 to 1.72 (units: hect)
Survey date date range:	01/01/12 - 24/05/19
Number of weekdays (Monday-Friday):	9
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

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

APPENDIX C

PICADY Output Files

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.0.0.4211 []

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

Filename: Do-Something.j9
Path: G:\2019\p190230\calcs\picady
Report generation date: 11/02/2021 08:56:37

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
	Do-Something - 2022							
Stream B-AC	0.1	9.74	0.05	A	0.0	8.41	0.02	A
Stream C-AB	0.0	6.08	0.01	A	0.0	4.73	0.02	A
Stream C-A								
Stream A-B								
Stream A-C								
	Do-Something - 2027							
Stream B-AC	0.1	10.83	0.12	B	0.1	9.11	0.05	A
Stream C-AB	0.0	6.10	0.02	A	0.1	4.73	0.06	A
Stream C-A								
Stream A-B								
Stream A-C								
	Do-Something - 2037							
Stream B-AC	0.2	11.28	0.12	B	0.1	9.36	0.05	A
Stream C-AB	0.0	6.08	0.02	A	0.1	4.63	0.06	A
Stream C-A								
Stream A-B								
Stream A-C								

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

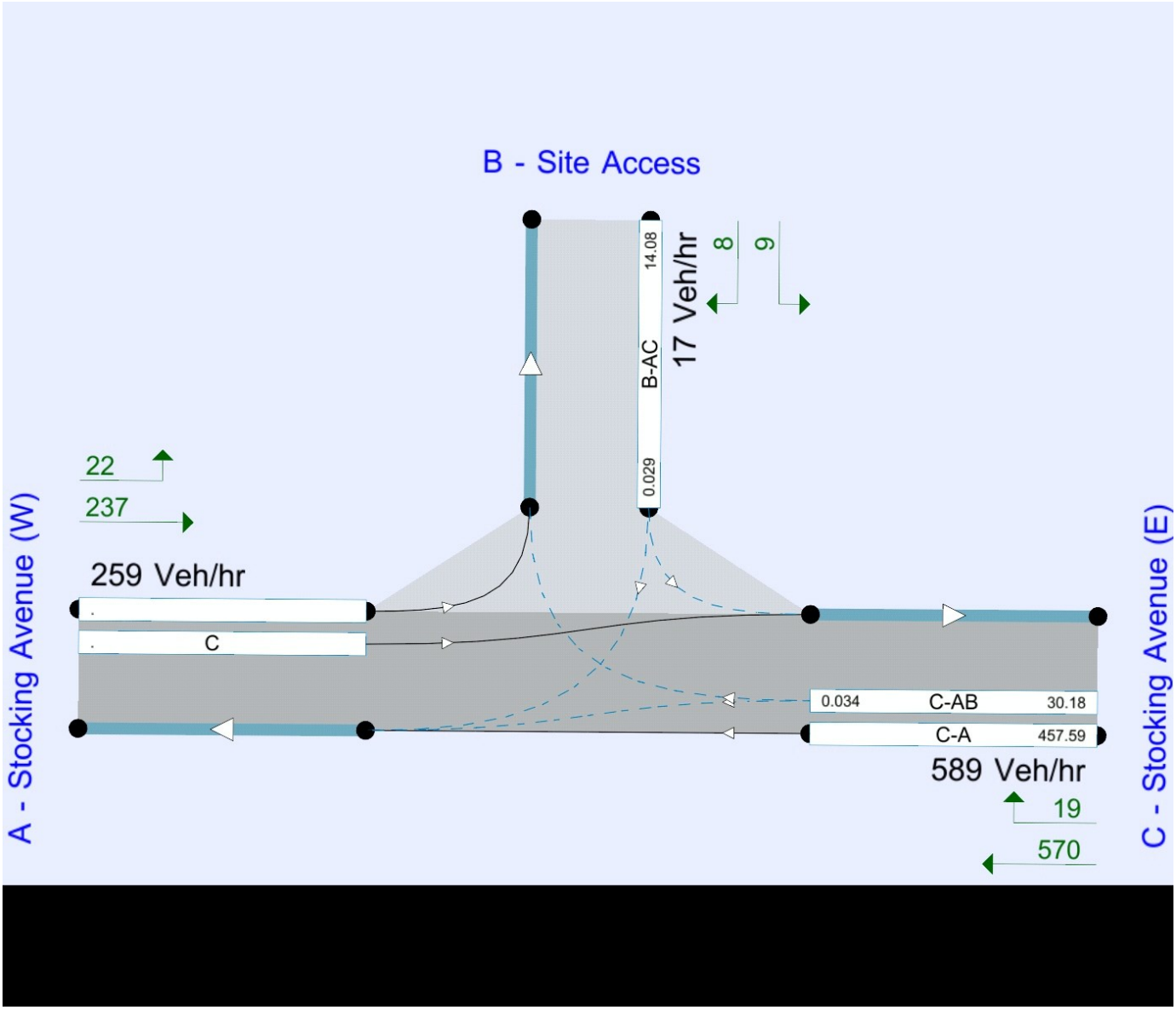
File summary

File Description

Title	White Pines East Residential Development
Location	Stocking Avenue, Dublin 16
Site number	
Date	28/05/2020
Version	
Status	Pre-Planning
Identifier	DJG
Client	
Jobnumber	190230
Enumerator	HEADOFFICE"GARVEYD
Description	

Units

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



The junction diagram reflects the last run of Junctions.

Analysis Options

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

Demand Set Summary

Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
2022	AM	ONE HOUR	07:15	08:45	15
2022	PM	ONE HOUR	16:45	18:15	15
2027	AM	ONE HOUR	07:15	08:45	15
2027	PM	ONE HOUR	16:45	18:15	15
2037	AM	ONE HOUR	07:15	08:45	15
2037	PM	ONE HOUR	16:45	18:15	15

Do-Something - 2022, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Do-Something	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1 - untitled	untitled	T-Junction	Two-way	0.28	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Stocking Avenue (W)		Major
B	Site Access		Minor
C	Stocking Avenue (E)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C - Stocking Avenue (E)	7.45			100.0	✓	0.00

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

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - Site Access	One lane	3.00	70	45

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	522.604	0.089	0.225	0.142	0.322
1	B-C	652.266	0.094	0.237	-	-
1	C-B	631.874	0.229	0.229	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

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

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
D1	2022	AM	ONE HOUR	07:15	08:45	15

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Stocking Avenue (W)		✓	450.00	100.000
B - Site Access		✓	17.00	100.000
C - Stocking Avenue (E)		✓	189.00	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	0.000	2.000	448.000
	B - Site Access	9.000	0.000	8.000
	C - Stocking Avenue (E)	187.000	2.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	10	10	10
	B - Site Access	10	10	10
	C - Stocking Avenue (E)	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.05	9.74	0.1	A
C-AB	0.01	6.08	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

Main results: (07:15-07:30)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	14.08	474.92	0.030	13.95	0.0	8.589	A
C-AB	2.15	653.52	0.003	2.14	0.0	6.078	A
C-A	154.37			154.37			
A-B	1.66			1.66			
A-C	371.01			371.01			

Main results: (07:30-07:45)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	16.81	454.97	0.037	16.78	0.0	9.037	A
C-AB	2.72	659.06	0.004	2.71	0.0	6.032	A
C-A	184.18			184.18			
A-B	1.98			1.98			
A-C	443.02			443.02			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	20.59	427.23	0.048	20.54	0.1	9.735	A
C-AB	3.60	667.32	0.005	3.59	0.0	5.965	A
C-A	225.31			225.31			
A-B	2.42			2.42			
A-C	542.58			542.58			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	20.59	427.23	0.048	20.59	0.1	9.737	A
C-AB	3.60	667.32	0.005	3.60	0.0	5.965	A
C-A	225.30			225.30			
A-B	2.42			2.42			
A-C	542.58			542.58			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	16.81	454.97	0.037	16.86	0.0	9.041	A
C-AB	2.72	659.06	0.004	2.73	0.0	6.032	A
C-A	184.18			184.18			
A-B	1.98			1.98			
A-C	443.02			443.02			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	14.08	474.92	0.030	14.11	0.0	8.593	A
C-AB	2.16	653.52	0.003	2.16	0.0	6.081	A
C-A	154.36			154.36			
A-B	1.66			1.66			
A-C	371.01			371.01			

Do-Something - 2022, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Do-Something	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1 - untitled	untitled	T-Junction	Two-way	0.19	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Major Arm Geometry

[same as above]

Minor Arm Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
D2	2022	PM	ONE HOUR	16:45	18:15	15

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Stocking Avenue (W)		✓	209.00	100.000
B - Site Access		✓	7.00	100.000
C - Stocking Avenue (E)		✓	490.00	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	0.000	9.000	200.000
	B - Site Access	3.000	0.000	4.000
	C - Stocking Avenue (E)	482.000	8.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	10	10	10
	B - Site Access	10	10	10
	C - Stocking Avenue (E)	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.02	8.41	0.0	A
C-AB	0.02	4.73	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	5.80	515.59	0.011	5.75	0.0	7.767	A
C-AB	11.61	849.65	0.014	11.55	0.0	4.724	A
C-A	394.17			394.17			
A-B	7.45			7.45			
A-C	165.63			165.63			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	6.92	500.51	0.014	6.91	0.0	8.022	A
C-AB	15.26	889.45	0.017	15.24	0.0	4.529	A
C-A	469.29			469.29			
A-B	8.90			8.90			
A-C	197.78			197.78			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	8.48	479.22	0.018	8.46	0.0	8.411	A
C-AB	21.12	942.24	0.022	21.09	0.0	4.298	A
C-A	572.33			572.33			
A-B	10.90			10.90			
A-C	242.22			242.22			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	8.48	479.22	0.018	8.48	0.0	8.412	A
C-AB	21.13	942.26	0.022	21.13	0.0	4.298	A
C-A	572.32			572.32			
A-B	10.90			10.90			
A-C	242.22			242.22			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	6.92	500.51	0.014	6.94	0.0	8.023	A
C-AB	15.28	889.47	0.017	15.31	0.0	4.531	A
C-A	469.27			469.27			
A-B	8.90			8.90			
A-C	197.78			197.78			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	5.80	515.58	0.011	5.81	0.0	7.769	A
C-AB	11.65	849.68	0.014	11.67	0.0	4.727	A
C-A	394.14			394.14			
A-B	7.45			7.45			
A-C	165.63			165.63			

Do-Something - 2027, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Do-Something	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1 - untitled	untitled	T-Junction	Two-way	0.67	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Major Arm Geometry

[same as above]

Minor Arm Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
D3	2027	AM	ONE HOUR	07:15	08:45	15

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Stocking Avenue (W)		✓	492.00	100.000
B - Site Access		✓	41.00	100.000
C - Stocking Avenue (E)		✓	210.00	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	0.000	5.000	487.000
	B - Site Access	21.000	0.000	20.000
	C - Stocking Avenue (E)	204.000	6.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	10	10	10
	B - Site Access	10	10	10
	C - Stocking Avenue (E)	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.12	10.83	0.1	B
C-AB	0.02	6.10	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

Main results: (07:15-07:30)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	33.95	467.50	0.073	33.61	0.1	9.127	A
C-AB	6.62	655.88	0.010	6.57	0.0	6.098	A
C-A	167.29			167.29			
A-B	4.14			4.14			
A-C	403.30			403.30			

Main results: (07:30-07:45)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	40.54	445.60	0.091	40.45	0.1	9.772	A
C-AB	8.41	662.10	0.013	8.40	0.0	6.057	A
C-A	199.25			199.25			
A-B	4.94			4.94			
A-C	481.58			481.58			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	49.66	415.12	0.120	49.50	0.1	10.826	B
C-AB	11.23	671.39	0.017	11.21	0.0	5.997	A
C-A	243.11			243.11			
A-B	6.06			6.06			
A-C	589.82			589.82			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	49.66	415.12	0.120	49.65	0.1	10.835	B
C-AB	11.23	671.40	0.017	11.23	0.0	6.000	A
C-A	243.10			243.10			
A-B	6.06			6.06			
A-C	589.82			589.82			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	40.54	445.60	0.091	40.69	0.1	9.783	A
C-AB	8.42	662.12	0.013	8.44	0.0	6.057	A
C-A	199.24			199.24			
A-B	4.94			4.94			
A-C	481.58			481.58			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	33.95	467.49	0.073	34.05	0.1	9.139	A
C-AB	6.64	655.89	0.010	6.65	0.0	6.098	A
C-A	167.27			167.27			
A-B	4.14			4.14			
A-C	403.30			403.30			

Do-Something - 2027, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Do-Something	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1 - untitled	untitled	T-Junction	Two-way	0.44	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Major Arm Geometry

[same as above]

Minor Arm Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
D4	2027	PM	ONE HOUR	16:45	18:15	15

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Stocking Avenue (W)		✓	240.00	100.000
B - Site Access		✓	17.00	100.000
C - Stocking Avenue (E)		✓	543.00	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	0.000	22.000	218.000
	B - Site Access	8.000	0.000	9.000
	C - Stocking Avenue (E)	524.000	19.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	10	10	10
	B - Site Access	10	10	10
	C - Stocking Avenue (E)	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.05	9.11	0.1	A
C-AB	0.06	4.73	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	14.08	497.86	0.028	13.95	0.0	8.181	A
C-AB	28.84	865.80	0.033	28.64	0.0	4.730	A
C-A	420.84			420.84			
A-B	18.22			18.22			
A-C	180.53			180.53			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	16.81	480.18	0.035	16.78	0.0	8.545	A
C-AB	38.16	908.15	0.042	38.09	0.1	4.551	A
C-A	498.80			498.80			
A-B	21.76			21.76			
A-C	215.58			215.58			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	20.59	455.16	0.045	20.54	0.1	9.110	A
C-AB	59.62	988.09	0.060	59.45	0.1	4.264	A
C-A	598.02			598.02			
A-B	26.64			26.64			
A-C	264.02			264.02			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	20.59	455.14	0.045	20.59	0.1	9.112	A
C-AB	59.68	988.17	0.060	59.67	0.1	4.265	A
C-A	597.96			597.96			
A-B	26.64			26.64			
A-C	264.02			264.02			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	16.81	480.15	0.035	16.86	0.0	8.549	A
C-AB	38.23	908.25	0.042	38.39	0.1	4.555	A
C-A	498.73			498.73			
A-B	21.76			21.76			
A-C	215.58			215.58			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	14.08	497.82	0.028	14.11	0.0	8.188	A
C-AB	28.95	865.88	0.033	29.02	0.0	4.734	A
C-A	420.73			420.73			
A-B	18.22			18.22			
A-C	180.53			180.53			

Do-Something - 2037, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Do-Something	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1 - untitled	untitled	T-Junction	Two-way	0.64	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Major Arm Geometry

[same as above]

Minor Arm Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
D5	2037	AM	ONE HOUR	07:15	08:45	15

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Stocking Avenue (W)		✓	535.00	100.000
B - Site Access		✓	41.00	100.000
C - Stocking Avenue (E)		✓	228.00	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	0.000	5.000	530.000
	B - Site Access	21.000	0.000	20.000
	C - Stocking Avenue (E)	222.000	6.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	10	10	10
	B - Site Access	10	10	10
	C - Stocking Avenue (E)	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.12	11.28	0.2	B
C-AB	0.02	6.08	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

Main results: (07:15-07:30)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	33.95	457.69	0.074	33.60	0.1	9.330	A
C-AB	6.80	658.72	0.010	6.75	0.0	6.073	A
C-A	182.01			182.01			
A-B	4.14			4.14			
A-C	438.91			438.91			

Main results: (07:30-07:45)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	40.54	433.82	0.093	40.44	0.1	10.064	B
C-AB	8.70	665.74	0.013	8.68	0.0	6.026	A
C-A	216.77			216.77			
A-B	4.94			4.94			
A-C	524.11			524.11			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	49.66	400.55	0.124	49.49	0.2	11.275	B
C-AB	11.71	676.20	0.017	11.69	0.0	5.958	A
C-A	264.42			264.42			
A-B	6.06			6.06			
A-C	641.89			641.89			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	49.66	400.55	0.124	49.65	0.2	11.284	B
C-AB	11.72	676.21	0.017	11.72	0.0	5.958	A
C-A	264.42			264.42			
A-B	6.06			6.06			
A-C	641.89			641.89			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	40.54	433.82	0.093	40.70	0.1	10.077	B
C-AB	8.71	665.75	0.013	8.73	0.0	6.029	A
C-A	216.76			216.76			
A-B	4.94			4.94			
A-C	524.11			524.11			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	33.95	457.68	0.074	34.06	0.1	9.351	A
C-AB	6.82	658.73	0.010	6.83	0.0	6.076	A
C-A	182.00			182.00			
A-B	4.14			4.14			
A-C	438.91			438.91			

Do-Something - 2037, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Do-Something	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1 - untitled	untitled	T-Junction	Two-way	0.43	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Major Arm Geometry

[same as above]

Minor Arm Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
D6	2037	PM	ONE HOUR	16:45	18:15	15

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A - Stocking Avenue (W)		✓	259.00	100.000
B - Site Access		✓	17.00	100.000
C - Stocking Avenue (E)		✓	589.00	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	0.000	22.000	237.000
	B - Site Access	8.000	0.000	9.000
	C - Stocking Avenue (E)	570.000	19.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
		A - Stocking Avenue (W)	B - Site Access	C - Stocking Avenue (E)
From	A - Stocking Avenue (W)	10	10	10
	B - Site Access	10	10	10
	C - Stocking Avenue (E)	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.05	9.36	0.1	A
C-AB	0.06	4.63	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	14.08	490.41	0.029	13.95	0.0	8.309	A
C-AB	30.18	885.42	0.034	29.98	0.1	4.629	A
C-A	457.59			457.59			
A-B	18.22			18.22			
A-C	196.27			196.27			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	16.81	471.10	0.036	16.78	0.0	8.716	A
C-AB	44.05	949.19	0.046	43.95	0.1	4.374	A
C-A	538.40			538.40			
A-B	21.76			21.76			
A-C	234.36			234.36			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	20.59	443.67	0.046	20.54	0.1	9.357	A
C-AB	64.31	1018.72	0.063	64.15	0.1	4.150	A
C-A	649.04			649.04			
A-B	26.64			26.64			
A-C	287.04			287.04			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	20.59	443.65	0.046	20.59	0.1	9.359	A
C-AB	64.37	1018.79	0.063	64.37	0.1	4.150	A
C-A	648.98			648.98			
A-B	26.64			26.64			
A-C	287.04			287.04			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	16.81	471.06	0.036	16.86	0.0	8.719	A
C-AB	44.13	949.32	0.046	44.29	0.1	4.378	A
C-A	538.31			538.31			
A-B	21.76			21.76			
A-C	234.36			234.36			

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

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	14.08	490.36	0.029	14.11	0.0	8.315	A
C-AB	30.30	885.52	0.034	30.40	0.1	4.631	A
C-A	457.47			457.47			
A-B	18.22			18.22			
A-C	196.27			196.27			