BY EMAIL AND POST

10th January 2020

Our Ref: C04301

LISBURN & CASTLEREAGH CITY COUNCIL
Local Planning Office
Lagan Valley Island
Island Civic Centre
The Island
Lisburn
BT27 4RL

GRAVIS PLANNING
BELFAST | DUBLIN

Dear Sir/Madam,

Re: Lisburn and Castlereagh City Council Local Development Plan – Response to the Draft Plan Strategy relating to lands located at Old Mill Grove, Dundonald

This letter is submitted on behalf of our client Fraser Houses Ltd and relates to the publication of the Lisburn and Castlereagh City Council draft Plan Strategy, which was launched by the Council on Friday 11th October 2019.

Our client is the landowner of the lands shown in Appendix 1, at Old Mill Grove in Dundonald. The linear 3.5ha site is situated south of the A20 Upper Newtownards Road. The site sits at the edge of the settlement of Dundonald and is close to Dundonald local centre. The site is also easily commutable to Belfast City Centre and other provincial towns such as Newtownards and Bangor.

The site lies within the development limit and is identified as land zoned for housing under designation MCH 03/06 'Land at Millmount, Quarry Corner and Carrowreagh Road'. A road proposal is also designated within BMAP to travel through the site (MCH 14/02 Quarry Corner – Comber Road) which is planned to provide access from the A22 Comber Road to the A20 Upper Newtownards Road transport corridor and the EWAY Rapid Transit Scheme.

However, the Link Road potentially duplicates the planned, and already partially delivered, spine road within the Old Mill Meadow, Coopers Mill and Millmount Village proposals, which, as a condition of planning approval for developments within MCH03, will ultimately provide a continuous route between the A20 with the A22. This will perform the function of a local distributor road.

SYSTRA Ltd, a specialist transport planning consultancy, was commissioned by Fraser Houses to review the 'Quarry Corner to Comber Road link' (MCH14/02) scheme, and to consider whether there is a case for its continued inclusion in the emerging Lisburn and Castlereagh Local Development Plan. The full report is set out in Appendix 2.

The study was informed by a comprehensive series of traffic surveys in the Dundonald Area. The Appraisal found that the purpose of the Link Road scheme has changed significantly since it was originally proposed in the draft BMAP (2004).

The Link Road would have played a clear role in transferring traffic from the A20 corridor to a proposed Park and Ride (P+R) site at Millmount. From here, buses would then continue towards Belfast along the former rail corridor, which would be a dedicated public transport route.

In BMAP (2014), the Link Road scheme now contains no public transport elements and is essentially a road scheme providing access between the A22 Comber Road to the A20 Upper Newtownards corridor. The Millmount P+R has been superseded by the Dundonald Park and Ride site (and associated Glider service), and the former rail corridor has now become the Comber Community Greenway.

The findings of the assessment strongly suggest that the Link Road would have little strategic value and would perform no public transport function. In addition, the Housing Distributor Road through Old Mill Meadow, Coopers Mill and Millmount Village, which is nearly completed, will provide direct access for traffic and bus services between the A22 and A20.

Lisburn and Castlereagh City Council Local Development Plan - Part 1 Plan Strategy

Lisburn and Castlereagh City Council Vision

> **The LDP Vision**
>
> The Local Development Plan (LDP) will respond to the needs of the community in providing a sustainable economy, society and environment. It will support a thriving, vibrant and connected place in which people live, work, visit and invest; and an attractive, green and quality place which will enhance the wellbeing and quality of life for all.

We **support** this vision as it reflects the Council aspirations for the area to have a sustainable economy, society and environment that meets the needs of the community over the plan period. This is an important part of fostering healthy sustainable communities and delivering successful thriving, vibrant and connected places. It also sets out that wellbeing and quality of life is also important, making the Council area a better place in which to live, work, visit and invest over the plan period.

Strategic Objectives

Six plan objectives have been developed to deliver the vision for the Local Development Plan. The six objectives set out the aims of the LDP and what it seeks to achieve over the 15-year plan period. These include an appropriate balance between improving quality of life, economic prosperity for all, the

protection of the Council's environmental assets, and to ensure that development is sustainable in the interests of future generations.

The plan objectives aim to link directly and are implemented through the strategic policies and spatial strategy detailed in Chapter 4 and operational policies contained in Part 2 of the Plan Strategy.

These objectives are:

- A: A Quality Place
- B: A Thriving Place
- C: A Vibrant Place
- D: An Attractive Place
- E: A Green Place
- F: A Connected Place

We are **generally supportive** of these objectives in principle. Although, specifically would like to focus on 'F: A Connected Place'. Within the policy context for this objective, the Belfast Metropolitan Transport Plan (BMTP) is mentioned, which outlines a number of proposals building on the RDS which are suggested to be of particular significance for the next stage of Plan preparation.

Relating to Dundonald, both the Glider (formerly EWAY) which runs east to west and has a terminus in Dundonald Park & Ride and Quarry Corner – Comber Road Non-Strategic Road Scheme is mentioned. The proposed Quarry Corner – Comber Road Non-Strategic Road Scheme traverses through our client's site and is identified within the plan as 'ongoing'. However, this is incorrect, as the road scheme has never come forward since its first inclusion in the 1969 Belfast Transportation Plan and has been held as land reserve for over 50 years with no progress made.

Despite being retained within the Belfast Urban Area Plan 2000 and BMAP (2004 and 2014 iterations), SYSTRA perceives that there are potential limitations of the BMAP Quarry Corner – Comber Road approach:

- It is considered unlikely to significantly reduce traffic congestion on the A20 / A22 corridor between Dundonald and Belfast City Centre;
- It does not appear to serve any obvious public transport function. It previously provided a direct link from the A20 to the Millmount Park and Ride site, which has now been removed from BMAP;
- The Link Road does not provide the most direct route to the Dundonald Park and Ride site from the A22 south. Analysis suggests that using the Link Road would result in journeys approximately 1.3km longer than travelling via the A22 and East Link Road;
- The Link Road potentially duplicates the planned spine road within the Old Mill Meadow, Coopers Mill and Millmount Village proposals, which, as a condition of planning approval for developments within MCH03, would ultimately provide a continuous route between the A20 with the A22. This would perform the function of a local distributor road;
- It is not clear which developments would fund Link Road MCH14/02. The housing developments at Old Mill Meadow, Coopers Mill and Greengraves Meadow have been

completed, and the 293-unit 'Millmount Village' is currently in planning. These sites are described as 'Committed Housing Sites with development ongoing / not started' in BMAP and with no Key Site Requirements or planning conditions relating to the delivery of Link Road MCH14/02.

The Emerging Local Plan to date has not provided any detail on whether the retention of the road proposal is warranted. The Preferred Options Paper (POP) published in March 2017, did not provide further information on MCH 14/02 in terms of purpose, or how it would be funded. It is assumed that the funding position is as set out in BMAP.

The 'Transport Position Paper', one of the supporting documents to POP, states that, *"This non-strategic road scheme provides access from the A22 Comber Road to the A20 Upper Newtownards Road transport corridor and the EWAY Rapid Transit Scheme"*, which again suggests that one of the primary purposes of the road is to provide access to the Dundonald Park and Ride site from the A22.

The Public Consultation Report sets out that for Key Option 22 (Retention of Key Transport Schemes), 5 respondents specifically mentioned the Quarry Corner road scheme. The PCR states that, *"the majority of respondents commented that as this road proposal is unlikely to proceed it should not be retained as a key transport infrastructure scheme"*.

The Key Option 22 Summary notes that;
"We welcome the support for the Preferred Option to retain a number of key transportation infrastructure schemes to enhance accessibility within the area. Any future zonings and their impact on traffic congestion will be considered at the relevant plan-making stage and will be subject to transport assessments to ensure better integration of land use planning and transportation. Key Site Requirements will ensure that the need for travel is reduced, sustainable and active forms of transport are encouraged, existing public transport services are considered and efficient road networks are promoted. The Plan Strategy will be accompanied by a Transport Strategy (being prepared by DfI) which will identify currently protected schemes that are to be retained and rolled forward to the Local Policies Plan".

The above suggests that the DfI ought to have carried out a Strategic Transportation Assessment at this stage to inform what Strategic schemes they need to take forward, however this does not appear to have been carried out and we would recommend the Council to do so to inform the Local Policies Plan.

Both within the Draft Plan Strategy and the supporting Local Transport Study, there are no specific details or justification for the inclusion of the Quarry Corner to Comber Road Link proposal. It is stated on Page 137 of the Draft Plan that *"the detail and provision of schemes will be identified at the Local Policies Plan stage through an integrated Local Transport Plan, as part of the wider updated Belfast Metropolitan Transport Plan (BMTP)"*.

Furthermore, Page 140 of the Draft Plan states that *"The Local Transport Study does not list specific infrastructure schemes. The intention is that this provides more flexibility, with detail of specific*

schemes being identified at the Local Policies Plan stage when land use zonings are identified, thereby integrating land-use proposals and transportation"

As evidenced by Systra's findings, we consider that the Quarry Corner to Comber Road Link proposal to be no longer required and would encourage the Council to remove the proposal at Local Policies Plan stage.

Should the Council retain the proposal at Local Policies Plan, robust justification would be needed for including the proposed road scheme at this stage, given that it has not come forward in over 50 years and that the need for the road proposal is diluted. We consider that there is little justification for its inclusion and suggest that the Council remove the proposal on that basis. Further discussion on the relevant strategic policies are discussed in detail below.

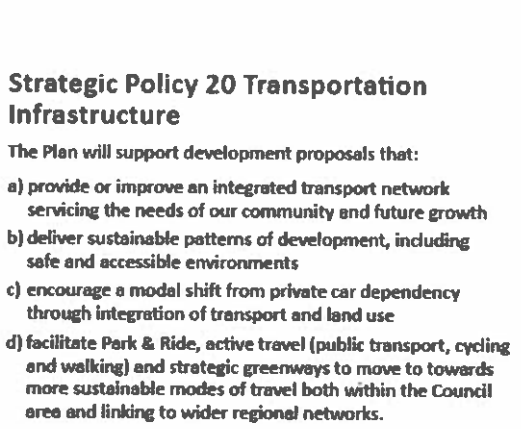
Spatial Strategy

We are **generally supportive** of the Spatial Strategy below, specifically the criterion to support the growth and regeneration of our city, towns and villages, sustaining a living and working countryside and protecting environmentally sensitive areas. However, the role of Greater Urban Area (including Dundonald) should be considered as providing opportunities for housing and employment of an appropriate scale and character. Furthermore, we **support** the shift to more sustainable travel modes and integrated land use proposals in accordance with the regional transportation policy, promoting reduced reliance on the private car.

- *support the growth and regeneration of our city, towns and villages, sustaining a living and working countryside and protecting environmentally sensitive areas*
- *provide a settlement hierarchy, defining development limits and allocating land for housing growth in accordance with the sequential approach of the RDS*
- *encourage good design and positive place-making creating places in which people want to live, work, visit and explore*
- *allocate employment land to provide an adequate and continuous supply, taking account of accessibility to major transport routes and proximity to sustainable locations near large centres of population*
- *identify, define and designate land for retailing, recreation, education or community facilities where appropriate*
- *identify, protect and enhance our historic and natural heritage environment, promote green and blue infrastructure and ecological networks*
- *accommodate sustainable development in the countryside in accordance with prevailing regional planning policy*
- *provide key site requirements where required to achieve good quality development that is reflective of the context within which it is set*

• *promote, influence and deliver a shift to more sustainable travel modes and integrated land use proposals in accordance with the regional transportation policy, promoting reduced reliance on the private car.*

Strategic Policy 20 Transportation Infrastructure



Strategic Policy 20 Transportation Infrastructure

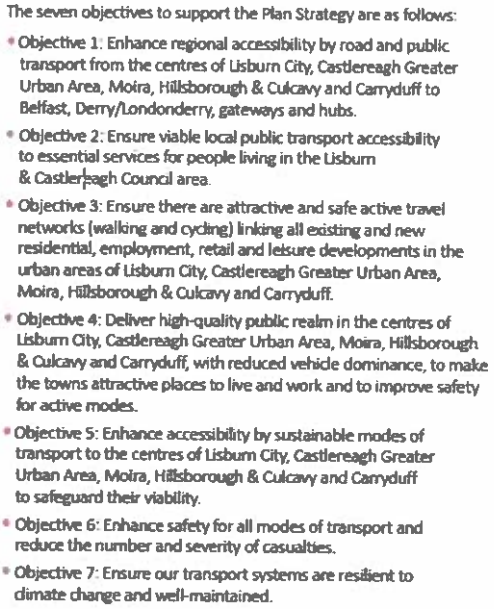
The Plan will support development proposals that:

a) provide or improve an integrated transport network servicing the needs of our community and future growth

b) deliver sustainable patterns of development, including safe and accessible environments

c) encourage a modal shift from private car dependency through integration of transport and land use

d) facilitate Park & Ride, active travel (public transport, cycling and walking) and strategic greenways to move to towards more sustainable modes of travel both within the Council area and linking to wider regional networks.



The seven objectives to support the Plan Strategy are as follows:

- Objective 1: Enhance regional accessibility by road and public transport from the centres of Lisburn City, Castlereagh Greater Urban Area, Moira, Hillsborough & Culcavy and Carryduff to Belfast, Derry/Londonderry, gateways and hubs.
- Objective 2: Ensure viable local public transport accessibility to essential services for people living in the Lisburn & Castlereagh Council area.
- Objective 3: Ensure there are attractive and safe active travel networks (walking and cycling) linking all existing and new residential, employment, retail and leisure developments in the urban areas of Lisburn City, Castlereagh Greater Urban Area, Moira, Hillsborough & Culcavy and Carryduff.
- Objective 4: Deliver high-quality public realm in the centres of Lisburn City, Castlereagh Greater Urban Area, Moira, Hillsborough & Culcavy and Carryduff, with reduced vehicle dominance, to make the towns attractive places to live and work and to improve safety for active modes.
- Objective 5: Enhance accessibility by sustainable modes of transport to the centres of Lisburn City, Castlereagh Greater Urban Area, Moira, Hillsborough & Culcavy and Carryduff to safeguard their viability.
- Objective 6: Enhance safety for all modes of transport and reduce the number and severity of casualties.
- Objective 7: Ensure our transport systems are resilient to climate change and well-maintained.

We are **generally supportive** of the above strategic policy, specifically the need to encourage a modal shift from private car dependency. We consider that on our client's site specifically, given that the need for the Quarry Corner – Comber Road proposal has been diluted, an additional beneficial use of the corridor would be to provide a direct walking and cycling route, ultimately linking into Comber Community Greenway. This is in line with objective 3 seen above within the supporting Technical Supplement 8: Local Transport Study (October 2019).

Lisburn and Castlereagh City Council Local Development Plan - Part 2 Operational Policies

TRA4 Protection for New Transport Schemes

Planning permission will not be granted for development that would prejudice the implementation of a transport scheme identified in the Local Development Plan.

We consider that the Policy TRA4 'Protection for New Transport Schemes' is too ambiguous at this stage, given that we do not yet know what transport schemes are being brought forward as the Local Transport Study does not list specific infrastructure schemes. The intention is that this provides more flexibility, with detail of specific schemes being identified at the Local Policies Plan stage when land use zonings are identified, thereby integrating land-use proposals and transportation.

Should the Quarry Corner - Comber Road proposal be retained as a non-strategic proposal at Local Policies Plan stage, we do not support the above policy.

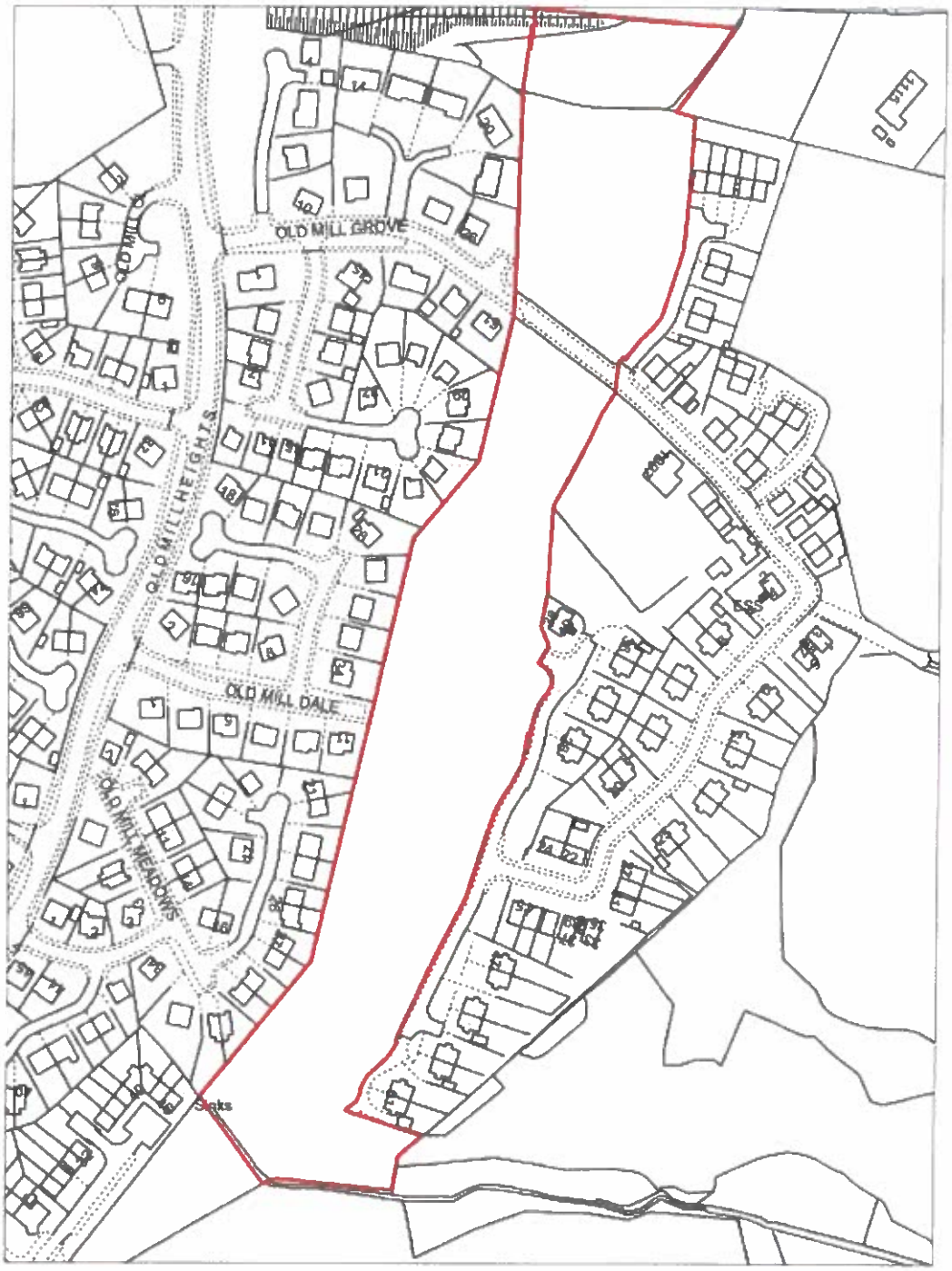
On the above basis, we would encourage the Council to consider the removal of the non-strategic road proposal from the Emerging Local Plan given the arguments set out within the above

representation. The land should be returned to the landowner and progressed in line with its zoning for housing and be redeveloped for that purpose.

We look forward to receiving an acknowledgement of receipt of this submission and engaging further with the Council as preparation of the LDP progresses.

Yours Sincerely,

Appendix 1
Lands in client's ownership


OLD MILL GROVE
OLD MILL HEIGHTS
OLD MILL DALE
OLD MILL MEADOWS
Sikes

Appendix 2
Systra Initial Appraisal: BMAP MCH14/02 - Quarry Corner/Comber

Millmount Development

10/01/2020

Reference number GB01T18G40

BMAP MCH14/02 - QUARRY CORNER TO COMBER ROAD LINK APPRAISAL REPORT

SYSTRA

MILLMOUNT DEVELOPMENT

BMAP MCH14/02 - QUARRY CORNER TO COMBER ROAD LINK APPRAISAL REPORT

IDENTIFICATION TABLE	
Client/Project owner	Fraser Houses (NI) Limited
Project	Millmount Development
Study	BMAP MCH14/02 - Quarry Corner to Comber Road Link Appraisal Report
Type of document	For Issue
Date	10/01/2020
Reference number	GB01T18G40
Number of pages	55

APPROVAL

Version	Name	Position	Date	Modifications
1	Author	Principal	30/05/2019	Client Draft
	Checked by	Principal	04/06/2019	
	Approved by	Director	07/06/2019	
2	Author	Principal	30/05/2019	For Issue
	Checked by	Principal	04/06/2019	
	Approved by	Director	07/06/2019	

SYSTRA

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1. INTRODUCTION

1.1 Client Brief

1.1.1 One of the items for consideration within the emerging Lisburn and Castlereagh Local Development Plan (LDP) is the retention of seven key transportation infrastructure schemes that are proposed in the Belfast Metropolitan Urban Plan (BMAP).

1.1.2 The non-strategic 'Quarry Corner to Comber Road Link' is one of these schemes ('the Link Road'). This road would run to the east of Dundonald and connect the A20 Upper Newtownards Road with the A22 Comber Road. The road would only be accessible from the A20 and A22 and would not provide any local connections.

1.1.3 The road corridor is currently safeguarded against future development. In total, approximately 60 residential units could be constructed on the currently protected alignment in the Millmount area, around 16 of which would be on land owned by Fraser Houses.

1.1.4 Fraser Houses (NI) is one of a number of landowners affected by this situation, and has commissioned SYSTRA to review the planning history and evolution of the proposed scheme, and to consider whether there is a case for its continued inclusion in the emerging Lisburn and Castlereagh Local Development Plan.

1.1.5 The analysis presented in this report makes use of extensive traffic surveys in Dundonald that were commissioned by Fraser Houses in April 2019.

1.2 Transport Infrastructure and Developments

1.2.1 Current transport infrastructure, along with selected existing and planned developments in the Dundonald area is shown in **Figure 1.1**.

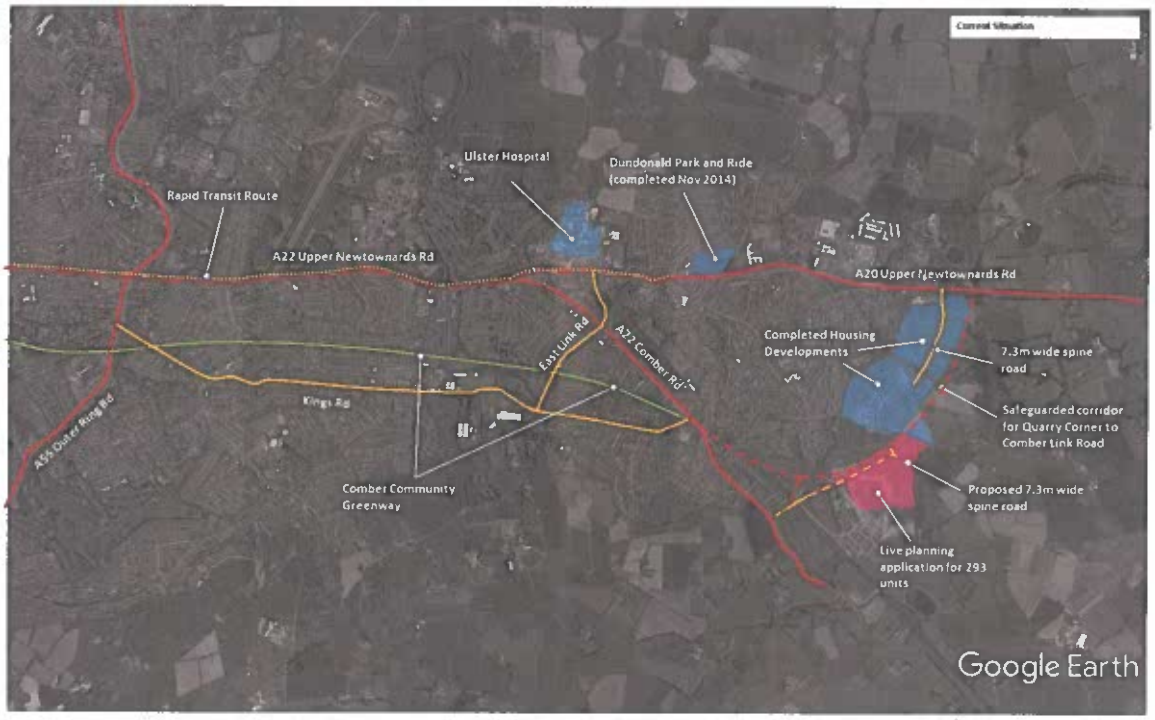


Figure 1.1 : Current Transport Infrastructure

1.2.2 The main elements shown in Figure 1.1 are:

- The A20 and A22 'Protected Routes' which provide the main strategic links into Belfast city centre.
- The 520-space Dundonald Park and Ride, which opened in November 2014. Glider Services operate from the facility along the Rapid Transit Route which provides bus priority in both directions along Upper Newtownards Road.
- The designated Comber Community Greenway which follows the former Comber Rail Corridor, and provides an off-road route for pedestrians and cyclists.
- The proposed safeguarded corridor for the Quarry Corner to Comber Road non-strategic Link Road.
- The completed housing developments at Old Mill Meadow, Coopers Mill and Greengraves Meadow, which contain sections of a 7.3m housing distributor road (and bus route) which through a planning obligation would ultimately connect the A20 with the A22.
- The live Millmount Village planning application for 293 units (Ref: LA05/2018/0512/F).

1.3 Report Structure

1.3.1 This report is structured as follows:

- Section 2 sets out the Planning History of the Link Road
- Sections 3 and 4 discuss traffic surveys undertaken in April 2018 to support this study
- Section 5 presents an appraisal of the planning and technical case for the Link Road
- Section 6 presents the conclusions from the study.

2. PLANNING HISTORY

2.1 Overview

2.1.1 This section provides an overview of the various transport schemes that have been proposed in the Dundonald area, as set out in National and Local policies and plans.

2.2 Belfast Urban Area Plan 2001

2.2.1 The Belfast Urban Area Plan 2001 (BUAP) was adopted in 1991. It proposed a new Strategic Road that would pass to the east and south of Dundonald to link into the A22 Comber Road, and also provide a direct road route into Belfast City Centre, via the former Comber Rail Link corridor.

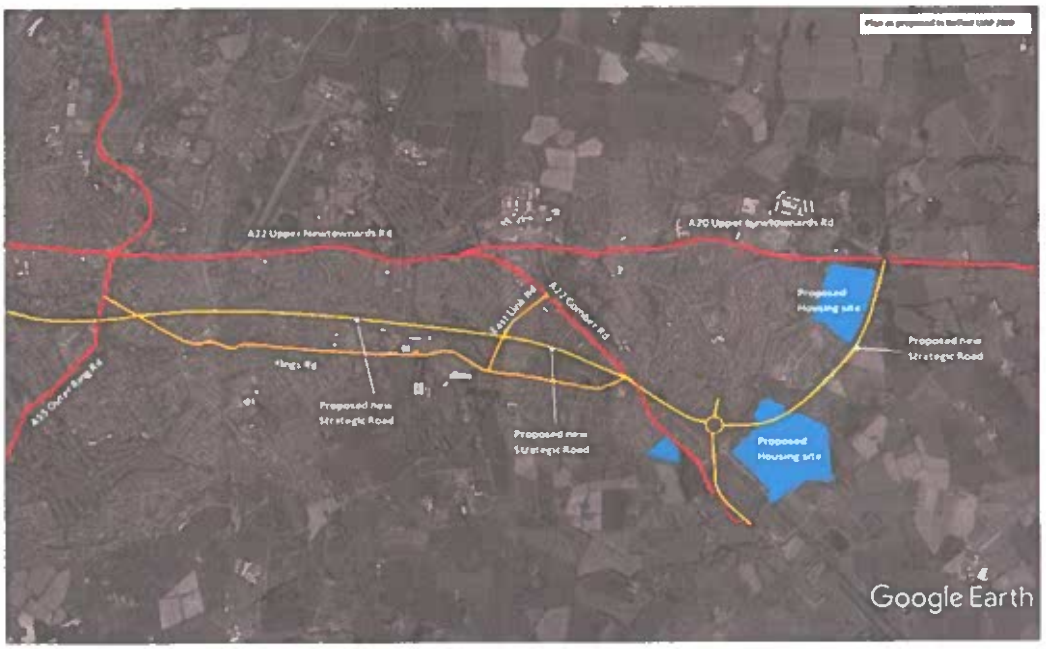


Figure 2.1 : BUAP 2001 Proposals

2.2.2 The proposed Strategic Road would have been funded by Central Government. If constructed to dual carriageway standard, it would have provided a significant capacity upgrade to east-west movements into and out of Belfast city centre and significant traffic relief through Dundonald.

2.2.3 SYSTRA perceives the following benefits of the Strategic Road scheme, based on the proposals as set out in BUAP:

- To remove traffic from the A20 and A22 Upper Newtownards Road, reducing traffic congestion, particularly in the centre of Dundonald.
- To improve journey times between Newtownards, Dundonald and Belfast city centre.
- To support proposed development in the east of Dundonald and in the Newtownards area.

- To provide a strategic route between the A20 and A22, reducing the use of local roads in central and south Dundonald.

2.2.4 As with many proposed schemes of this period, the proposed strategic road reflects the 'predict and provide' approach to road traffic demand, and attempted to provide additional capacity to cope with future traffic demand. No complementary public transport measures, which would seek to reduce demand for private vehicles, accompanied the proposals.

2.3 Draft Belfast Metropolitan Area Plan (BMAP) 2015

2.3.1 The Draft Belfast Metropolitan Area Plan 2015 (BMAP) was published for consultation in 2006. The plan was supported by a new transport plan (Belfast Metropolitan Transport Plan – BMTP) which reflected the then regional transport strategy of seeking to minimise car use and provide appropriate sustainable travel alternatives. In Dundonald BMAP retained elements of the proposed BUAP Strategic Road, and combined this with significant public transport initiatives.

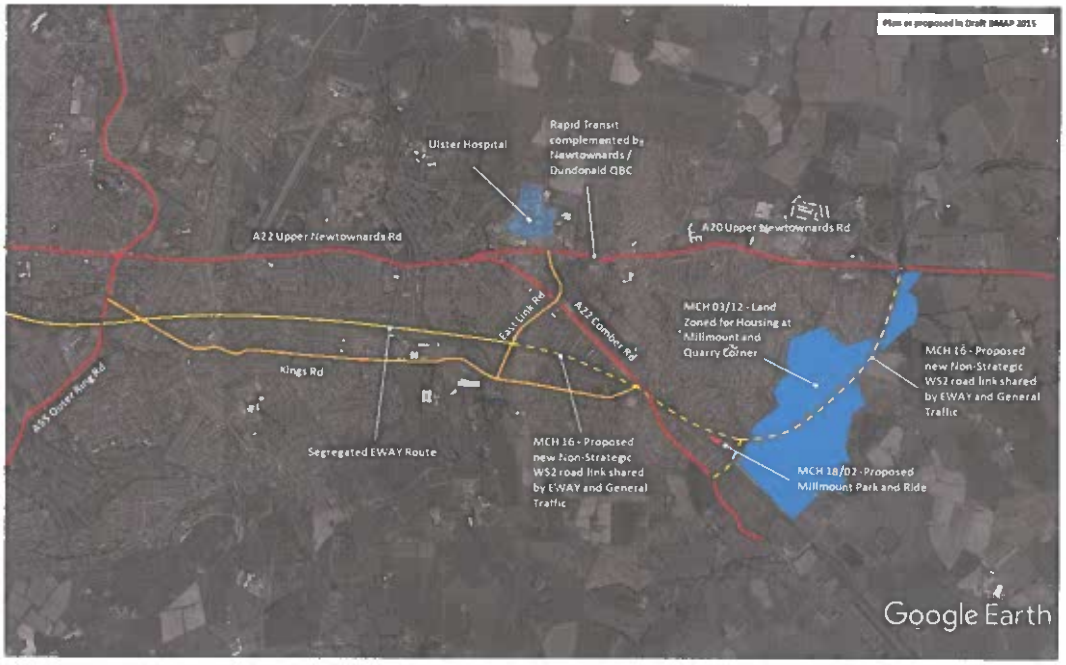


Figure 2.2 : Draft BMAP 2015 Proposals

2.3.2 The main elements of the Draft BMAP proposals shown in **Figure 2.2** are:

- A new non-strategic wide single carriageway road round the east and south of Dundonald, linking into the A22 and East Link Road. This link road would be shared by EWAY services and general traffic. Beyond East Link Road the former rail corridor would become a segregated public transport route for the EWAY service only.
- Construction of a Park-and-Ride at Millmount, along with conversion of the former Comber Rail Corridor to provide a segregated EWAY public transport route. EWAY services would run east and west from the Park and Ride.
- A complementary Quality Bus Corridor to improve bus services on the A20 / A22 Upper Newtownards Road as set out in Policy MCH 18.

2.3.3 For information, EWAY refers to the proposed high-quality public transport proposal through this transport corridor. While EWAY is now recognised as the Belfast Glider, in the Belfast Metropolitan Transport Plan the form of the service had not been defined, and could have been delivered as a tram, road train or (as constructed) a bus rapid transit system.

2.3.4 The Belfast Metropolitan Transport Plan (BMTP), on which the transport interventions in the Draft BMAP are based, states that the Quarry Corner to Comber Road Link Road would be provided in conjunction with the EWAY rapid transit scheme (i.e. centrally funded).

2.3.5 The BMTP states that for the majority of non-strategic schemes "*The implementation of the (non-strategic) schemes, **other than those in Belfast city centre and Dundonald**) will be developer led with funding at the appropriate level. Developers will be responsible for funding the scheme either in full or in a very substantial part. The Department's priority for funding will be concentrated on the construction of major capital works schemes on the Strategic Network. Any contribution towards developer-led schemes will be subject to detailed economic appraisal, the availability of funding and inclusion within the Major Works Programme*".

2.3.6 The Draft BMAP zoned 91.60 hectares of land at Millmount and Quarry Corner for a maximum of 1,080 housing units. One of the 'Key Site Requirements' required a Concept Masterplan to be produced. This would include:

- The land corridor required for the proposed MCH 16 non-strategic road scheme.
- No direct access from the housing to the MCH 16 scheme.
- Construction of a housing distributor road through the site from Old Mill Heights to Millmount Link Road.
- Construction of the Link Road between Comber Road and the proposed roundabout associated with the Park and Ride access.

2.3.7 The proposed EWAY / non-strategic link road proposals provided a coherent scheme to address transport challenges in the A20 and A22 corridors.

2.3.8 The proposed non-strategic road would provide a wide single carriageway, providing additional capacity. It would have fulfilled the twin purposes of providing a direct route for EWAY services between the A20 and the former Comber Rail Corridor, and providing access for general traffic to the proposed Millmount Park and Ride site.

2.3.9 The Millmount Park and Ride and EWAY service would have significantly increased public transport capacity between Newtownards, Dundonald and Belfast city centre, whilst removing car-based trips from the road network.

2.3.10 SYSTRA perceives that the Draft BMAP scheme would have provided the following benefits:

- A coherent multi-modal transport strategy to provide enhanced public transport capacity and reduce traffic congestion.
- To provide a direct, (partially) segregated public transport route between Newtownards, Dundonald and Belfast city centre.
- Provision of a direct transport route between the A20 and the proposed Millmount Park and Ride site to intercept and reduce car trips to and from the city.

- To remove traffic (via the P+R) from the A20 Upper Newtownards Road, reducing traffic congestion, particularly in the centre of Dundonald.
- To provide an alternative route between A22 Comber Road and A20 Upper Newtownards Road.
- To provide an alternative route from A20 Upper Newtownards Road to the south-west of Dundonald.

2.3.11 It appears that a grade-separated crossing of the A22 was proposed, at the point where the route would have continued west towards the East Link Road.

2.4 Belfast Metropolitan Area Plan 2015 (BMAP)

2.4.1 The Belfast Metropolitan Area Plan 2015 (BMAP) was adopted in 2014, but this status was withdrawn following a ruling by the Court of Appeal in 2017.

2.4.2 The main change to transport proposals between the Draft and, later withdrawn, 'Final' BMAP documents is the removal of the proposed Millmount Park-and-Ride and associated EWAY scheme. In the interim period, this had been superseded by the emergence of the Dundonald Park and Ride site, and commencement of the Bus Rapid Transit Route on the A22 between this site and Belfast city centre.

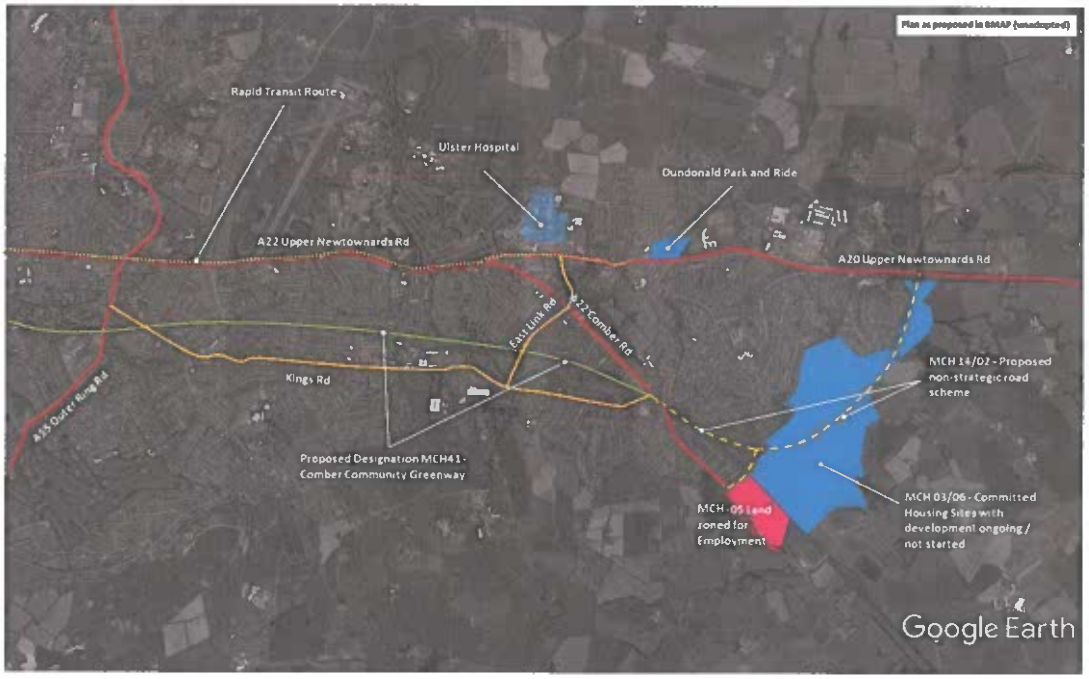


Figure 2.3 : BMAP 2015 Proposals

2.4.3 The main elements of the BMAP proposals shown in **Figure 2.3** are:

- Retention of the proposed non-strategic road scheme round the east and south of Dundonald, linking into the A22. This would now be designed to serve general traffic, and terminate at A22 Comber Road rather than at the East Link Road.

- Designation of the former Comber Rail Corridor as a Community Greenway for pedestrians and cyclists.

2.4.4 BMAP states that "*The Quarry Corner to Comber Road non-strategic road scheme provides access from the A22 Comber Road to the A20 Upper Newtownards Road transport corridor and the EWAY Rapid Transit Scheme – now proposed to be road based*".

2.4.5 SYSTRA suggests that the purpose of the road scheme has changed significantly from earlier proposals and has two main purposes:

- To link the A22 and A20, catering for demand between the east and south of Dundonald.
- To provide access from the A22 to the Dundonald Park and Ride site.

2.4.6 BMAP states that, "*Developers will be responsible for funding MCH 14/02 either in full or in a substantial part. DRD's priority for funding will be concentrated on the construction of major capital work schemes on the Strategic Road Network. Any contribution towards developer-led schemes will be subject to detailed economic appraisal, the availability of funding and inclusion within the major works programme*".

2.4.7 BMAP does not state which developments will be considered responsible for funding MCH14/02. The housing developments at Millmount and Quarry Corner (MCH 03) are described as 'Committed Housing Sites' where development is either ongoing or not started. As such BMAP does not stipulate further Key Site Requirements. Site MCH 03 is not required to contribute to funding the route.

2.4.8 SYSTRA perceives that the Link Road could provide the following benefits:

- The provision of a wide single lane in either direction, providing additional road capacity between the A22 and A20 transport corridors to the south and east of Dundonald.
- The new link road potentially creates a partial bypass around congestion hot-spots in central Dundonald. This could result in a reduction in existing traffic movements and congestion within the Dundonald urban area as trips between the A22 and A20 reassign onto the non-strategic road.
- It provides a potential route to the Dundonald Park and Ride site, and other locations in central Dundonald, from the A22.
- To provide an alternative route from A20 Upper Newtownards Road to the south-west of Dundonald.

2.4.9 It appears that an at-grade-junction would now be requried where the route meets the A22. This would prevents challenges in terms of junction design, with noticeable level differences between the new road and A22 Comber Road, and the need to accommodate vehicle movements from five roads.

2.5 Lisburn and Castlereagh Local Development Plan

2.5.1 Lisburn and Castlereagh Council published its Local Development Plan (LDP) Preferred Options Paper (POP) in March 2017.

2.5.2 As set out in the Council's Statement of Community Involvement (SCI)1 the purpose of the Preferred Options Paper is to outline the key planning issues affecting the Council area and identify the options available to address them.

2.5.3 Its purpose is to stimulate debate and receive feedback on issues of strategic significance which are likely to influence the shape of future development in the Council area and identify the Council's preferred option.

2.5.4 No final decisions have been made by the Council at this stage. The debate and feedback will inform the Local Development Plan (LDP).

2.5.5 The proposals in the Dundonald area are set out in **Figure 2.4**.

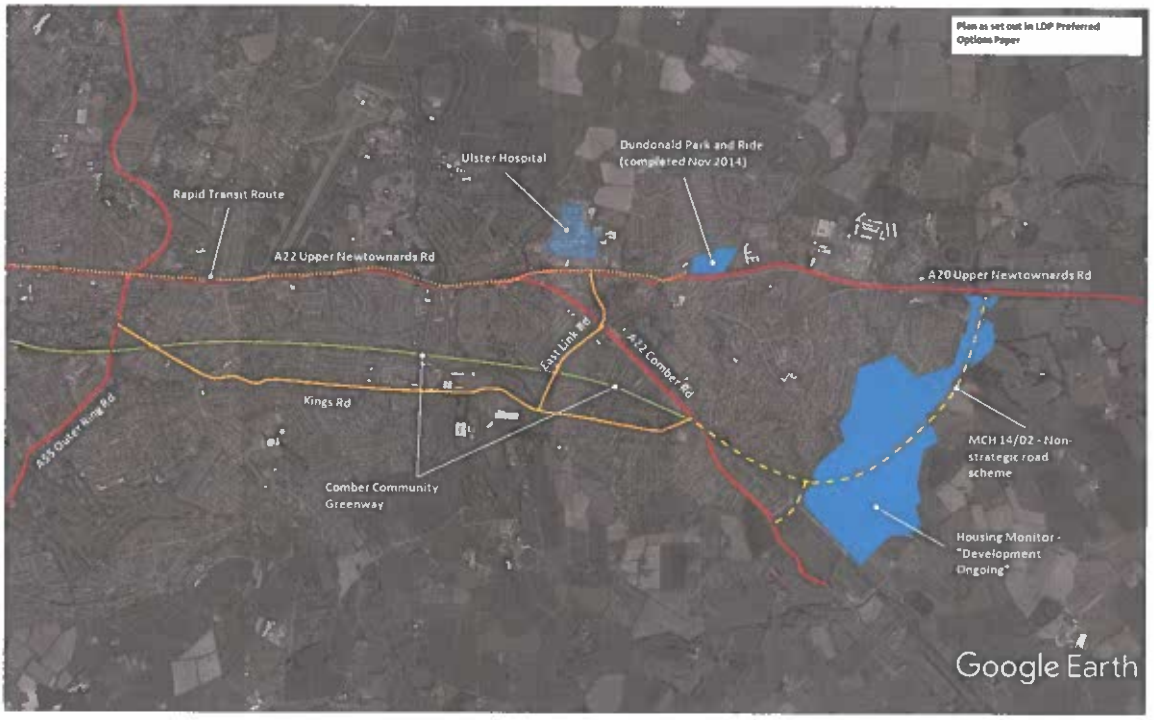


Figure 2.4 : Lisburn and Castlereagh LDP Preferred Options Paper Proposals

2.5.6 The POP invites comments on the retention of seven key transportation infrastructure schemes set out in the Belfast Metropolitan Urban Plan (BMAP). The non-strategic 'Quarry Corner to Comber Road Link', which would connect the A20 Upper Newtownards Road with the A22 Comber Road, is one of these schemes.

2.5.7 There are no further sustainable or public transport interventions proposed in the Dundonald area beyond the operational Park and Ride site, associated Rapid Transit Route and existing Comber Community Greenway.

2.5.8 The perceived benefits of the scheme are as per the BMAP scheme set out in **Section 2.3.**

2.5.9 The POP does not provide further information on MCH 14/02 in terms of purpose, or how it would be funded. It is assumed that the funding position will be as set out in BMAP.

2.5.10 The 'Transport Position Paper', one of the supporting documents to POP, states that, "*This non-strategic road scheme provides access from the A22 Comber Road to the A20 Upper Newtownards Road transport corridor and the EWAY Rapid Transit Scheme*", which again suggests that one of the primary purposes of the road is to provide access to the Dundonald Park and Ride site from the A22.

2.5.11 A subsequent LDP Public Consultation Report (PCR) was published in September 2017 which reported back on the findings of this consultation exercise

2.5.12 The PCR noted that for Key Option 22 (Retention of Key Transport Schemes), 5 respondents specifically mentioned the Quarry Corner road scheme. The PCR states that, "*the majority of respondents commented that as this road proposal is unlikely to proceed it should not be retained as a key transport infrastructure scheme*".

The PCR states that, "*The Plan Strategy will be accompanied by a Transport Strategy (being prepared by DfI) which will identify currently protected schemes that are to be retained and rolled forward to the Local Policies Plan*".

2.5.13 The above suggests that the DfI will look at the justification for the inclusion of the Quarry Corner to Comber Road Link as part of the Plan Strategy process, which is indicatively programmed to conclude in 2022 Q1.

2.6 Conclusions

2.6.1 The form and function of the Link Road scheme has changed considerably from the proposal originally set out in BUAP 2001, as summarised below:

- **Belfast Urban Area Plan 2001** – Part of a proposed Strategic Road scheme funded by Central Government, that would have provided a new road corridor between Dundonald and Belfast. No Public Transport or sustainable travel elements.

- **Draft BMAP 2015** – A proposed new Non-Strategic WS2 Link Road providing access for EWAY services and general traffic between the A20, Millmount Park and Ride, and then beyond to the A22 and East Link Road.

  Beyond the East Link Road, the EWAY only would travel along the former rail corridor towards the city centre.

- **BMAP 2015** – Retained as a Non-Strategic Road Scheme but limited to connection between A20 and A22 and with EWAY/Millmount P+R now superseded by Dundonald P+R. Former rail corridor now designated as Comber Community Greenway.

- **Lisburn and Castlereagh LDP** – One of seven road schemes set out within BMAP 2015 whose retention is being considered as part of the LDP process, but in the initial consultation the majority of respondents who commented on the scheme stated that it should not be retained.

2.6.2 In SYSTRA's opinion, the proposed scheme as set out in draft BMAP represented a coherent multi-modal scheme that would have enhanced public transport capacity and reduced traffic congestion. The Link Road played a clear role in transferring traffic from the A20 corridor onto public transport services.

2.6.3 In the intervening period, the introduction of the Dundonald P+R (and public transport improvements on the A20 corridor) as a replacement for the proposed Millmount P+R, has removed any public transport elements from the Link Road scheme. The development of the Comber Community Greenway in the former rail corridor has curtailed the possibility of future public transport services along this route and also means that, if constructed, the Link Road will feed traffic back onto A22 Comber Road. While this is considered likely to displace traffic within the Dundonald urban area it will not provide an opportunity for overall traffic relief or reduce congestion.

2.6.4 In its current form, the Link Road proposal would therefore seem to be an isolated part of a previous larger and coherent solution, where the other elements – the Comber Community Greenway, the Dundonald Park and Ride, and Glider services on the A20 corridor – have evolved in the interim. This leaves the shortened road link with limited purpose or function.

3. TRAFFIC SURVEY DATA COLLECTION

3.1 Introduction

3.1.1 In order to establish current traffic conditions in the Dundonald area, a comprehensive series of traffic surveys was undertaken in April 2019. The Glider bus system was operational at the time of survey.

3.1.2 The traffic surveys have been undertaken by MHC Traffic Surveys Ltd, a professional traffic data collection company that was established in 2000. All surveys were recorded on high-definition HD cameras, and have been quality checked using MHC's internal quality management systems and guidelines.

3.2 Aims

3.2.1 The aims of the surveys were to:

- Assess current strategic travel demands between key locations on the strategic and local road networks.
- Provide an indication of current journey times and levels of congestion on the A20 and A22 corridors.
- Provide turn count and queue length information at selected key junctions on the local and strategic road network.
- Focus on traffic movements which were likely to benefit from the new link.

3.3 Date and Time

3.3.1 The surveys were undertaken on Thursday 11th April 2019, a neutral weekday outside of school holiday periods. The following time periods were surveyed:

- AM Peak – 06:30-09:30
- PM Peak – 16:00-19:00

3.3.2 The following peak hours were identified:

- AM Peak hour – 07:45-08:45
- PM Peak – 16:15-17:15

3.4 Format

3.4.1 The surveys comprised:

- Junction Turning Count (JTC) and queue length surveys at six locations; and
- Automatic Number Plate Recognition (ANPR) cameras (two-way) at five locations.

3.4.2 The survey locations are shown in **Figure 3.1**

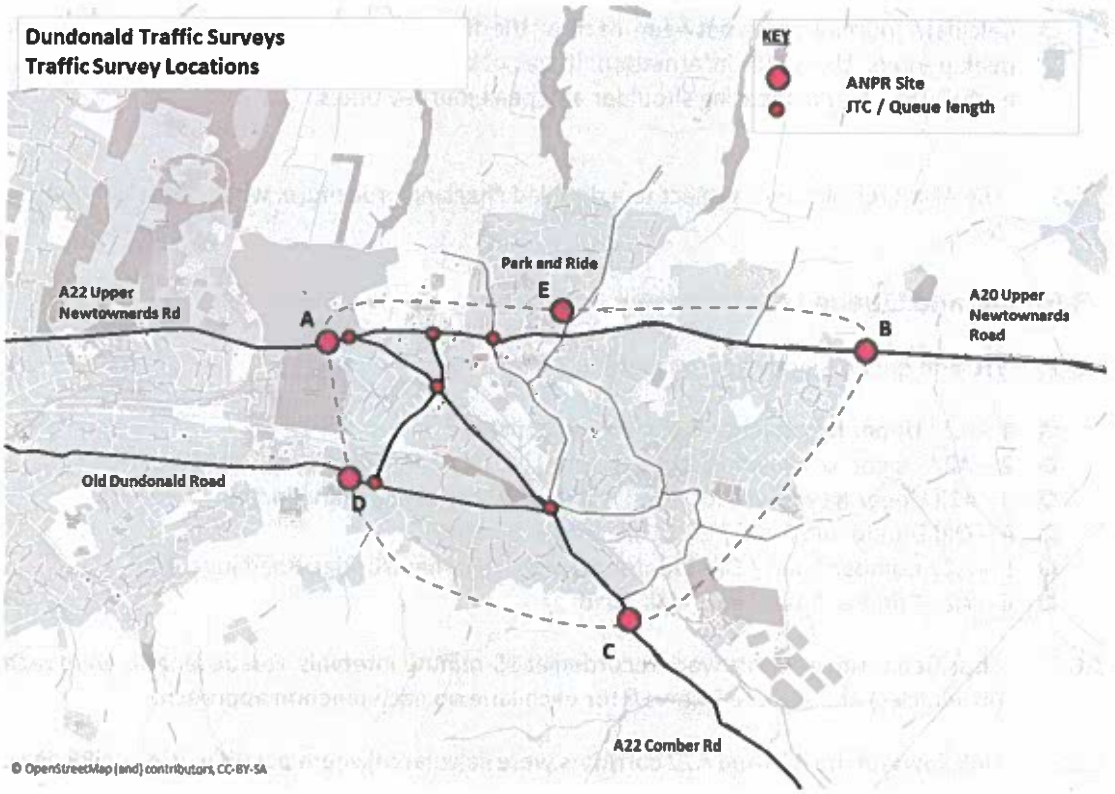


Figure 3.1 : Traffic survey locations

3.5 ANPR Survey Points

3.5.1 ANPR cameras were located at the following points on the network, and captured traffic flows in both directions:

- A – A22 Upper Newtownards Road to the west of the A22 / A20 junction
- B – A20 Upper Newtownards Road to the east of Belfast Road
- C – A22 Comber Road to the south of Millmount Road
- D – Old Dundonald Road to the west of East Link Road
- E – Dundonald Park and Ride

3.5.2 The ANPR cameras were positioned to capture flows on the main routes into and through Dundonald. Although positioned with the aim of forming a strategic cordon, it is recognised that there are a number of other routes which traffic can enter and leave the study area.

3.5.3 The ANPR cameras recorded the time and location of 'matched' number-plates at different points on the network throughout the survey periods. This allowed the volume and split of strategic flows between each point to be calculated, along with journey times during quieter and busier periods.

3.5.4 ANPR data was used to:

- Establish Origin-Destination demands between each of the five ANPR locations in the AM and PM peak periods; and
- Calculate journey times between each of the five ANPR points throughout the AM and PM peak periods. Using this information, it was possible to estimate the level of traffic delay for each O-D pair by comparing shoulder and peak journey times.

3.5.5 The ANPR results were subject to a detailed checking procedure, which is set out in **Appendix A.**

3.6 JTC and Queue Length survey locations

3.6.1 JTC and queue length surveys were undertaken at:

- 1 – A22 Upper Newtownards Road / A20 junction
- 2 – A22 Upper Newtownards Road / East Link Road / Ulster Royal junction
- 3 - A22 Upper Newtownards Road / Church Road / Ballyregan junction
- 4 – Old Dundonald Road / East Link Road junction
- 5 – A22 Comber Road / Old Dundonald Road / Grahamsbridge Road junctions
- 6 – A22 Comber Road / East Link Road

3.6.2 Classified turning counts were recorded at 15-minute intervals. Queue lengths were recorded (in vehicles) at 5-minute intervals for each lane on each junction approach.

3.6.3 Link flows on the A20 and A22 corridors were calculated where possible using ANPR link count data and from JTC counts.

4. SURVEY RESULTS

4.1 JTC data

4.1.1 Turning Count diagrams for the following scenarios are presented in **Appendix B**:

- A1 - AM Peak hour turning counts (07:45-08:45)
- A2 - AM Peak hour turning proportions (07:45-08:45)
- A3 - AM Peak 3hr turning counts (06:30 - 09:30)
- A4 - PM Peak hour turning counts (16:15-17:15)
- A5 - PM Peak hour turning proportions (16:15-17:15)
- A6 - PM Peak 3hr turning counts (16:00-19:00)

The turning count diagrams also include a matrix of matched vehicles between each ANPR point, for both the peak hour and three-hour survey periods.

4.2 Queue Length data

4.2.1 Queue length graphs for each junction, showing the maximum recorded queue length on each approach arm for each five-minute period are provided in **Appendix C**.

4.3 Link Count data

4.3.1 Link Count data for the AM peak hour is presented in **Figure 4.1** below, and presented in **Appendix B**.

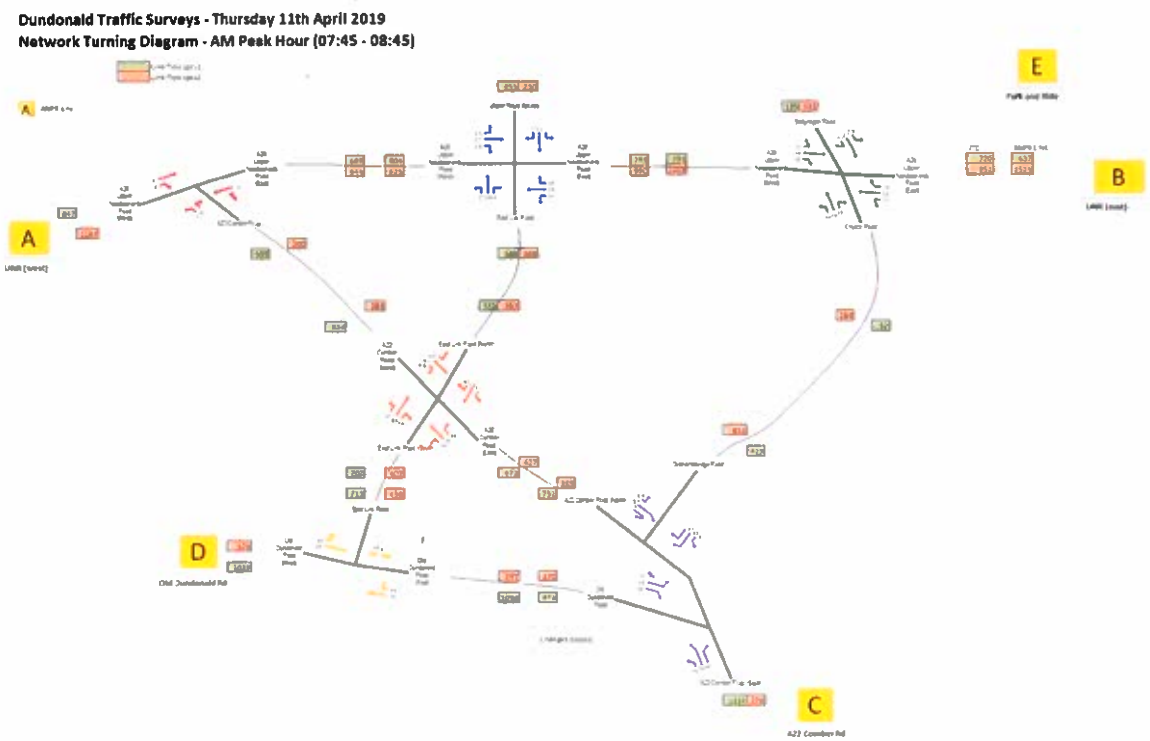


Figure 4.1 : Observed Link Flows AM Peak hour (07:45 – 08:45)

4.3.2 **Figure 4.1** shows that:

- 673 pcu left the westbound A20 between the ANPR site and the Ballyregan Road junction, a distance of 2km. The main intervening junctions are Craigleith Drive, Carrowreagh Road and Dunlady Road / Robbs Road. Potential destinations on the A20 prior to Ballyregan Road include Dundonald High School, the Dundonald Industrial Estate and Carrowreagh Business Park.
- Traffic flows on the A20 within Dundonald fluctuate between the major junctions, and are highest between Ballyregan road and the East Link Road. There is a noticeable tidal flow wards Belfast city centre in the AM peak.
- 1237 pcu arrive northbound on A22 Comber Road, of which around half continues northbound on the A22. Northbound flows on the A22 reduce between Grahamsbridge Road, East Link Road and the A20 junction.
- 562 westbound pcu join Old Dundonald Road between Comber Road and the East Link Road, which are likely to be from either at Gransha Road or Ballyhanwood Road.
- There are significant flows on East Link Road and on the south section Grahamsbridge Road.
- Changes in observed flows between adjacent junctions suggests that a significant number of trips originate and destinate with Dundonald.

4.3.3 Link Count data for the PM peak hour is presented in **Figure 4.2** below.

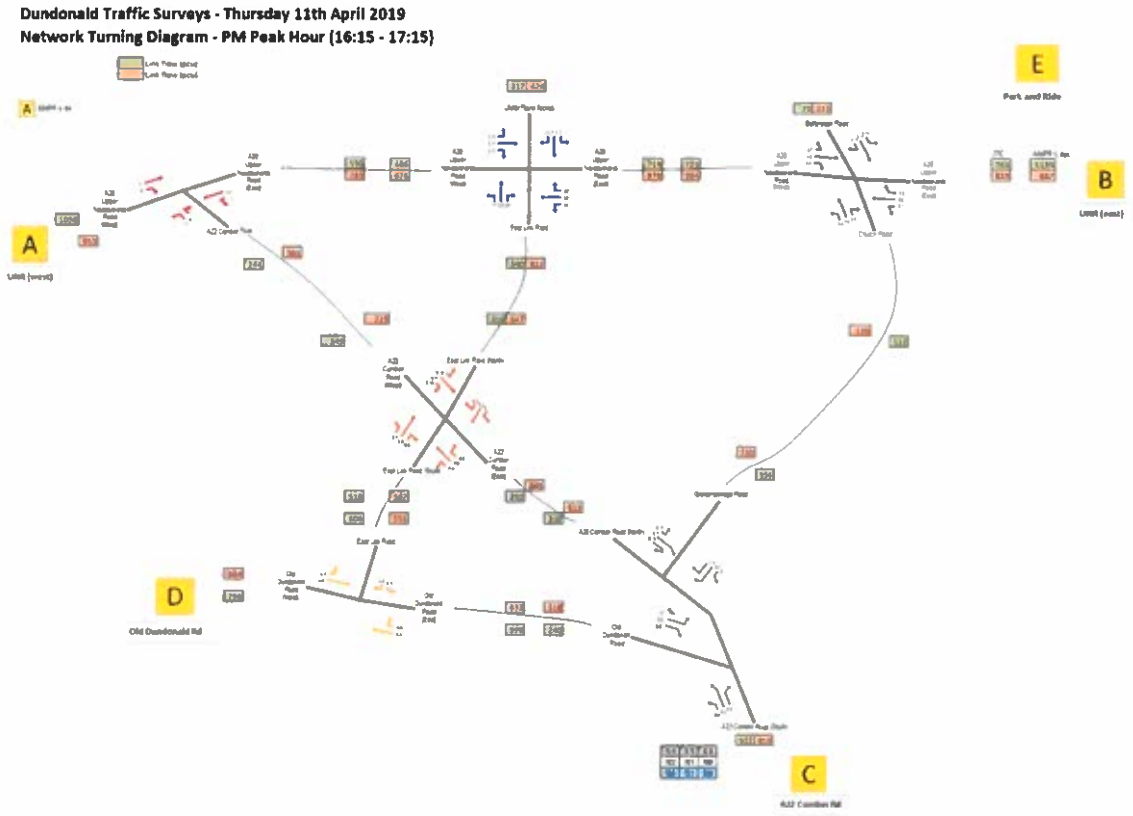


Figure 4.2 : Observed Link Flows AM Peak hour (16:15 – 17:15)

4.3.4 **Figure 4.2** shows that:

- 374 pcu joined the eastbound A20 between the Ballyregan Road junction and the ANPR site, a distance of 2km. This is a reversed pattern from the AM peak hour, showing that traffic joins from minor roads between the two surveyed locations.
- Traffic flows on the A20 within Dundonald fluctuate between the major junctions, and is highest between Ballyregan road and the East Link Road.
- There is a not a particularly noticeable tidal flow away from Belfast city centre in the PM peak along the A20, but the A22 does exhibit much higher southbound flows compared to northbound traffic, typically in the range of 700-900 pcu in the peak hour.
- There are significant flows on Old Dundonald Road, East Link Road and on the south section Grahamsbridge Road.
- 673 pcu join Old Dundonald Road between Comber Road and the East Link Road, which are likely to be from either at Gransha Road or Ballyhanwood Road.
- Changes in observed flows between the south side of Grahamsbridge Road and Church Road suggest traffic originating and destinating in Dundonald.

4.4 ANPR Origin-Destination results

4.4.1 Origin-Destination flows for the identified peak hours, as well as the three-hour peak survey periods, were calculated from the received survey data. These have been factored to match the observed link flows at each location, using the factors shown in **Appendix A**. The ANPR O-D matrix for the AM peak hour is presented in **Table 1** below[1].

Table 1. ANPR O-D matrix (AM peak period 06:30-09:30)

	A	B	C	D	E	Other	TOTAL
A - A20 west		442	158	42	33	1486	**2160**
B - A20 east	1018		2	373	247	1948	**3588**
C - A22 Comber Rd	765	7		494	55	934	**2256**
D - ODR	31	96	59		7	1080	**1274**
E - P+R	38	8	2	4		71	**123**
Other	1225	786	397	1574	205		**4188**
TOTAL	**3078**	**1340**	**618**	**2486**	**548**	**5519**	**13589**

4.4.2 The ANPR O-D matrix for the PM peak period is presented in **Table 2** below.

Table 2. ANPR O-D matrix (PM peak period 16:00-19:00)

	A	B	C	D	E	Other	TOTAL
A - A20 west		692	750	61	7	1389	**2899**
B - A20 east	628		12	316	16	931	**1904**
C - A22 Comber Rd	272	16		300	5	609	**1203**
D - ODR	62	365	231		1	1999	**2659**
E - P+R	54	183	43	19		259	**558**
Other	1518	1835	1123	1543	48		**6067**
TOTAL	**2534**	**3091**	**2159**	**2241**	**78**	**5187**	**15290**

4.4.3 Full O-D matrices are presented in **Appendix D**, and shown graphically in the series of figures in **Appendix E**. Selected key movements are presented and discussed in the section below.

AM Peak Period

4.4.4 **Figure 4.1** shows the destination of recorded matched vehicles from Site B in the AM period.

[1] Trips originating from and destinating in the same location (i.e. the diagonals in Tables 1 and 2) have been included in the 'Other' column. These represent vehicles that enter the cordon and then return via the same route. Such trips are typically related to shopping trips, or the school run.

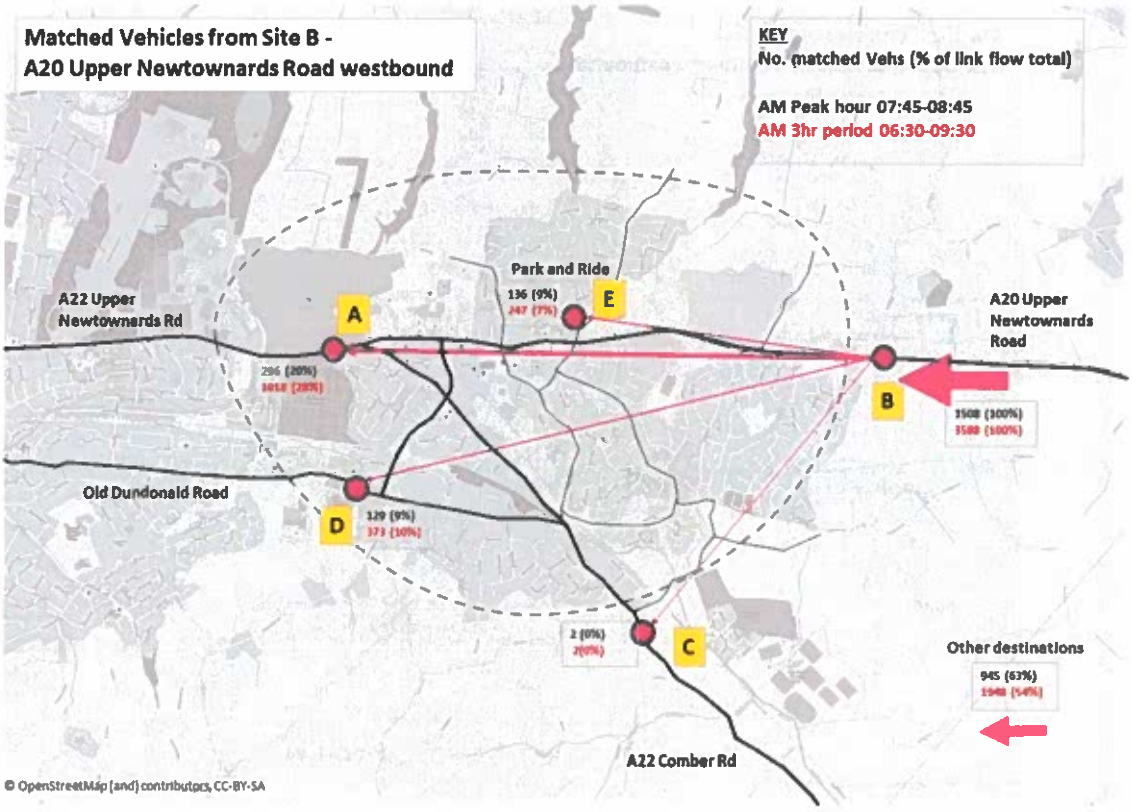


Figure 4.3 : Recorded ANPR matches from Site B - A20 Upper Newtownards Road (east), AM period

4.4.5 **Figure 4.3** shows that 296 vehicles, 20% of westbound traffic recorded at Site B in the AM peak hour travels from east to west to Site A, with 129 vehicles, 9%, travelling to Site D. 136 vehicles, from Site B travel to Site E, the Park and Ride site.

4.4.6 945 vehicles, 63% of westbound vehicles recorded at Site B, ended within, or left the cordon at sites that were not surveyed. As previously discussed, a relatively large volume of westbound traffic leaves the A20 in the AM peak, or does not make it as far as Ballyregan Road before stopping. The main potential locations for this traffic to leave the A22 are at Carrowreagh Road, Old Mill Meadows, Craigleith Drive, or at the Dunlady Road / Robbs Road junction, none of which were included in this particular survey.

4.4.7 Only 2 vehicles were recorded travelling between Site B and Site C, A22 Comber Road.

4.4.8 **Figure 4.4** shows the origin of recorded westbound vehicles at Site A in the AM period.

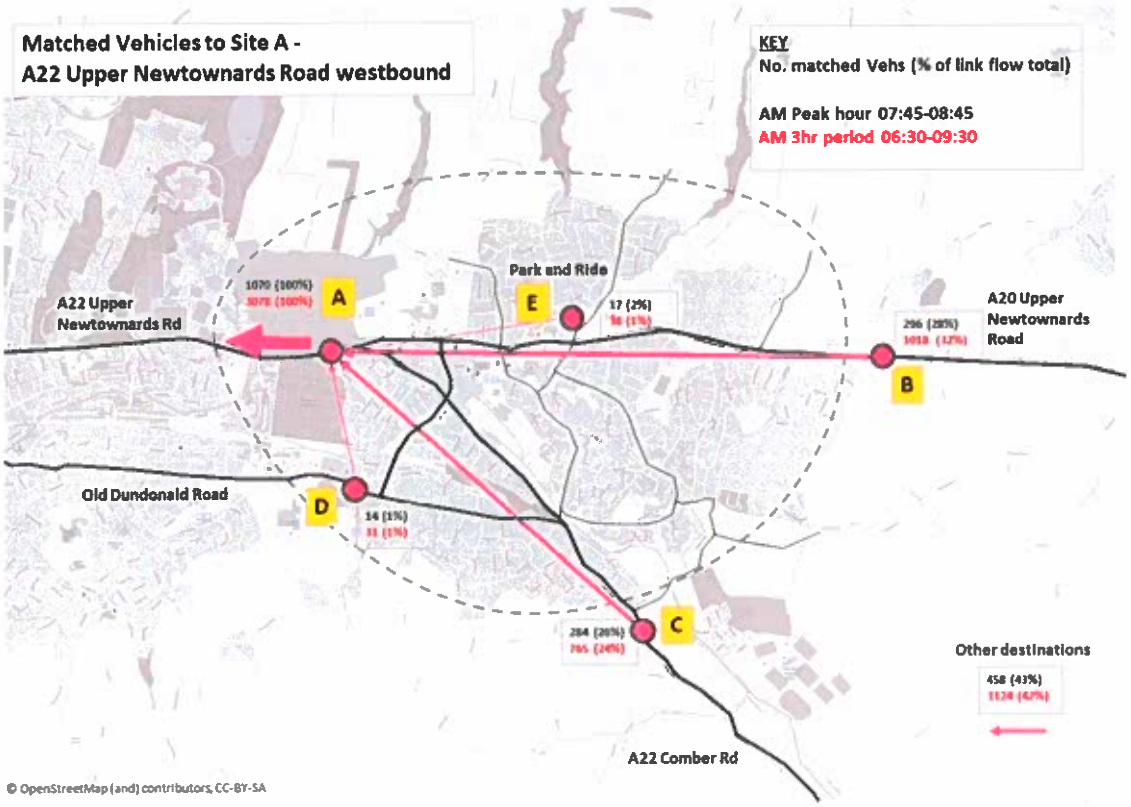


Figure 4.4 : Recorded ANPR matches to Site A - A20 Upper Newtownards Road (west), AM period

4.4.9 **Figure 4.4** shows that 28% of westbound traffic recorded at Site A in the AM peak hour travelled from Site B, with a further 26% travelling from Site C, A22 Comber Road. 43% of traffic arriving at Site A originated from within the cordon, or from a point that was not surveyed by ANPR cameras.

4.4.10 **Figure 4.5** shows the destination of northbound vehicles recorded at Site C, A22 Comber Road.

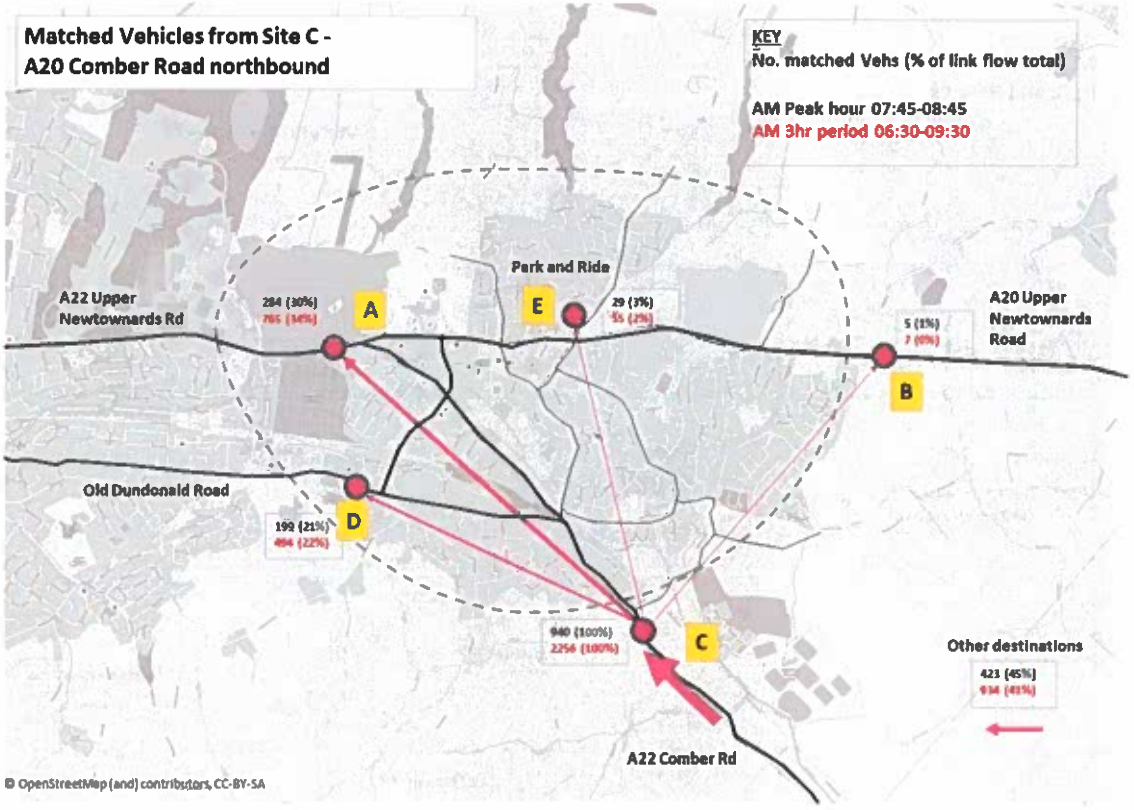


Figure 4.5 : Recorded ANPR matches from Site C - A22 Comber Rd AM period

4.4.11 **Figure 4.5** shows that 284 vehicles, 30% of matched vehicles in the AM peak hour from Site C, travelled to Site A, and 199 vehicles, 21%, to Site D.

4.4.12 Just 5 vehicles were recorded travelling from Site C to Site B in the AM peak hour.

4.4.13 **Figure 4.6** shows the origins of recorded vehicles that entered Site E, the Park and Ride, site in the AM period.

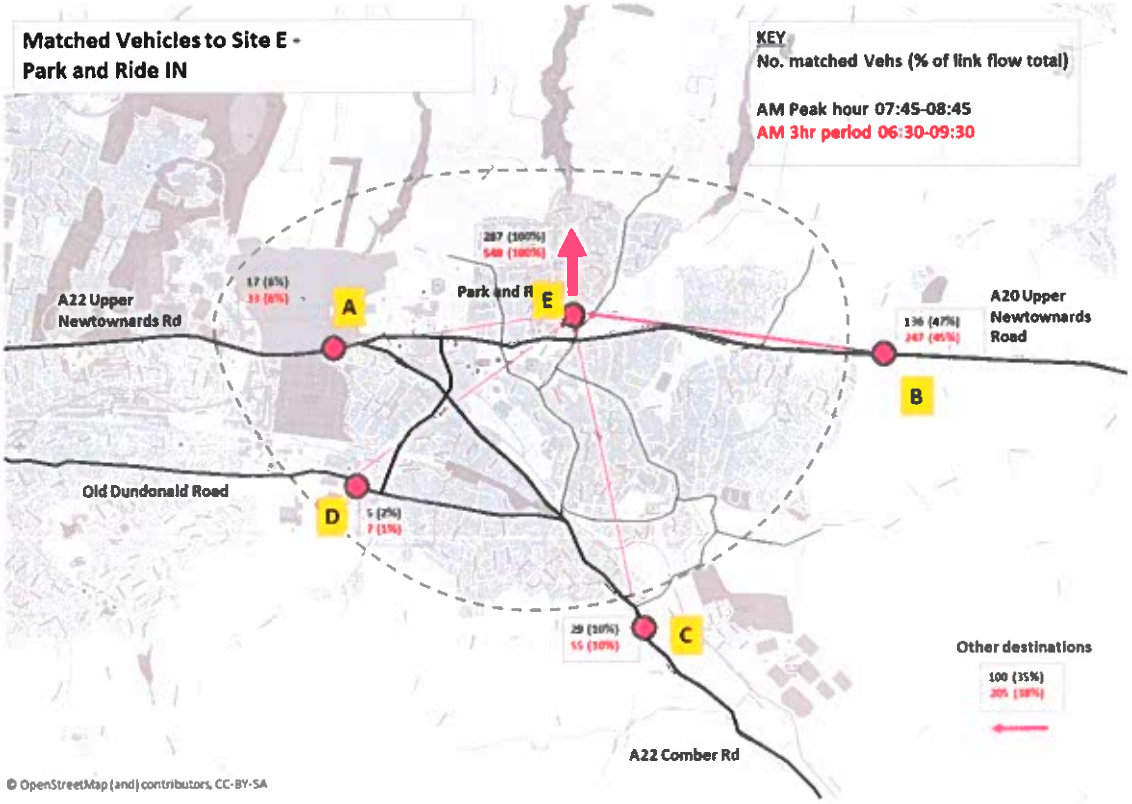


Figure 4.6 : Recorded ANPR matches to Site E- Dundonald Park and Ride AM period

4.4.14 **Figure 4.6** shows that in total 287 vehicles entered the Park and Ride site in the AM peak hour. Of these vehicles, 136 (47%) arrived from Site A, A22 Upper Newtownards Road (east), and 29 (10%) from A22 Comber Road. 100 vehicles (35%) arrived from inside the cordon, or from roads not surveyed, with the most likely origins being from within the Dundonald urban area itself.

4.4.15 This level of demand for the Park and Ride is encouraging (548 vehicles entered the site in the 3hr AM peak period), and suggests that the service has been effective in reducing the number of strategic trips on the network. Of these 548 vehicles, 205 did not originate from one of the ANPR sites, suggesting more local demand from within Dundonald itself. If these users could be encouraged to travel to the Park and Ride by sustainable modes, this would free up further capacity for strategic trips.

PM Peak Period

4.4.16 **Figure 4.7** shows the destination of recorded eastbound matched vehicles from Site A, Upper Newtownards Road (west) in the PM period.

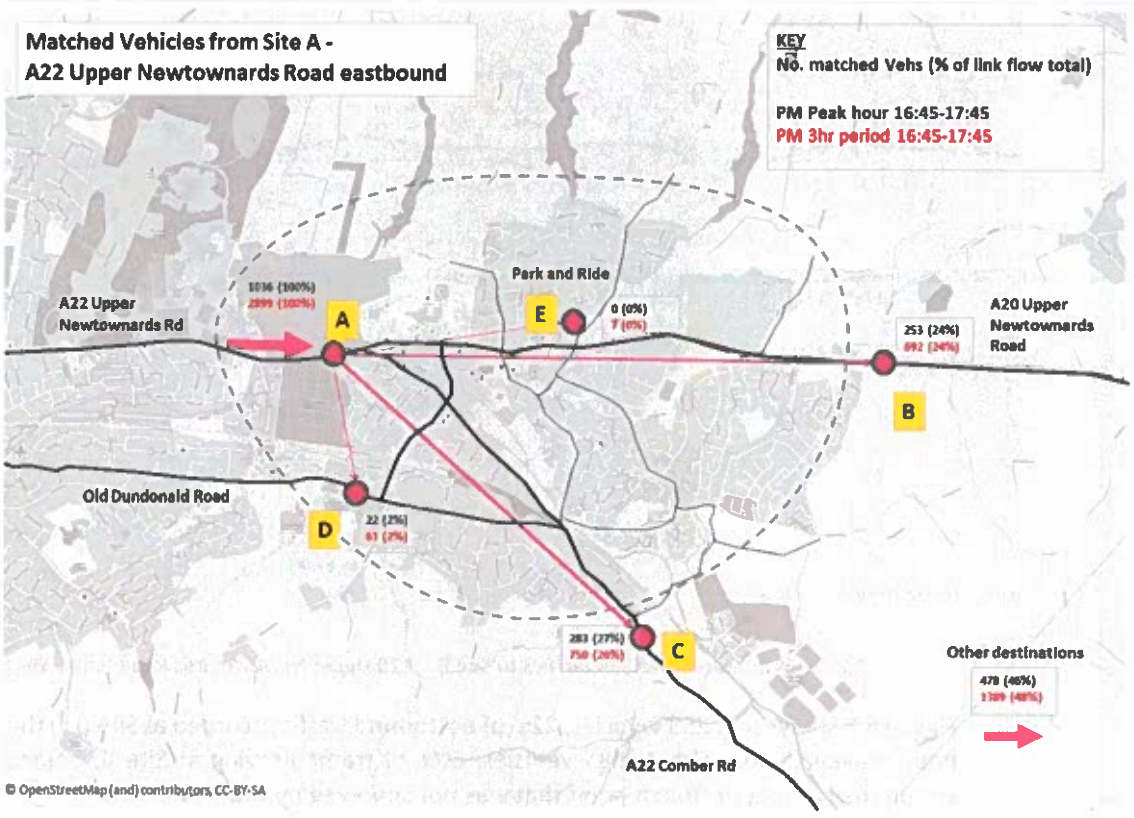


Figure 4.7 : Recorded ANPR matches from Site A - PM period

4.4.17 **Figure 4.7** shows that 253 vehicles, 24% of eastbound traffic recorded at Site A in the PM peak hour, travels from west to east through the cordon to Site B. A further 283 vehicles, 27% of traffic, travels to Site C.

4.4.18 478 vehicles, 46% of westbound vehicles recorded at Site A ended within, or left the cordon at sites that were not surveyed.

4.4.19 **Figure 4.8** shows the origin of recorded eastbound matched vehicles at Site B, Upper Newtownards Road (west) in the PM period.

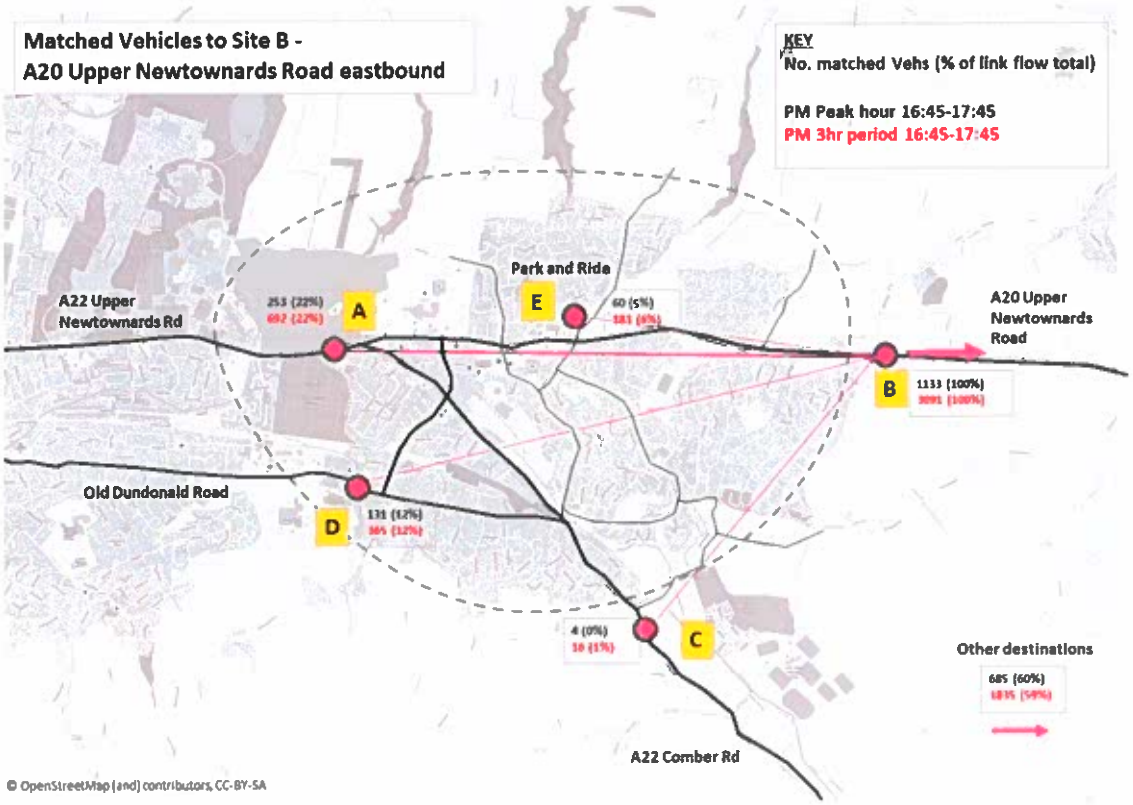


Figure 4.8 : Recorded ANPR matches to Site B - A20 Upper Newtownards Road (east), PM period

4.4.20 **Figure 4.8** shows that 253 vehicles, 22% of eastbound traffic recorded at Site B in the PM peak hour, travelled from Site A. 685 vehicles, 60% of traffic arriving at Site B, originated from within the cordon, or from a point that was not surveyed by ANPR cameras.

4.4.21 374 pcu joined the eastbound A20 between the Ballyregan Road junction and the ANPR site, a distance of 2km. This is a reversed pattern from the AM peak hour, showing that traffic joins from minor roads between the two surveyed locations. The main intervening junctions are Craigleith Drive, Carrowreagh Road and Dunlady Road / Robbs Road. Potential destinations on the A20 prior to Ballyregan Road include Dundonald High School, the Dundonald Industrial Estate and Carrowreagh Business Park.

4.4.22 Only 4 vehicles were recorded travelling from Site C to Site B in the PM peak hour.

4.4.23 **Figure 4.9** shows the origin of recorded southbound matched vehicles at Site C, A22 Comber Road (west) in the PM period.

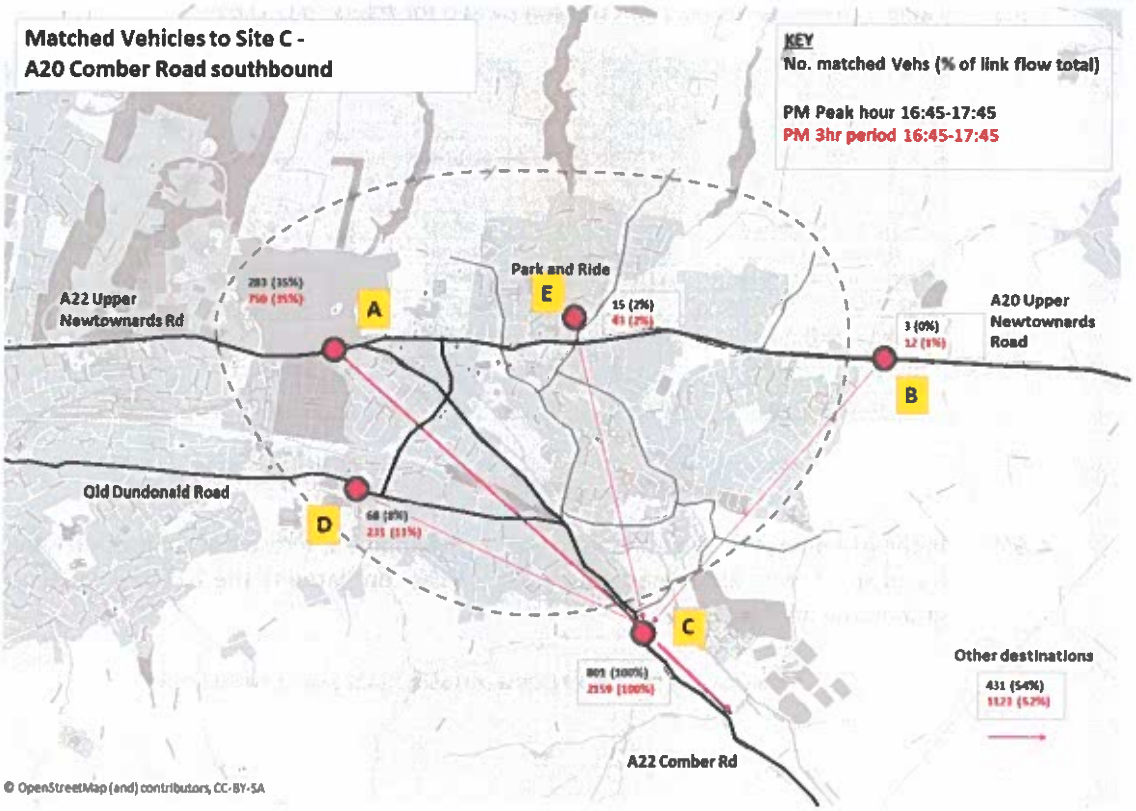


Figure 4.9 : Recorded ANPR matches to Site C - A22 Comber Road, PM period

4.4.24 **Figure 4.9** shows that 283 vehicles, 35% of southbound traffic recorded at Site C in the PM peak hour travelled from Site A and a further 68 vehicles, 8%, from Site D. 431 vehicles, 54% of traffic arriving at Site C, originated from within the cordon, or from a point that was not surveyed by ANPR cameras.

4.5 ANPR journey times

4.5.1 The ANPR data allows the calculation of journey times between each ANPR site throughout the survey period. A full set of results in presented within **Appendix F**.

4.5.2 15th percentile, 50th percentile and 85th percentile journey times have been calculated. The 15th percentile journey times are likely to represent quieter periods at the start and end of the surveyed three-hour peaks. The 85th percentile journey times are likely to represent peak times on the network, and therefore a comparison of the 15th and 85th percentile times is likely to give a good indication of the delay caused by congestion on each route.

4.5.3 **Table 3** presents results from the AM period for selected O-D pairs.

Route	Route	Distance (km)	AM						
			15th Percentile	Speed (kph)	50th Percentile	85th Percentile	Speed (kph)	Calculated delay	% increase on15th Percentile
A22 west to A20 east	A - B	3.06	0:04:18	43	0:05:54	0:07:54	23	0:03:36	84%
A20 east to A22 west	B - A	3.06	0:02:57	62	0:05:35	0:08:36	21	0:05:38	191%
A22 west to A22 Comber	A - C	2.25	0:03:55	34	0:04:41	0:06:08	22	0:02:13	56%
A22 Comber to A20 west	C - A	2.25	0:02:47	49	0:03:57	0:04:55	27	0:02:08	77%
A20 Comber to ODR	C - D	3.71	0:03:14	69	0:03:37	0:04:29	50	0:01:15	39%
ODR to A20 Comber	D - C	3.71	0:02:53	77	0:04:07	0:07:06	31	0:04:13	146%
A20 east to ODR	B - D	4.02	0:05:34	43	0:07:39	0:11:33	21	0:05:59	107%
ODR to A20 east	D - B	4.02	0:05:49	41	0:07:57	0:13:16	18	0:07:27	128%

Table 3. Recorded ANPR journey times (06:30-09:30)

4.5.4 In the AM peak, the biggest increase in journey times as a result of congestion is between Site B and Site A, with an increase of 5m 38s (191%) compared to the 15th percentile, as displayed graphically on **Figure 4.10.**

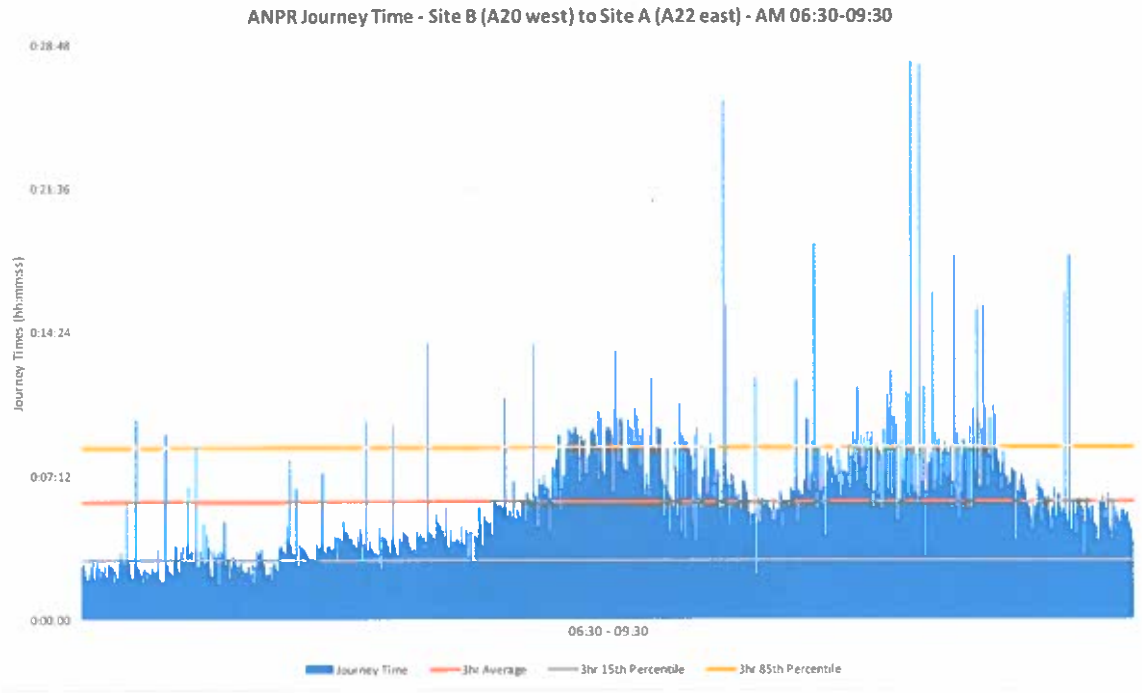


Figure 4.10 : Site A to Site B journey times – AM peak period (06:30-09:30)

4.5.5 There are two noticeable peaks in journey times, the first around 07:45, likely to be associated with commuter traffic, and the second around 08:30, likely to be associated with school traffic.

4.5.6 **Table 4** presents results from the AM period for selected O-D pairs.

Route	Ref	Distance (km)	PM						
			15th Percentile	Speed (kph)	50th Percentile	85th Percentile	Speed (kph)	Calculated delay	% increase on 15th Percentile
A22 west to A20 east	A - B	3.06	0:05:54	31	0:11:43	0:17:26	11	0:11:32	196%
A20 east to A22 west	B - A	3.06	0:03:51	48	0:05:07	0:06:24	29	0:02:33	66%
A22 west to A22 Comber	A - C	2.25	0:04:52	28	0:06:38	0:09:49	14	0:04:57	102%
A22 Comber to A20 west	C - A	2.25	0:03:11	42	0:03:49	0:06:22	21	0:03:11	100%
A20 Comber to ODR	C - D	3.71	0:03:16	68	0:03:39	0:04:54	45	0:01:37	50%
ODR to A20 Comber	D - C	3.71	0:04:06	54	0:05:01	0:09:05	25	0:04:59	122%
A20 east to ODR	B - D	4.02	0:06:21	38	0:07:37	0:09:38	25	0:03:17	52%
ODR to A20 east	D - B	4.02	0:07:03	34	0:09:50	0:13:24	18	0:06:20	90%

Table 4. Recorded ANPR journey times (16:00-19:00)

4.5.7 In the PM peak, by far the biggest delays occur for eastbound traffic along the A22 / A20 corridor, with calculated congestion delays of over 11 minutes (196%) for vehicles between A22 west and A20 east.

4.5.8 **Figure 4.11** graphically presents these results.

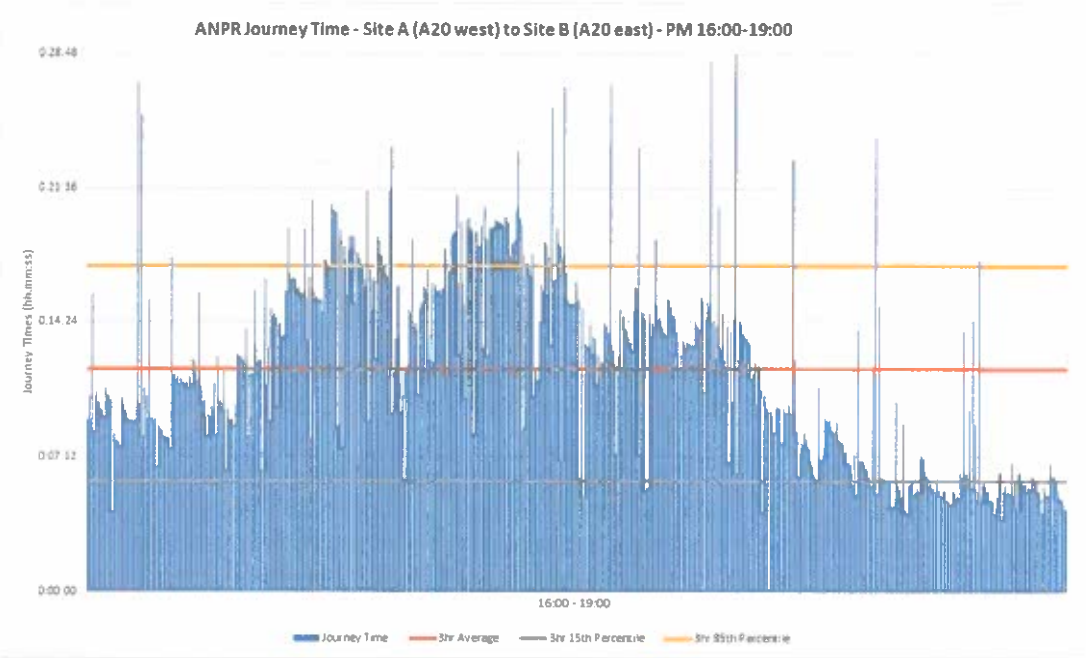


Figure 4.11 : Site A to Site B journey times – PM peak period (16:00-19:00)

4.5.9 Eastbound journey times in the PM peak are noticeably longer than the westbound equivalent in the AM peak, with congestion evident for a longer period – building up around 16:30 and lasting until after 18:00.

4.6 Main Findings

4.6.1 The main findings of the traffic surveys in relation to general traffic conditions throughout the Dundonald area show that:

- The A20 and A22 corridors within Dundonald carry significant amounts of traffic in the AM and PM peak periods, generally exhibiting 'tidal' flows towards Belfast in the morning, and out of the city in the evening.

- The level of 'end-to-end' through traffic on the A20 and A22 corridors was not as high as expected. This suggests that a high proportion of vehicles arrive or leave the cordon via more minor roads that were not covered by the surveys. Potential routes into and out of the cordon not covered by the surveys include:

    - Dunlady Road to the north
    - Ballyregan Road to the north
    - Ballyhanwood Road to the south-west.

- The lower than expected matched 'end-to-end' through traffic on the A20 and A22 corridors also suggest that:

    - There is a high degree of traffic routeing through urban areas within Dundonald
    - Dundonald appears to be a significant generator and attractor of trips in its own right

- Strategic traffic attempting to avoid congestion on the A20 and A22 will place pressure on internal 'inappropriate' roads and junctions within Dundonald, and the surveys showed that the following non-strategic routes were heavily used:

    - East Link Road between A20 and Old Dundonald Road
    - Old Dundonald Road between A22 Comber Road and beyond East Link Road.

- Another indicator of this urban routeing is high volumes of traffic leave the westbound A20 between Belfast Road and the Ballyregan junction in the AM period, and in the opposite direction in the PM period. The main potential locations for this traffic to leave the A20 are at Carrowreagh Road, Old Mill Meadows, Craigleith Drive, or at the Dunlady Road / Robbs Road junction, none of which were included in this particular survey.

4.6.2 The level of demand for the Park and Ride is encouraging, with 548 vehicles entering the site in the 3hr AM peak period. This suggests that the service has been effective in reducing the number of strategic trips on the network. Of these 548 vehicles, 205 did not originate from one of the ANPR sites, suggesting more local demand from within Dundonald itself. If these users could be encouraged to travel to the Park and Ride by sustainable modes, this would free up further capacity for strategic trips.

4.6.3 The findings of particular relevance to the potential Link Road scheme are discussed in **Section 5**.

5. LINK ROAD APPRAISAL

5.1 Introduction

5.1.1 This section presents an appraisal of the proposed Link Road, with reference to relevant findings from the traffic surveys.

5.2 Road Function

5.2.1 As set out in **Section 2.5**, SYSTRA perceives that the Link Road could provide the following benefits:

- Additional road capacity between the A22 and A20 transport corridors to the south and east of Dundonald.
- Creation of a partial bypass around congestion hot-spots in central Dundonald. This could result in a reduction in existing traffic movements and congestion within the Dundonald urban area as trips between the A22 and A20 reassign onto the non-strategic road.
- A potential route to the Dundonald Park and Ride site, and other locations in central Dundonald, from the A22.
- An alternative route from A20 Upper Newtownards Road to the south-west of Dundonald.

5.3 Potential Demand

5.3.1 **Figure 5.1** shows the main potential traffic demands for the Link Road.

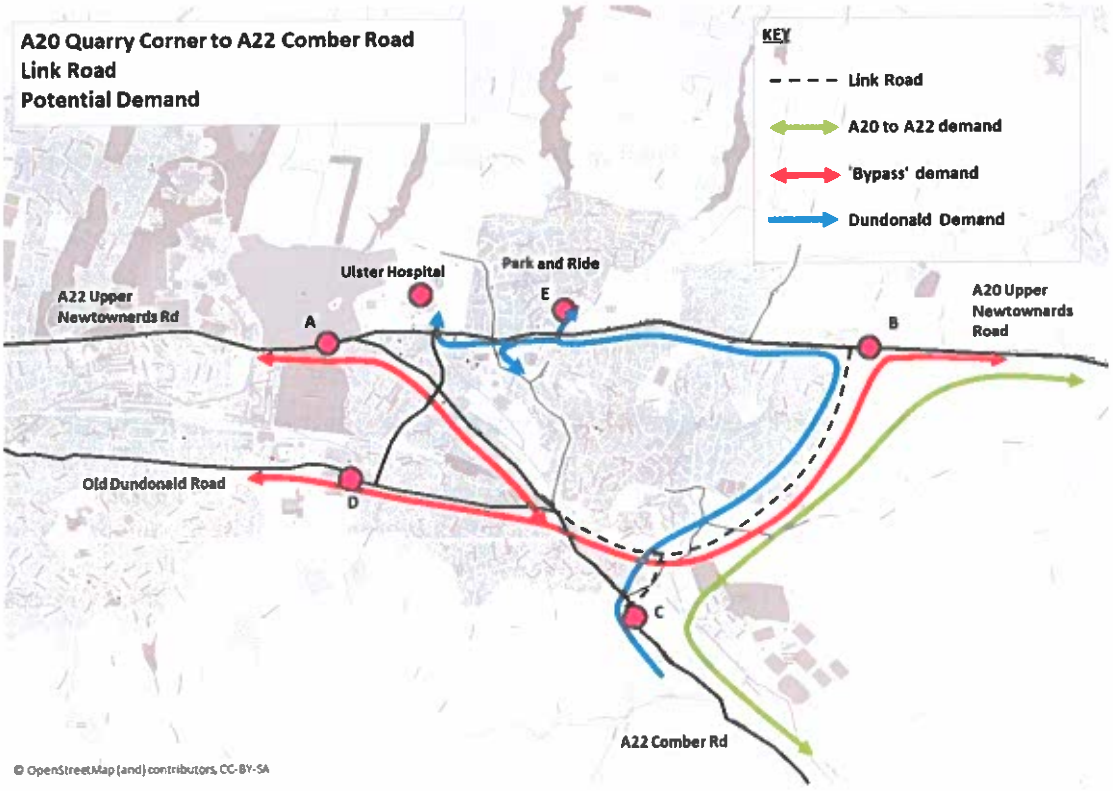


Figure 5.1 : Link Road – Potential Demand

5.3.2 **Figure 5.1** shows the main potential sources of demand for the new Link Road, as identified by SYSTRA.

- Traffic wishing to travel between the A20 and A22 (A and B).
- Traffic heading towards, and returning from, Belfast wishing to bypass central Dundonald. Two potential key movements have been identified:
  - Traffic rejoining the A22 / A20 corridor either side of Dundonald (B-C-A)
  - Traffic using Old Dundonald Road as a route to and from the City Centre (B-C-D).
- Traffic wishing to access destinations in Dundonald, such as the Park and Ride or Ulster Hospital.

5.4 Existing demand between A20 and A22

5.4.1 **Table 5** presents the total recorded demand between the ANPR points on the A20 east and A22 Comber Road during the surveys.

Table 5. Summary of A20 to A22 observed demands (veh)

		AM (06:30-09:30)			PM (16:00-19:00)		
		To			To		
			B	C		B	C
From	A20 east	B		2	B		12
	A22 Comber	C	7		C	16	

5.4.2 The surveys suggest that there is very little strategic demand for vehicles travelling between the A20 east and A22 Comber Road. It is likely that the majority of vehicle currently wishing to travel from the west side of Newtownards to the Comber area, and from Comber to Newtownards, will do so via the A21, which provides a direct, strategic route, part of which is dual-carriageway.

5.4.3 Traffic originating from within Dundonald currently wishing to travel to / from Site B and Site C will do so using existing local roads such as Craigleith Drive and Grahamsbridge Road, and will not have been picked up by the ANPR survey.

5.4.4 However, the proposed Link Road will only have connecting junctions at either end (i.e. on the A20 and A22), and will not be directly accessible from residential areas within Dundonald. This means that it is unlikely that trips that originate within Dundonald will use the new link road to travel towards Newtownards or Comber.

5.4.5 It is acknowledged that due to the lack of a direct route at present that there could be suppressed demand for this movement that is not being catered for. As with many road schemes, there is potential for the Link Road to induce traffic demand which does not exist at present. The creation of additional traffic demand, rather than better managing existing demand, would likely be an unwanted consequence of the Link Road.

5.4.6 When the partly-constructed local distributor road between the A20 and A22 along Old Mill Meadows and Coopers Mill Park is completed, this will perform the functions of the planned Link Road - connecting the A20 with the A22, and providing access to the rapid transit route (and Park and Ride) on the Newtownards Road corridor. In addition, it would provide access for local traffic, and a bus route linking the A22 and A20.

Finding: The surveys suggest that there is very little existing demand for vehicles travelling between the ANPR points on the A20 east and A22 Comber Road. Even assuming a level of induced trips this volume of traffic could easily be accommodated on the partly-constructed local distributor road between provided between the A20 and A22.

5.5 Potential Bypass Effect

5.5.1 The main determinant in whether drivers will wish to use the Link Road as a bypass around central Dundonald will be whether the future route will provide shorter journey times than those that exist at present.

5.5.2 This assessment requires a consideration of the following:

- Traffic demands between A20 east, A22 Upper Newtownards Road and Old Dundonald Road (B, A and D)
- Changes in route length as a result of the Link Road
- Existing travel times and congestion delays on these existing routes
- Potential journey time savings using the proposed Link Road.

Existing demands

5.5.3 **Table 2** presents the total recorded demand between A20 east, A22 west and A22 Comber Road during the three-hour peak survey periods.

Table 6. Summary of potential bypass demands (veh)

AM (06:30-09:30)

From	To A	To B	To D	
A22 west (A)		442	-	442
A20 east (B)	1018		373	1391
A22 Comber (D)	-	96		96
TOTAL	1018	538	373	

PM (16:00-19:00)

From	To A	To B	To D	
A		692	-	692
B	628		316	944
D	-	365		365
TOTAL	628	1057	316	

The surveys suggest that:

- A proportion of 1,460 vehicles in the AM period and 1,320 vehicles in the PM period currently travelling between points A and B, and could potentially divert onto the Link Road.
- 469 vehicles in the AM period and 681 vehicles in the PM period currently travelling between points B and D, could potentially divert onto the Link Road. It is likely that these vehicles currently route through Dundonald, using Robbs Road and Grahamsbridge Road.

Journey Distance

5.5.4 The introduction of the Link Road would result in the following changes to journey distances:

Route	Route	Distance (km)		
		Existing	with Link Road	Diff
A22 west to A20 east	A - C	3.06	3.8	-0.74
A20 east to A22 west	B - A	3.06	3.8	-0.74
A20 east to ODR	B - D	4.02	3.4	0.62
ODR to A20 east	D - B	4.02	3.4	0.62

Table 7. Changes to route length

5.5.5 **Table 6** shows that the Link Road would provide a shorter route between the A20 east and Old Dundonald Road, but would constitute a longer route between the A20 east and A22 west.

Journey Times

5.5.6 **Table 8** presents recorded average journey times and calculated congestion between A20 east, A22 west and Old Dundonald Road.

Table 8. Journey time and congestion summary

Average Journey Time

AM (06:30-09:30)

From \ To	A	B	D
A		0:05:54	-
B	0:05:35		0:07:39
D	-	0:07:57	

PM (16:00-19:00)

From \ To	A	B	D
A		0:11:43	-
B	0:05:07		0:07:37
D	-	0:09:50	

Additional delay at peak times

AM (06:30-09:30)

From \ To	A	B	D
A		0:03:36	-
B	0:05:38		0:05:59
D	-	0:07:27	

PM (16:00-19:00)

From \ To	A	B	D
A		0:11:32	-
B	0:02:33		0:03:17
D	-	0:06:20	

5.5.7 **Table 8** shows that:

- Calculated peak time congestion delays between the A20 east and A22 west are in the region of 4 mins (eastbound) and 6 minutes (westbound) in the AM peak period. In the PM period, these figures are 12 minutes (eastbound) and 3 minutes (westbound).
- Calculated peak time congestion delays between the A20 east and Old Dundonald Road are in the region of 7 mins (eastbound) and 6 minutes (westbound) in the AM peak period. In the PM period, these figures are 6 minutes (eastbound) and 3 minutes (westbound).

Conclusion

Alternative to the A20 corridor

- It is not considered that the Link Road would provide an attractive diversion for most vehicles wishing to travel end-to-end on the A20 corridor.
- Calculated congestion delays in the AM peak are less than 6 minutes in either direction, and taking the additional 740m distance into account, and allowing for the transfer of some of this delay onto junctions on the new route such as the A22 / East Link Road and the junctions at either end of the Link Road, it is considered that journey times are likely to be longer on the new route for the majority of the day.
- In the PM period, calculated eastbound congestion delays are in the region of 12 minutes, and whilst some vehicles may consider switching to the new Link Road, it is SYSTRA's opinion that this effect would be limited to peak times within the PM peak period. Westbound congestion delays are less than 3 minutes, meaning that vehicles are likely to remain on the A20 corridor.

A much more likely impact is that vehicles might switch from the A20 corridor to the Old Dundonald Road corridor, as discussed below.

Access to destinations within Dundonald

- The traffic surveys suggested that Dundonald is a significant attractor of trips in its own right. The Link Road will only connect into the A20 to the north and A22 to the south, and will not provide a route for traffic to enter or leave the suburban area.

Alternative route to Old Dundonald Road

- The Link Road could be an attractive route for vehicles wishing to travel between the A20 east and Old Dundonald Road in both directions. It provides a shorter route than is currently available, and the standard of the Link Road, with no access points between the A20 and A22, is likely to result in more free-flowing conditions, therefore improving both average speeds and overall journey time.
- Current demands between the A20 east and Old Dundonald Road were observed as 469 vehicles in the three-hour AM peak period and 681 vehicles in the PM peak period. Assuming that all of these vehicles currently route via Robbs Road and Grahamsbridge Road, the Link Road has the potential to remove these vehicles from central Dundonald.

Induced trips

- One of the consequences of the Link Road is that it could divert vehicles that currently travel to and from Belfast via the A20 onto the Old Dundonald Road / Kings Road corridor, shifting traffic from a strategic route onto a local route, and changing traffic patterns across a wider area. This is a single-carriageway road that passes through residential areas, and is not designated or designed as a strategic road. The Link Road therefore has the potential to change the character of the Old Dundonald Road / Kings Road corridor, and DfI would need to consider whether this was an appropriate outcome of the Link Road.

Finding: The Link Road could provide an attractive route for vehicles between the A20 east and the Old Dundonald Road / King's Road corridor.

It is unlikely that 'end-to-end' traffic on the A20 corridor will use the Link Road to divert around central Dundonald as when congestion delays and the additional distance are taken into account, the average journey is likely to take longer.

A much more likely impact is that vehicles might switch from the A20 corridor to the Old Dundonald Road corridor, shifting traffic from a strategic route onto a local route, and changing traffic patterns across a wider area. DfI would need to consider whether this was an appropriate outcome of the Link Road.

5.6 Access to the Park and Ride

5.6.1 **Figure 4.5** shows the origins of recorded vehicles that entered Site E, the Park and Ride, site in the AM period.

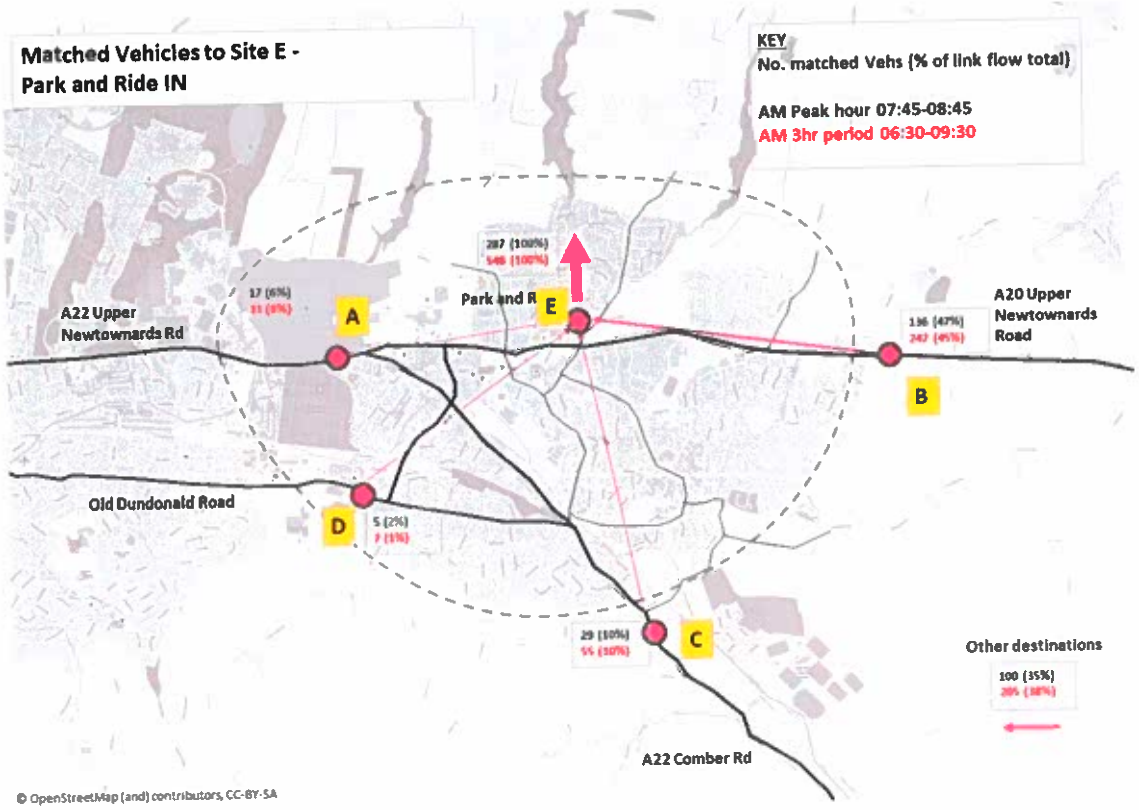


Figure 5.2 : Recorded ANPR matches to Site E- Dundonald Park and Ride AM period

5.6.2 **Figure 4.5** shows that in total 287 vehicles entered the Park and Ride site in the AM peak hour. Of these vehicles, 136 (47%) arrived from Site A A22 Upper Newtownards Road (east) and 29 (10%) from A22 Comber Road. 100 vehicles (35%) arrived from inside the cordon, or from roads not surveyed, with the most likely origins being from within the Dundonald urban area itself.

5.6.3 Vehicles traveling north on A22 Comber Road wishing to access the Park and Ride site are likely to travel via Grahamsbridge Road. This route is approximately 1.9km longer than that which would be provided via the Link Road. It is therefore considered unlikely that much demand on the Link Road would associated with the Park and Ride on the basis of:

- Low existing demands from A22 Comber Road
- The 1.9km shorter existing route via Grahamsbridge Road

5.6.4 It is also considered unlikely that traffic on the A22 and bound for other destinations in central Dundonald, such as the Ulster Hospital, would use the Link Road, due to the presence of existing shorter routes.

Finding: It is considered unlikely that many vehicles travelling to central Dundonald from the A22 will use the Link Road due to:

- Low existing demands from this direction for the P+R from A22 Comber Road
- A shorter existing route along Grahamsbridge Road.

Summary Table

5.6.5 **Table 9** provides an appraisal of the summarised effects of the Link Road for each of the 'Potential Benefits' set out in **Section 2.5.**

Table 9. Summary of Findings

POTENTIAL BENEFIT	FINDING
A reduction in existing traffic movements and congestion within the Dundonald urban area as trips between the A22 and A20 reassign onto the non-strategic road.	The surveys suggest that there is very little strategic demand for vehicles travelling between the A20 east and A22 Comber Road, with two-way demands of 9 vehicles and 28 vehicles recorded in the AM and PM three- hour peak periods. It is acknowledged that due to the lack of a direct route at present that there could be some suppressed demand for this movement that is not being catered for. As with many road schemes, there is potential for the Link Road to induce traffic demand which does not exist at present. The creation of additional traffic demand, rather than better managing existing demand, would likely be an unwanted consequence of the Link Road. It is likely that the majority of vehicle currently wishing to travel from the west side of Newtownards to the Comber area, and from Comber to Newtownards, will do so via the A21, which provides a direct, strategic route, part of which is dual-carriageway. When the partly-constructed local distributor road between the A20 and A20 along Old Mill Meadows and Coopers Mill Park is completed, this will provide a directly accessible route for both local and strategic traffic between the A20 and A22, catering for Dundonald related demand and trips from further afield. The Link Road will not benefit demand originating from within Dundonald making these movements as the Link Road will only be accessible from the A20 or A22.

POTENTIAL BENEFIT	FINDING
Bypass of congestion hotspots in Dundonald, cutting journey times and reducing existing pressure	The Link Road could provide an attractive route for vehicles between the A20 east and the Old Dundonald Road / King's Road corridor. Observed two-way demands totalled 469 vehicles and 681 vehicles in the AM and PM three-hour peaks respectively. It is considered unlikely that 'end-to-end' traffic on the A20 corridor will use the Link Road to divert around central Dundonald, as when congestion delays and the additional distance are taken into account, journey tines via the Link Road are likely to be longer. A much more likely impact is that vehicles might switch from the A20 corridor to the Old Dundonald Road corridor, shifting traffic from a strategic route onto a local route, and changing traffic patterns across a wider area. DfI would need to consider whether this was an appropriate outcome of the Link Road.
Potential route to Dundonald Park and Ride and other sites in central Dundonald from A22 Comber Road	It is considered unlikely that many vehicles travelling to central Dundonald from the A22 will use the Link Road due to: - Low existing demands from this direction for the P+R from A22 Comber Road - A shorter existing route along Grahamsbridge Road.

6. SUMMARY OF MAIN FINDINGS

6.1.1 SYSTRA has been commissioned by Fraser Houses (NI) Limited to examine the contribution of the proposed Quarry Corner to Comber Road Link (MCH14/02) to transport in east Belfast. Fraser Houses (NI) Limited has commissioned SYSTRA to review the planning history and evolution of the proposed scheme, and to consider whether there is a case for its continued inclusion in the emerging Lisburn and Castlereagh Local Development Plan.

6.2 POLICY SHIFT

6.2.1 The form and function of the Link Road scheme has changed considerably from the proposal originally set out in BUAP 2001, as summarised below:

- **Belfast Urban Area Plan 2001** –Strategic Road scheme funded by Central Government, with a new road corridor between Dundonald and Belfast. No Public Transport or sustainable travel elements.
- **Draft BMAP 2015** –Non-Strategic WS2 Link Road providing access for EWAY services and general traffic between the A20, Millmount Park and Ride, and then beyond to the A22 and East Link Road.
- **BMAP 2015** –Non-Strategic Road Scheme, with EWAY/Millmount P+R now superseded by Dundonald P+R and Glider.
- **Lisburn and Castlereagh LDP** – One of seven road schemes set out within BMAP 2015 whose retention is being considered as part of the LDP process.

6.2.2 SYSTRA consider that the proposed scheme as set out in draft BMAP represented a coherent multi-modal scheme that would have enhanced public transport capacity and reduced traffic congestion. The Link Road would have played a clear role in transferring traffic from the A20 corridor onto public transport services.

6.2.3 The introduction of the Dundonald P+R (and public transport improvements on the A20 corridor) as an alternative to the proposed Millmount P+R, has removed any public transport elements from the Link Road scheme. The development of the Comber Community Greenway in the former rail corridor has curtailed the possibility of future public transport services or general traffic use along this route (in the foreseeable future), and also means that the Link Road will feed traffic back onto A22 Comber Road, at a location which is constrained by level differences and adjacent junctions. This is considered likely to displace traffic within the Dundonald urban area rather than reduce overall congestion.

6.2.4 In its current form, the Link Road proposal has become an isolated part of a previous larger and coherent solution, while the other elements – the Comber Community Greenway, the Dundonald Park and Ride, and Glider services on the A20 corridor – have evolved in the interim.

6.2.5 If the Link Road scheme is not continued, there would be an opportunity to make use of some of the corridor to provide a direct walking and cycling route linking into Comber Community Greenway.

6.3 TRAFFIC APPRAISAL

6.3.1 The traffic appraisal concludes that the Link Road would have limited benefits on traffic congestion within Dundonald, and on the A20 corridor.

6.3.2 The appraisal shows that there is little strategic traffic demand between the A20 east and A22 Comber Road, and little potential demand from A22 Comber Road via the link road to central Dundonald.

6.3.3 It is unlikely that 'end-to-end' traffic on the A20 corridor will use the Link Road to divert around central Dundonald, as when congestion delays and the additional distance are taken into account, the journey via the Link Road is likely to be longer.

6.3.4 The Link Road could provide an attractive route between the A20 and the Old Dundonald Road / King's Road corridor. This would have the benefit of removing traffic that currently routes through Dundonald, but an unwelcome consequence is likely to be that Belfast-bound vehicles switch from the A20 corridor to the Old Dundonald Road corridor, shifting traffic from a strategic route onto a local route, and changing traffic patterns across a wider area. DfI would need to consider whether this was an appropriate outcome of the Link Road.

6.3.5 Therefore, while the link road could provide an alternative route for some traffic this is neither likely to be significant nor strategic in nature.

6.4 FUNDING

6.4.1 The issue around delivery of the non-strategic Link Road is also significant. BMAP states that:

"Developers will be responsible for funding MCH 14/02 either in full or in a substantial part. DRD's priority for funding will be concentrated on the construction of major capital work schemes on the Strategic Road Network. Any contribution towards develop-led schemes will be subject to detailed economic appraisal, the availability of funding and inclusion within the major works programme".

6.4.2 Developments within MCH03 have been required to set aside land to support the proposed link road, but these developments are not required to contribute to the delivery of the route, and it is therefore not clear which developments would fund MCH14/02.

6.4.3 The housing developments at Old Mill Meadow, Coopers Mill and Greengraves Meadow have been completed, and the 293-unit 'Millmount Village' is currently submitted for planning. These sites are described as *'Committed Housing Sites with development ongoing / not started'* in BMAP and with no Key Site Requirements or planning conditions relating to the delivery of MCH14/02.

6.4.4 Therefore, even if the road were retained in the LDP, there is no obvious source of funding to deliver the route.

6.5 HOUSING DISTRIBUTOR ROAD

6.5.1 The Link Road would potentially duplicate the planned housing distributor road within the Old Mill Meadow, Coopers Mill and Millmount Village proposals. When complete, the spine road will provide a continuous route between the A20 and the A22. It will be built to Local Distributor standard, and be suitable for buses.

6.5.2 At present there is a 'missing link' of approximately 800m, but there is a planning mechanism for the delivery of the remaining sections.

6.5.3 The housing distributor road would be of an appropriate standard, and perform the stated functions of the planned Link Road - connecting the A20 with the A22, and providing access to the rapid transit route (and Park and Ride) on the Newtownards Road corridor.

6.5.4 In addition, it would provide access for local traffic, and a bus route linking the A22 and A20.

6.6 CONCLUSION

6.6.1 This report provides a comprehensive review and assessment of the continued requirement for a direct link road between the A20 and A22 (MCH14/02). It has been supported by a significant survey capturing strategic traffic movements in the Dundonald area.

6.6.2 The purpose of the assessment was to determine whether it remains appropriate to reserve a road line through development site MCH03 or whether, given the dilution of the function of the route, the reserved land should be returned to the land owners.

6.6.3 The findings of the assessment are that:

- The new Link Road would seem to perform little strategic road or public transport function;
- It would be likely to encourage higher traffic levels on Old Dundonald Road, which may be unwelcome;
- It would be of limited benefit to local traffic due to a lack of connections; and
- There is no obvious source of funding to deliver it.

6.6.4 The Housing Distributor Road through site H03, which is nearing completion, would perform many of the functions of the planned Link Road, in addition to providing direct access for local traffic and a bus route linking the A22 and A20.

6.6.5 Therefore there does not appear to be the need for both schemes. An alternative beneficial use of the corridor would be to provide a direct walking and cycling route, linking into Comber Community Greenway.

APPENDIX A – ANPR CHECKS

Capture Rate

ANPR surveys are never able to successfully capture the number plate of every vehicle that passes, due to a range of factors including:

- Vehicles driving too close, or queued too close to the vehicle in front, obscuring the number plate
- Excessive glare from low sun, surface water or headlights
- Poor light conditions

At each ANPR point a concurrent link survey was also conducted, so that that percentage of vehicles registered by the cameras could be calculated, and an adjustment made to the figures to allow for this.

Table C1 and **Table C2** show the calculated capture rates for the AM and PM three-hour periods.

Table C1 - ANPR AM capture rates (06:30-09:30)

	ANPR Location	ANPR Capture (veh)	Link Count (veh)	Percentage	Factor
A	A22 Upper Newtownards Rd (west)	2028	2160	94%	1.07
B	A22 Upper Newtownards Rd (east)	3486	3588	97%	1.03
C	A22 Comber Road	2196	2256	97%	1.03
D	Old Dundonald Road	1255	1274	99%	1.02
E	Park and Ride	120	123	98%	1.03

Table C2 - ANPR PM capture rates (16:00-19:00)

	ANPR Location	ANPR Capture (veh)	Link Count (veh)	Percentage	Factor
A	A22 Upper Newtownards Rd (west)	2741	2899	95%	1.06
B	A22 Upper Newtownards Rd (east)	1847	1904	97%	1.03
C	A22 Comber Road	1105	1203	92%	1.09
D	Old Dundonald Road	2540	2659	96%	1.05
E	Park and Ride	549	558	98%	1.02

The number of matched O-D pairs were factored by the rates shown in Table C1 and Table C2 to account for those vehicles whose number-plates were not registered by the cameras.

MHC Traffic aims for an ANPR capture rate of 85% (i.e. the percentage of number plates that are successfully captured from all passing traffic). In this instance, ANPR capture rates for each site varied between 92% and 99%.

At three sites where initial capture rates were lower than 85%, the traffic videos were watched manually to improve the capture rate, and all the additional plates were double checked to ensure there were no data entry errors. MHC are therefore satisfied that all possible plates were picked up.

Plate matching

In terms of plate matching, MHC's ANPR software only matches full plates (as opposed to partial matches), as past experience has shown that applying 'fuzzy logic' can sometimes over-estimate the number of matches. MHC carried out quality checks on the matches recorded to ensure the plates were indeed matching at both the sites where the plate was recorded.

Link flow vs JTC check

A further check was undertaken by comparing the surveyed link flows at each point with link flows calculated from the nearest JTC survey point.

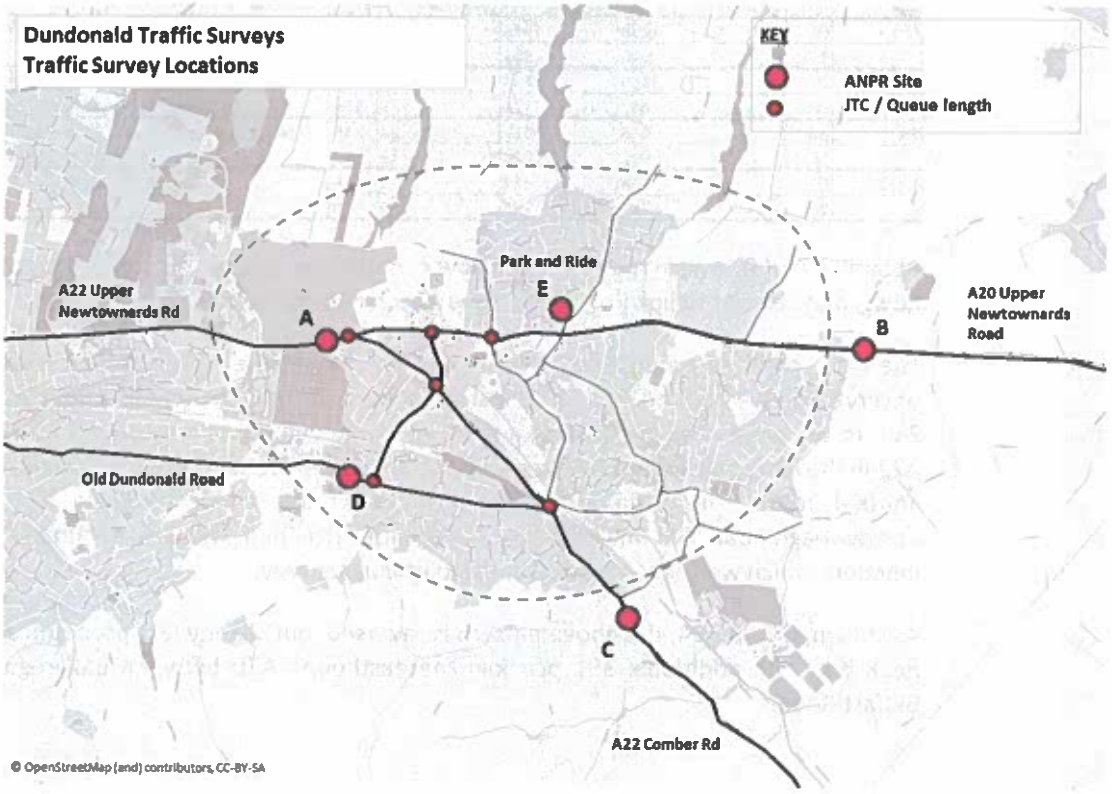


Figure C1 - ANPR and JTC locations

The correlation between the two sets of data is shown in **Table C3** and **Table C4** below. ANPR Site E has not been included as there is no suitable nearby JTC site.

Table C3 - Correspondence between ANPR link flows and JTC (07:45-08:45, pcu)

Site	Dir	Link flow (pcu)	JTC (pcu)	Difference	%	Comment
Site A	EB	865	847	18	2%	ANPR site close to TC location
	WB	1102	1107	-5	0%	
Site B	EB	637	720	-83	-13%	2km between ANPR and TC site, with several intervening junctions.
	WB	1525	852	673	44%	Potential for traffic to join or leave
Site C	NB	966	1237	-271	-28%	630m between ANPR and TC site. Potential for traffic to join at
	SB	298	270	28	9%	intervening junctions
Site D	EB	564	575	-11	-2%	ANPR site close to TC location
	WB	1030	1039	-9	-1%	

Table C4 - Correspondence between ANPR link flows and JTC (16:15-17:15, pcu)

Site	Dir	Link flow (pcu)	JTC (pcu)	Difference	%	Comment
Site A	EB	1058	1019	39	4%	ANPR site close to TC location
	WB	940	953	-13	-1%	
Site B	EB	1135	744	391	34%	2km between ANPR and TC site, with several intervening junctions.
	WB	687	774	-88	-13%	Potential for traffic to join or leave
Site C	NB	416	512	-97	-23%	630m between ANPR and TC site. Potential for traffic to join at
	SB	801	819	-18	-2%	intervening junctions
Site D	EB	878	884	-5	-1%	ANPR site close to TC location
	WB	789	795	-6	-1%	

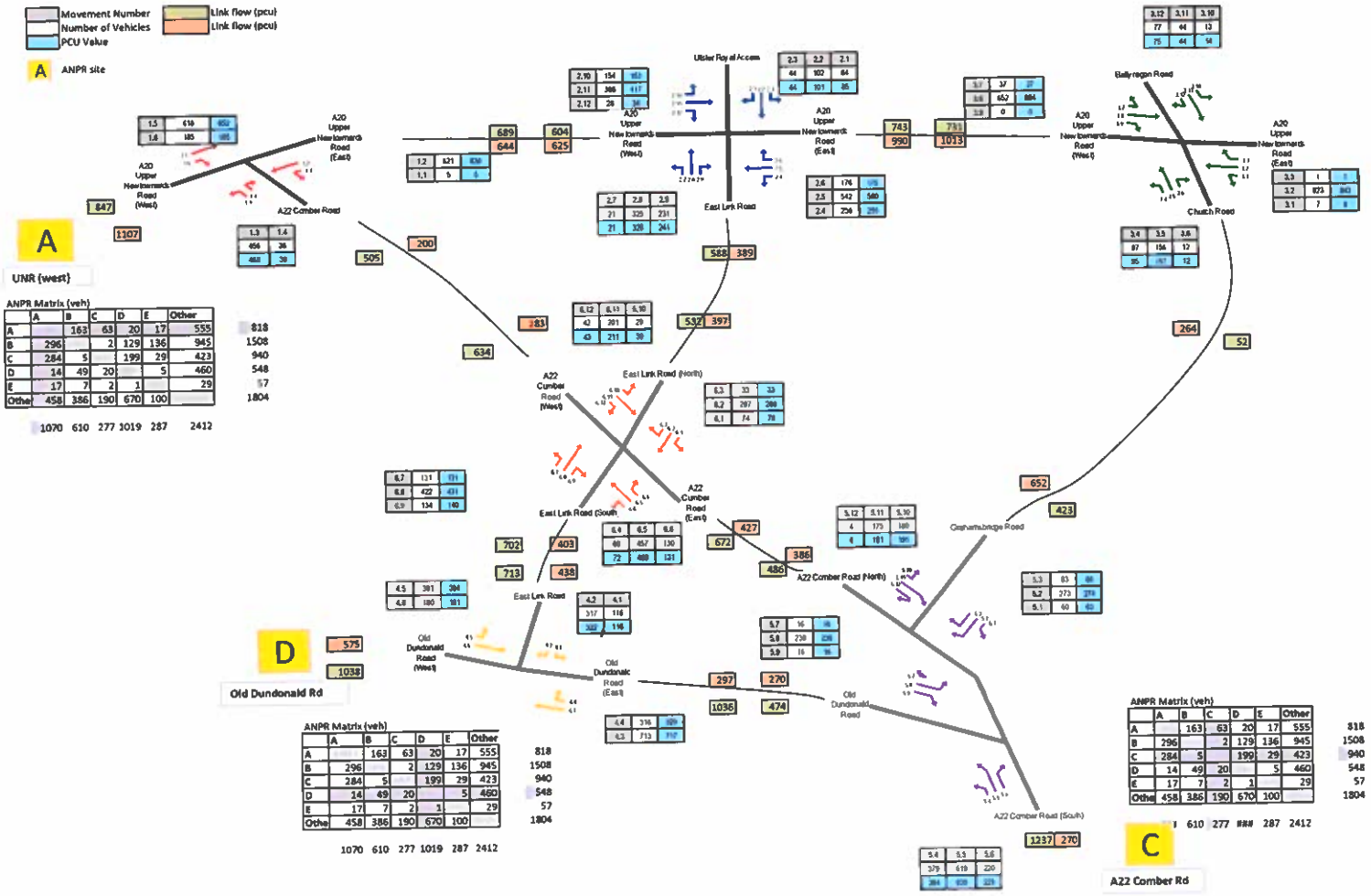
At Sites A and D, where the ANPR link flow counter was close to a surveyed junction, the link flows, and calculated link flows from the JTC corresponded well.

The main point to emerge from **Table C3** was that in the AM peak 673 fewer pcu were observed on westbound A20 at Belfast Road (Site B) than at the Ballyregan Road junction, 2km to the west. This means that a relatively large volume of westbound traffic leaves the A22 in the AM peak, before Ballyregan Road, and either stops within Dundonald, or leaves via another route. The main potential locations for this traffic to leave the A22 are at Carrowreagh Road, Old Mill Meadows, Craigleith Drive, or at the Dunlady Road / Robbs Road junction, which were not included in this particular survey.

As shown in **Table C4**, the above pattern is reversed, but slightly less pronounced, in the PM peak hour. An additional 391 pcu join the eastbound A20 between Ballyregan Road and Belfast Road.

APPENDIX B – TURN COUNT / LINK COUNT DIAGRAMS

Dundonald Traffic Surveys - Thursday 11th April 2019
Network Turning Diagram - AM Peak Hour (07:45 - 08:45)



A — UNR (west)

ANPR Matrix (veh)

	A	B	C	D	E	Other	
A		163	63	20	17	555	818
B	296		2	129	136	945	1508
C	284	5		199	29	423	940
D	14	49	20		5	460	548
E	17	7	2	1		29	57
Other	458	386	190	670	100		1804
	1070	610	277	1019	287	2412	

B — UNR (east)

ANPR Matrix (veh)

	A	B	C	D	E	Other	
A		163	63	20	17	555	818
B	296		2	129	136	945	1508
C	284	5		199	29	423	940
D	14	49	20		5	460	548
E	17	7	2	1		29	57
Other	458	386	190	670	100		1804
	1070	610	277	1019	287	2412	

C — A22 Comber Rd

ANPR Matrix (veh)

	A	B	C	D	E	Other	
A		163	63	20	17	555	818
B	296		2	129	136	945	1508
C	284	5		199	29	423	940
D	14	49	20		5	460	548
E	17	7	2	1		29	57
Other	458	386	190	670	100		1804
	1070	610	277	###	287	2412	

D — Old Dundonald Rd

ANPR Matrix (veh)

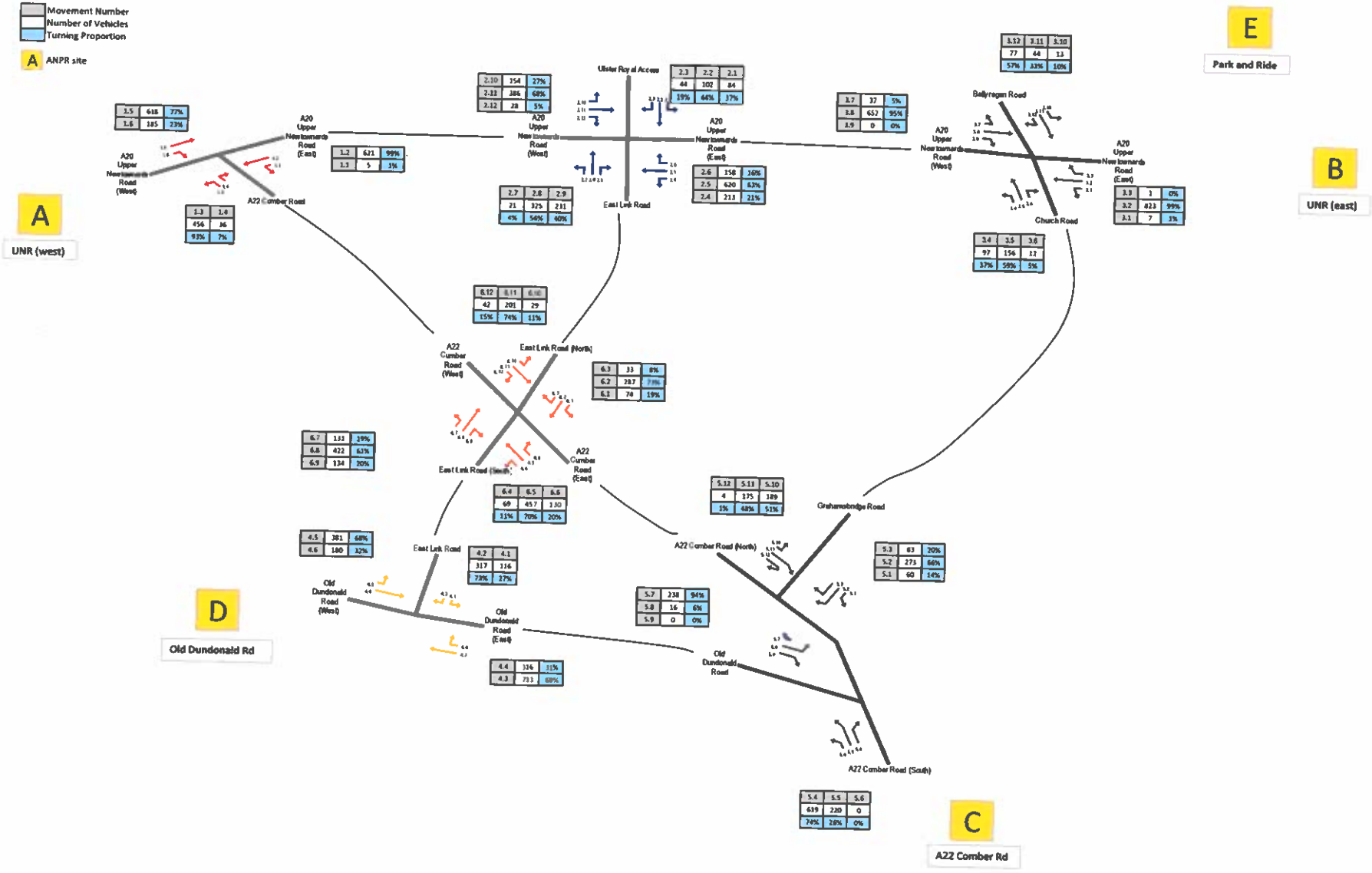
	A	B	C	D	E	Other	
A		163	63	20	17	555	818
B	296		2	129	136	945	1508
C	284	5		199	29	423	940
D	14	49	20		5	460	548
E	17	7	2	1		29	57
Other	458	386	190	670	100		1804
	1070	610	277	1019	287	2412	

E — Park and Ride

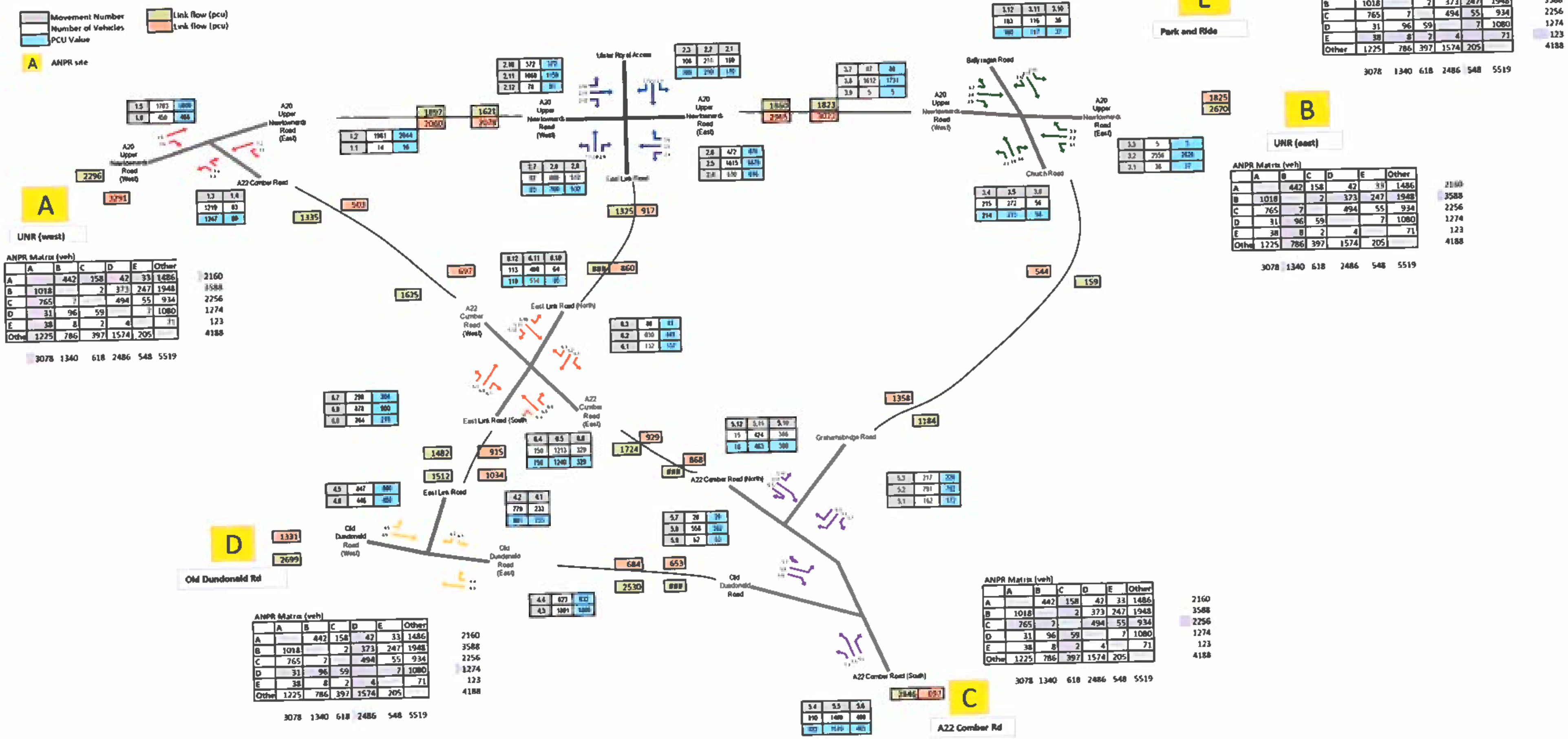
ANPR Matrix (veh)

	A	B	C	D	E	Other	
A		163	63	20	17	555	818
B	296		2	129	136	945	1508
C	284	5		199	29	423	940
D	14	49	20		5	460	548
E	17	7	2	1		29	57
Other	458	386	190	670	100		1804
	1070	610	277	1019	287	2412	

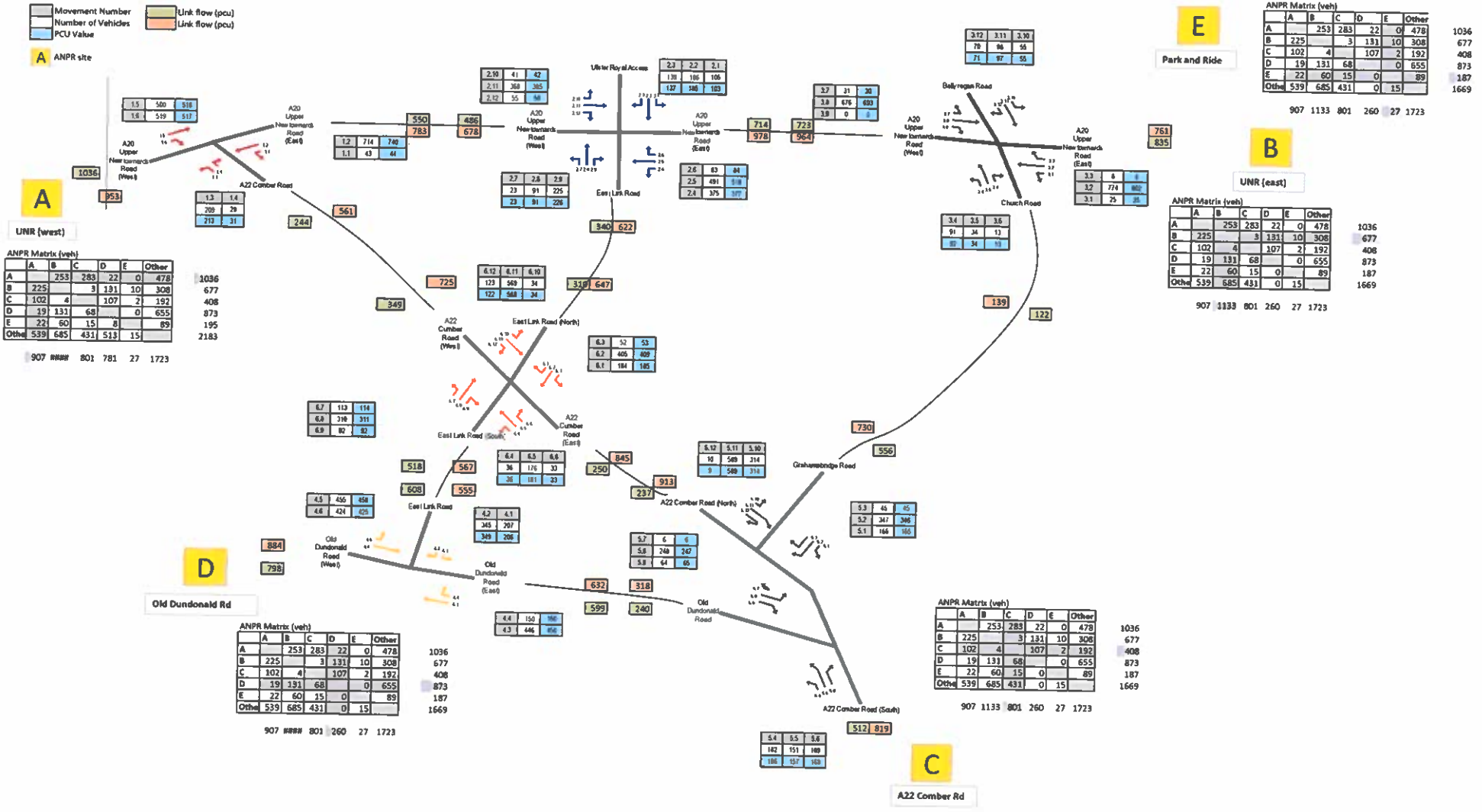
Dundonald Traffic Surveys - Thursday 11th April 2019
Network Turning Proportions - AM Peak Hour (07:45 - 08:45)



Dundonald Traffic Surveys - Thursday 11th April 2019
Network Turning Diagram - AM Peak Period (06:30 - 09:30)



Dundonald Traffic Surveys - Thursday 11th April 2019
Network Turning Diagram - PM Peak Hour (16:15 - 17:15)



ANPR Matrix (veh)

	A	B	C	D	E	Other	
A		253	283	22	0	478	1036
B	225		3	131	10	308	677
C	102	4		107	2	192	408
D	19	131	68		0	655	873
E	22	60	15	0		89	187
Other	539	685	431	0	15		1669
	907	1133	801	260	27	1723	

ANPR Matrix (veh)

	A	B	C	D	E	Other	
A		253	283	22	0	478	1036
B	225		3	131	10	308	677
C	102	4		107	2	192	408
D	19	131	68		0	655	873
E	22	60	15	0		89	195
Other	539	685	431	513	15		2183
	907	####	801	781	27	1723	

ANPR Matrix (veh)

	A	B	C	D	E	Other	
A		253	283	22	0	478	1036
B	225		3	131	10	308	677
C	102	4		107	2	192	408
D	19	131	68		0	655	873
E	22	60	15	0		89	187
Other	539	685	431	0	15		1669
	907	####	801	260	27	1723	

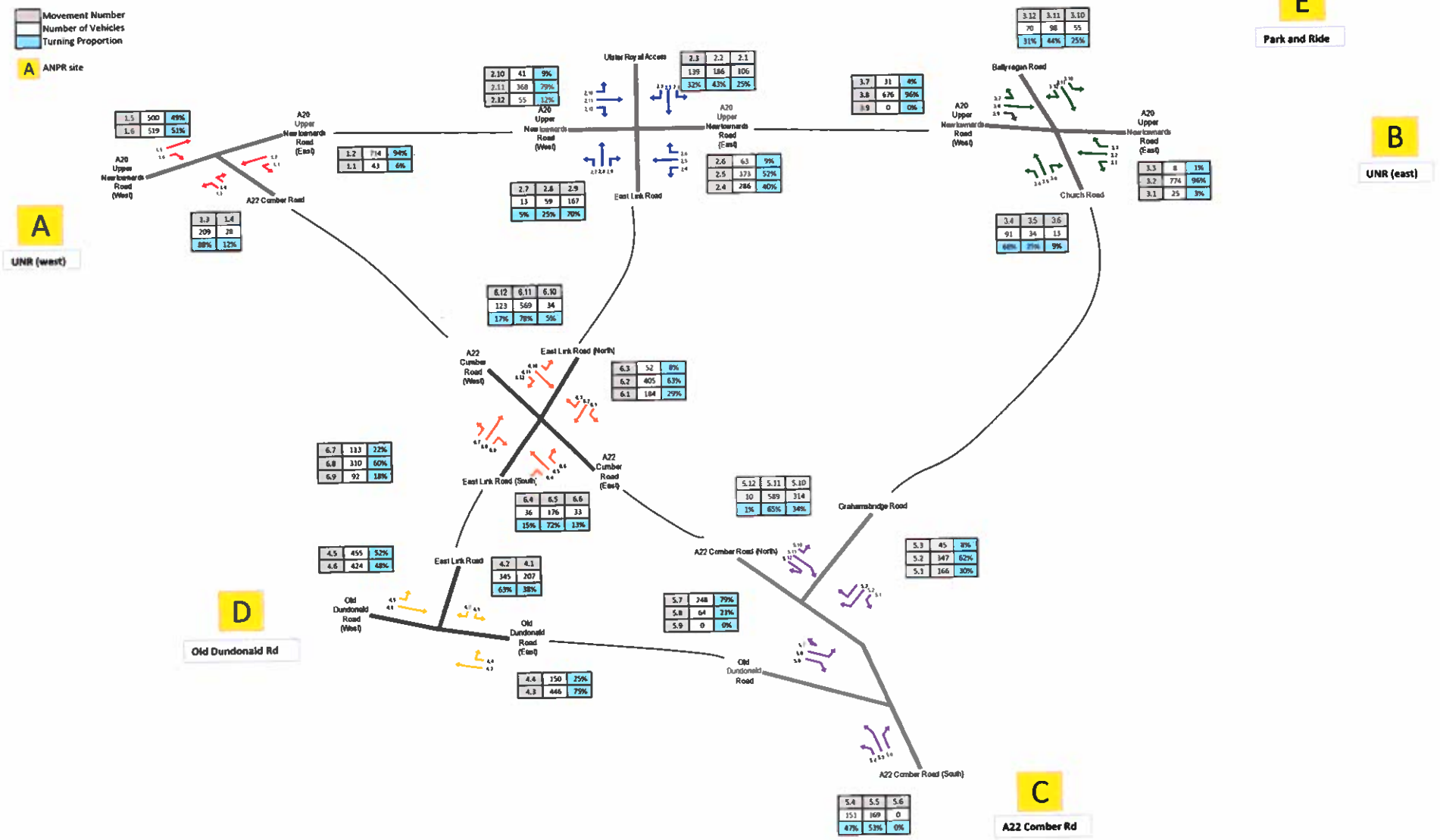
ANPR Matrix (veh)

	A	B	C	D	E	Other	
A		253	283	22	0	478	1036
B	225		3	131	10	308	677
C	102	4		107	2	192	408
D	19	131	68		0	655	873
E	22	60	15	0		89	187
Other	539	685	431	0	15		1669
	907	1133	801	260	27	1723	

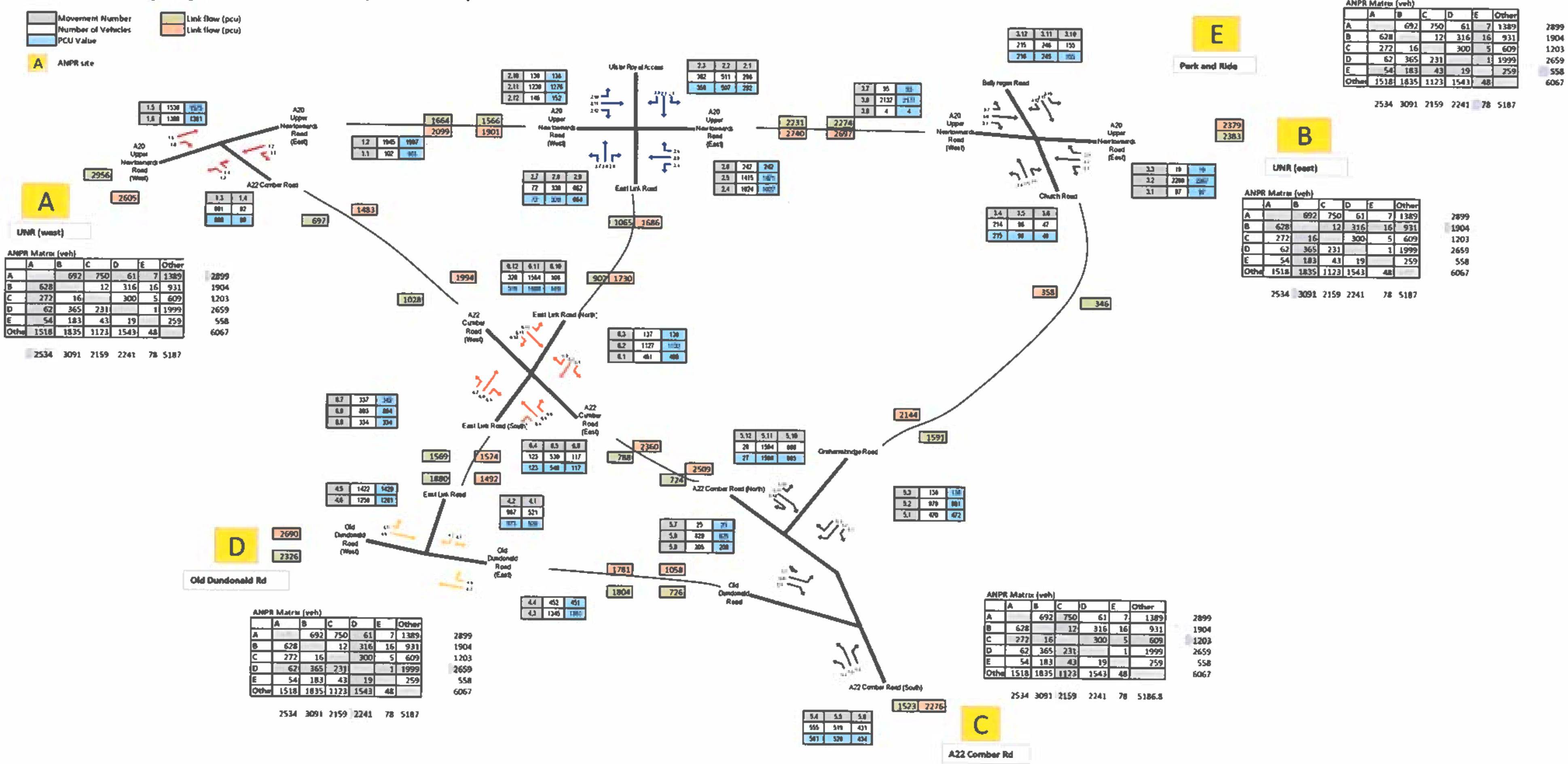
ANPR Matrix (veh)

	A	B	C	D	E	Other	
A		253	283	22	0	478	1036
B	225		3	131	10	308	677
C	102	4		107	2	192	408
D	19	131	68		0	655	873
E	22	60	15	0		89	187
Other	539	685	431	0	15		1669
	907	1133	801	260	27	1723	

Dundonald Traffic Surveys - Thursday 11th April 2019
Network Turning Proportions - PM Peak Hour (16:15 - 17:15)



Dundonald Traffic Surveys - Thursday 11th April 2019
Network Turning Diagram - PM Peak Period (16:00 - 19:00)

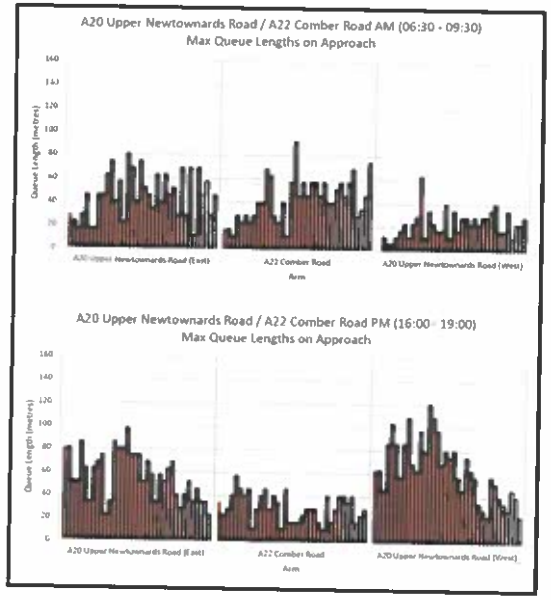


ANPR Matrix (veh)

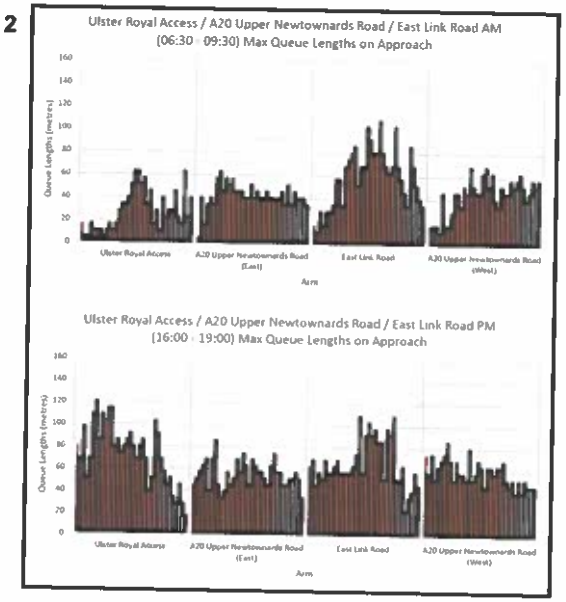
	A	B	C	D	E	Other	
A		692	750	61	7	1389	2899
B	628		12	316	16	931	1904
C	272	16		300	5	609	1203
D	62	365	231		1	1999	2659
E	54	183	43	19		259	558
Other	1518	1835	1123	1543	48		6067
	2534	3091	2159	2241	78	5187	

APPENDIX C – QUEUE LENGTH RESULTS

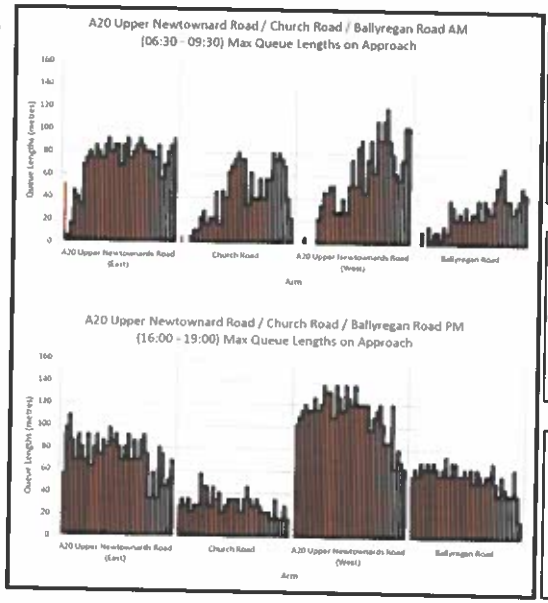
1

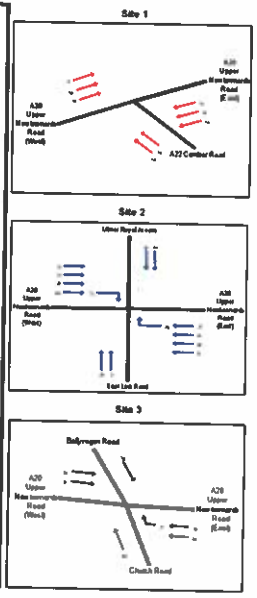

A20 Upper Newtownards Road / A22 Comber Road AM (06:30 - 09:30)
Max Queue Lengths on Approach
Queue Length (metres)
A20 Upper Newtownards Road (East)
A22 Comber Road
A20 Upper Newtownards Road (West)
Arm
A20 Upper Newtownards Road / A22 Comber Road PM (16:00 - 19:00)
Max Queue Lengths on Approach
Queue Length (metres)
A20 Upper Newtownards Road (East)
A22 Comber Road
A20 Upper Newtownards Road (West)
Arm

2

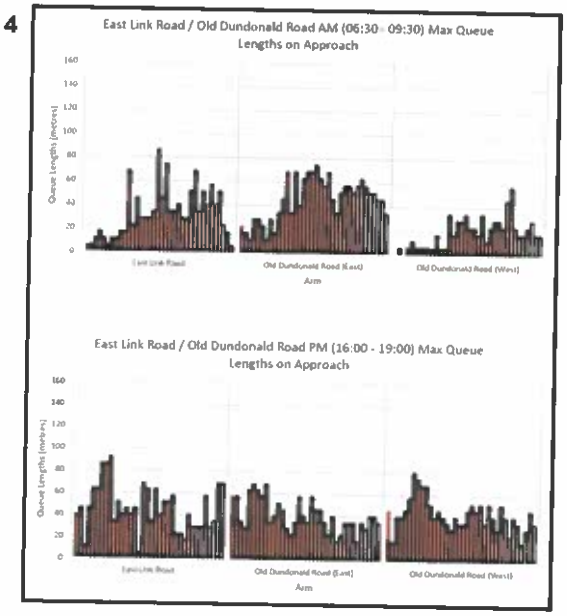

Ulster Royal Access / A20 Upper Newtownards Road / East Link Road AM
(06:30 - 09:30) Max Queue Lengths on Approach
Queue Lengths (metres)
Ulster Royal Access
A20 Upper Newtownards Road (East)
East Link Road
A20 Upper Newtownards Road (West)
Arm
Ulster Royal Access / A20 Upper Newtownards Road / East Link Road PM
(16:00 - 19:00) Max Queue Lengths on Approach
Queue Lengths (metres)
Ulster Royal Access
A20 Upper Newtownards Road (East)
East Link Road
A20 Upper Newtownards Road (West)
Arm

3

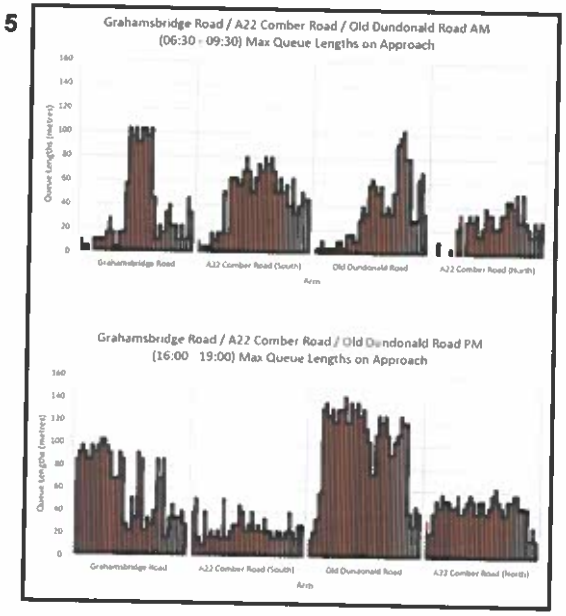

A20 Upper Newtownard Road / Church Road / Ballyregan Road AM
(06:30 - 09:30) Max Queue Lengths on Approach
Queue Lengths (metres)
A20 Upper Newtownards Road (East)
Church Road
A20 Upper Newtownards Road (West)
Ballyregan Road
Arm
A20 Upper Newtownard Road / Church Road / Ballyregan Road PM
(16:00 - 19:00) Max Queue Lengths on Approach
Queue Lengths (metres)
A20 Upper Newtownards Road (East)
Church Road
A20 Upper Newtownards Road (West)
Ballyregan Road
Arm


Site 1
A20 Upper Newtownards Road (West)
A20 Upper Newtownards Road (East)
A22 Comber Road
Site 2
Ulster Royal Access
A20 Upper Newtownards Road (West)
A20 Upper Newtownards Road (East)
East Link Road
Site 3
Ballyregan Road
A20 Upper Newtownards Road (West)
A20 Upper Newtownards Road (East)
Church Road

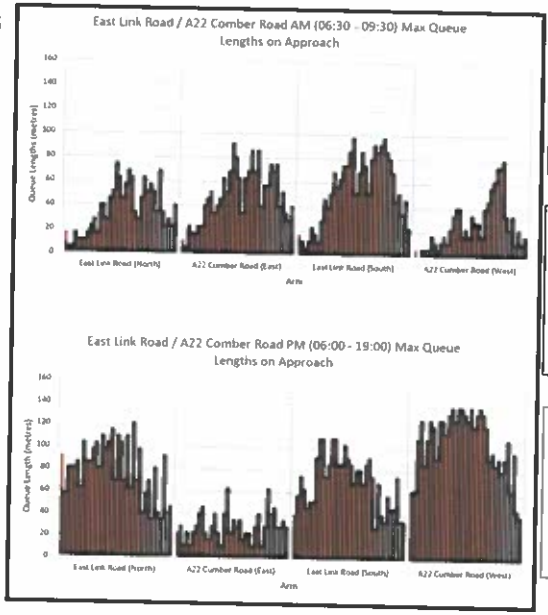
4

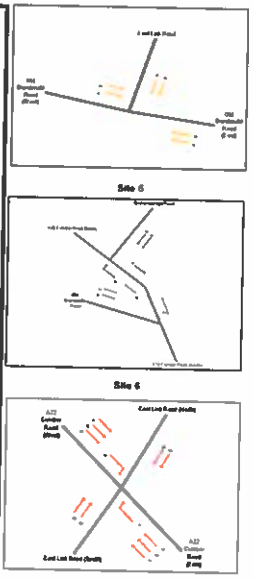

East Link Road / Old Dundonald Road AM (06:30 - 09:30) Max Queue
Lengths on Approach
Queue Lengths (metres)
East Link Road
Old Dundonald Road (East)
Old Dundonald Road (West)
Arm
East Link Road / Old Dundonald Road PM (16:00 - 19:00) Max Queue
Lengths on Approach
Queue Lengths (metres)
East Link Road
Old Dundonald Road (East)
Old Dundonald Road (West)
Arm

5


Grahamsbridge Road / A22 Comber Road / Old Dundonald Road AM
(06:30 - 09:30) Max Queue Lengths on Approach
Queue Lengths (metres)
Grahamsbridge Road
A22 Comber Road (South)
Old Dundonald Road
A22 Comber Road (North)
Arm
Grahamsbridge Road / A22 Comber Road / Old Dundonald Road PM
(16:00 - 19:00) Max Queue Lengths on Approach
Queue Lengths (metres)
Grahamsbridge Road
A22 Comber Road (South)
Old Dundonald Road
A22 Comber Road (North)
Arm

6


East Link Road / A22 Comber Road AM (06:30 - 09:30) Max Queue
Lengths on Approach
Queue Lengths (metres)
East Link Road (North)
A22 Comber Road (East)
East Link Road (South)
A22 Comber Road (West)
Arm
East Link Road / A22 Comber Road PM (06:00 - 19:00) Max Queue
Lengths on Approach
Queue Length (metres)
East Link Road (North)
A22 Comber Road (East)
East Link Road (South)
A22 Comber Road (West)
Arm


Site 4
Site 5
Site 6

APPENDIX D – ANPR ORIGIN-DESTINATION MATRICES

Table 10. AM Peak Hour ANPR matrix (07:45-08:45, veh)

	A	B	C	D	E	Other	TOTAL
A		163	63	20	17	555	818
B	296		2	129	136	945	1508
C	284	5		199	29	423	940
D	14	49	20		5	460	548
E	17	7	2	1		29	57
Other	458	386	190	670	100		1804
TOTAL	**1070**	**610**	**277**	**1019**	**287**	**2412**	**5675**

Table 11. AM Peak 3hr period ANPR matrix (06:30-09:30, veh)

	A	B	C	D	E	Other	TOTAL
A		442	158	42	33	1486	2160
B	1018		2	373	247	1948	3588
C	765	7		494	55	934	2256
D	31	96	59		7	1080	1274
E	38	8	2	4		71	123
Other	1225	786	397	1574	205		4188
TOTAL	**3078**	**1340**	**618**	**2486**	**548**	**5519**	**13589**

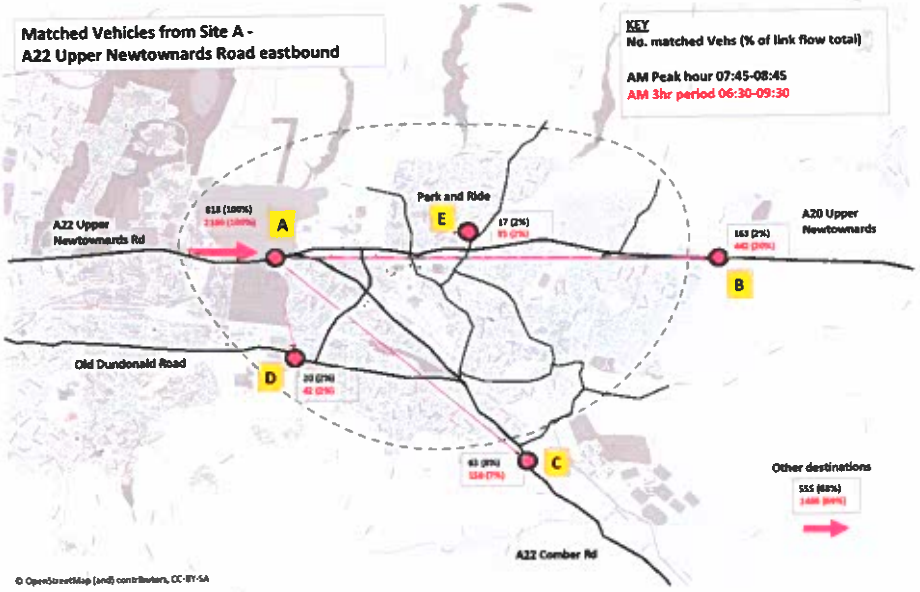
Table 12. PM Peak Hour ANPR matrix (16:15-17:15)

	A	B	C	D	E	Other	TOTAL
A		253	283	22	0	478	1036
B	225		3	131	10	308	677
C	102	4		107	2	192	408
D	19	131	68		0	655	873
E	22	60	15	8		89	195
Other	539	685	431	513	15		2183
TOTAL	**907**	**1133**	**801**	**781**	**27**	**1723**	**5372**

Table 13. PM Peak 3hr period ANPR matrix (16:15-17:15)

	A	B	C	D	E	Other	TOTAL
A		692	750	61	7	1389	2899
B	628		12	316	16	931	1904
C	272	16		300	5	609	1203
D	62	365	231		1	1999	2659
E	54	183	43	19		259	558
Other	1518	1835	1123	1543	48		6067
TOTAL	**2534**	**3091**	**2159**	**2241**	**78**	**5187**	**15290**

APPENDIX E – ORIGIN-DESTINATION DIAGRAMS


Matched Vehicles from Site A -
A22 Upper Newtownards Road eastbound
KEY
No. matched Vehs (% of link flow total)
AM Peak hour 07:45-08:45
AM 3hr period 06:30-09:30
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
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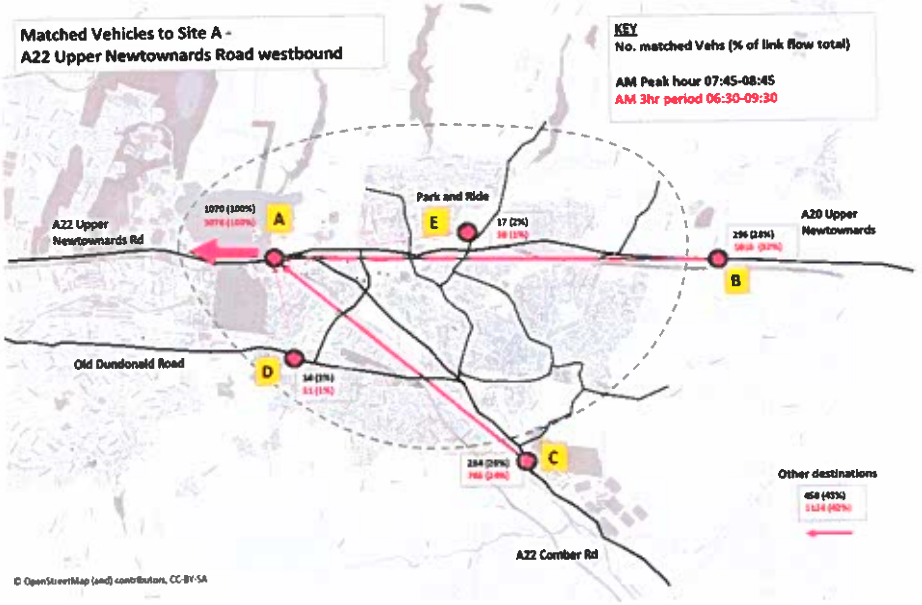
Matched Vehicles to Site A -
A22 Upper Newtownards Road westbound
KEY
No. matched Vehs (% of link flow total)
AM Peak hour 07:45-08:45
AM 3hr period 06:30-09:30
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
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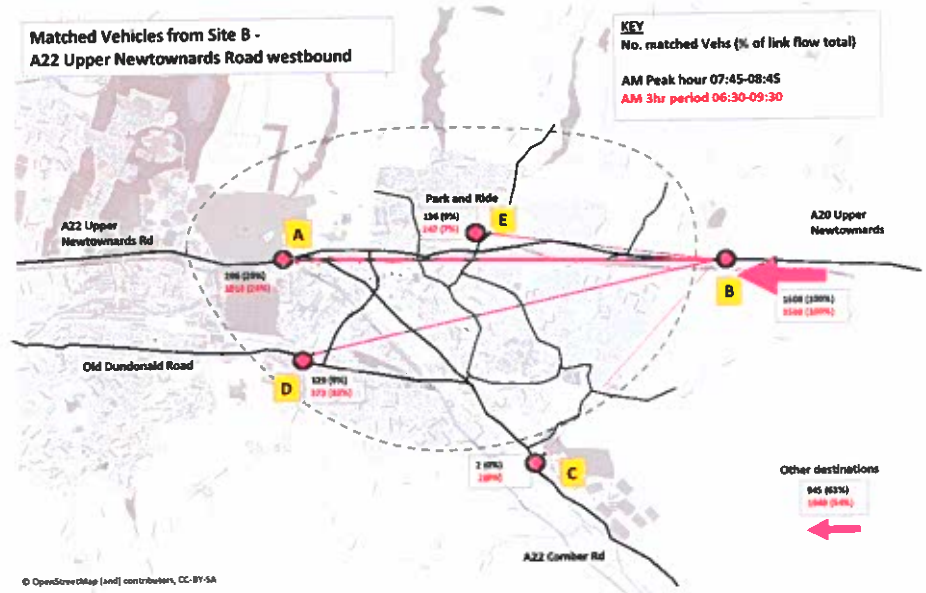
Matched Vehicles from Site B -
A22 Upper Newtownards Road westbound
KEY
No. matched Vehs (% of link flow total)
AM Peak hour 07:45-08:45
AM 3hr period 06:30-09:30
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
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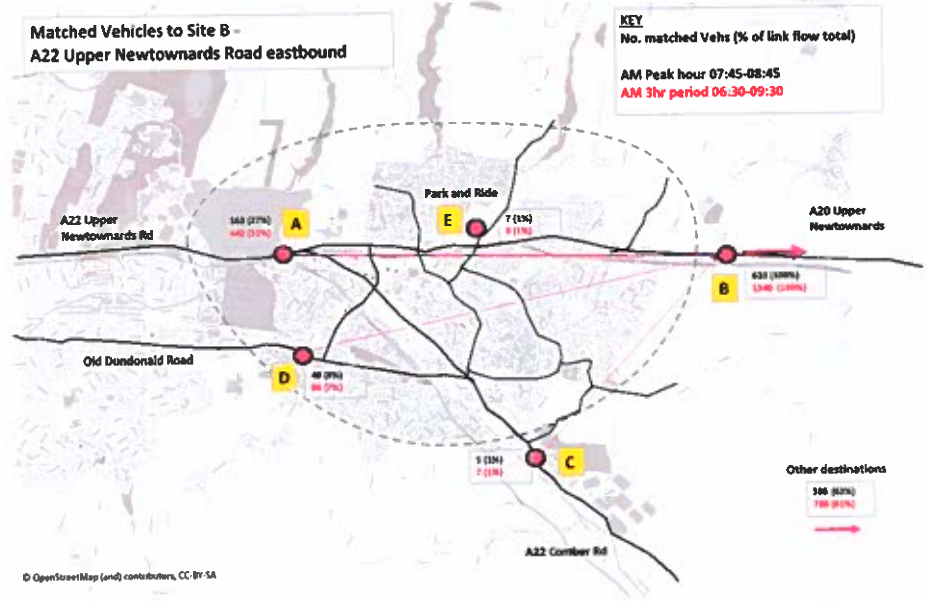
Matched Vehicles to Site B -
A22 Upper Newtownards Road eastbound
KEY
No. matched Vehs (% of link flow total)
AM Peak hour 07:45-08:45
AM 3hr period 06:30-09:30
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
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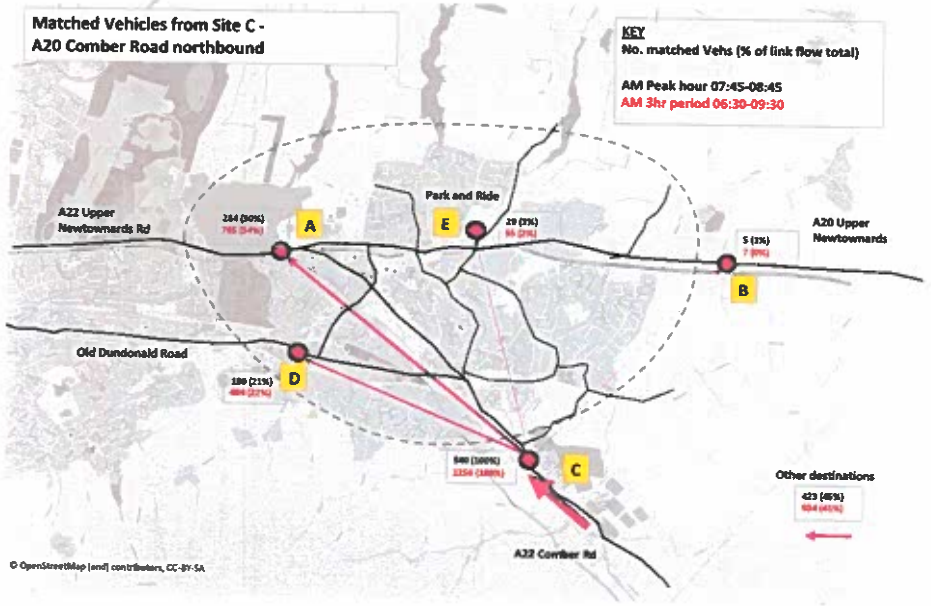
Matched Vehicles from Site C -
A20 Comber Road northbound
KEY
No. matched Vehs (% of link flow total)
AM Peak hour 07:45-08:45
AM 3hr period 06:30-09:30
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
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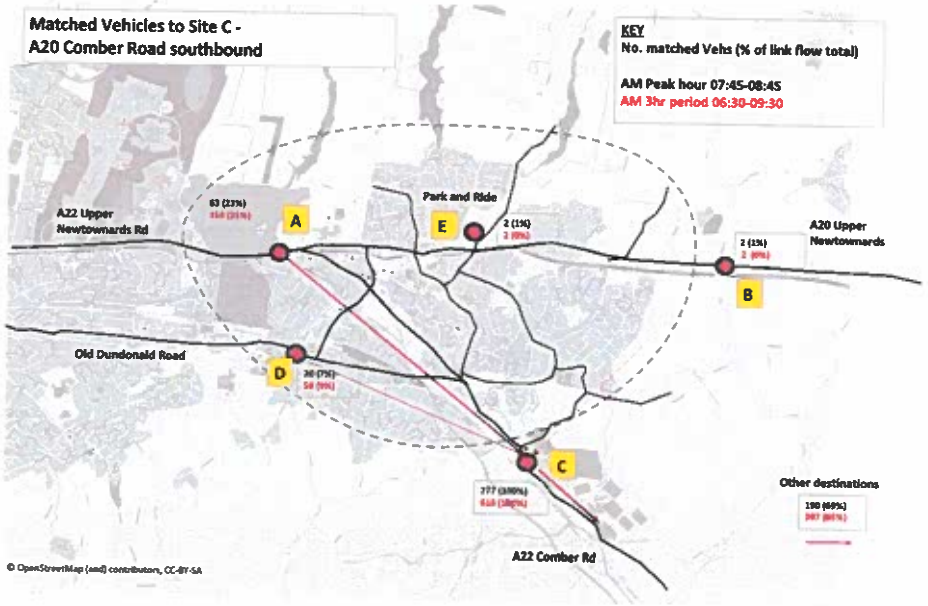
Matched Vehicles to Site C -
A20 Comber Road southbound
KEY
No. matched Vehs (% of link flow total)
AM Peak hour 07:45-08:45
AM 3hr period 06:30-09:30
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
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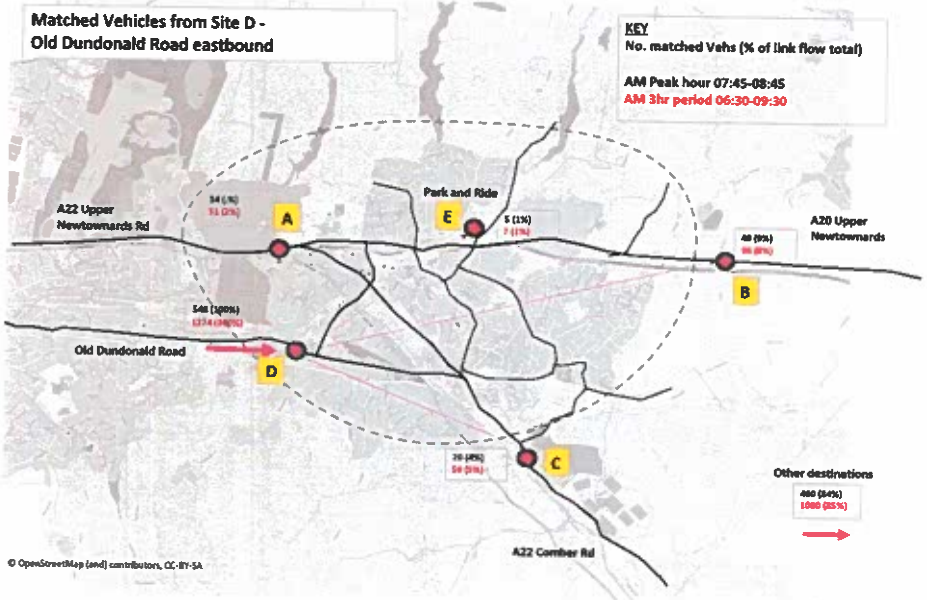
Matched Vehicles from Site D -
Old Dundonald Road eastbound
KEY
No. matched Vehs (% of link flow total)
AM Peak hour 07:45-08:45
AM 3hr period 06:30-09:30
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
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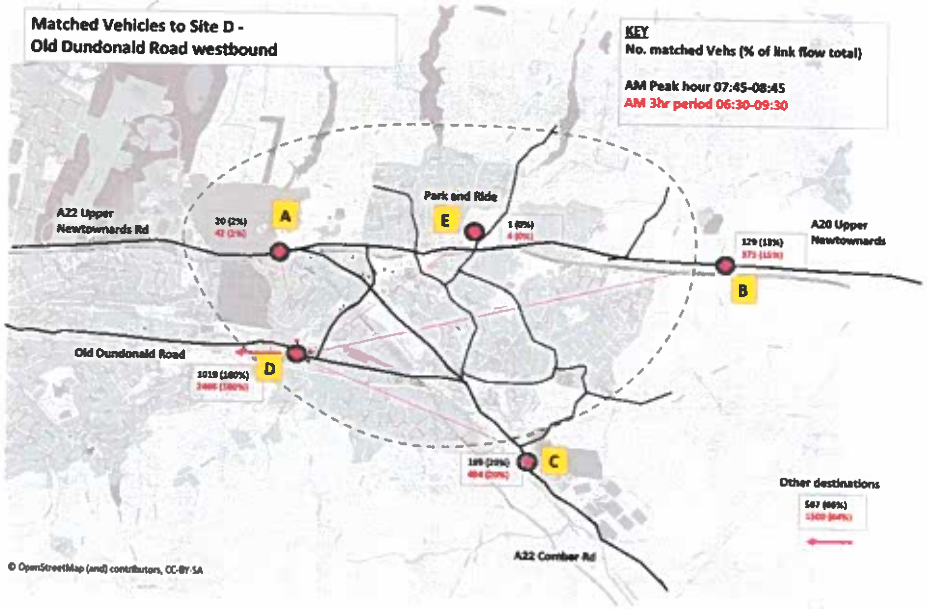
Matched Vehicles to Site D -
Old Dundonald Road westbound
KEY
No. matched Vehs (% of link flow total)
AM Peak hour 07:45-08:45
AM 3hr period 06:30-09:30
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
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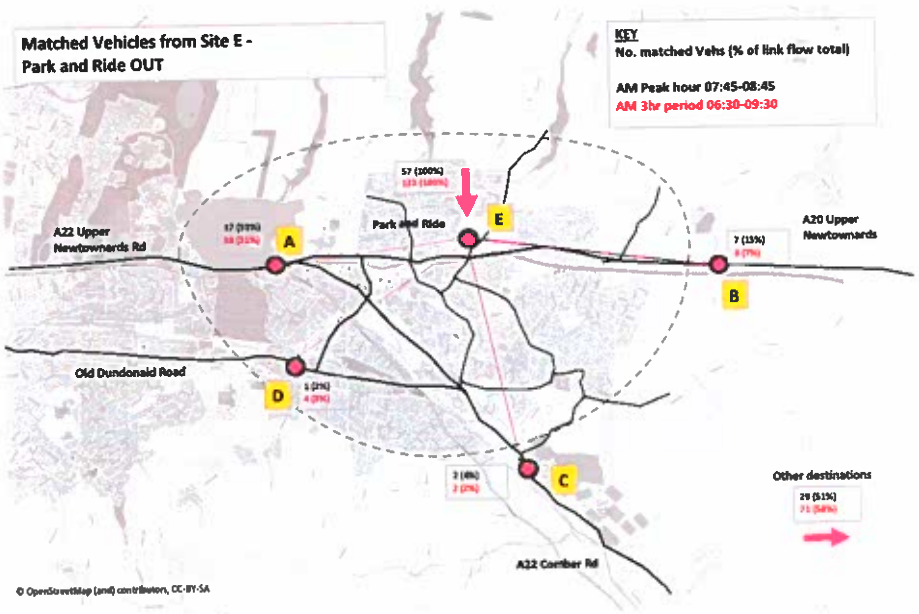
Matched Vehicles from Site E -
Park and Ride OUT
KEY
No. matched Vehs (% of link flow total)
AM Peak hour 07:45-08:45
AM 3hr period 06:30-09:30
A22 Upper Newtownards Rd
A20 Upper Newtownards
Park and Ride
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
57 (100%)
7 (15%)
29 (51%)
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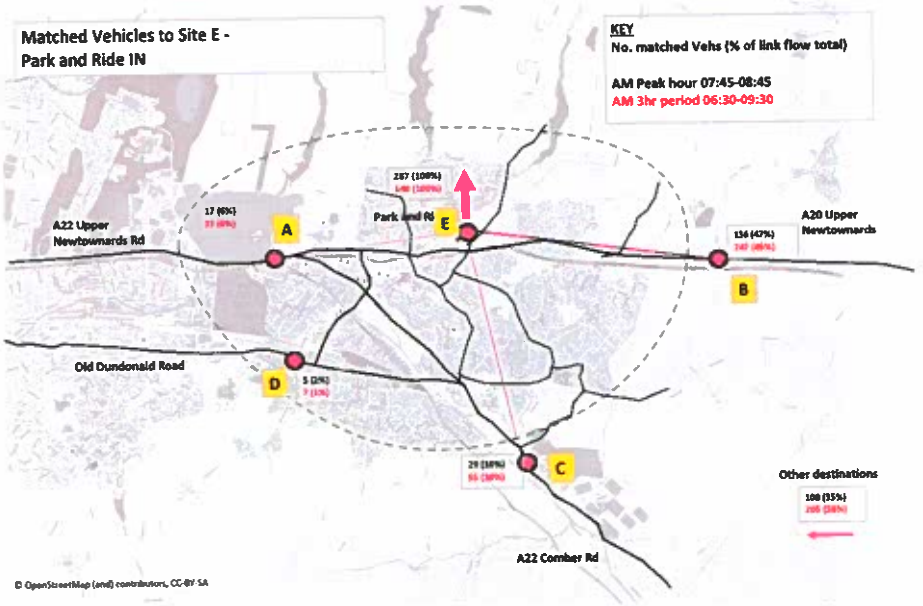
Matched Vehicles to Site E -
Park and Ride IN
KEY
No. matched Vehs (% of link flow total)
AM Peak hour 07:45-08:45
AM 3hr period 06:30-09:30
A22 Upper Newtownards Rd
A20 Upper Newtownards
Park and Ride
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
287 (100%)
156 (47%)
29 (38%)
108 (35%)
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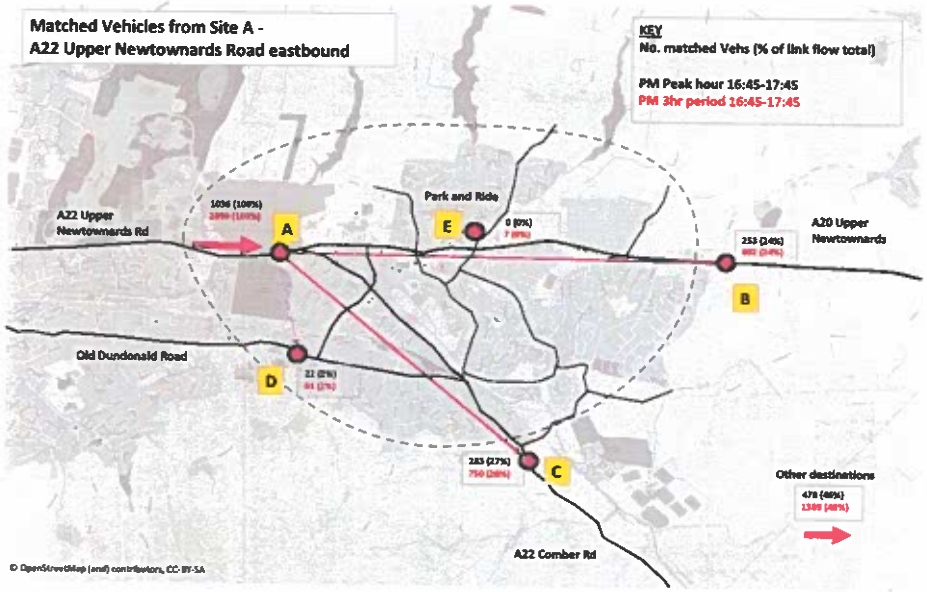
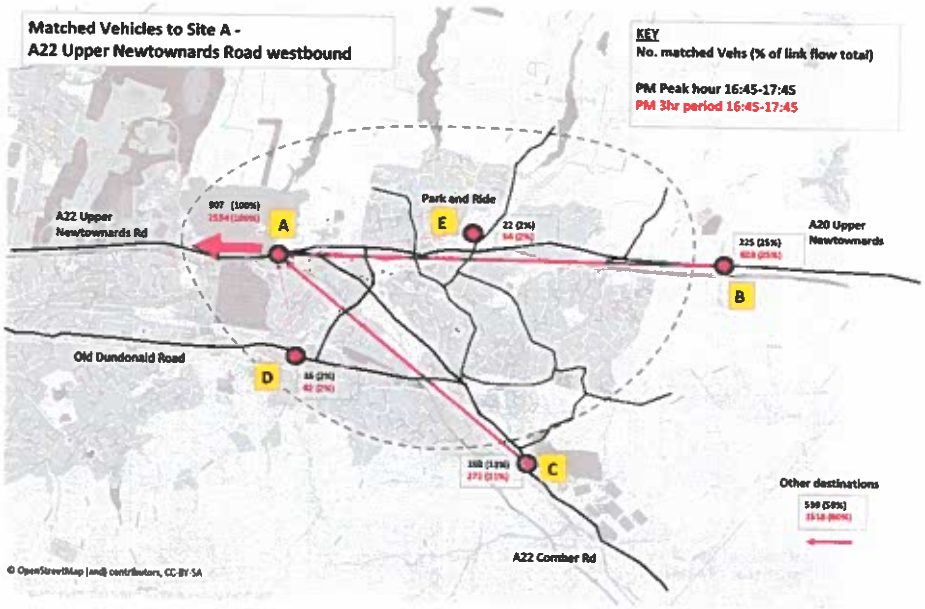
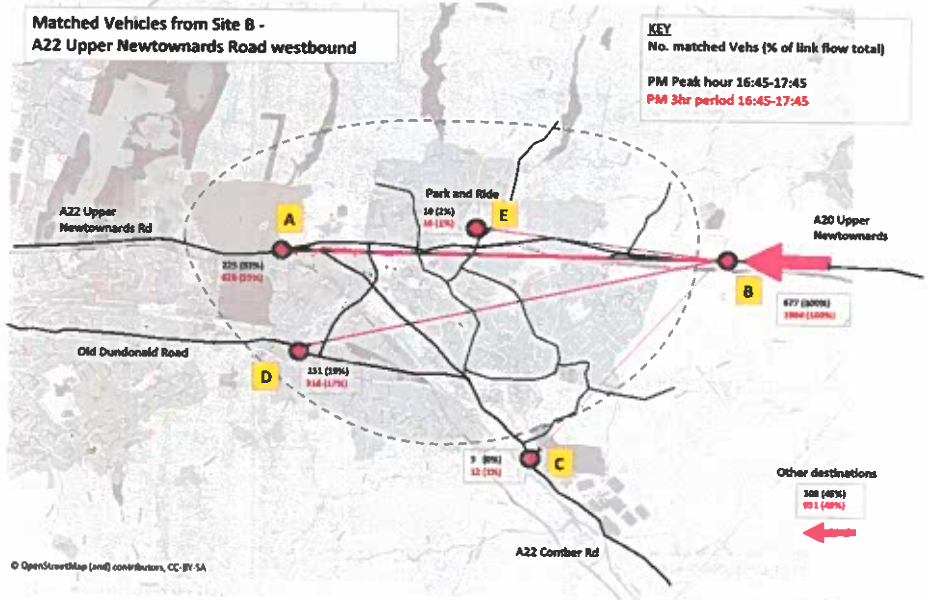
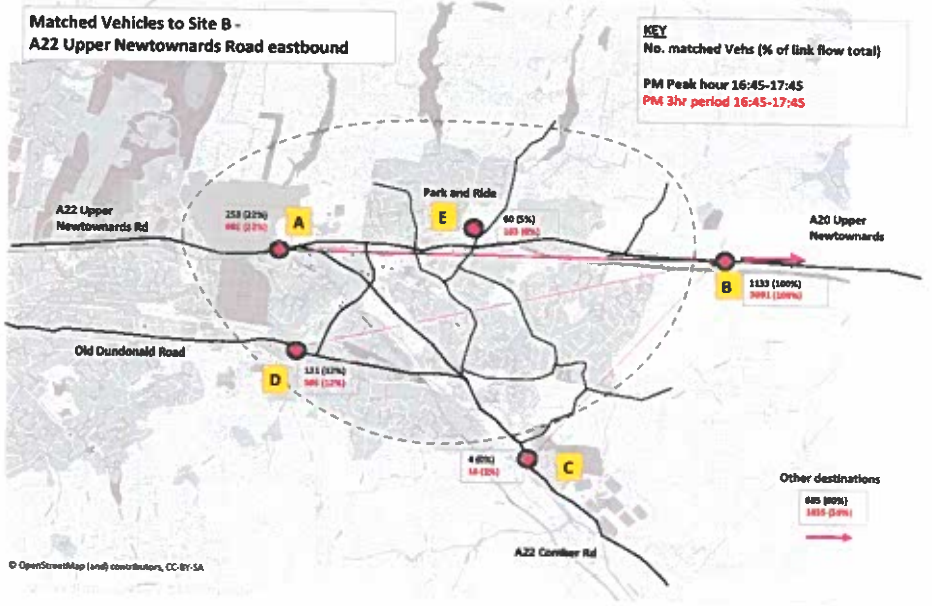
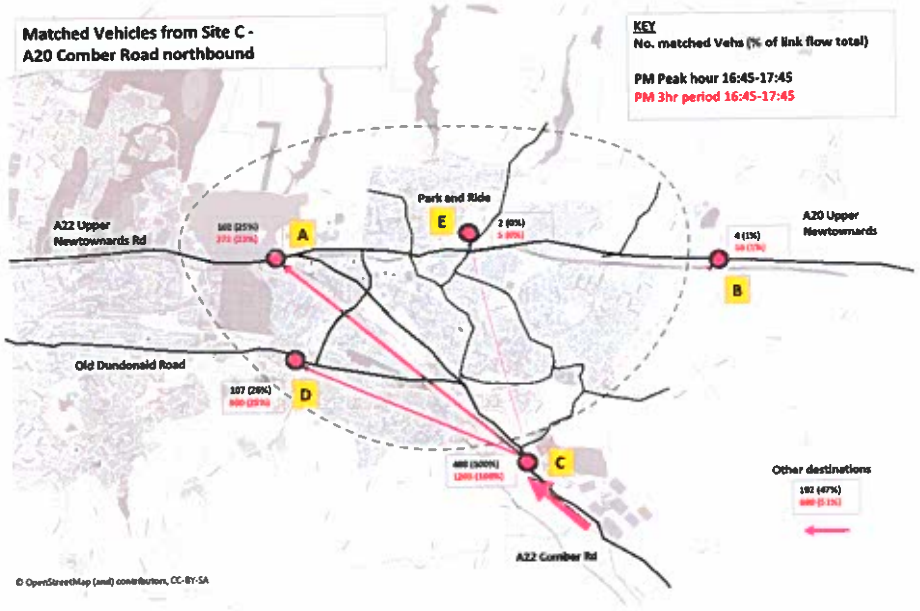
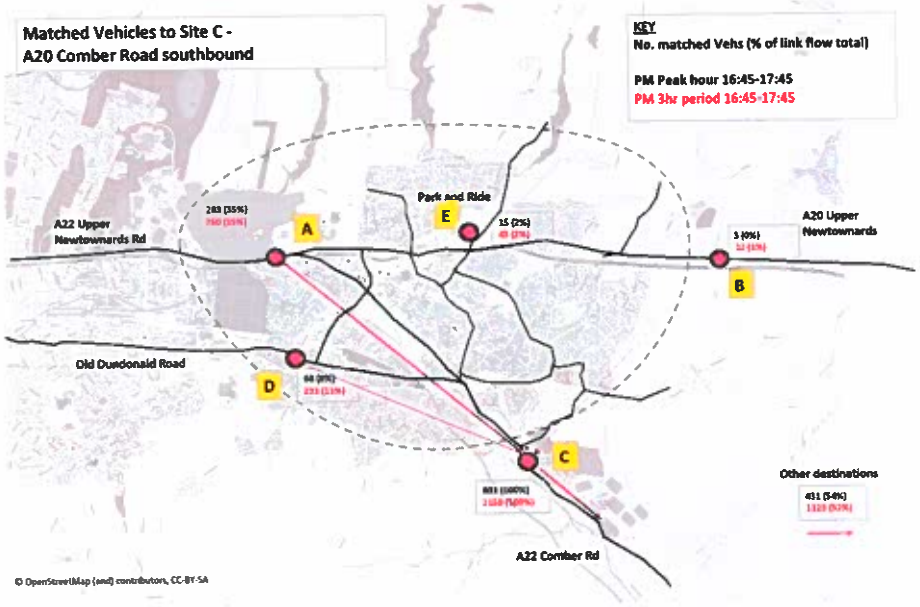

Matched Vehicles from Site A -
A22 Upper Newtownards Road eastbound
KEY
No. matched Vehs (% of link flow total)
PM Peak hour 16:45-17:45
PM 3hr period 16:45-17:45
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E


Matched Vehicles to Site A -
A22 Upper Newtownards Road westbound
KEY
No. matched Vehs (% of link flow total)
PM Peak hour 16:45-17:45
PM 3hr period 16:45-17:45
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E

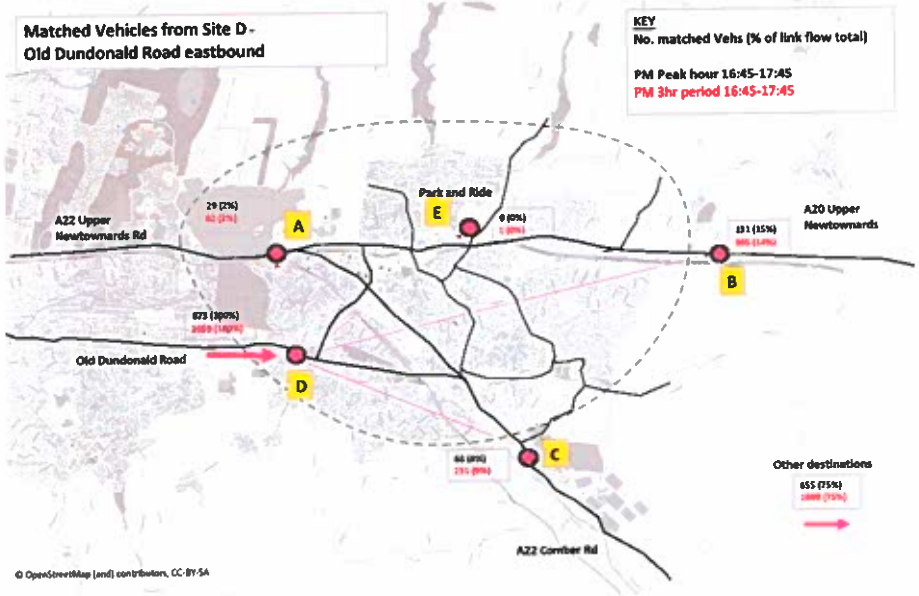

Matched Vehicles from Site B -
A22 Upper Newtownards Road westbound
KEY
No. matched Vehs (% of link flow total)
PM Peak hour 16:45-17:45
PM 3hr period 16:45-17:45
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E

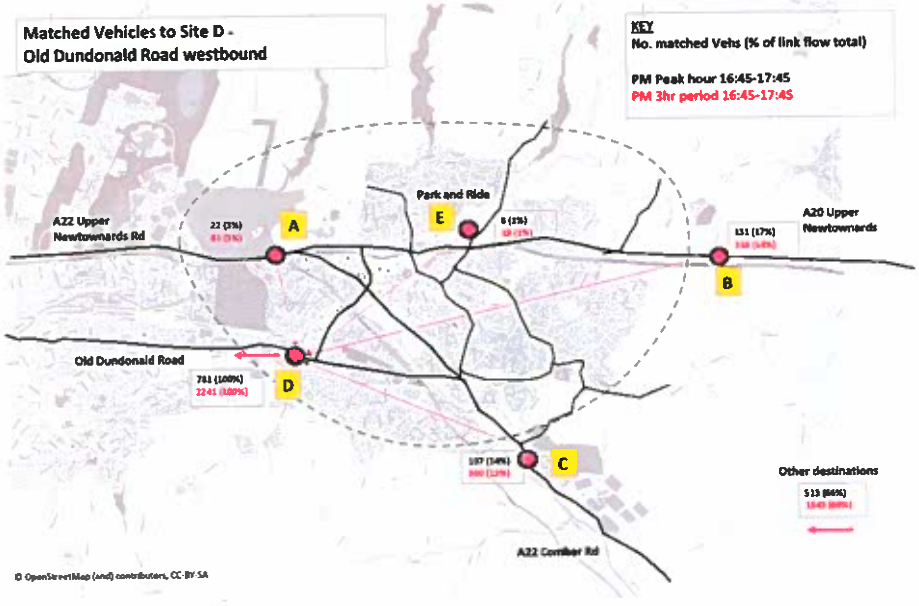

Matched Vehicles to Site B -
A22 Upper Newtownards Road eastbound
KEY
No. matched Vehs (% of link flow total)
PM Peak hour 16:45-17:45
PM 3hr period 16:45-17:45
A22 Upper Newtownards Rd
Park and Ride
A20 Upper Newtownards
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E

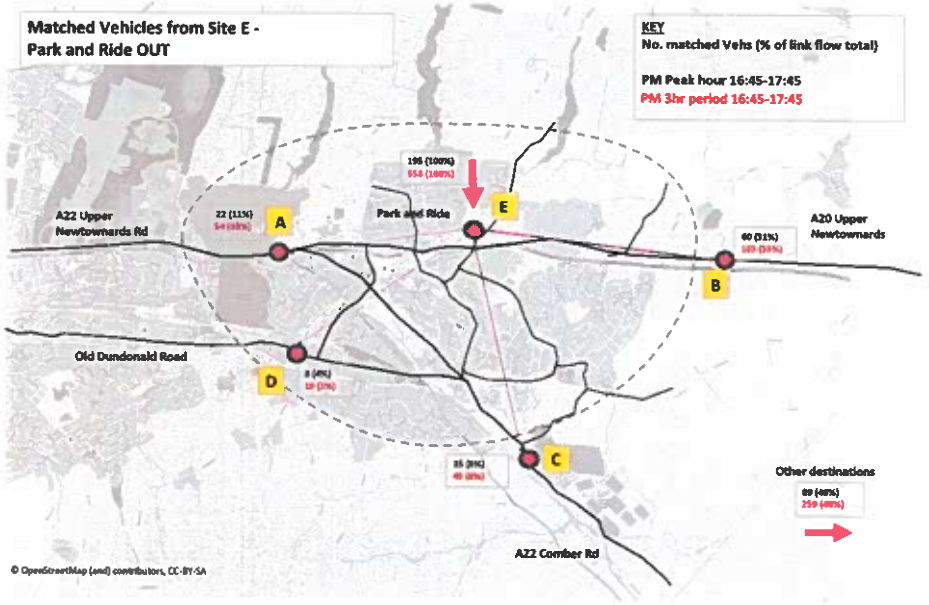




COMPLETED UP TO HERE






Matched Vehicles from Site E -
Park and Ride OUT
KEY
No. matched Vehs (% of link flow total)
PM Peak hour 16:45-17:45
PM 3hr period 16:45-17:45
A22 Upper Newtownards Rd
A20 Upper Newtownards
Park and Ride
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
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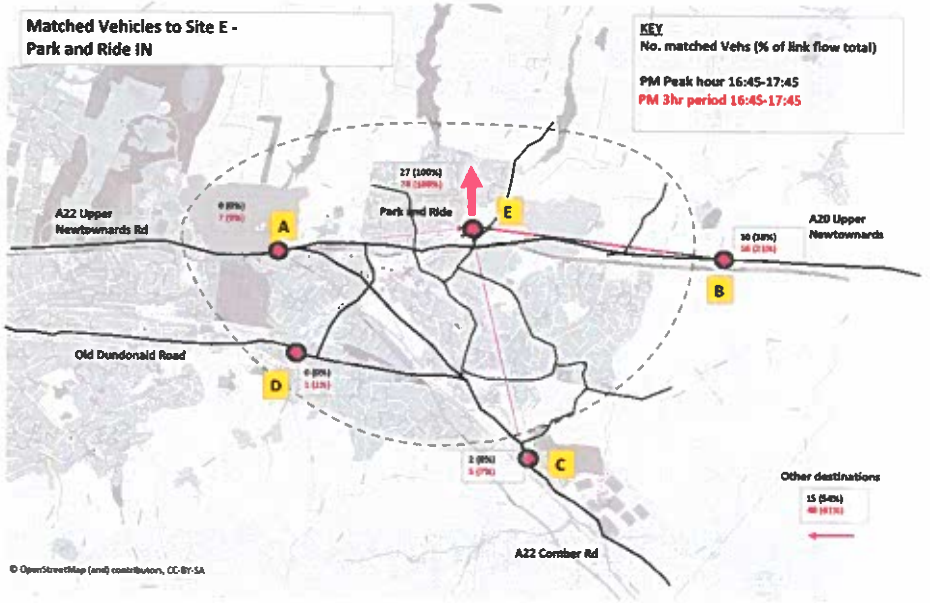
Matched Vehicles to Site E -
Park and Ride IN
KEY
No. matched Vehs (% of link flow total)
PM Peak hour 16:45-17:45
PM 3hr period 16:45-17:45
A22 Upper Newtownards Rd
A20 Upper Newtownards
Park and Ride
Old Dundonald Road
A22 Comber Rd
Other destinations
A
B
C
D
E
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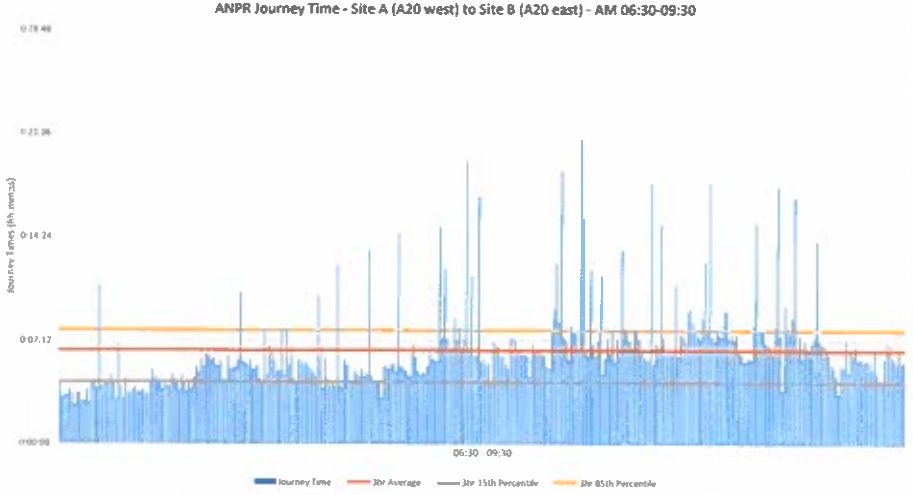
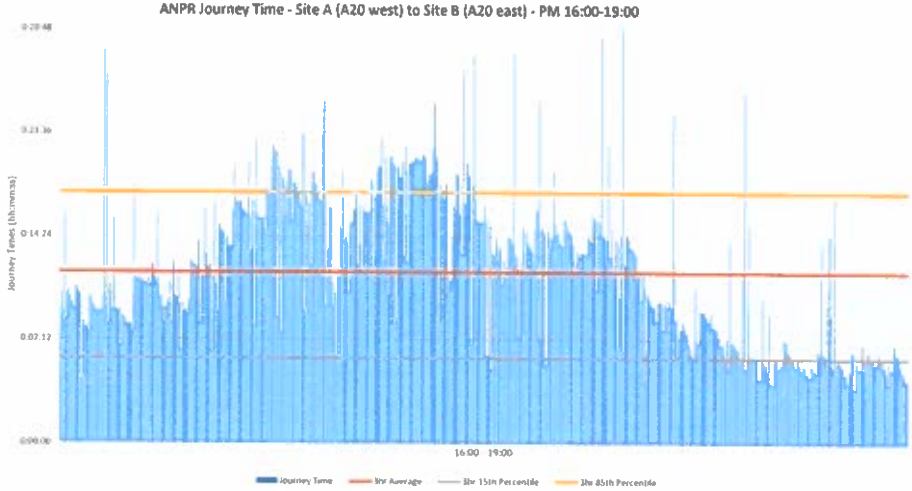
APPENDIX F – JOURNEY TIME GRAPHS

ANPR Journey Time - Site A (A20 west) to Site B (A20 east) - AM 06:30-09:30

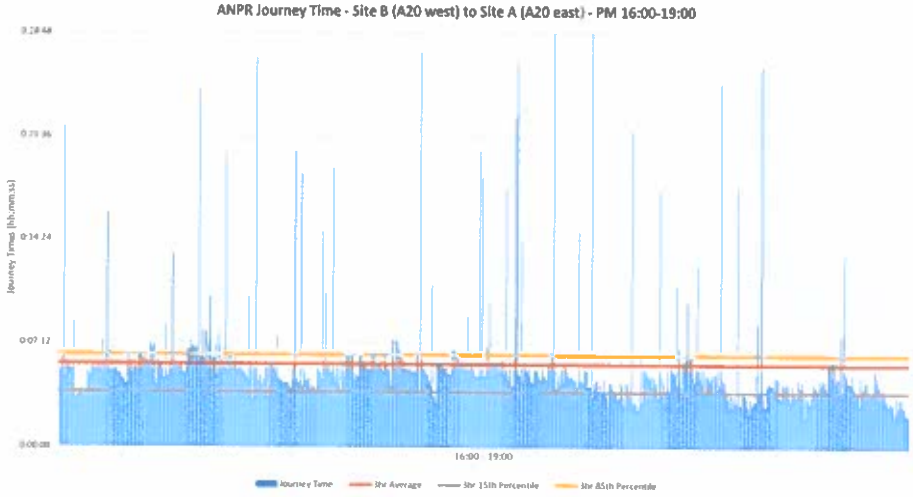


ANPR Journey Time - Site A (A20 west) to Site B (A20 east) - PM 16:00-19:00

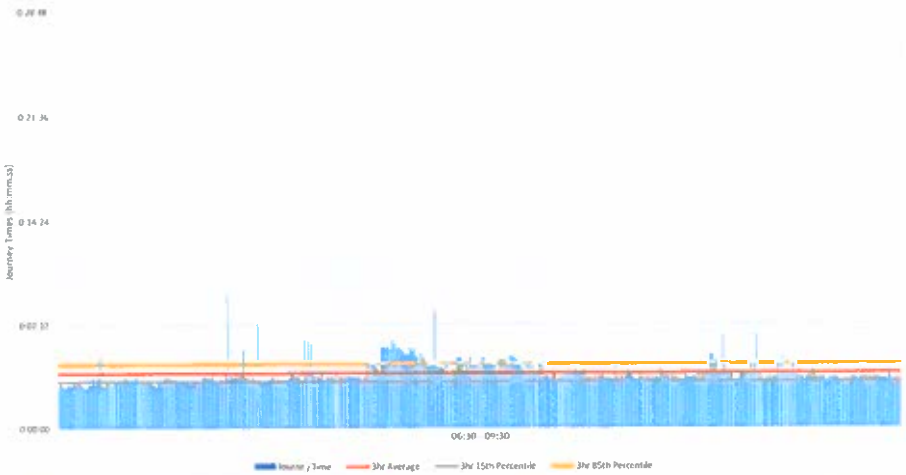


ANPR Journey Time - Site B (A20 west) to Site A (A20 east) - AM 06:30-09:30

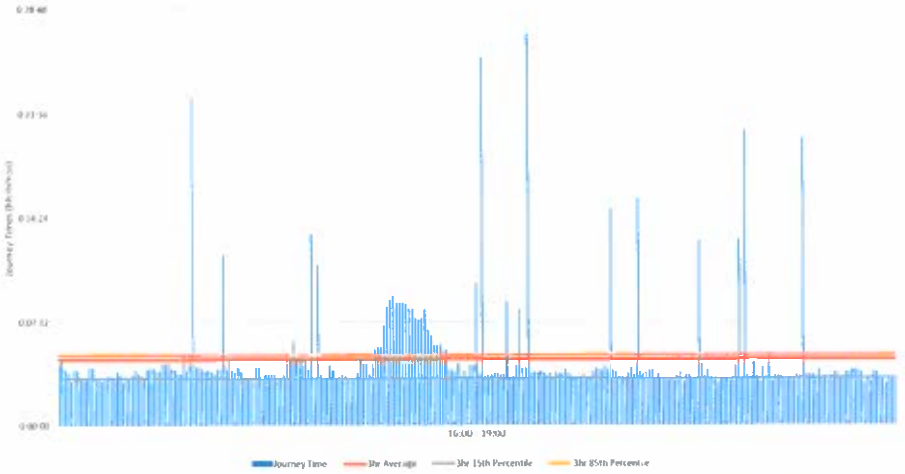
ANPR Journey Time - Site B (A20 west) to Site A (A20 east) - PM 16:00-19:00



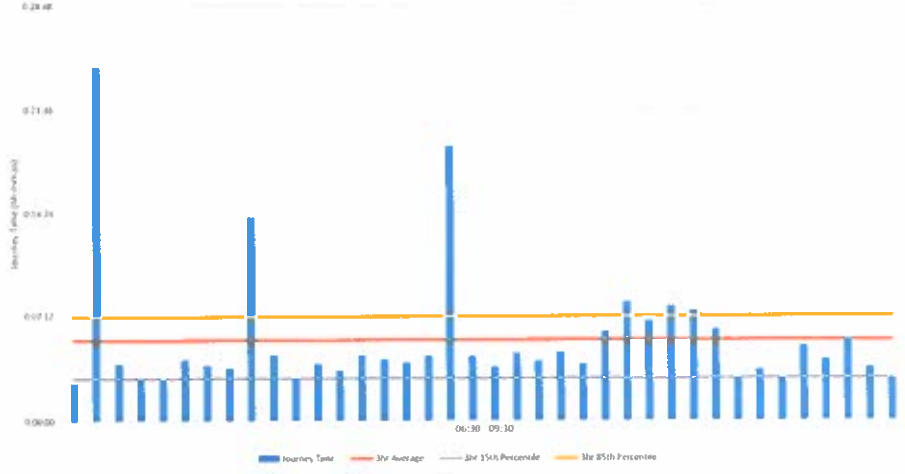
ANPR Journey Time - Site C (A22 Comber Road) to Site D (ODR) - AM 06:30-09:30



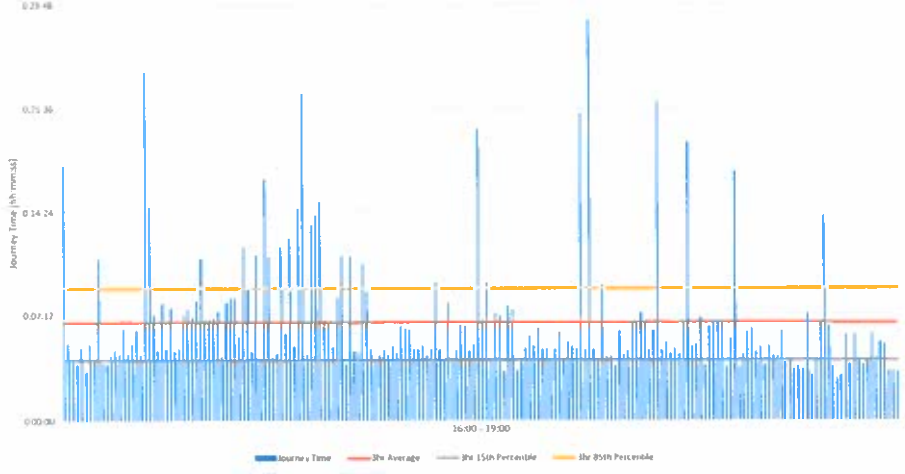
ANPR Journey Time - Site C (A22 Comber Road) to Site D (ODR) - PM 16:00-19:00



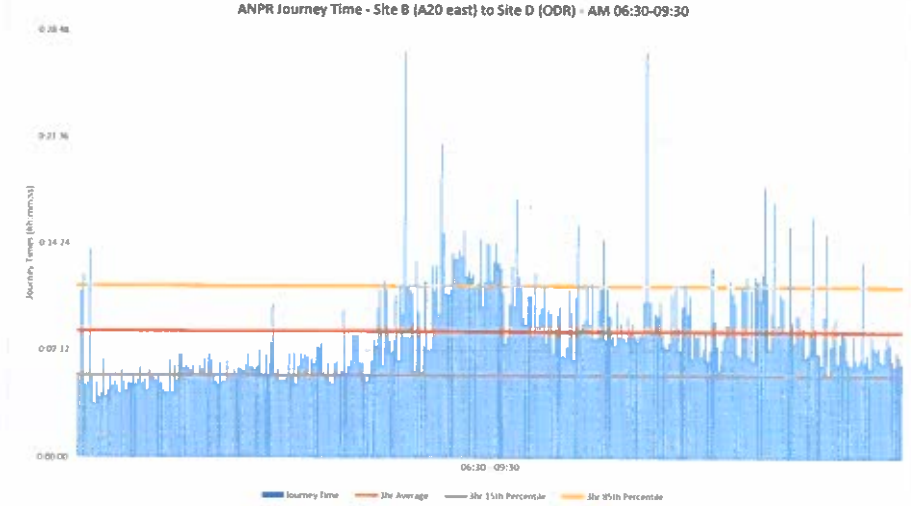
ANPR Journey Time - Site D (ODR) to Site C (A22 Comber Road) - AM 06:30-09:30



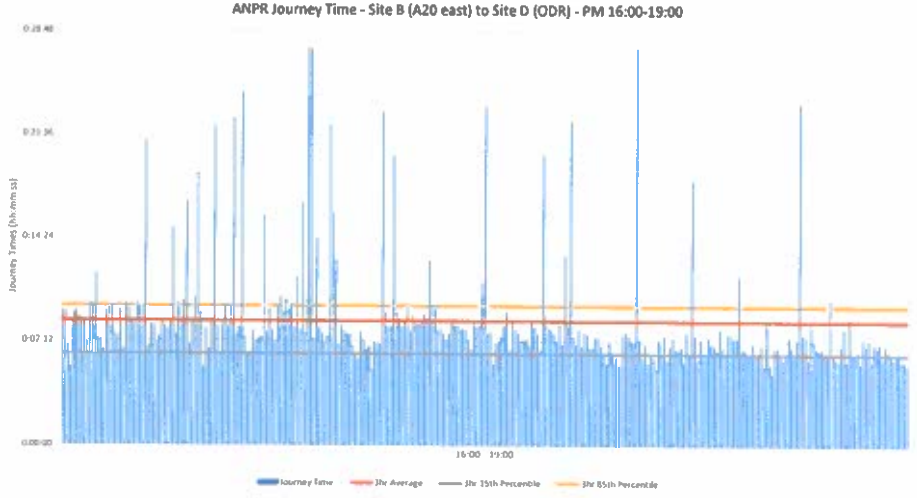
ANPR Journey Time - Site D (ODR) to Site C (A22 Comber Road) - PM 16:00-19:00



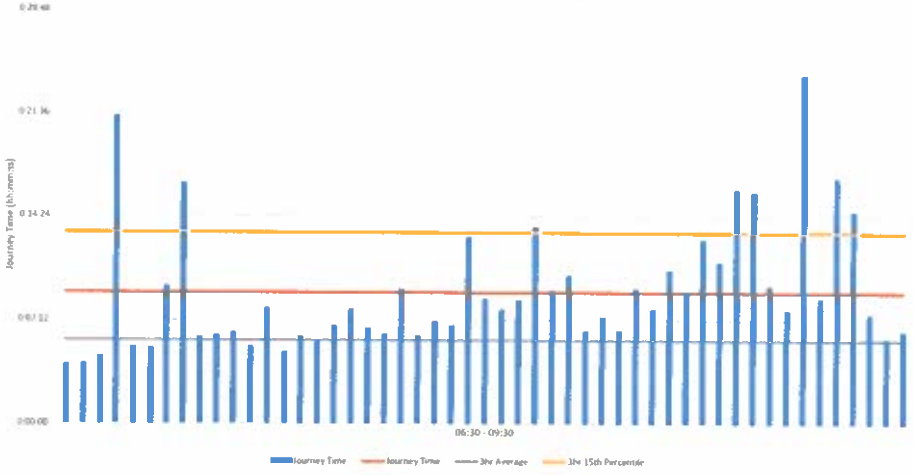
ANPR Journey Time - Site B (A20 east) to Site D (ODR) - AM 06:30-09:30



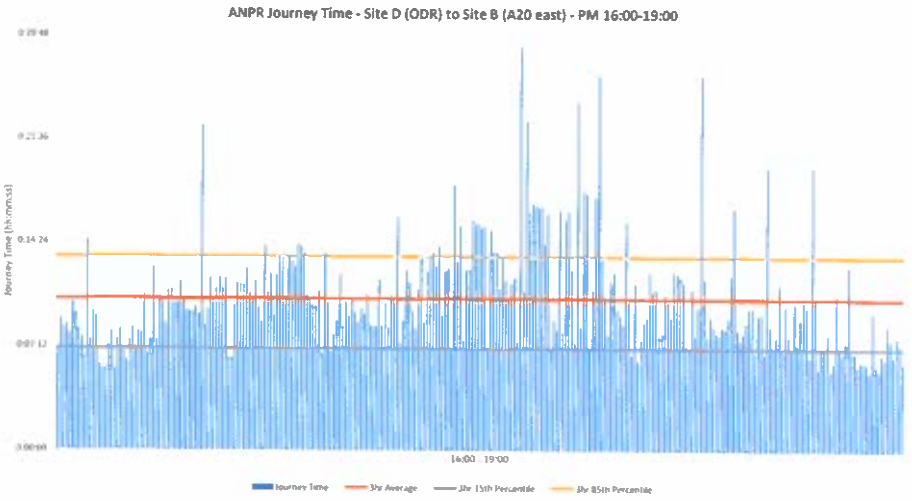
ANPR Journey Time - Site B (A20 east) to Site D (ODR) - PM 16:00-19:00



ANPR Journey Time - Site D (ODR) to Site B (A20 east) - AM 06:30-09:30



ANPR Journey Time - Site D (ODR) to Site B (A20 east) - PM 16:00-19:00



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