

DLR COVID-19 MOBILITY REVIEW

Coastal Mobility Route (Ph1b): Mobility Update July 2022

Evaluation and Review of the Phase 1
Covid-19 Mobility and Public Realm
Works undertaken by Dún Laoghaire-
Rathdown County Council

MOBILITY FINDINGS - JULY 2022

Technological University Dublin

Authored by:

The Sustainable Transport & Mobility Research
Group at the School of Transport Engineering,
Environment & Planning, TU Dublin, City
Campus, Dublin 1



TU Dublin Project Team (Ph1b):

Principal Investigator: Dr. Sarah Rock

Co-Investigator: David O'Connor, Assistant Head of School

Project Manager: David O'Connor, Assistant Head of School

Postgraduate Investigator: Michael Banim

Head of School: Dr. Conor Norton

TU Dublin Collaborators: Dr. Lorraine D'Arcy; Odran Reid, Sinead Flavin; Brendan Meskell; Colm Walsh; Emmet Ó Briain; Thamiris Gaberz.

Dún Laoghaire-Rathdown County Council Project Team:

Covid Mobility Leads: Robert Burns, Director of Services Infrastructure and Climate Change (until January 2022); Paul Kennedy, Director of Services Infrastructure and Climate Change (from March 2022); and Conor Geraghty, Senior Engineer.

Funder: Dún Laoghaire-Rathdown County Council

Table of Contents

1. INTRODUCTION	4
1.1 Background	5
1.2 National Context & Government Covid-19 Guidance	6
1.3 Review Scope	7
1.4 Data Sources & Collection	8
1.5 Data Limitations	9
2. CMR MOBILITY UPDATE	10
2.1 Introduction	11
2.2 Walking and Cycling	13
2.2.1 CMR Range of User Groups.....	14
2.2.2 Seasonal and Covid Reopening (Sept 20 – May 22): Cycling	17
2.2.3 Seasonal and Covid Reopening (Sept 20 – May 22): Walking.....	27
2.3 Public Transport & Bus Performance	29
2.4 Vehicular Traffic Analysis	36
2.4.1 Vehicular Traffic Volumes and the Pandemic.....	37
2.4.2 Vehicular Traffic Speeds and Trip Times.....	40
2.4.3 Vehicular Traffic Speeds along the CMR: Traffic Calming & Pedestrian Improvements.....	47
3. DISCUSSION & CONCLUSIONS	61
3.1 Discussion & Conclusions	62
References	69



T OLLSCOIL TEICNEOLAÍOCHTA
BHAILE ÁTHA CLIATH
DUBLIN
TECHNOLOGICAL
UNIVERSITY DUBLIN

1. INTRODUCTION

1.1 Background

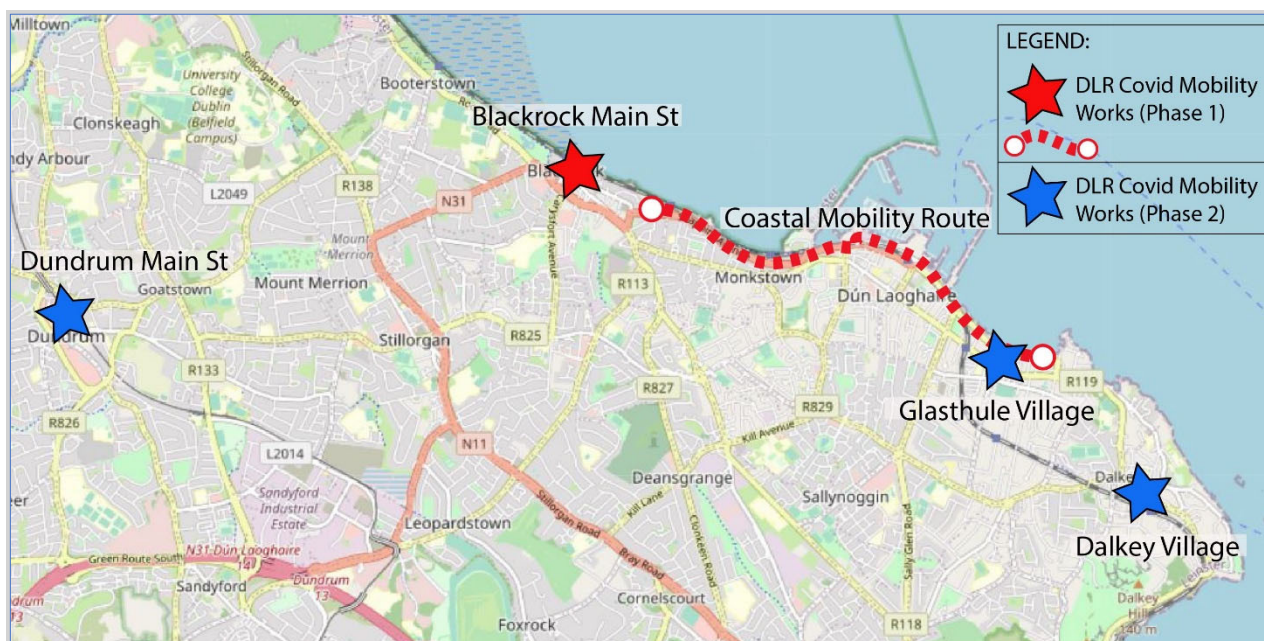
The Covid-19 pandemic has transformed life across significant parts of the world since early 2020. The response has been different around the world, but a key tool to mitigate the severity of the disease and used by many governments, including Ireland's, has been one of widescale societal and economic 'lockdown'. The severity of lockdowns have varied over time and have tended to increase with Covid-19 case numbers. This included closing all but 'essential' retail and educational institutions, as well as the imposition of 'stay-at-home' orders and 'work-from-home when possible' orders. During this period in Ireland, public transport capacity was severely limited and social distancing protocols were in place for both indoor and outdoor environments.

Dún Laoghaire-Rathdown County Council (DLR) were one of the first Local Authorities in Ireland to introduce significant mobility and public realm measures in order to respond to some of the challenges of Covid-19. The key objectives of the measures are to:

- Increase outdoor social distancing space for pedestrians in villages
- Increase cycling and pedestrian comfort and safety
- Reduce pressure on public transport capacity by providing a sustainable mobility alternative
- Decrease reliance on private vehicles for short journeys, while increasing the use of walking and cycling as transport modes for a wide range of users
- Support economic development in villages/urban centres.

The reconfiguration and redesign of Blackrock Village Main Street and the introduction of the Coastal Mobility Route along the coast road from Seapoint to Sandycove were the first two projects implemented, followed closely by Glasthule Village, Dundrum Village and Dalkey Village (see Figure 1).

Figure 1 Showing DLR's Key Covid-19 Mobility and Public Realm Projects (source map from Openstreetmap.org and adapted by author)



Given the significant scale of the projects, and the short timescales for implementation, Dún Laoghaire-Rathdown County Council engaged the School of Transport Engineering, Environment and Planning in Technological University Dublin to undertake a preliminary evaluation and review of the Council's Covid-19 mobility and public realm response (referred to as '*Covid Mobility*' from here on in), with Phase 1 of the review focusing on Blackrock Main Street and the Coastal Mobility Route. The Phase 1 Interim Findings report was published in November 2021. Due to the unprecedented impact of Covid-19 on mobility nationally and internationally, a recommendation of the Ph1 report was the ongoing monitoring and evaluation of the changing mobility patterns throughout 2021 and 2022, as responses to the Covid-19 pandemic change and evolve.

This report (Ph1 Mobility Update, 2022), is a response to that recommendation and provides an update on the evolving patterns over a longer time period. Some sections of the original report are also included in this report to provide background and context. This report will feed into a wider socio-economic study of the impacts of the Coastal Mobility Route, which forms a key element of the next phase of the research. In Ireland, there is some research into the socio-economic impacts of rural greenways, but there is limited research into the socio-economic impacts of urban cycle trails, similar to the Coastal Mobility Route.

1.2 National Context & Government Covid-19 Guidance

Dublin is one of the most congested cities for vehicular traffic in the world, ranking at no. 17 in 2019, no.21 in 2020 and no. 35 in 2021 in the TomTom world congestion ranking¹. This severe constraint on road capacity coupled with national policy² and international climate change obligations³ that seek to prioritise sustainable and low carbon forms of transport (such as walking, cycling and public transport) brings particular challenges for the movement of people throughout the Covid-19 pandemic. These challenges became particularly acute with the relaxation of restrictions after respective 'lockdown' periods but with public transport capacity still considerably reduced and continued social distancing requirements.

As a response to these conditions, the Department of Transport, Tourism and Sport (since renamed the Department of Transport) announced funding on the 28th May 2020 for technical and financial support through the National Transport Authority (NTA) to deliver walking and cycling infrastructure across the country⁴. The NTA offered all Local Authorities support for initiatives including:

- widening footpaths to enable queuing and social distancing
- one-way streets and pedestrianisation schemes for social distancing purposes and to support business activities

¹ https://www.tomtom.com/en_gb/traffic-index/ranking/

² For example, see '*Project Ireland 2040: National Planning Framework*', accessible at <https://npl.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf>

³ See Government of Ireland's '*Climate Action Plan 2021*' for more information, accessible at <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

⁴ <https://www.gov.ie/en/press-release/062bd-minister-ross-announces-nationwide-supports-for-pedestrians-and-cyclists/>

-
- altering traffic signals times to reduce pedestrian waiting times and crowding
 - temporary cycling facilities
 - external space provision to support business activities.

Following on from this, the Government issued an 'Interim Advice Note – Covid 19'⁵ on June 23rd 2020 to provide guidance to Local Authorities in order to assist them in implementing the above-mentioned initiatives. The document advises Local Authorities to *'also consider the longer term alignment with the principles, approaches and measures contained within the Design Manual for Urban Roads and Streets which prioritises sustainable modes of transport (walking, cycling and public transport), advocates a multi-disciplinary approach to street design and promotes the principles of universal design. Local Authorities should also consider broader Government policies on road safety, transport planning, accessibility for people with disabilities and climate change, including the National Planning Framework, notably National Policy Objective 27: 'Ensure the integration of safe and convenient alternatives to the car into the design of our communities, by prioritising walking and cycling accessibility to both existing and proposed developments, and integrating physical activity facilities for all ages.'* (p.1). The Advice Note suggests that Local Authorities use existing powers available to them under legislation⁶ to address immediate public health concerns regarding space for social distancing in the public realm, and that the Design Manual for Urban Roads and Streets (2019) user hierarchy should be followed which prioritises the needs of pedestrians first, followed by cyclists, then public transport users and then private car drivers. Design measures should also align with the principles of Universal Design.

Since that time, the mobility context has continued to change in that at the time of writing, Russia has invaded Ukraine leading to a humanitarian disaster as well as global energy security fears, mass displacement and migration, and international food security ramifications.

1.3 Review Scope

The scope of Phase 1 study is limited to the two major projects that were completed at the time of commencement of this study in September 2020: Blackrock Main Street and the Coastal Mobility Route (CMR). Phase 1 is explorative in nature, reflecting the uniqueness of the wider Covid-19 context and the lack of precedence in Ireland for such an emergency/rapid response in the case of urban mobility and public realm planning, and evaluation there-of. As outlined in Section 1.1 above, the Phase 1 Interim Findings report was published in November 2021. Due to the unprecedented impact of Covid-19 on mobility nationally and internationally, a recommendation of the Ph1 report was the ongoing monitoring and evaluation of the changing mobility patterns in the region of Coastal Mobility Route throughout 2021 and 2022, as responses to the Covid-19 pandemic change and evolve. This report (Ph1 Mobility Update, June 2022), is a response to that recommendation and provides an update on the evolving mobility

⁵ <https://www.dmurs.ie/what-s-new>

⁶ According to the NTA, the two main legislative provisions are Section 95 of the Road Traffic Act 1961 (as amended by Section 37 of the Road Traffic Act 1994) and Section 38 of the Road Traffic Act 1994.

patterns over a longer time period, focusing on the Coastal Mobility Route. This report will feed into a wider socio-economic study of the impacts of the Coastal Mobility Route, which forms a key element of Phase 2 of the research. Dún Laoghaire Rathdown County Council have taken the decision to move forward with a planning application to make a permanent public realm, mobility and regeneration scheme for Blackrock Village, informed by the evaluation and largely positive experiences of the temporary Covid Mobility works undertaken there in Summer 2020.

This part of the study was predominantly undertaken during the various stages of the Omicron wave of Covid-19 that dominated particularly from December 2021 through to Spring 2022. During this time, a number of restrictions were introduced in late December 2021⁷ including the early (8pm) closure of restaurants, cafes and pubs. By late February and early March 2022, most restrictions were lifted⁸ and mobility levels over Spring 2022 showed increased levels of return to workplaces and use of public transport, for example, although levels are still lower than the pre-pandemic baseline.⁹

1.4 Data Sources & Collection

Both primary and secondary data sources have been used as part of this study.

The main primary data sources include:

- pedestrian and cycle user groups observation counts undertaken in October 2021
- interview data.

The main secondary data sources utilised and analysed include:

- the TomTom Move Dataset, which uses location data from anonymous GPS devices, was used to review how traffic movements, trips and speeds have changed during the period under investigation
- sample vehicular counts from the SCATS traffic system, provided by request from DLR
- national road traffic counts from Transport Infrastructure Ireland (via TFI website) historic cycle counts previously commissioned by DLR
- raw pedestrian and cycle counts utilizing DLR's and the NTA's data from internal counters (Eco-Visio)
- raw bus journey times data between specific bus stops, provided by request from the National Transport Authority
- public transport passenger data, provided by request from the National Transport Authority.

⁷ For more information, see <https://www.gov.ie/en/publication/4174f-new-public-health-measures-announced-friday-17-december/>

⁸ For more information see <https://www.gov.ie/en/press-release/6ae30-minister-for-health-stephen-donnely-publishes-nphet-advice-on-removal-of-mandatory-covid-19-restrictions-from-28-february/>
<https://www.gov.ie/en/press-release/0cacf-ending-of-covid-19-requirements-for-travellers-to-ireland/>

⁹ For example, see data from the NTA public transport patronage figures in Chapter 2.

1.5 Data Limitations

While every effort has been made to undertake an extensive review and obtain representative data, as with all data collection exercises, there are limitations. The main limitations associated with this project are related to tight study timeframes, data availability and other resource constraints and the impact of public health restrictions associated with Covid-19. Mobility is likely to be in a continual state of flux, and this study can only examine a sample of impacts on various modes and/or snapshots in time. Data availability, validity and suitability is a limitation for mobility analysis in particular. Since March 2020 there has been a variety of mobility restrictions, a continuous roll-out of mobility infrastructure measures across Dún Laoghaire-Rathdown and a number of adjustments to junction layouts and signal timings as adaptive responses to traffic changes during the pandemic, and addition of new infrastructure. There is also uncertainty as to the medium or long term impacts of the pandemic on mobility patterns, particularly relating to public transport usage and changing mobility patterns associated with working from home, for example.



2. CMR MOBILITY UPDATE

2.1 Introduction

The COVID-19 pandemic has led to an unprecedented shift in mobility patterns, both in Ireland and internationally. Some of the biggest changes include substantial reductions in the use of public transportation, the reduction in traditional peak-hour travel, and an increase in daytime and more locally based trip making. These shifts can be largely attributed to ‘work-from-home’ orders, significant capacity limitations on public transportation¹⁰ and the imposition of travel limits such as 2km and 5km exercise limits. Coupled with the reduction in public transport capacity was a drop in ridership confidence leading to people choosing private alternative modes of transport for necessary trips (NTA & DCC 2020). In addition, the Irish government asked that people walk and cycle where possible, so that public transport capacity could be prioritised for essential workers.

On the 12th March 2020, all schools, colleges and childcare facilities were closed. This is significant since, according to the National Household Travel Survey 2017 (NTA, 2018), 20% of trips (excluding return trips) are for education purposes. Schools and Colleges remained closed until September 2020 and closed again in December 2020 and remained so until a phased re-opening between March and April 2021. Non-essential workplaces also closed in March 2020 with many people continuing to work from home during 2021 (CSO, 2022a) and a high demand to continue to do so into the future (CSO, 2022b).

As outlined in the Phase 1 Interim Review, the changing restriction levels and adaptations to the levels as more was learned about the virus, has meant that the methods of traffic modelling often used to determine the impact of a change in infrastructure or traffic management on traffic and transport systems are largely unreliable. Typically, baseline traffic data is collected pre-intervention, post-intervention and a number of months post intervention. The latter is particularly important in the case of active travel interventions as modal shift behaviour change can happen gradually (UKCRC, 2017) as individuals go through a process of (i) contemplation of change, (ii) preparedness for change, (iii) action and then (iv) maintenance of the behaviour as the new habit forms. The effort to change from private car usage to public transport or active travel modes requires more effort for the user in environments (such as Ireland’s) where transport infrastructure has traditionally been designed to optimise the movement of vehicular traffic, sometimes to the detriment of walking, cycling and public transport trips.

The mobility analysis in this study is an exploratory piece of research to investigate changing mobility patterns during a period of continued and unprecedented change. It is also intended to inform a wider study that recognises that mobility is just one of the potential impacts of change, and is part of a wider socio-economic and environmental system. The complexity of the changing mobility patterns, the number of emergency response mobility measures being rolled out across the country and public health restriction levels during the COVID pandemic requires an alternative to more traditional pre- and post- intervention traffic counts and associated traffic distribution analysis, for example. In addition, vehicular traffic is just one of the forms of mobility affected with walking, cycling and public transport usage (as well as freight

¹⁰ For example, there is a 25% capacity cap on public transportation associated with Level 5 Covid-19 restrictions in Ireland, and a 50% cap associated with Level 3 restrictions (<https://www.gov.ie/en/publication/2dc71-level-5/#transport>).

transport) in a continual state of flux over the study period. Using available data sources and within the constraints of the study timeframes and resources, this part of the study explores the changing nature of the passenger mobility system throughout Covid-19.

This part of the study looks at the movement of people and motorised vehicles in the vicinity of the Coastal Mobility Route (CMR). The Coastal Mobility Route involved the reallocation of one direction of vehicular traffic away from vehicles and towards cyclists (and to a lesser extent other micro-mobility such as scooters) through the implementation of a two-way segregated and dedicated cycle-lane. The route runs along the coast road for 3.6km with segregated cycle facilities, and 4.5km in total from Seapoint to Sandycove via Dún Laoghaire. There is a portion of the route from Old Dunleary Road/Coal Quay Bridge through Harbour Road to Queen’s Road in Dún Laoghaire that is shared with vehicular traffic and not segregated (see Figure 2).

Section 2.2 explores the mobility impacts on walking and cycling; Section 2.3 explores the impact on public transportation; and Section 2.4 examines the impact on vehicular traffic.

Figure 2 Simplified diagram illustrating the Coastal Mobility Route running from Seapoint to Sandycove (source map from Openstreetmap.org and adapted by author)



2.2 Walking and Cycling

The Ph1 Interim Findings assessed walking and cycling patterns associated with the introduction of the Coastal Mobility Route and the mobility impacts of the pandemic in late 2020 and early 2021. While pre-pandemic data was limited for comparison purposes, now that the CMR has been in operation since Summer 2020, and usage data is available from September 2020 onwards, a greater sense of the impact of the CMR on walking and cycling usage can now be assessed. Nonetheless it is likely that usage patterns will continue to evolve as infrastructure takes time to bed in and as additional infrastructure comes on-stream, the network effect of quality infrastructure is likely to grow. Additional data sources allow for a greater assessment of the performance of the CMR relative to similar coastal cycling routes along the northside of Dublin.

The Ph1 report found a wide range of users of the CMR and signs of a possible ‘network effect’ in development. This study updates some of the key findings from Ph1 as various phases of the pandemic unfold (largely up until Spring 2022), including expanding the study to compare with wider city trends.

Primary and secondary data sources were analysed as part of this study and include observation data as outlined in Section 2.2.1 and data taken from a series of pedestrian and cyclist, or pedestrian only counters within DLR and the wider Dublin city area (Eco-Visio counters) (see Figure 3 and Figure 4). The latter are outlined in Section 2.2.2 and 2.2.3.

Figure 3 Rock Road and CMR counter locations: (1) Rock Road (on-road cycle counter, and adjacent in-park cycle and pedestrian counter), (2) Seapoint Avenue, 3 (York Road), 4 (People’s Park, Dún Laoghaire) (source map from Openstreetmap.org and adapted by author).

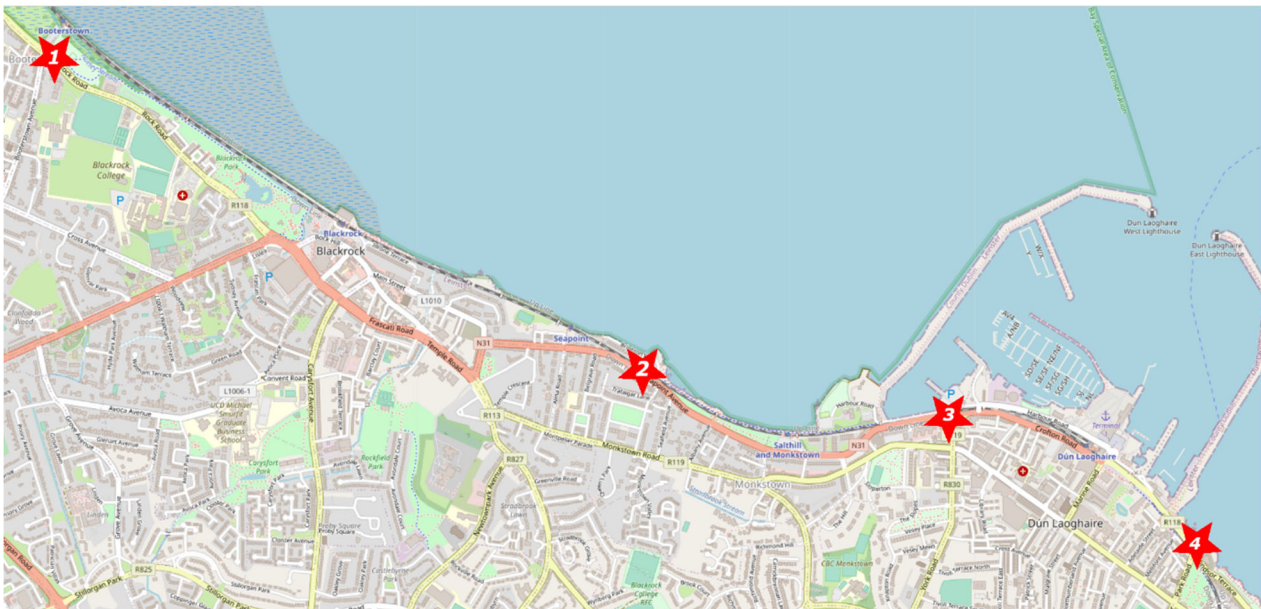
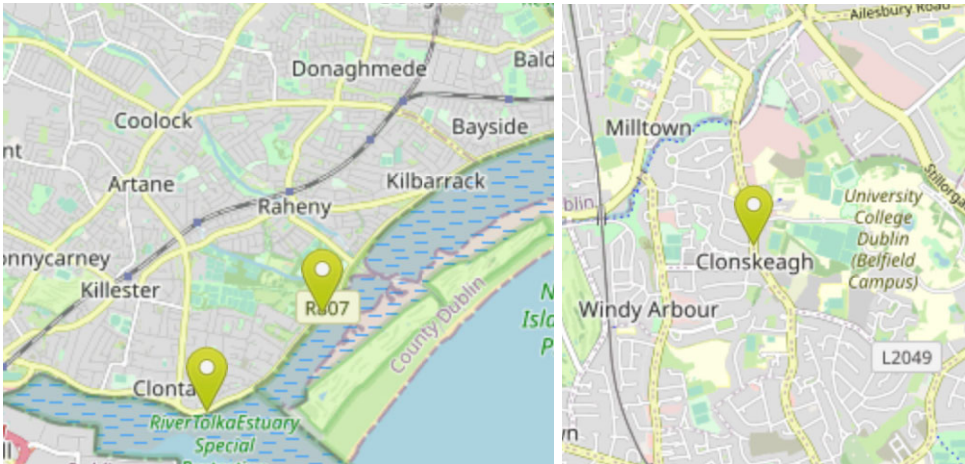


Figure 4 Locations of the Clontarf cycle counters x 2 on image to the left (Pebble Beach Car-Park to the south, and James Larkin Rd to the north, both within Dublin City Council administrative area), and the Clonskeagh Cycle counter on Clonskeagh Rd on image to the right, within DLR Council area (extracted from Eco-Visio platform and based on a map from openstreetmap.org). The James Larkin Rd counter (northside) is a similar distance to the city centre as the Seapoint counter (southside), and Pebble Beach (northside) similar to the Rock Rd/Park counters (southside).



2.2.1 CMR Range of User Groups

An observational survey was undertaken on the Coastal Mobility Route at Seapoint into the range of users in order to gain a greater insight into the inclusiveness of the facilities. The original survey was undertaken in October 2020¹¹, and was repeated in October 2021. Specifically, this survey sought to gain insights into assessing the following DLR Covid Mobility objectives:

- increase cycling and pedestrian comfort and safety,
- reduce pressure on public transport capacity by providing a sustainable mobility alternative, and
- decrease reliance on private vehicles for short journeys, while increasing the use of walking and cycling as transport modes for a wide range of users.

The study sought to investigate user groups based on gender, age group, family composition, casual versus sporty users, disability bikes, scooters, joggers etc. It should be noted that the study was observational in its nature, thus certain assumptions had to be made. For example, with the categorisation of gender of those who were observed, it was solely based on the assumption/understanding of gender by the observer who most likely follow the social norms of appearance for each gender. ‘Sporty’ cyclists were generally

¹¹ The original survey was undertaken between the 6th and 22nd of October 2020 on Seapoint Avenue. Cycle data was recorded between 8- 9am, 1.30-3pm and 6-7pm on weekdays, and between 1-2.30pm on Sundays. A smaller sample of pedestrians were taken for gender ratio comparison purposes.

categorised as such if they wore sporty clothing and were on a sporty bicycle, with ‘casual’ cyclists identified as wearing more casual clothing and travelling on a non-sporty bicycle.

The October 2021 update survey was undertaken to assess if there had been any significant change in the user groups identified in October 2021. A range of user data was manually collected between the 17th and 21st October 2021 on Seapoint Avenue. Cycle data was recorded over 7 different periods between 8- 9am, 1.30-3pm and 5.30-6.30pm on weekdays, and between 1-2.30pm on Sundays. Pedestrians were also recorded during these timeframes for gender ratio comparison purposes. The timeframes were kept as similar as practical as the original survey. Some minor adjustments were made to some timeframes to take account of reduction in light in the evenings due to the slightly later date of the survey time.

In October 2020, the gender ratio for cyclists along the CMR was found to be 35% female and 65% Male. By October 2021, there was a slight increase in the gender ratio for females with an overall finding of 36% females and 64% males. The gender ratios for walkers along the CMR for October 2021 were also in line with the 2020 sample figures. **In 2020, a ratio of 59%:41% female to male was recorded, whereas in 2021, a ratio of 57%:43% female to male was recorded.** This is in line with other studies which show that more women typically walk than men¹². It was also noted that the majority (74%) of walkers (57% female and 43% male) walked alongside the cycle-route and along the coast, rather than the residential side of the carriageway.

As identified in the Ph1 Interim Findings, analysis of the 2016 Census of Population (the most recent Census of Population data currently available) shows a gender split of use of a bicycle as a mode of transport to work/school at 74:26 male: female¹³ in the Dún Laoghaire-Rathdown Local Authority area whereas the NTA/Sustrans’ Bike Life 2019 study notes that in Dublin (across the city region), 32% of people who cycle weekly are female, while 68% are male. The recently published Dublin Metropolitan Area Walking and Cycling Index 2021 (NTA & Sustrans, 2022) shows that there has been an increase in females cycling at least once a week from 14% in 2019 to 18% in 2021 (compared with 35% of males in 2019 and a reduction to 33% of males in 2021). Both the 2019 and 2021 studies are limited to those aged 16 and over. There are many complex reasons surrounding women’s travel choices, however cycle safety is a consistently raised concern, of which a network of segregated cycle facilities are of particular importance (Aldred et al., 2016; NTA, 2019; TII, 2020; W4C, 2018).

Table 1 outlines the key user groups identified, compared with the observation survey undertaken in October 2020. The key changes noted are a **9% increase in female ‘casual’ cyclists and a 10% increase in male sport cyclists (including ‘sporty commuters’) on weekdays over the 2020 numbers.** It is likely that a number of these represent an increase in commuter cyclists given a lower level of Covid-19 restrictions at this time.

¹²Such as the international comparison study by Goel et al. (2021); the Dublin Metropolitan Area Walking and Cycling Index (2022); and Sport Ireland’s ‘Impact of Covid-19 Restrictions on Sports and Recreational Walking’ study (2021). However, it should be noted that the recently published CSO Travel Behaviour Trends 2021 (June 2022) shows that 15.8% of journeys were made by walking for women, compared with 17.9% for men.

¹³ See Central Statistics Office database number E6011 (<https://data.cso.ie/>)

Overall, there was a small decrease in the numbers of cyclists recorded during the weekdays (10.7%) since October 2020 (when Level 3+ Covid Restrictions were in place), however there was a significant decrease noted in the Sunday numbers (56%) on this particular sample Sunday. A decrease in older cyclists and children was also noted.

Over the whole week figures, females youths showed a disproportionate decrease in numbers compared with male youths (52% compared with 33%). However, the sample sizes here are small, thus the data may not be as reliable as for the larger sample sizes. All other categories held up similar in terms of gender ratios. Particular efforts are needed at a societal level in order to understand and address the barriers to female cycling, including female youths. A recent campaign by Green Schools *#andshecycle*¹⁴ and paper by Egan and Hackett (2022) highlight the context for these issues within Ireland.

Table 1 CMR User Group Categories – Observation Sample, October 2021

CATEGORIES¹⁵	2020*	2020* % of total	2021	2021* % of total
Casual (25-64) (inc. 'parents')	915	53.9%	710	58.4%
Sporty (25-64) inc. sporty commuters	302	17.8%	227	18.7%
Older/Elderly (65+)	126	7.4%	69	5.7%
Teenage/Youth (12-25)	162	9.5%	98	8.1%
Children (under 12)	167	9.8%	91	7.5%
Other	26	1.5%	20	1.6%
<i>*Totals (for cross-comparability purposes totals and associated percentages for 2020 have been adjusted to ensure the same number of time periods are included in 2021 as in 2020 and categories are comparable).</i>	1698		1215	

¹⁴ For more information, see <https://greenschoolsireland.org/andshecycle-campaign/>

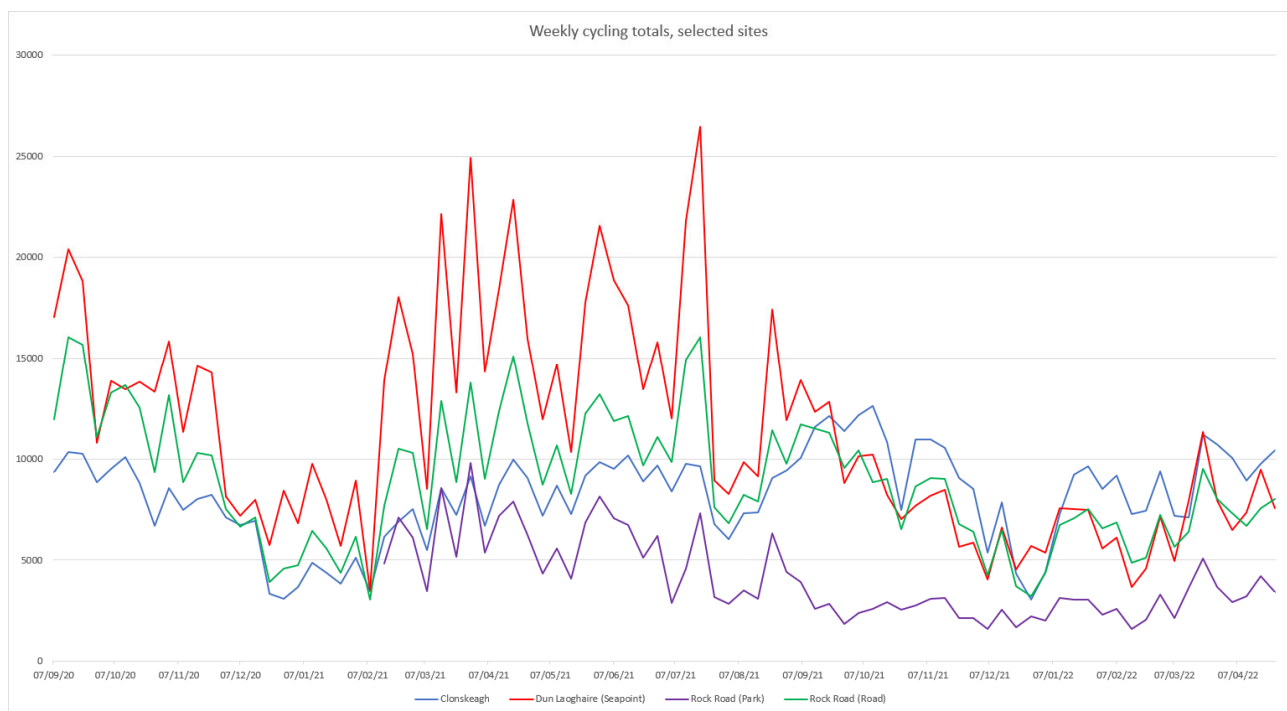
¹⁵ Minor changes have been made to the classification of the findings between 2020 and 2021 to ensure a higher level of cross comparison.

2.2.2 Seasonal and Covid Reopening (Sept 20 – May 22): Cycling

Figure 5 shows that during the course of the pandemic (when the CMR counters came on stream in September 2020), **the numbers using the CMR significantly outperformed all other key cycle routes within the DLR County, with a particular peak in usage evident over Spring and Summer 2021.** This trend continued until September 2021, when Covid-19 restrictions were reduced and there was a return to school and college and a degree of return to the office. From the period September 2021 towards early Summer 2022, Clonskeagh largely outperformed the Coastal Mobility Route, except for a period of Christmas 2021/New Year and in late March 2022. Despite Clonskeagh having a higher population catchment due to its inland position, **Seapoint still outperformed all other DLR counters in terms of total volume of users over this longer time period (September 2020 – April 2022):**

1. Seapoint, CMR: 971,941 users
2. People's Park, CMR: 775,891 users
3. Rock Road*: 767,619 users
4. Clonskeagh: 705,343 users

Figure 5 Weekly cycling totals for Clonskeagh, the Coastal Mobility Route (at Seapoint), Rock Road and Blackrock Park (including estimated figures for Rock Road bus lane*) (base data from DLR/Eco-Visio).



**includes estimated counts due to missing counts (3 weeks in Sep/Oct 2021 and 7 weeks in Mar/Apr 2022)*

In addition, the latest available figures for Seapoint compared with Clonskeagh show that the summer usage trends have become well re-established by May 2022, with usage at Seapoint continuing to increase (see Figure 6), and with the **full year figures from 01 June 2021 to 31 May 2022 from the CMR and Clonskeagh showing that the highest daily average figure is calculated at Seapoint, followed by Clonskeagh, People's Park and York Road.**

Figure 6 Daily cyclist traffic at Clonskeagh and Seapoint over a full year period June 2021-May 2022 (data sourced from DLR/Eco-Visio)

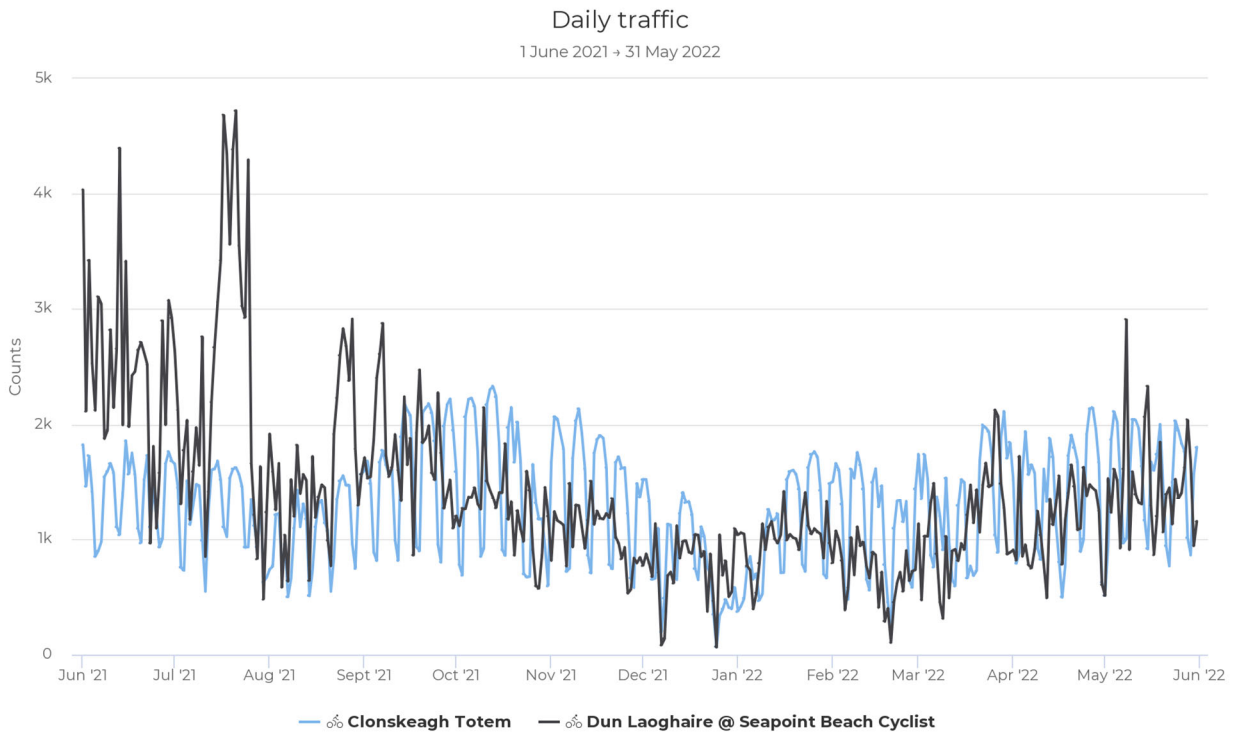
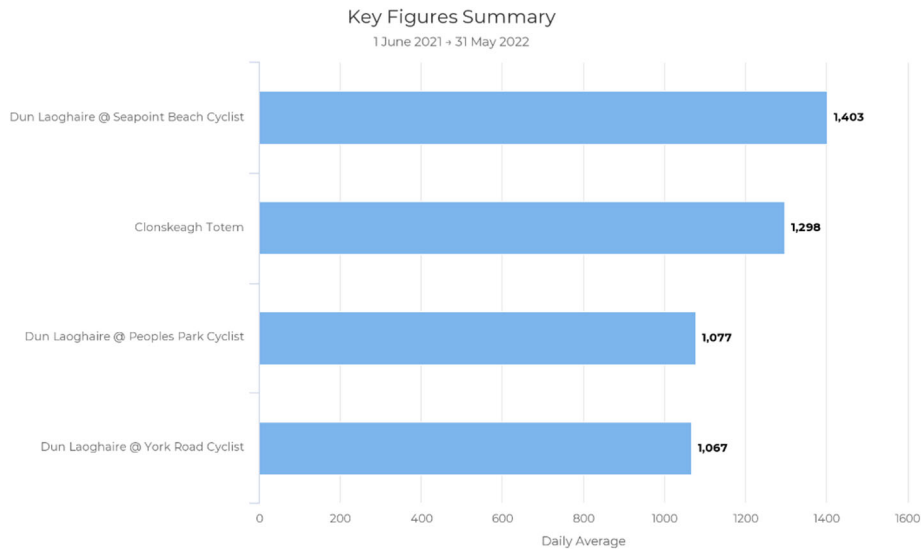


Figure 7 Daily average cycle usage along the Coastal Mobility Route and Clonskeagh over a full year time period June 2021-May 2022 (data sourced from DLR/Eco-Visio)

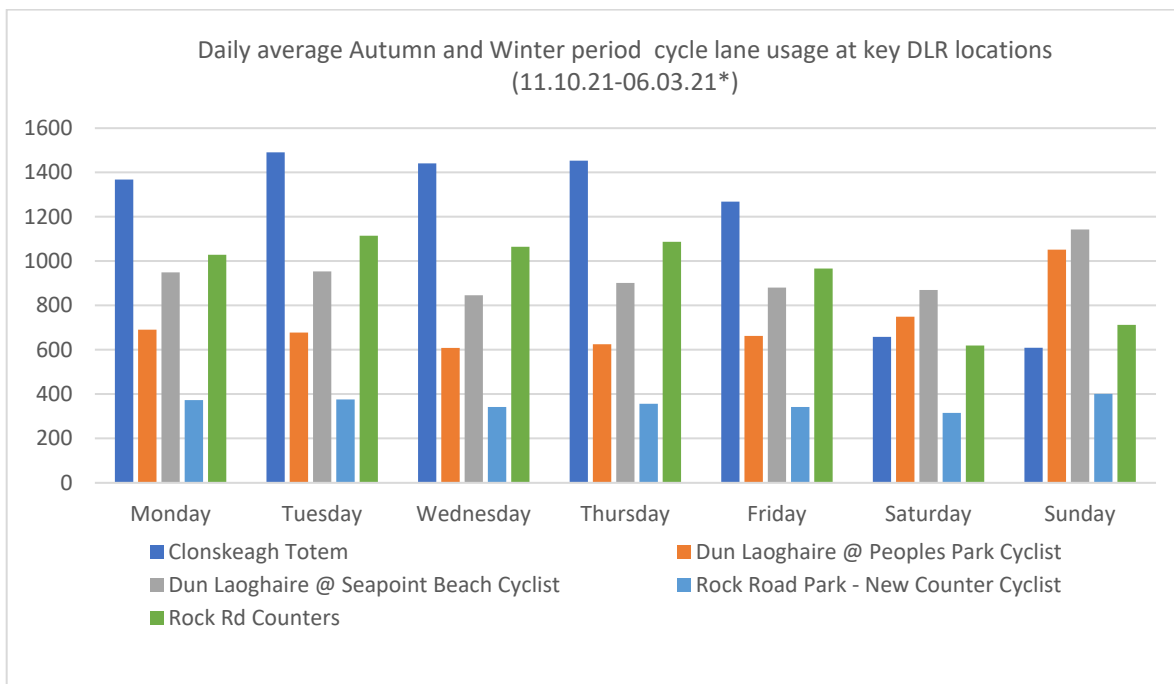


These counts are consistent with the Phase 1 Interim Findings and with the wider body of literature that suggest that numbers cycling are influenced by seasonal factors such as temperature, precipitation, hours of sunshine and wind speeds and direction (see Section 5.3.2 of Ph1 Interim Findings report), and that recreational cyclists are more likely to be more affected than utilitarian cyclists. The Ph1 research (Interim Findings report) found 52-54% declines in cycling numbers between days with no rainfall and heavy rainfall

(with heavy rainfall making up 13.7% of the days). It also found that cycling numbers began to decline with wind speeds above 10.4 knots (a moderate breeze, 43.4% of days), and that counts were lower with southerly or south-easterly winds, perhaps owing to the geography of the coastal area in Dún Laoghaire-Rathdown. The reduced hours of sunshine during winter were also found to have had an impact on cycling numbers, with a much smaller proportion of users being recorded after 4pm during winter.

Figure 8 to Figure 12 illustrate how the key DLR cycle lanes have been used over the recent autumn and winter period 2021-2022 (full-year usage is also examined in the following pages). A more traditional commuter pattern is being clearly re-established in Clonskeagh which has higher levels of usage from Monday-Friday and less usage on weekends, and with two clear peak usage times during the morning (8am) and evening (5pm), with a smaller lunchtime peak (1pm). A similar pattern can also be seen with the road-based cycle lanes on the Rock Road (Figure 8), although the usage levels are greater here on Sundays. The latter may be related to a possible ‘network effect’¹⁶ with the nearby Coastal Mobility Route. From the weekly usage patterns over the Winter period, it would appear that the CMR is used more consistently throughout the full week than Clonskeagh and the N11 for example. Saturday and Sundays are the peak usage days for all CMR counters (especially around 11am/midday), while usage at Clonskeagh reduces considerably over weekends.

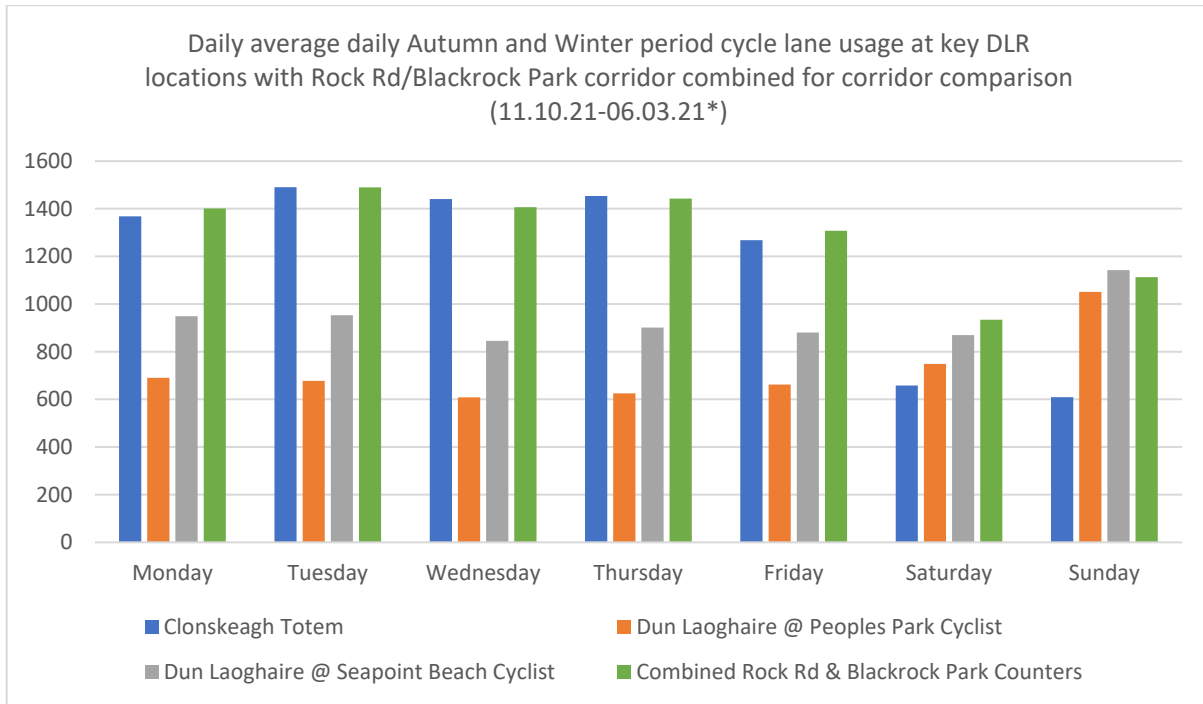
Figure 8 Key DLR cycle counters usage over the winter period 2021-2022 comparing weekdays with weekends (data sourced from DLR/Eco-Visio)



* specific date range chosen to maximise completeness of available data-sets.

¹⁶ A network effect is where economies of scale and interconnectivity of a high quality cycling network can lead to further usage and growth. For more information see McLeod et al. (2020) and Mees (2010). Prior to the pandemic and the installation of the CMR, the Rock Road cycle lanes generally only exceeded Clonskeagh cycle lanes in terms of weekend usage over the Summer months (May – August).

Figure 9 Daily average Autumn & Winter 2021-22 cycle lane usage at key DLR locations (with Rock Road & adjacent Blackrock Park counters combined) (data sourced from DLR/Eco-Visio)



* specific date range chosen to maximise completeness of available data-sets.

Figure 10 Key DLR cycle counters usage over the Autumn/Winter period 2021-2022 comparing hourly usage during Monday-Friday (base data from DLR/Eco-Visio)

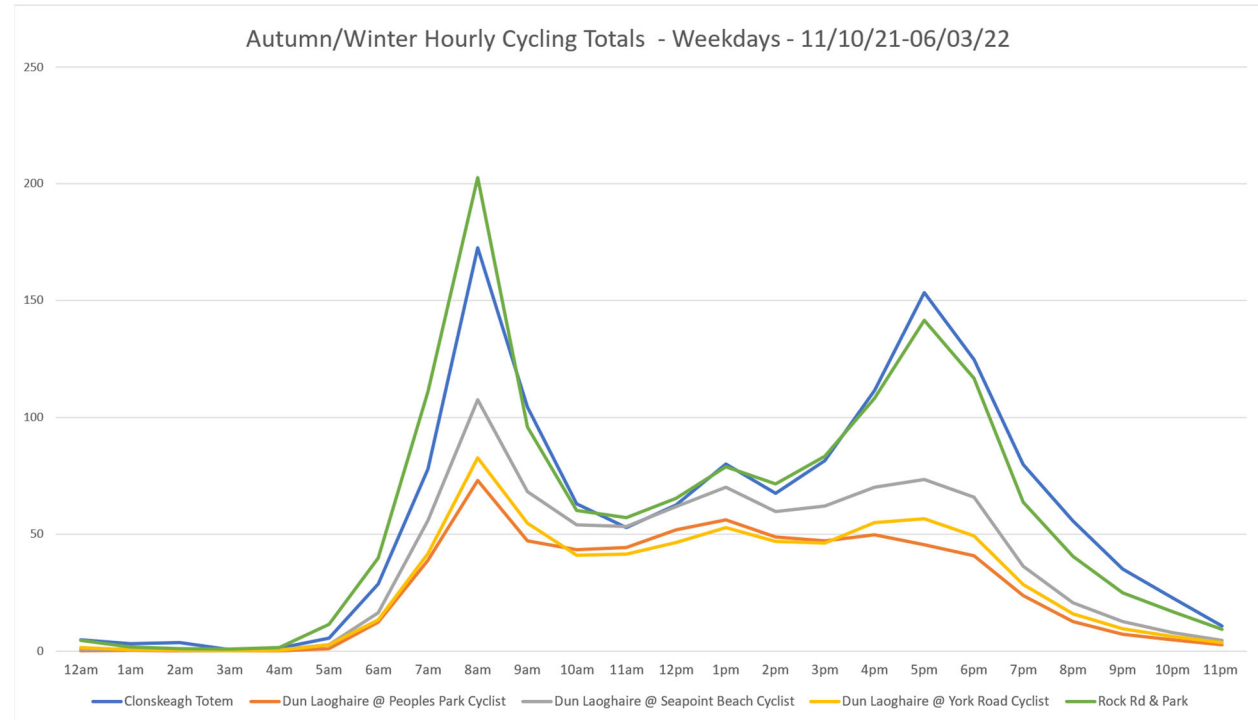
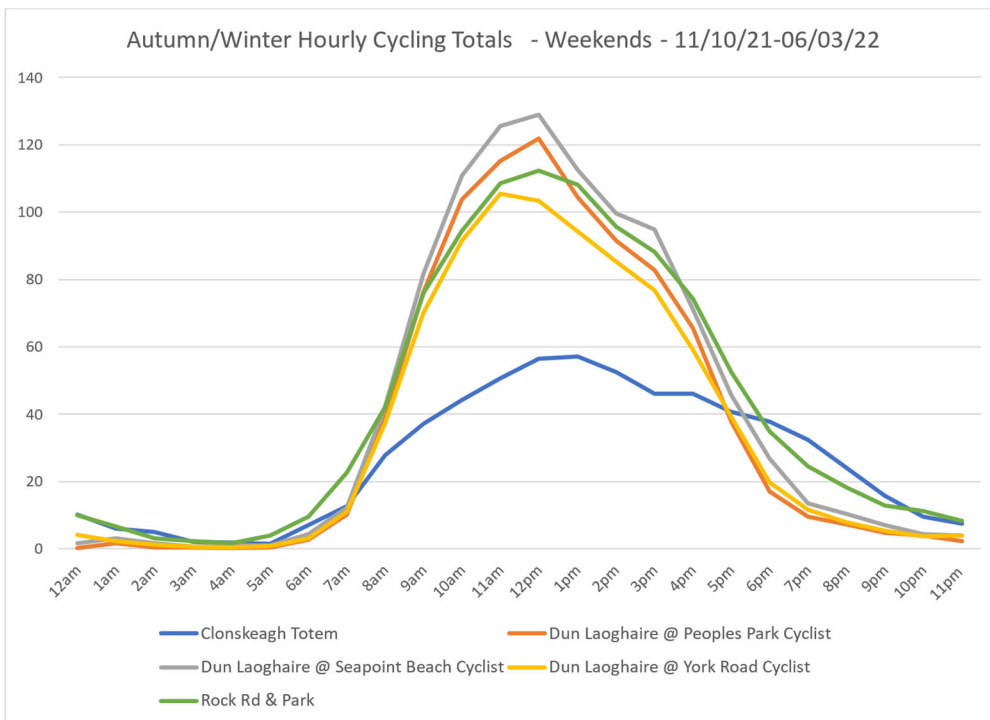


Figure 11 Key DLR cycle counters usage over the Autumn/Winter period 2021-2022 comparing hourly usage over weekends (base data from DLR/Eco-Visio)



As time has passed, different patterns of usage have established along the Coastal Mobility Route. These patterns are closely aligned with the patterns of usage that are evident on the coastal cycle and walking routes along the north of Dublin city from Clontarf to Baldoyle (see Figure 12 to Figure 16). Usage along the north and south of the city along the coast have followed very similar usage patterns with similar peaks and troughs. The key performers are Seapoint along the CMR and Clontarf (at Pebble Beach within the Dublin City Council administrative area, see Figure 4)¹⁷. Use of the coastal routes are highest over the Summer months with another peak in September, and then with a similar pattern of reduced use over winter in both the north and southside, and an increase again from Spring onwards. Over the Spring 2022 period, the coastal counters have experienced growth in usage over every day of the week, but particularly on Thursday, Fridays and Saturdays (see Figure 16).

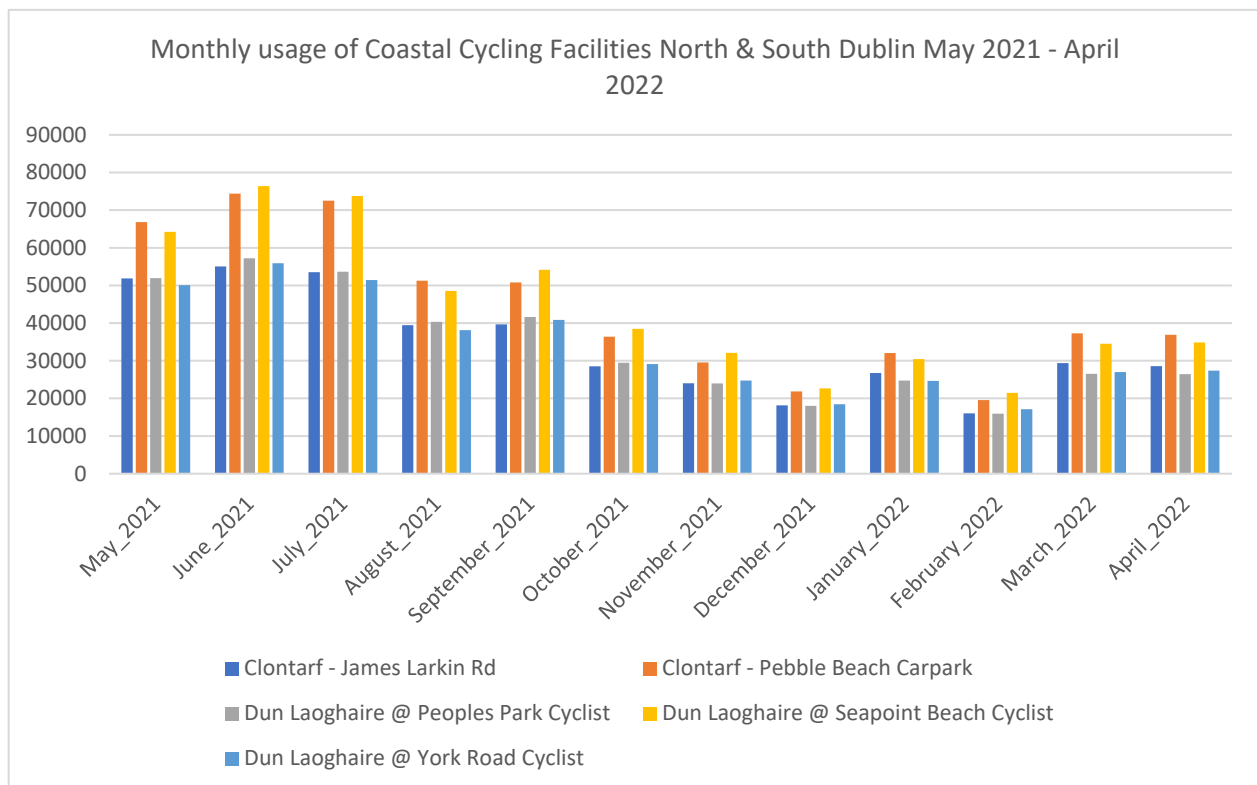
In terms of weekday versus weekend patterns over a full years usage, the coastal cycle routes tend to display different usage patterns to the more inland commuter focused routes, with a somewhat more consistent usage pattern over the full week (7 days), with peaks at the weekend as well as weekday mornings. This is likely to indicate a greater use of the cycle routes at the weekend for recreational, amenity and exercise/well-being reasons as well as being used for commuting in addition to and other mid-week day-time trip purposes (see Figure 13 and Figure 14). Figure 13 also illustrates that outside of the

¹⁷ The counter at Pebble Beach, Clontarf is located approximately 6km north of the city centre (similar to the Rock Rd counters on the southside), while the James Larkin Rd counter is located approximately 8km north of the city centre (similar to the Seapoint counter on the southside at c.9km).

morning and afternoon traditional weekday commuter peaks, Seapoint has a higher usage throughout the day than Clonskeagh, illustrating a higher usage for additional trip purposes over and above typical journeys to work and education.

Overall, over the last full year including both Winter and Summer months (from May 2021-end of April 2022), Seapoint on the CMR had the highest daily average number of cyclists recorded across the NTA’s city cycle counter network outside of the inner city counters (Grove Road, Grand Canal Cycle path and North Strand)¹⁸, or fourth highest including the city centre counters.

Figure 12 Monthly usage patterns of Dublin coastal cycle facilities from May 2021 – April 2022 (data source NTA/Eco-Visio)



¹⁸ 1 May 2021-30 April 2020 average daily usage: (1) Grove Road, 2407 (2) Grand Canal Lock C5, 1721 (3) North Strand north & southbound, 1908 (4) Seapoint, 1460.

Figure 13 Pattern of weekday users of DLR & Dublin Coastal cycle facilities over a full year period from May 2021 - April 2022, with select inland counter (Clonskeagh) for comparison purposes) (data source NTA/Eco-Visio).

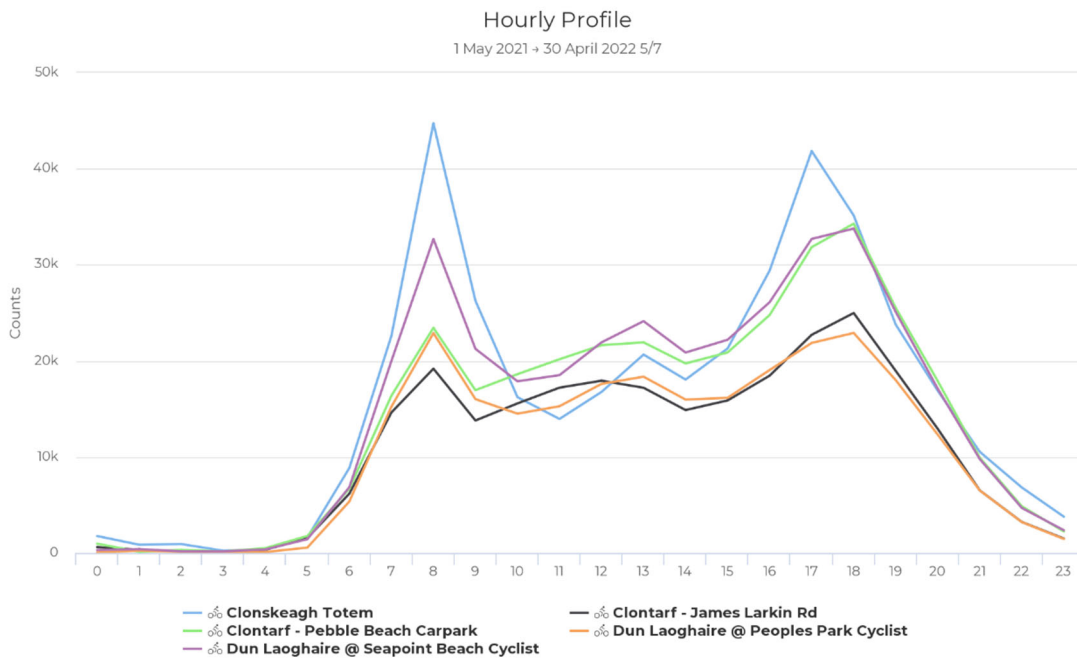


Figure 14 Pattern of weekend users of DLR, & Dublin Coastal cycle facilities over a full year period from May 2021 - April 2022, with select inland counter (Clonskeagh) for comparison purposes) (data source NTA/Eco-Visio).

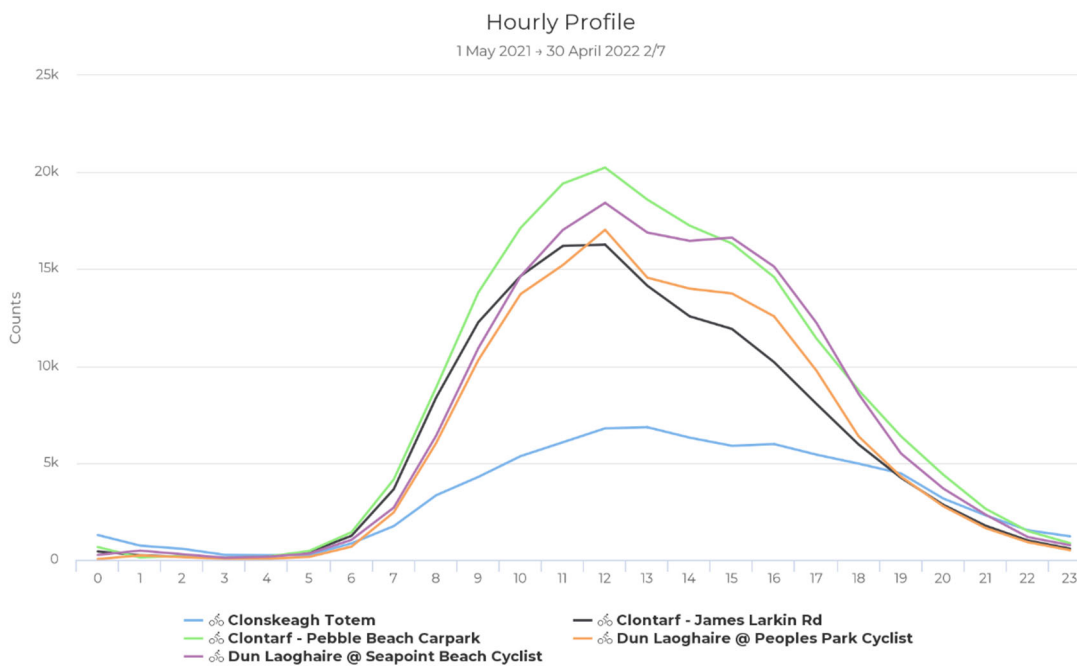
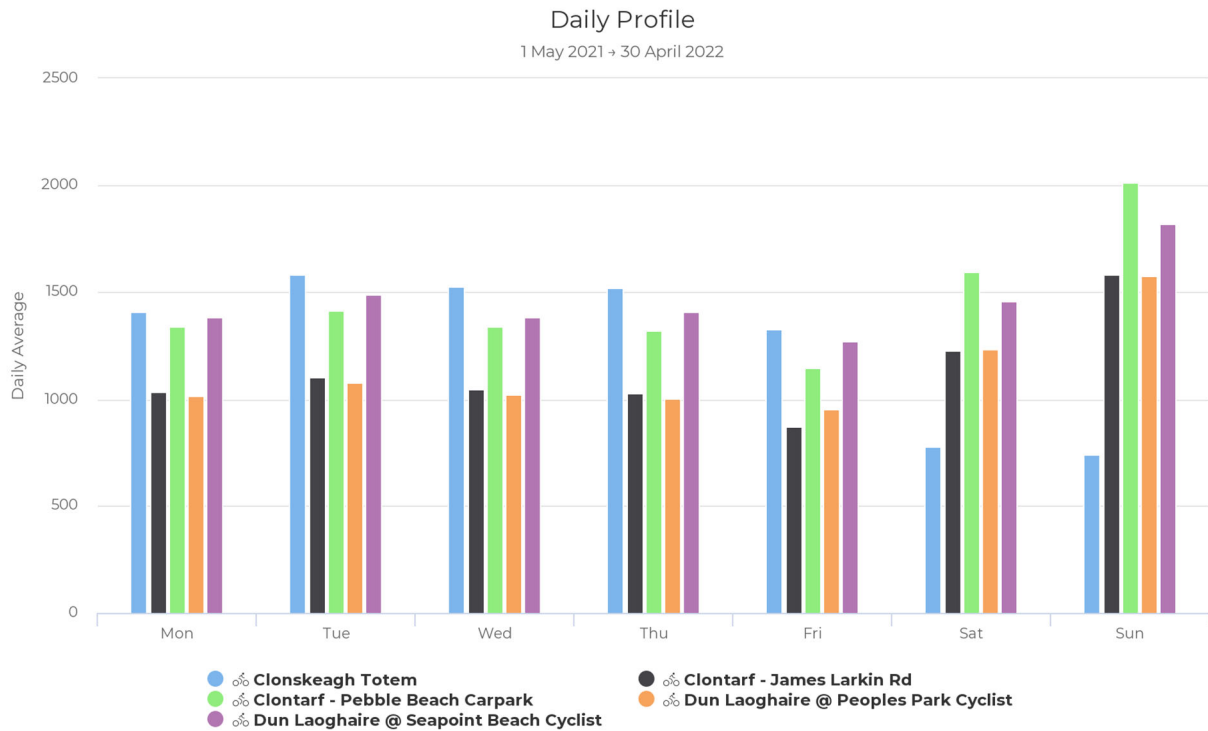
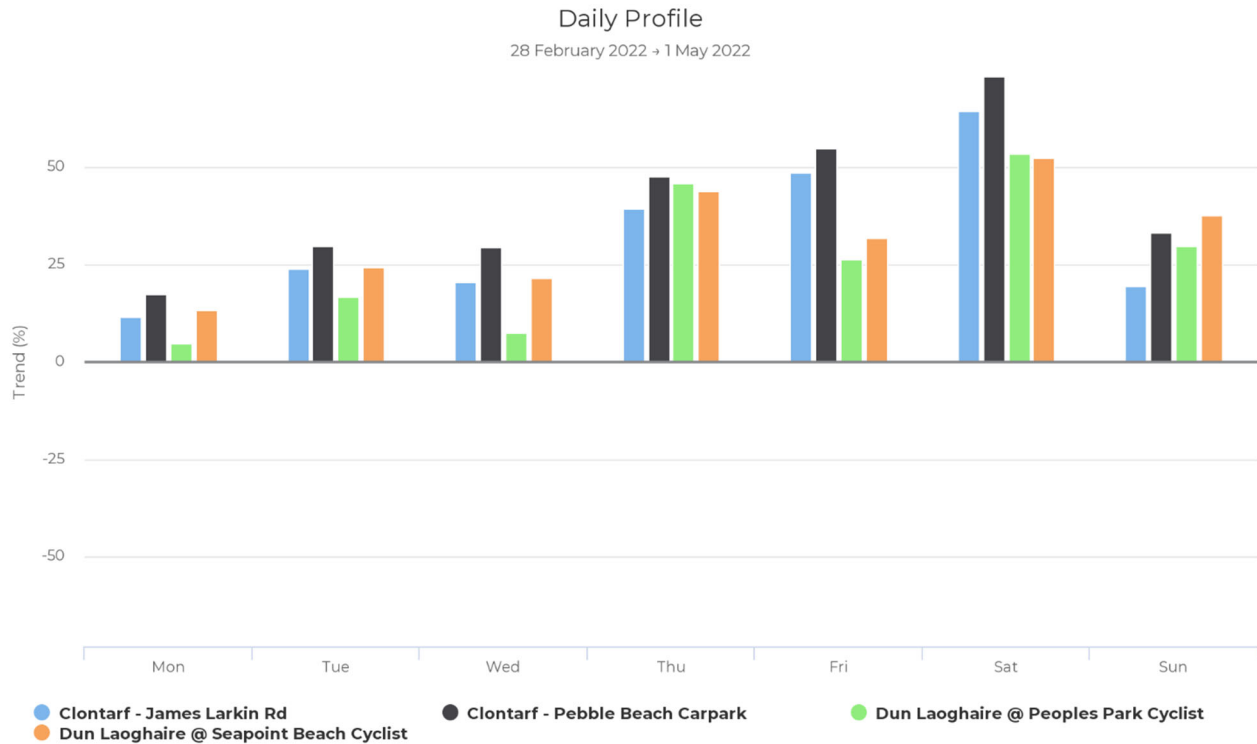


Figure 15 Daily usage of DLR, Dublin City Coastal cycle facilities over a full year period from May 2021 – April 2022, with select inland counter (Clonskeagh) for comparison purposes (data source NTA/Eco-Visio).



The daily pattern of usage is similar both north and southside along the coast with Clontarf (Pebble Beach Carpark) and Seapoint being the main performing counters. Usage levels are similar through weekdays, with Tuesday being the highest weekday usage across all counters. Peak usage on the CMR (and Clontarf) is seen on Sundays, indicating a high level of recreational and exercise use at weekends (see Figure 15). Figure 16 shows that since the springtime 2022, there has been an increase in usage along all counter locations every day of the week, particularly from Thursdays, Fridays and Saturdays.

Figure 16 Change in daily usage patterns since commencement of Spring 2022 (compared with 27 Dec 21-27 Feb 22 time period) (source NTA/Eco-Visio).



As highlighted in the Ph1 Interim Findings report, there is only a small sample of cycle counts available at points along the current route of the CMR before the segregated cycle route was installed in the Summer 2020 and before the pandemic, with a count taken at Old Dunleary Road (near the Old Dunleary Hill/Wallace’s Hill junction) in May 2019. Although snapshot counts are very dependent on local conditions, such as weather (and rain was present on some of the days, particularly in May 2021 and May 2022 which can reduce numbers substantially, particularly for moderate and heavy rain based on research shown in the Ph1 Interim Findings report – Section 5.3.2), it still provides a useful indicator of change.

Table 2 illustrates that there is a substantial increase in the average daily number of cyclists using the route since the introduction of the segregated cycle route (c. 115-126% increase at York Road/Old Dunleary Road at the nearest equivalent counter in May and September 2021). The May 2022 counts are likely to be significantly negatively impacted by the presence of moderate and heavy rain on some of the days. Despite the more adverse weather conditions on the May 2022 compared with the May 2019 snapshot counts, cycling numbers are still up 62% here.

York Road/Old Dunleary Road is also the point of the most conservative cycle numbers along the Coastal Mobility Route, thus numbers are larger at Seapoint in particular (see Table 2). While the Old Dunleary Hill count is closer to the York Road counter than the Seapoint counter, it still provides a useful estimation of the level of increase in cycling numbers.

York Road is the point along the CMR where the segregated cycle route stops, and cyclists join with vehicular traffic. This is also a point where the potential ‘network effect’ of the route is likely reduced as the network effect is highly dependent on a continuous safe and segregated cycle facility.

Table 2 Snapshot cyclist counts at York Road/Old Dunleary Road and Seapoint (September 2020, May 2021 & May 2022) and at adjacent location in May 2019 (data sources include IDASO for DLR & Eco-Visio).

Count Time Periods	May 2019 (Fri – Mon 10-13 th May)	September 2020 (Fri-Mon 11-14 Sept & 18-21 st)	May 2021 (Fri-Mon 7-10 & 14-17 th)	September 2021 (Fri 10-Mon 13 th)	May 2022 (Fri-Mon 6-9 & 13-16 th)	September 2020 (Fri-Mon 11-14 Sept & 18-21 st)	May 2021 (Fri-Mon 7-10 & 14-17 th)	September 2021 (Fri 10-Mon 13 th)	May 2022 (Fri-Mon 6-9 & 13-16 th)
	Purty Kitchen/Wallace’s Hill, Old Dunleary Rd (snapshot count)	Old Dunleary Rd/York Rd (permanent counter)	Old Dunleary Rd/York Rd (permanent counter)	Old Dunleary Rd/York Rd (permanent counter)	Old Dunleary Rd/York Rd (permanent counter)	Seapoint (permanent counter)	Seapoint (permanent counter)	Seapoint (permanent counter)	Seapoint (permanent counter)
Weather [^]	Light rain on day 1 (0.6mm)	Light rain (day 1 – 0.2mm) and moderate rain (day 4 – 4.4mm).	Heavy rain (day 1 – 20.8mm) & light rain day 2,3,4,5,6 & 8 (0.1-1.1mm)	No rain	Moderate rain (day 1 – 3.2mm), light rain (day 4 & 8 – 0.8mm & 0.2mm), heavy rain (day 7 - 6.5mm)	Light rain (day 1 – 0.2mm) and moderate rain (day 4 – 4.4mm)	Heavy rain (day 1 – 20.8mm) & light rain day 2,3,4,5,6 & 8 (0.1-1.1mm)	No rain	Moderate rain (day 1 – 3.2mm), light rain (day 4 & 8 – 0.8mm & 0.2mm), heavy rain (day 7 - 6.5mm)
Friday	398	1390	1767	1700	825	1875	2333	2239	1110
Saturday	806	1996	1606	2180	1401	2432	1881	2685	1838
Sunday	1186	3764	2424	1887	2129	4499	3040	2355	2619
Monday	803	1935	1080	1437	819	3200	1454	1893	1097
4-day daily average	798	2271	1719	1801	1293*	3001	2177	2293	1666*
Times more cyclists over May 2019		2.8	2.2	2.3	1.6*	3.8	2.7	2.9	2.1*
Increase in daily avr. No. of cyclists over May 2019		1473	921	1002.8	495*	2203	1379	1495	867*
% increase in cycling numbers over May 2019		184.5%	115.3%*	125.6%	62.0%*	276%	172.7%*	187.3%	108.7*

[^] historical weather data obtained from Dun Laoghaire weather station www.met.ie/climate/available-data/historical-data

*figures likely to be considerably reduced due to presence of moderate & heavy rain

2.2.3 Seasonal and Covid Reopening (Sept 20 – May 22): Walking

Like cyclists, the numbers of walkers along particular routes were affected by the pandemic and are subject to seasonal and weather variations, albeit to a less extent than cyclists. For example, the Phase 1 Interim Findings (2021) show a higher level of resilience with walking and levels of rainfall, compared with cycling. The 2021 report and the findings outlined in Section 2.2.1 above also shows that more women than men tend to walk.

Figure 17 charts pedestrian numbers along the Coastal Mobility Route and for comparison a south city centre location at Grand Canal Street. Pedestrian counters only came on stream along the CMR in September 2020, however no similar counters are available in northside coastal locations. The location at Grand Canal Street gives an indication of the number of office works in the city given its location near to numerous large multi-national companies and associated office blocks. For example, pedestrian levels are depressed during Level 5 Covid-19 restrictions in early 2021 when work-from-home orders were in place for non-essential workers. Pedestrian numbers start to recover from September 2021 onwards when restrictions levels started to ease (except for a large drop over the Christmas and New Year periods).

The patterns along the CMR are quite different in comparison. The People’s Park in Dún Laoghaire is a very popular location for pedestrians, with particularly high numbers evident on Sundays, followed by Saturdays (Figure 18), reflecting its increasing role as an amenity location. In comparison the Grand Canal Street counters record much less pedestrians over the weekend compared with weekdays, most likely due to the reduction in office workers at weekends. As the return to the office increases during this time period, there are more pedestrians evident in weekday city locations and less in the CMR locations (see Figure 20). Pedestrian levels at the Seapoint and York road counters are relatively subdued in their numbers, however, they are both located in positions where an alternative and higher amenity adjacent pedestrian path is available along the coastline (and these pedestrians are not picked up in the counters).

Figure 17 Pedestrian numbers along the Coastal Mobility Route and at Grand Canal St in the south city centre from September 2020 until May 2022 (data source NTA/Eco-visio).

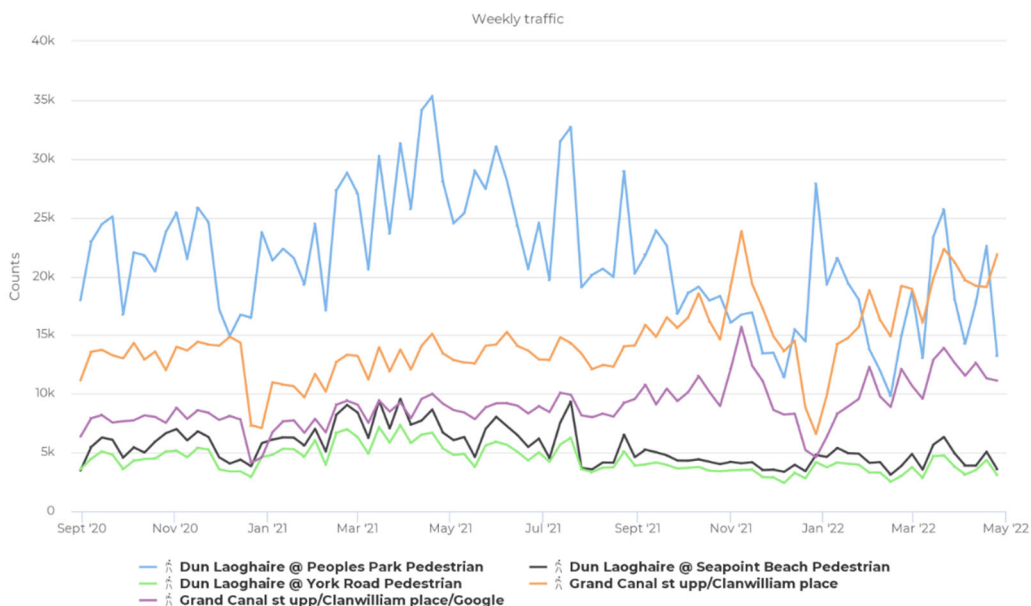


Figure 18 Daily profile of pedestrians at locations along the CMR and at Grand Canal St in the south city centre from May 2021 until April 2022 (data source NTA/Eco-visio).

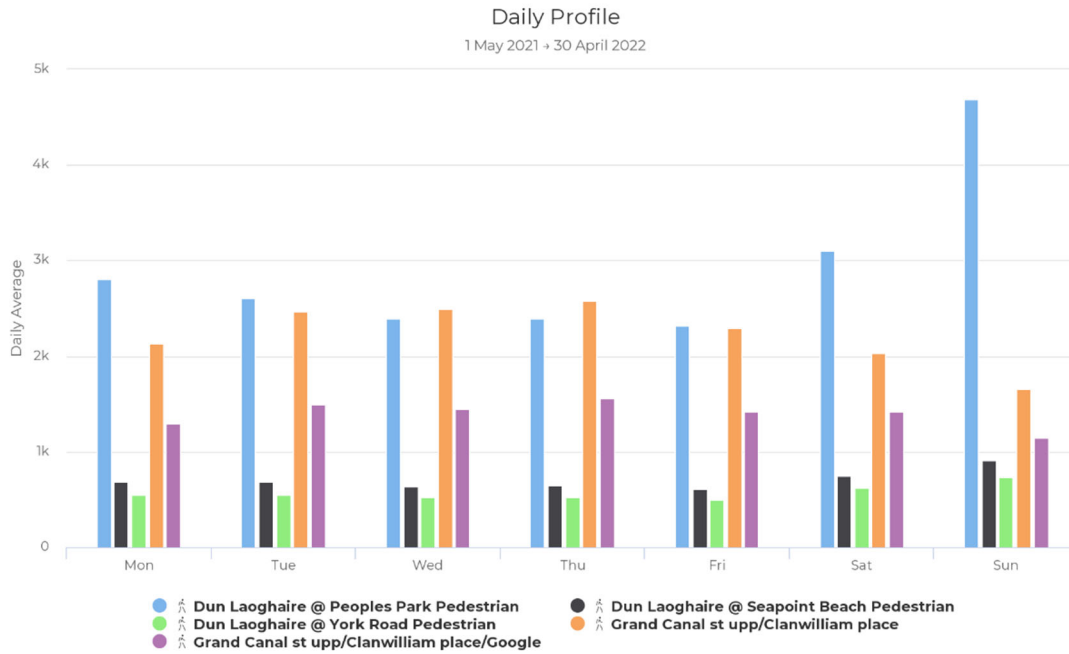


Figure 19 Average all-week (7 day) pedestrians per counter location 01.09.21 to 30.04.22 compared with 02.09.20 to 02.05.21 (data source NTA/Eco-visio).

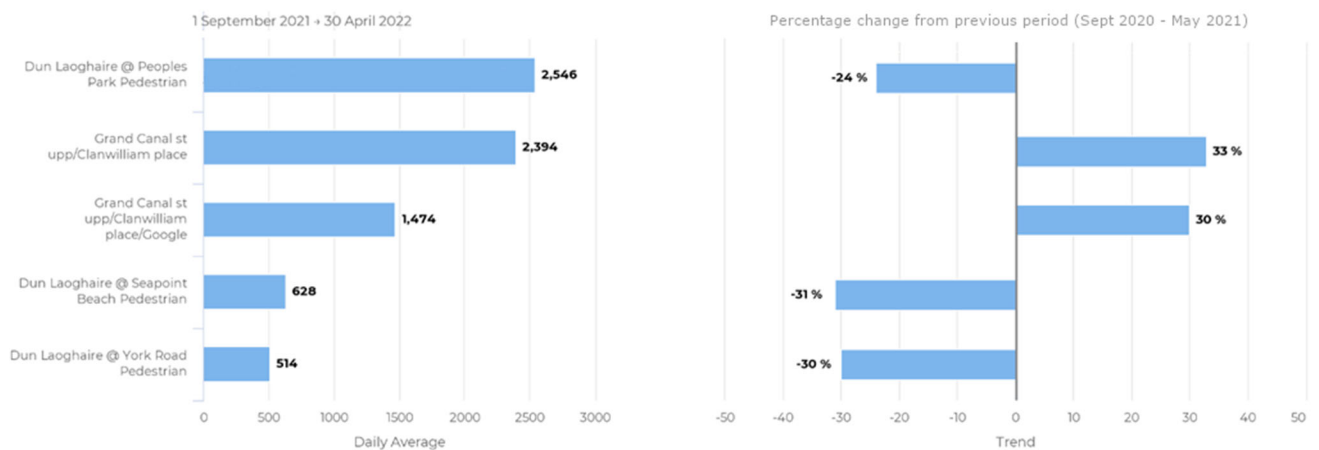


Figure 20 Average weekday pedestrians per location 01.09.21 to 30.04.22 compared with 02.09.20 to 02.05.21 (data source NTA/Eco-visio).

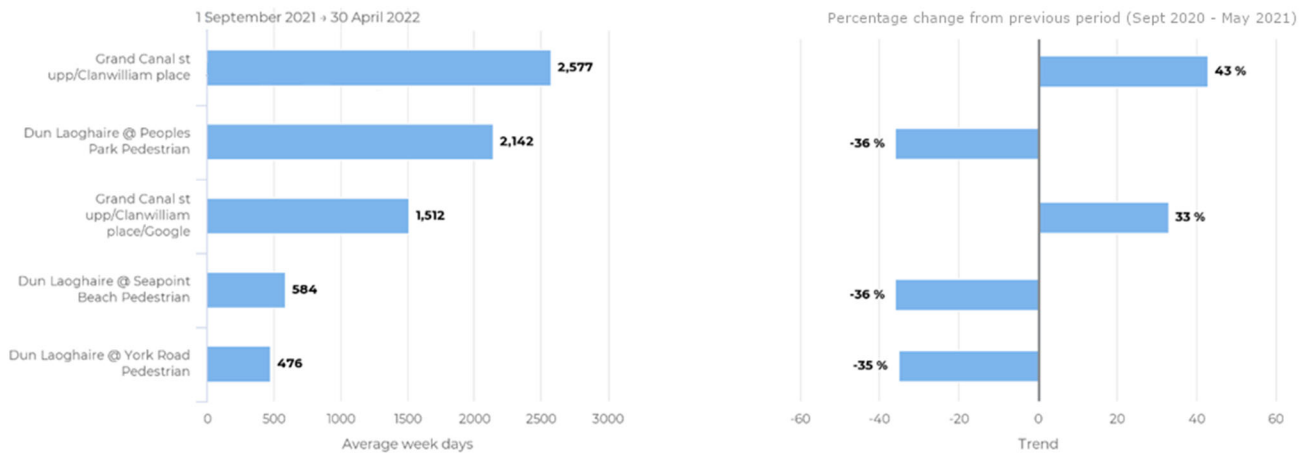
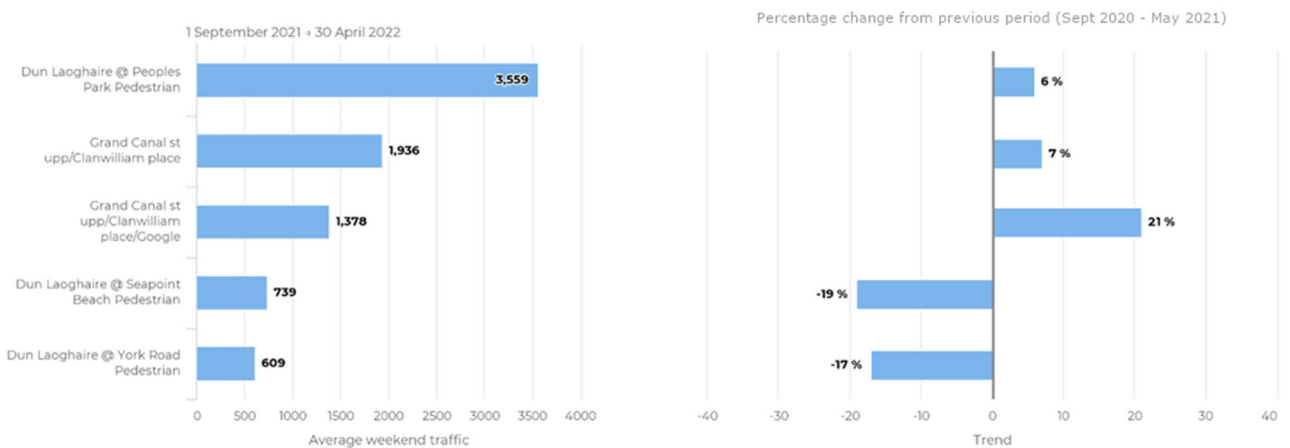


Figure 21 Average weekend pedestrians per location 01.09.21 to 30.04.22 compared with 02.09.20 to 02.05.21 (data source NTA/Eco-visio).



2.3 Public Transport & Bus Performance

The Phase 1 interim report noted the overall importance of maintaining public transport priority on routes that may be adjacent to or affected by traffic management measures (such as the CMR). The initial study showed that while some traffic may have diverted onto adjacent routes, thereby affecting public transport service reliability, this settled down over time, particularly with signal adjustment and traffic management by the local authority. Overall the implementation of the CMR was seen as a progressive traffic management measure which, when combined with well-planned public transport, can lead to improved mobility and a more sustainable urban environment. It was emphasised that the performance of public transport should continue to be monitored in the context of the continuing implementation of the CMR.

The Phase 1 report included feedback from the main bus operator on routes in the environs of the CMR, Go Ahead Ireland (GAI). Feedback was received on the implementation of the initial CMR scheme and how

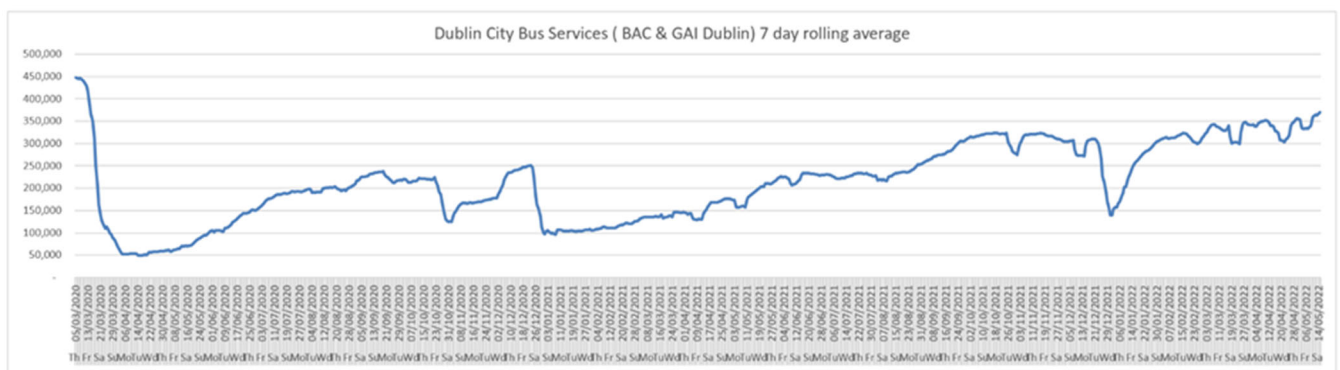
it has affected public transport services. Public transport journey time data from the NTA was also looked at. As part of the Ph1 mobility update, TU Dublin sought to provide an update on public transport conditions in comparison to the earlier study. The update examined a number of data and information sources, including: -

- public transport patronage figures for the Dublin area in general and for services that serve the CMR region in particular
- NTA public transport journey time data through Dún Laoghaire town centre
- A follow-on update was received from the main bus operator (GAI) serving the CMR area.

Public Transport Patronage since the Covid-19 Emergency Measures

Figure 22 shows a 7-day rolling average of public transport passenger levels in the Dublin City since the commencement of the Covid-19 emergency measures. This includes data from the two main bus operators, Dublin Bus (who operate the bulk of city-wide services) and Go Ahead Ireland (who operate a percentage of local and orbital routes across the city, including a number of routes serving the CMR region).

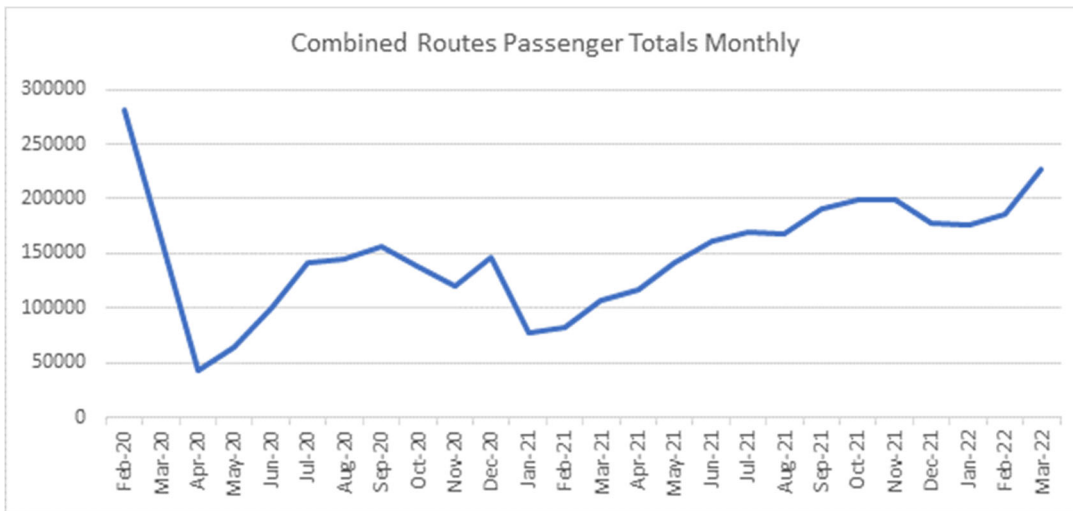
Figure 22 Dublin City Bus services average patronage numbers since the start of the pandemic until mid-May 2022 (source NTA)



Overall, at the time of writing this report, the latest public transport data available for mid-May 2022 showed that Dublin area bus services had **recovered to c.82% of pre-pandemic patronage numbers. This was based on a 7-day rolling average of 370,297 passengers per day (taken at 15th May 2022) compared with 449,426 (taken at 2nd March 2022).**

Patronage numbers were also obtained for a number of key routes serving the CMR environs. Figure 23 shows passenger numbers for the 7, 7A, 59 and 111 combined.

Figure 23 Passenger monthly totals of sample bus routes serving the CMR region (bus no. 7, 7a, 59 & 111).



The analysis shows combined figures across two separate operators. The no. 7 and 7A services are operated by Dublin Bus, and the 59 and 111 services are operated by Go Ahead Ireland.

The 7 and 7a are more traditional commuter style bus routes with a relatively high frequency service (typically every 15 minutes when combined). These are arterial routes serving the city centre as well as a number of neighbourhood and town centres including Loughlinstown, Dún Laoghaire, Monkstown, Blackrock and Ballsbridge.

The 59 and 111 routes are both lower frequency (typically every hour) local bus services focusing on connecting the town centre of Dún Laoghaire with its hinterland.

The analysis indicates that public transport in the vicinity of the CMR was still running below the pre-Covid passenger levels by the end of March 2022 (and by May 2022 at the time of this report writing) but likely to be broadly consistent with wider city-wide trends. It should be noted that this is a somewhat broad measurement and includes public transport ridership along the full length of these routes, as opposed to through the study area alone. Nonetheless it gives us some comparative insight into the health or otherwise of public transport services which access the CMR environs.

Figure 24 show a breakdown of patronage for both bus service types. The arterial bus (7 and 7a) routes performed well when compared with the wider Dublin services, however the local (59 and 111) services are recovering at a slower rate. For example, by the end of March 2022, the study area sample bus routes had recovered to c. 76.3-76.6% for the Dublin Bus services and 57-67% for the Go Ahead Ireland services, compared with pre-Covid passenger numbers.

Figure 24 Passenger numbers over the pandemic of 7 and 7a (left) and 59 and 11 (right)

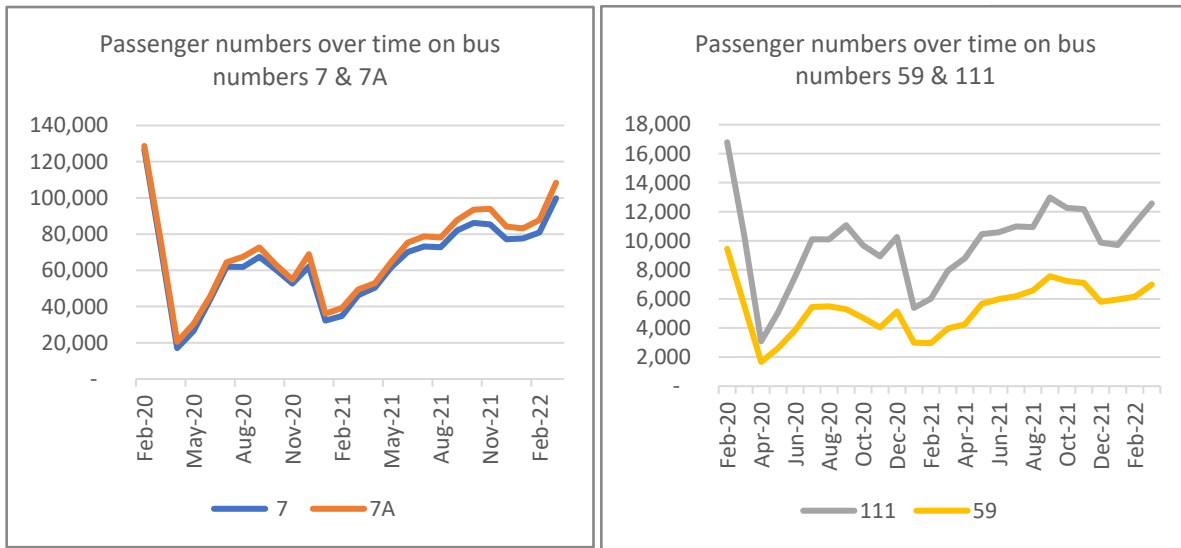


Figure 25 and Figure 26 show a daily profile of patronage for both bus service types. The daily profiles show that though the 7 and 7A numbers have recovered well Tuesday to Thursday (likely reflecting a return to more typical commuter style patterns), passenger numbers are still noticeably down on Friday and Saturday especially. The 59 and 111 numbers are still down on all days and the passenger recovery levels are behind the Dublin Bus service levels, reflecting the wider 7 day rolling average for the Dublin area Go-Ahead patronage patterns.

Figure 25 Daily profile of bus numbers 7 and 7a over time

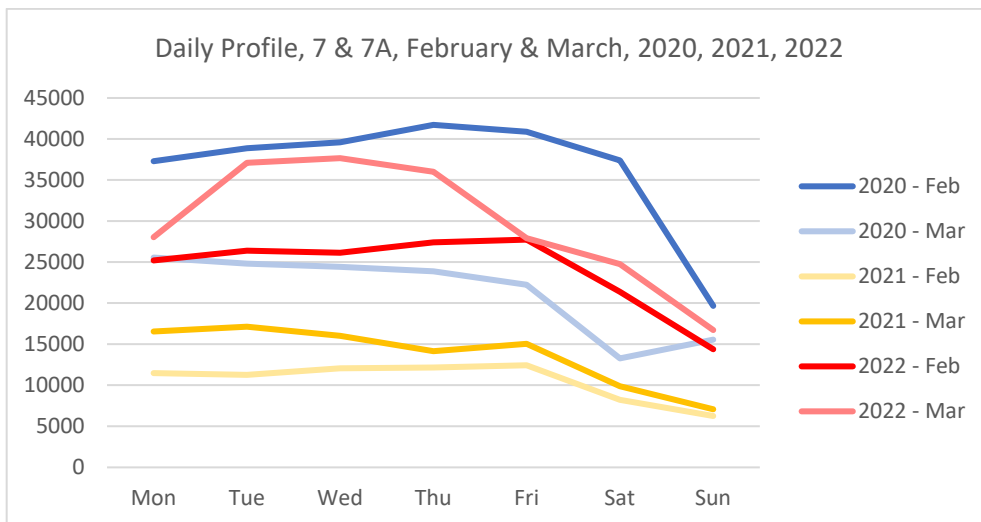
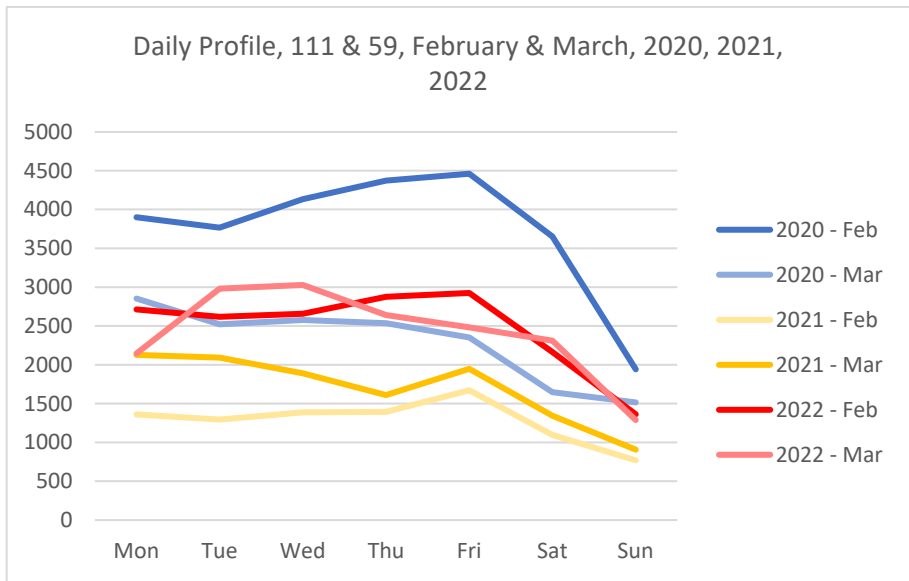
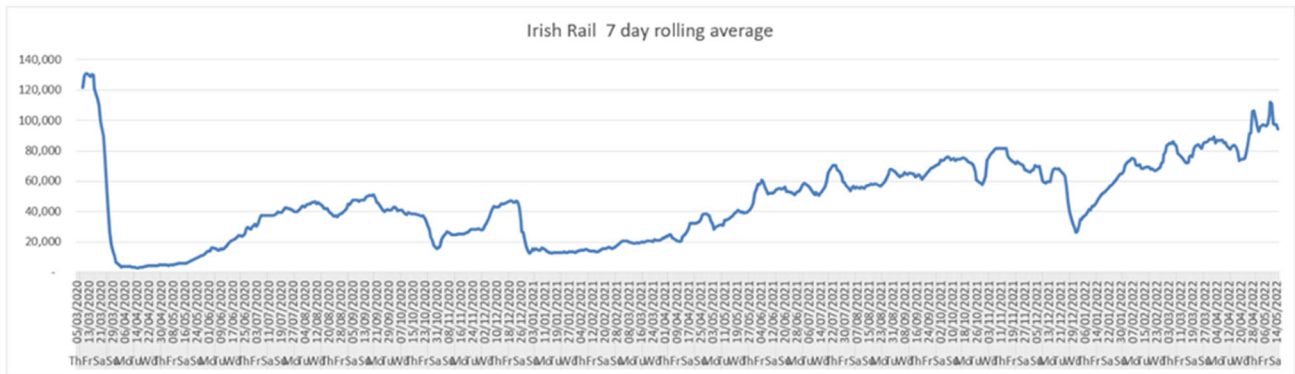


Figure 26 Daily profile of bus numbers 59 and 111 over time



In terms of rail-based movement, while detailed DART patronage data has not been available for this study, the national Irish Rail figures (as shown in Figure 27) show the significant and ongoing impact of the pandemic on rail patronage numbers. While there is a clear recovery underway, by the end of March 2022 for example, patronage numbers were still only at c.72%⁴ of pre-Covid numbers.

Figure 27 Irish Rail national average patronage figures from pre-pandemic until mid-May 2022 (source NTA)



Follow-on Public Transport Operator Update

A meeting was held with Mr. Derry O’Leary, Commercial Director of Go Ahead Ireland during June 2022 to provide an update on public transport conditions in the context of the continued implementation of the CMR. The purpose of the meeting was to provide an updated assessment of impacts on public transport patterns in the region of influence of the CMR, now that the infrastructure has been in place for almost 2 years and Covid restrictions are largely removed.

The meeting sought to reappraise feedback received in relation to Dún Laoghaire services as part of the initial report and phase of work, i.e. whether these concerns still stand or have been alleviated. The operator reported continuing issues with signalization (from George’s Street onto Glenageary Road Lower and onto Summerhill Road) at People’s Park Corner. This is likely as a result of some traffic which appears to have redirected from the coastal roads but not to same extent as before (i.e. there were

unfamiliar users but it has settled down). Nonetheless some services, according to the operator, are still going through multiple changes of lights without proceeding at this key junction. In general, operating conditions in Dún Laoghaire were described as “not bad”, though it was noted that these can worsen in summer months, with seasonal and amenity traffic movements occurring.

The operator raised a number of parallel issues. Although the meeting was primarily concerned with the CMR, the Summer Streets program (2021) was presented as a key issue. The pedestrianisation programme is considered a very positive social initiative by the operator, but concern was raised that something needs to be done to ensure good conditions for bus operations during the programme. Remote management of the SCATS (traffic signal management) system was also cited as an issue as it reduces the responsiveness and ability of local authorities to deal with local traffic conditions.

The future management of conditions for buses at Crofton Road, and protecting local bus access, were also cited as a source of concern. In the context of BusConnects, the CMR and other planning and infrastructural developments, the operator was keen to emphasise the strategic importance of the bus/rail interchange at Crofton Road. Reference was made to apparent suggestions that bus services could be re-routed onto Harbour Road and the Operator was opposed to this, stating that *“the answer is not to hide the buses on harbour road”*.

In general the operator contended that buses are key for the commercial life of the town and that bus access to amenities also needs to be emphasised. The operator recommended that studies be undertaken into the extent of this, citing similar studies for Dublin city centre which showed the importance of public transport for supporting strong and healthy retail environments¹⁹.

In conclusion, notwithstanding local signalisation issues and concerns about future infrastructural plans for the Dún Laoghaire area, the operator considered that any impacts emanating from the CMR have been acceptable. Overall public transport operations have been able to work around the new active mobility infrastructure and the operator would support its retention. Go Ahead Ireland, as part of a global public transport operations group, expressed their organisational support for investment in active travel and shifts towards more sustainable forms of mobility in general.

Public Transport & Bus Performance

To corroborate the above analysis, a basic bus journey time analysis, undertaken in the Phase 1 Interim Findings study, was repeated again here, in so far as data was available. The aim was to assess the impact of public realm measures on the speed and reliability of bus routes through the junction of George’s Street / Glenageary Road Lower / Park Road / Glasthule Road (the “People’s Park town corner”), highlighted by the operator as having ongoing delay issues for bus services.

¹⁹ O’Connor, D. Nix, J. Bradshaw, S. and Sheil, E. “Shopper Travel Behaviour in Dublin City Centre”, *Proceedings of Irish Transport Research Network 2011*

Bus journey time reliability data was requested from the National Transport Authority for routes 59 / 111 between the following stops on either side of the People’s Park town corner: 3047 – 3048.

The above bus journey data was accessed for weekdays and for the following monthly time periods: July-December 2021.

Table 3 shows the average actual running time differences (in seconds) (i) between 2019 and 2021 and (ii) between 2020 and 2021, for southbound through the People’s Park town corner. At the time of reporting 2021 data for northbound services was not available. However as outlined in the Ph1 Interim Findings report, some of the key concerns had been expressed by the operator in a southbound direction.

Year-on-year average journey times are proved to be both fairly consistent and stable over the selected time-period, with some minor improvements noted in a southbound direction. Between July-December 2019 and 2021 overall journey times, through this short section, have gotten shorter, i.e. an overall improvement in average running time of between 5 and 8 seconds. Average running time differences were calculated across day-long data (i.e. 7am – 11pm), provided by the National Transport Authority, which was broken down into 30 minute time periods.

It should be noted that the journey-time data relates to relatively short distances through a single junction. Therefore, inferences into the data are limited. For this reason, feedback from public transport operators, and in particular from service schedulers can be highly valuable. In particular, concerns raised about signalisation responsiveness should be given regard. Local authorities are responsible for traffic management, thus it is a legitimate concern for transport operators, particularly if control of signalisation is at a further remove from the local authority.

Table 3 Bus average running time differences (in seconds) for southbound services (data source NTA)

Comparative Time Period	Average Running Time Difference between 2019 & 2021 (southbound services)	Average Running Time Difference between 2020 & 2021 (southbound services)
July	-5 seconds	-7 seconds
August	-8 seconds	-1 seconds
September	-6 seconds	-2 seconds
October	-5 seconds	4 seconds
November	-6 seconds	3 seconds
December	-6 seconds	-3 seconds

2.4 Vehicular Traffic Analysis

Traffic patterns and volumes changed dramatic throughout the country and city (as well as internationally) throughout the various waves of Covid-19 and the associated restrictions of movement etc. While it is very difficult to examine traffic impacts due to the continually shifting patterns, this analysis focused on exploring two key questions: (1) did levels of vehicular traffic in the CMR and Dún Laoghaire appear to be significantly different to what was happening elsewhere within the County and outside of any reasonable sphere of influence of the CRM, and (2) how did vehicular traffic patterns appear to change throughout the various stages of Covid-19.

The analysis is informed by the available data, which in this case is largely the TomTom Move database and limited use of SCATS data²⁰. The question is largely explored using traffic speed as a proxy for traffic volume and congestion. The use of this proxy allows for a wider view of the local network and traffic speed data is available during different time periods and is then cross-comparable for locations across the County.

Much of analysis is undertaken using TomTom O/D Analysis (Origin/ Destination²¹) and traffic statistics accessed through the TomTom Move Dataset. This allowed a review to be undertaken of how traffic movements, trips and speeds have changed during 2020, 2021 and early 2022. The dataset contains a high volume of location data from anonymous GPS devices such as TomTom (connected) GPS devices, connected cars, and anonymous GPS-equipped mobile phones. Globally TomTom collects over 61 billion location measurements daily which it analyses to recognise patterns and sequences from a single device which define the concept of a trip with a start point and end point. Trips are anonymised and the start and end of trips are trimmed to prevent individuals being identified.

To provide an indication of the likely impact of the pandemic on traffic volumes and patterns in the area, a sample traffic volume count was also analysed at a key junction. This is detailed below in Section 2.4.1. Section 2.4.2 examines traffic speeds and trip times across a sample of the local network (with wider area cross-comparison) while Section 2.4.3 looks at traffic movements and distribution in the area.

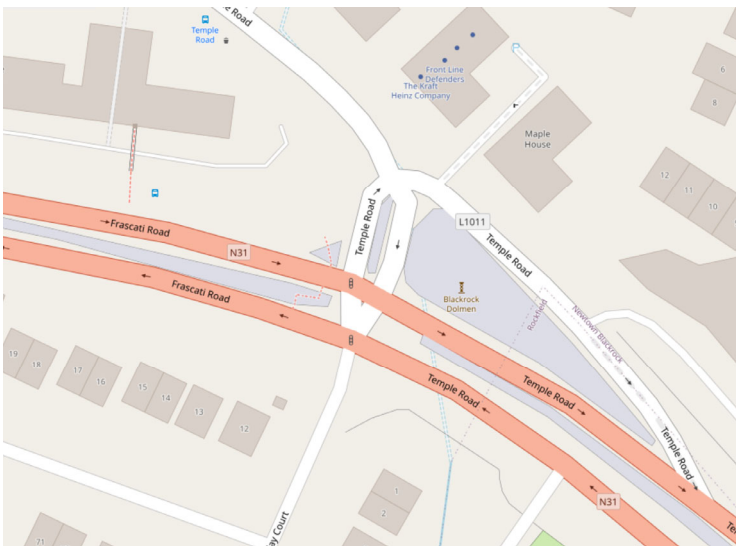
²⁰ SCATS is the urban traffic control system used on certain roads in Dublin.

²¹ When a vehicle passes through a defined area of interest it is detected as an 'Origin', with the final area that is passed through is listed as the 'Destination'. For more information, see <https://www.tomtom.com/products/origin-destination-matrix-analysis/>

2.4.1 Vehicular Traffic Volumes and the Pandemic

In addition to the TomTom data analysis detailed further below, a sample full vehicle movement count was undertaken at the junction of Frascati Road, Temple Road and Barclay Court in Blackrock (see Figure 28), using SCATS data. This junction was selected as it is located ‘upstream’ from the Coastal Mobility Route, thus it gives an indication of how traffic volumes and patterns changed over the course of the pandemic in the Blackrock/Monkstown area before south-east bound traffic movement is significantly impacted by vehicular route diversions associated with the CMR. The junction is on the N31 and is a strategic commuter route connecting Blackrock, Dún Laoghaire and Glenageary to the city centre. Three 2-week time periods were examined: February 2020 (forming the pre-pandemic baseline), September/October 2020, and February 2022²².

Figure 28 Frascati Road/Temple Rd/Balclay Court Junction, Blackrock (basemap source openstreetmap.org)



The changing patterns in people’s travel habits are clearly apparent in the SCATS counts as well. Overall, there was a 16.1% decline in vehicle counts at the junction in the September/October 2020 period compared to the February 2020 baseline. **Traffic counts had recovered slightly by February 2022 but were still down 13.3%**²³. However, it should be noted that **these changes were not evenly spread across times and trip types; for example, by February 2022 weekend counts declined by only 10.5%, compared to a 14.1% decline on weekdays.**

²² 3rd February 2020 – 16th February 2020; 28th Sept 2020 – 11th October 2020; 31st Jan 2022-13th Feb 2022. These time periods were chosen as a sample of pre Covid traffic; a time during Covid when schools were open but some restrictions were in place; and a time when Covid restrictions were largely lifted; and to be outside of typical school holiday periods.

²³ 24 hour time periods over full week

As a comparison, traffic volumes were also calculated at two other urban locations on the N31, Mount Merrion Avenue (Blackrock) and Brewery Road (Leopardstown), using data from Transport Infrastructure Ireland's traffic counters. Average weekly traffic volumes were down by 12.5% in February 2022 compared with the February 2020 baselines in Mount Merrion²⁴. During the September/October 2020 period and the February 2022 period, the peak period for traffic across the whole week was recorded on Friday afternoons at 3pm, with volumes exceeding that of the baseline/same period in 2019 (re Sept/Oct 2020) and 2020 (re Feb 2022), despite overall traffic volumes being reduced. This Friday mid-afternoon peak is also evident at Frascati/Temple Road junction, with the highest volumes of traffic over the course of the week in Feb 2020 was between 4-5pm on Fridays, and between 4-6pm in February 2022.

At Brewery Road, Leopardstown traffic volumes in February 2022 were only 5.5% less than the February 2020 baseline overall²⁵. A Friday afternoon peak is somewhat evident here too, although to a lesser extent and a later time than in Blackrock (4/5pm).

Most vehicular movements through the Frascati/Temple Rd junction during all time periods (91%) were straight-ahead journeys along Frascati Road, travelling either towards the city or away from it. On weekdays, counts for these movements declined by 16.6% in October 2020, recovering slightly by February 2022, but still down by 14.1%. On weekends, these declines were -14.0% and -10.5% respectively. This suggests that compared to pre-pandemic levels, commuting numbers have still not recovered, but perhaps also that overall vehicular trip levels to Dublin city centre have reduced as well as some potential modal shift.

However, the counts involving the other arms of the junction (Temple Road and Barclay Court) show very different patterns. There are large changes in both the September/October 2020 and February 2022 counts for vehicles turning right from Frascati Road onto Temple Road heading north (-45% in Feb 2022), and for vehicles turning right from Temple Road on to Frascati Road (+23.2% in Feb 2022). This is not surprising as since Blackrock Village has been made one way, vehicles travelling north on Frascati Road must now use Rock Hill, rather than Temple Road to access the village and the DART station, while vehicles exiting the village and travelling north can no longer use Rock Hill and must use Carysfort Avenue or Temple Road instead.

Vehicle counts exiting from Barclay Court, a small, exclusively residential estate, show a 13.8% increase on weekends in February 2022 compared to the pre-pandemic baseline, compared to a 4.3% increase on the baseline in September/October 2020. Though a small, new housing development was completed in late 2020 that might partially account for this increase, the counts also show a 14.4% decline on weekdays by February 2022, compared to a 10.8% decline in September/October 2020. Similarly, left turn counts from Temple Road on to Frascati Road, the southbound exit route from Blackrock for local residents from streets

²⁴ Based on average 7 day volume 24 hr counts of 11659 in Feb 2020 v's 10198 in Feb 2022 (source TFI traffic data). At the time of writing this report, the May 2022 traffic volumes at 11021 (avr. 7 day) were still 8.3% lower than May 2019 at 12021.

²⁵ Based on average 7 day volume 24 hr counts of 15745 in Feb 2020 v's 14884 in Feb 2022 (source TFI traffic data). At the time of writing this report, the May 2022 traffic volumes at 15514 (avr. 7 day) were only 1.8% lower than May 2019 at 15,798.

such as Idrone Terrace and Maretimo Villas, as well as for visitors and deliveries, were up 27.2% during weekends in February 2022, and were similar to pre-pandemic levels during weekdays (1.4% increase).

This may suggest that streets which serve a mainly arterial, commuter function for journeys to or from Dublin City may expect to see a reduction in traffic volumes of around 15% during weekdays, and a reduction of around 10% during weekends. However, streets with a more local and perhaps mixed-use function may have experienced increased traffic movement from locally generally traffic at weekends as people's weekly travel habits change.

Analysis of the to/from city movements at the junction for the morning and evening weekday rush-hours finds that the rush-hour periods have seen slightly smaller decreases than the overall total, meaning that off-peak hours on weekdays have seen greater declines. While the overall to/from city weekday total was down by 14.1% in February 2022, the morning peak (7am to 10am) was only down 12.6%, while the evening peak was down 11.0%. The 7-8am timeslot saw the second largest decline of any weekday timeslot, with a reduction of 30% in vehicle counts between February 2022 and February 2020. The other largest drops were outside the typically busy periods, between the hours of 7pm and 4am (-19% to -35% change, while the off-peak day-time hours 10am to 4pm) saw comparatively modest drops (-4% to -18%).

Overall traffic volumes at the Frascati/Temple Road junction are down from pre-pandemic times, although the timing and nature of trips has shifted, with increases in more local traffic exiting the Barclay Court and Temple Road arms of the junction at weekends, and a large decrease in weekday journeys along Frascati Road between the hours of 7 and 8 am, perhaps indicative of a reduced need for commuting motorists to leave early to beat the morning peak, as well as the increase in working from home reducing vehicle counts overall.

2.4.2 Vehicular Traffic Speeds and Trip Times

Vehicular speeds were analysed in the Monkstown and Glasthule areas adjacent to the CMR. Speeds were also explored in the Stillorgan and Clonskeagh areas to provide a baseline for comparison. Further background to this analysis is outlined in the Ph1 Interim Findings report (2021). Speed data was gathered on a selection of key streets²⁶ in each area across five time periods using TomTom Move²⁷ (see Figure 29):

- February 2020 (as pre-pandemic baseline),
- October 2020,
- February 2021,
- October 2021,
- and February 2022.

The median (50th percentile) speeds were collected for each segment on each street, added together, and used to calculate an average speed, weighted based on the length of each individual segment. These averages were calculated for each street and also for each area. Table 4 below shows the changes in this aggregate average speed across the four areas, relative to the pre-pandemic average in February 2020.

Larger increases in speeds are highlighted in green, suggesting a reduction in traffic congestion, and larger decreases are highlighted in red, suggesting an increase in traffic congestion. Speeds are broken time by time of day (traditional morning peak/rush hour, traditional evening peak/rush hour, and rest of day) and views of the changes broken down by weekday/weekend are shown, as well as the view across the whole week.

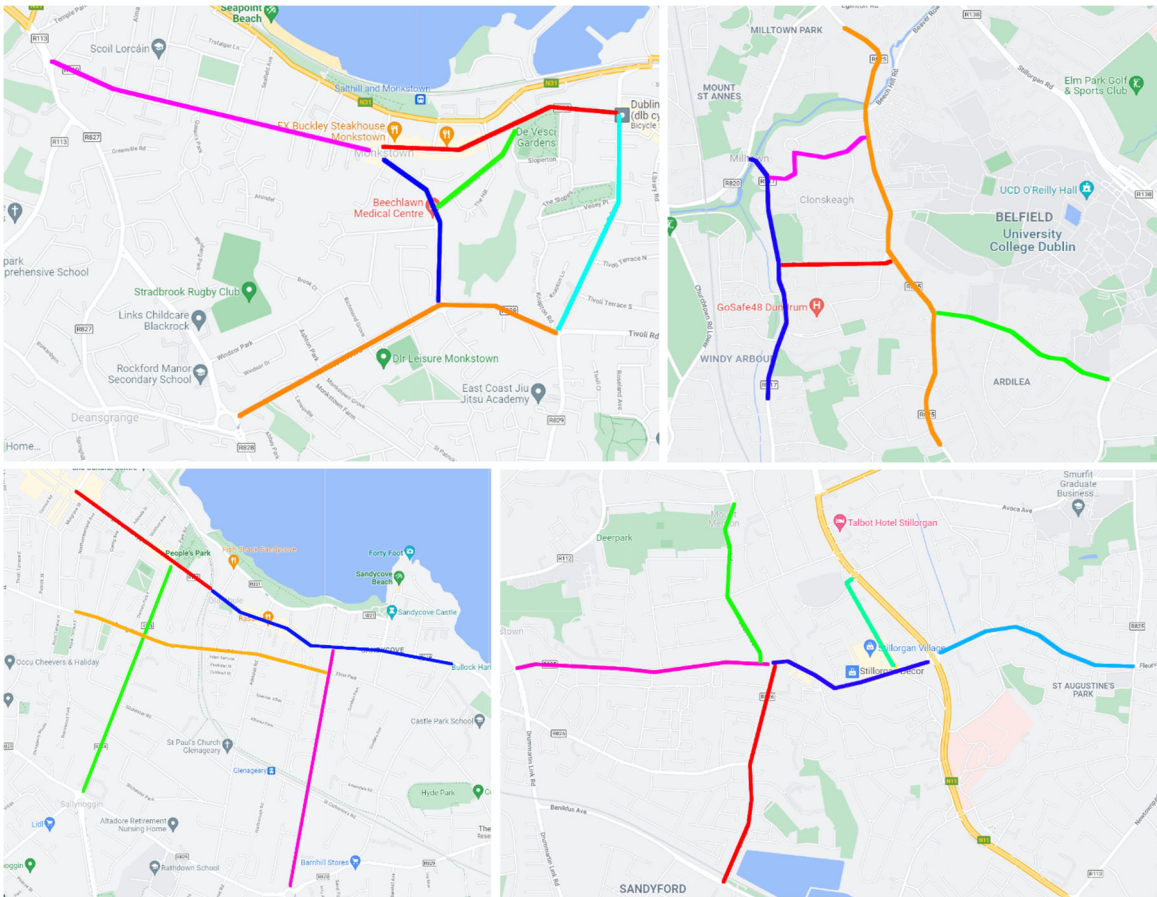
Differences in traffic speeds are observed across the measurement periods. October 2020 sees decreases in traffic speeds. These are particularly pronounced in the Glasthule area but are also noticeable in Stillorgan and Monkstown during the 10am to 4pm period. In October 2020, Dublin had Level 3+ and Level 5 restrictions in place, with Level 5 restricting movement to within 5km of home. In contrast, increases in traffic speeds are visible in this period during the traditional evening rush hour time period (4-7pm), likely reflecting the reduced levels of commuting.

February 2021 shows the striking impact of Level 5 lockdown measures on movement patterns, with large increases in traffic speeds, indicating a significant reduction in traffic levels and associated congestion. The 7am to 10am weekday speeds measured across all four areas in February 2021 were close to the speeds measured for the midnight to 4am time slot (not displayed in Table 4), suggesting congestion was largely absent at this time period. October 2021 and February 2022 indicate a gradual stabilisation of speeds, with variations for each area which will be analysed further in the next section.

²⁶ Excluding high capacity roads with speed limits over 50km/hr, such as the N11/Stillorgan Dual Carriageway.

²⁷ During October 2020, Dublin ranged between 3+ and Level 5 restrictions. During February 2021, Dublin was in Level 5 Covid-19 restrictions. During October 2021, Ireland had limited Covid-19 restrictions in place, and during February 2022, Ireland had begun to emerge from the worst of the first Omicron wave and Omicron related restrictions began to ease.

Figure 29 Key routes into and out of sample urban centres for vehicular traffic speed analysis (basemap from Google Maps and adapted by author).



Monkstown area (top left): Monkstown Road (pink), Monkstown Crescent (red), Pakenham Road (green), Carrickbrennan Road (dark blue), Monkstown Avenue & Mounttown Road Upper (orange), York Road (light blue)

Glasthule area (bottom left): Albert Road Upper/Lower (pink), George’s St Upper & Summerhill Road (red), Glasthule Road & Sandycove Road (dark blue), Corrig Road, Eden Road & Hudson Road (orange), Glenageary Road Lower (green)

Clonskeagh area (top right): Whitethorn Road & Milltown Bridge Road (pink), Bird Avenue (red), Roebuck Road (green), Dundrum Road (dark blue), Clonskeagh Road (orange)

Stillorgan area (bottom right): Lower Kilmacud Road (western section, pink), Lower Kilmacud Road (village section, dark blue), Kilmacud Road Upper & St Raphaela’s Road (red), South Avenue & North Avenue (green), Old Dublin Road (cyan), Stillorgan Park Road (light blue)

A difference between weekdays and weekends is noticeable across all areas and time periods; weekends in general see greater relative reductions or lower relative increases in traffic speeds compared to weekdays, i.e. relative traffic speeds tend to be slower at weekends compared with weekdays suggesting higher traffic volumes/congestion compared with pre-pandemic.

Table 5 below presents the same data as Table 4 but instead organised by area, making it easier to track changes in patterns for each area.

Table 4 Changes in average area speeds (km/hr) compared to the pre-pandemic baseline (February 2020), organised by measurement period (data sourced from TomTom Move).

Period	Time	October 2020				February 2021				October 2021				February 2022			
		Stillorgan	Clonskeagh	Monkstown	Glasthule	Stillorgan	Clonskeagh	Monkstown	Glasthule	Stillorgan	Clonskeagh	Monkstown	Glasthule	Stillorgan	Clonskeagh	Monkstown	Glasthule
Whole week	7:00-10:00	0.0	3.0	-0.1	-0.2	5.8	7.4	3.7	4.0	-0.3	1.9	0.3	1.0	0.3	1.7	-0.2	0.7
Whole week	10:00-16:00	-0.7	0.1	-0.8	-2.1	2.4	2.1	1.8	0.6	-1.1	-0.5	-0.1	-0.3	-0.5	-1.0	0.0	0.0
Whole week	16:00-19:00	1.1	2.8	0.2	-0.8	3.2	4.7	2.3	0.8	0.1	1.5	0.5	0.1	0.6	1.2	0.1	0.3
Weekdays	7:00-10:00	0.0	3.3	-0.2	-0.3	6.5	8.4	4.2	4.4	-0.6	1.8	-0.1	0.8	0.2	1.9	0.3	0.6
Weekdays	10:00-16:00	-1.0	0.3	-0.9	-1.8	2.5	2.5	1.9	0.8	-1.5	-0.6	-0.4	-0.1	-0.9	-1.4	-0.1	-0.2
Weekdays	16:00-19:00	1.6	3.6	0.7	-0.1	4.0	5.8	3.0	1.5	0.4	1.4	0.8	0.7	0.9	1.3	0.5	0.5
Weekends	7:00-10:00	0.0	0.0	0.1	-0.9	1.5	1.4	0.9	1.2	-0.5	-0.8	0.2	0.0	0.2	-0.9	0.2	0.1
Weekends	10:00-16:00	0.1	-0.5	-0.8	-2.8	2.1	1.0	1.5	0.2	-0.4	-0.6	0.3	-0.6	0.4	-0.7	0.8	0.4
Weekends	16:00-19:00	0.0	-0.6	-1.0	-2.3	1.2	0.7	0.9	-0.7	-0.9	-0.7	-0.4	-1.1	0.1	-0.7	0.0	0.0

Table 5 Changes in average area speeds (km/hr) compared to the pre-pandemic baseline period (Feb 2020), organised by geographic area (data sourced from TomTom Move). Larger increases in speeds are highlighted in green, suggesting a reduction in traffic congestion, and larger decreases are highlighted in red, suggesting an increase in traffic congestion.

	Time	Stillorgan area				Clonskeagh area				Monkstown area				Glasthule area			
		October 2020	February 2021	October 2021	February 2022	October 2020	February 2021	October 2021	February 2022	October 2020	February 2021	October 2021	February 2022	October 2020	February 2021	October 2021	February 2022
Whole week	7:00-10:00	0.0	5.8	-0.3	0.3	3.0	7.4	1.9	1.7	-0.1	3.7	0.3	-0.2	-0.2	4.0	1.0	0.7
Whole week	10:00-16:00	-0.7	2.4	-1.1	-0.5	0.1	2.1	-0.5	-1.0	-0.8	1.8	-0.1	0.0	-2.1	0.6	-0.3	0.0
Whole week	16:00-19:00	1.1	3.2	0.1	0.6	2.8	4.7	1.5	1.2	0.2	2.3	0.5	0.1	-0.8	0.8	0.1	0.3
Weekdays	7:00-10:00	0.0	6.5	-0.6	0.2	3.3	8.4	1.8	1.9	-0.2	4.2	-0.1	0.3	-0.3	4.4	0.8	0.6
Weekdays	10:00-16:00	-1.0	2.5	-1.5	-0.9	0.3	2.5	-0.6	-1.4	-0.9	1.9	-0.4	-0.1	-1.8	0.8	-0.1	-0.2
Weekdays	16:00-19:00	1.6	4.0	0.4	0.9	3.6	5.8	1.4	1.3	0.7	3.0	0.8	0.5	-0.1	1.5	0.7	0.5
Weekends	7:00-10:00	0.0	1.5	-0.5	0.2	0.0	1.4	-0.8	-0.9	0.1	0.9	0.2	0.2	-0.9	1.2	0.0	0.1
Weekends	10:00-16:00	0.1	2.1	-0.4	0.4	-0.5	1.0	-0.6	-0.7	-0.8	1.5	0.3	0.8	-2.8	0.2	-0.6	0.4
Weekends	16:00-19:00	0.0	1.2	-0.9	0.1	-0.6	0.7	-0.7	-0.7	-1.0	0.9	-0.4	0.0	-2.3	-0.7	-1.1	0.0

In Stillorgan, the most recent period (February 2022) shows small increases in traffic speeds during the morning and evening rush-hours while a small decrease is observed during off-peak hours, mostly from increased congestion during weekdays. Weekend speeds in February 2022 are marginally faster but broadly similar to those observed February 2020.

In Clonskeagh, changes are more pronounced. Though speed increases during morning and evening rush hours have declined compared to early in the pandemic, they are higher during the weekdays compared to pre-pandemic conditions. By contrast, all weekend speeds and off-peak weekday speeds are lower. These findings suggest a strong ‘pandemic effect’ in the area analysed; it has seen large changes in travel habits as the speeds indicate a greater level of congestion at weekends and off-peak hours, and a large reduction in congestion during weekday rush-hours. It is also notable this ‘pandemic effect’ appears to have grown

stronger between October 2021 and February 2022, whereas in the other areas, the ‘pandemic effect’ seems to be gradually reducing as time passes. This is perhaps partially explained by differences in the streets analysed for each area; much of the Clonskeagh area consists of ‘radial’ commuter routes, whereas the others consist of more of a mix of radial and ‘orbital’ routes typically used less by commuters.

Monkstown and Glasthule share some similarities in the changes in their movement patterns. Both areas saw notable decreases in traffic speeds in October 2020; in Glasthule, these decreases were particularly pronounced with the area registering the largest speed decreases of any area in the analysis during off-peak periods and at weekends. This supports anecdotal claims of increased traffic congestion in these areas during 2020. As these areas surveyed lie adjacent to the CMR and contain the streets to which vehicular traffic would be displaced to due to the traffic restrictions associated along the coast, it is understandable that that this congestion might be largely attributed to the presence of the CMR.

However, the data collected for October 2021 and February 2022 questions a definitive conclusion here, as despite the continued presence of the CMR, traffic speeds increased during these two measurement periods, suggesting a decline in congestion. In both Monkstown and Glasthule, traffic speeds during off-peak hours show little change between February 2020 and February 2022, while Glasthule shows an increase in traffic speeds during the traditional morning and evening peak-hours (4-7pm).

However, it should be noted that these speed changes are not uniform across their respective areas; with some streets experiencing greater changes than others. While the Monkstown area has traffic speeds that are broadly the same in February 2022 compared to February 2020, Monkstown Road for example does have lower speeds across each time slot (2-3km/hr). Though it is worth noting that despite these decreases Monkstown Road still has the highest speeds of any street monitored in the area, it nonetheless highlights how changes in traffic patterns resulting from both interventions and the pandemic can have an uneven impact on individual streets.

Table 6 Median speeds by street, Monkstown area (source TomTom Move).

	Feb 2020			Oct 2020			Feb 2021			Oct 2021			Feb 2022		
	7:00-10:00	10:00-16:00	16:00-19:00	7:00-10:00	10:00-16:00	16:00-19:00	7:00-10:00	10:00-16:00	16:00-19:00	7:00-10:00	10:00-16:00	16:00-19:00	7:00-10:00	10:00-16:00	16:00-19:00
Monkstown Road	43	41	40	40	38	38	44	40	40	41	38	38	40	39	38
Monkstown Cres / Cumberland St	35	31	32	35	30	31	37	32	33	35	30	31	35	30	32
Carrickbrennan Rd	40	37	38	40	37	39	42	39	39	40	37	38	40	37	37
Pakenham Rd	35	32	32	34	32	33	36	33	34	35	34	34	35	34	33
Monkstown Ave / Mounttown	34	33	32	35	33	34	41	38	38	37	35	35	36	35	34
York Road	38	36	36	39	36	36	42	38	38	38	36	36	37	36	36

Table 7 Median speeds by street, Glasthule area (source TomTom Move).

	Feb 2020			Oct 2020			Feb 2021			Oct 2021			Feb 2022		
	7:00-10:00	10:00-16:00	16:00-19:00	7:00-10:00	10:00-16:00	16:00-19:00	7:00-10:00	10:00-16:00	16:00-19:00	7:00-10:00	10:00-16:00	16:00-19:00	7:00-10:00	10:00-16:00	16:00-19:00
Glasthule Stn / Castle Park Rd	33	30	31	31	26	29	36	29	31	33	29	31	34	30	32
Glasthule Stn / Marine Road	27	24	26	27	22	24	31	25	26	28	23	24	27	23	24
Corrig Rd / Hudson Rd	32	31	31	33	30	31	37	33	32	34	32	32	34	32	32
Glenageary Rd Lower	35	34	33	36	32	34	39	35	35	36	33	34	35	34	33
Albert Road	34	35	34	34	33	33	40	35	35	36	35	35	35	34	34

Sample Route Journey Times

Comparative vehicular journey time analysis, along specified routes, was undertaken in the Phase 1 Interim Findings study, and a sample of these routes are repeated again here over a longer time period (pre-pandemic/February 2020 to February 2022). Figure 32 presents an updated version of travel time comparison that was provided in the Phase 1 Interim Findings report. It displays travel times (minutes and seconds) on a route running adjacent and parallel to the CMR between Merrion Gates and Castle Park (and vice versa) that would be expected to see spillover of traffic from the closure of the east/south-bound vehicular lane on Seapoint Avenue. This route can be seen in Figure 30. To provide context, travel times for a route between Clonskeagh and Stepside, travelling via Overend Way in Dundrum (Figure 31) are also included.

The route selection was based on the following criteria:

- Route is within the boundaries of DLR (due to data availability)
- Route provides a similar radial function for access to Dublin City
- Similarity of route length and traffic speeds
- Proximity to a major rail or tram line
- Proximity to major trip generators such as urban villages or shopping centres
- Road types (older roads were considered more comparable than modern distributor roads or motorways)
- Overlap with walking and cycling baselines from Ph1 (Rock Road and Clonskeagh Road).

Figure 30 N31/R119 alternative CMR-adjacent route. The southbound route diverts via Crofton Road and Marine Road (source map from Openstreetmap.org and adapted by author).



Figure 31 Stepside to and from Clonskeagh (source map from Openstreetmap.org and adapted by author).

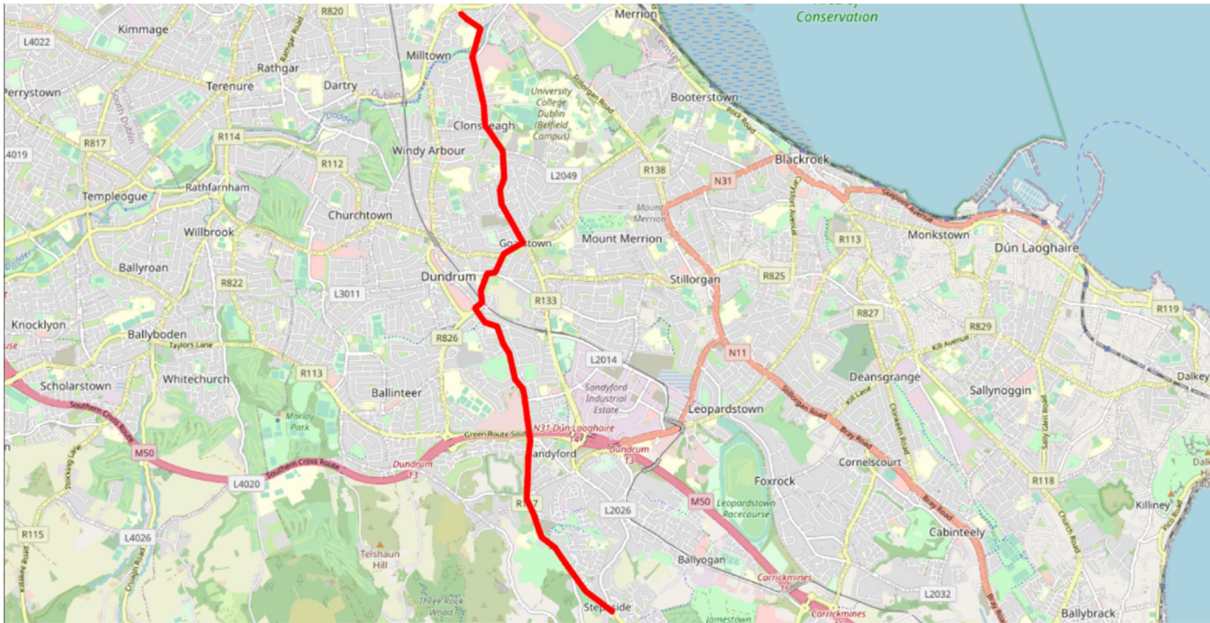


Figure 32 Change in sample vehicle journey times over the course of 2 year time period from pre Covid to end of February 2022 (source data from TomTom Move)

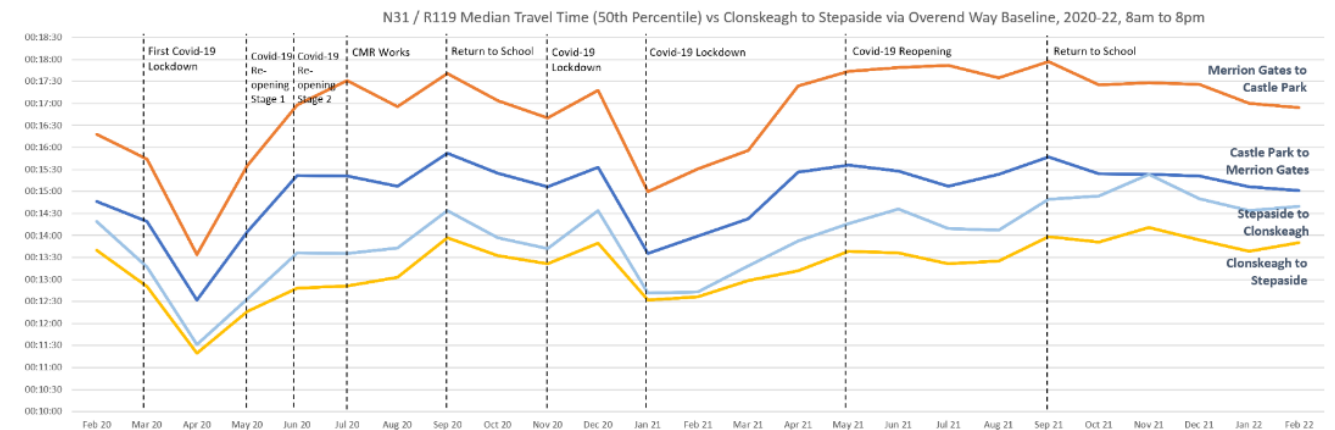


Figure 32 illustrates the change in vehicle journey times for the sample routes, Merrion Gates to Castle Park, Dalkey and vice versa; and Clonskeagh to Stepside. The impact of the various states of Covid-19 restrictions are particularly evident, as are key events such as return to school in September 2020 and September 2021. Both routes follow similar peaks and troughs in journey times, however there is a small peak in November 2021 in the Stepside/Clonskeagh route that is not evident in Merrion Gates/Castle Park, and another small increase in travel time in the citybound direction in July/August 2021. The latter could potentially be related to the temporary pedestrianisation of George’s Street Upper in Dún Laoghaire, and associated traffic diversion.

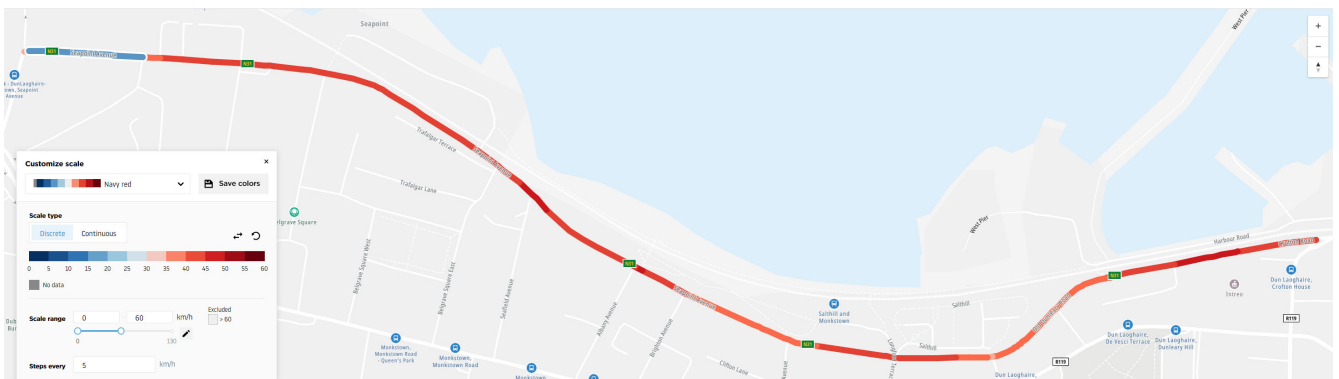
All the routes have begun to stabilise in their journey times. By February 2022, the Clonskeagh to Stepside route has largely returned to its pre-pandemic journey time with only 10 seconds in the difference, and 21 seconds in the difference on the Stepside to Clonskeagh route. The Castle Park, Dalkey to Merrion Gates route has also largely returned to its pre-pandemic journey times, with only an additional 15 seconds in journey time recorded over the full length of the journey. The largest journey time increase has been on the Merrion Gates to Castle Park route, however the increase is still fairly minor at 3.7%. This direction of travel was longer prior to the pandemic as it involves a diversion around Crofton Road and Marine Road due to the one-way traffic system on George’s St Lower. In February 2020, the median travel time was 16 minutes and 18 seconds, and was 36 seconds longer in February 2022.

2.4.3 Vehicular Traffic Speeds along the CMR: Traffic Calming & Pedestrian Improvements

Given the significance of the CMR in terms of pedestrian and cyclist movement, vehicular speeds along Seapoint Avenue, Crofton Road and Queen’s Road in Dún Laoghaire, and the coastal streets at Glasthule and Sandycove were also analysed to assess if any areas would warrant priority intervention to improve adjacent pedestrian and cyclist safety. Vehicular speeds are a very significant factor associated with road safety, particularly for pedestrians and cyclists²⁸. To determine the speeding potential of these streets, traffic speeds between midnight and 4am were collected using the TomTom Move database, as congestion, which can limit speeding, tends to be minimal during these hours.

Figure 33 and Figure 34 below show the median speeds (50th percentile) on the coastal routes at Seapoint and Glasthule from midnight to 4am (equivalent to free-flow conditions) in October 2021. The 50th percentile speed is the speed at or below which 50 percent of all vehicles tracked are travelling. It is useful to determine a ‘typical’ speed of a motor vehicle travelling at the time selected, however it should be noted that many vehicles will have travelled at higher speeds. Both the 50th and 85th percentile speeds²⁹ are considered in this study as this provides for a wider consideration of the impact of vehicle speed on pedestrian/cyclist comfort and safety.

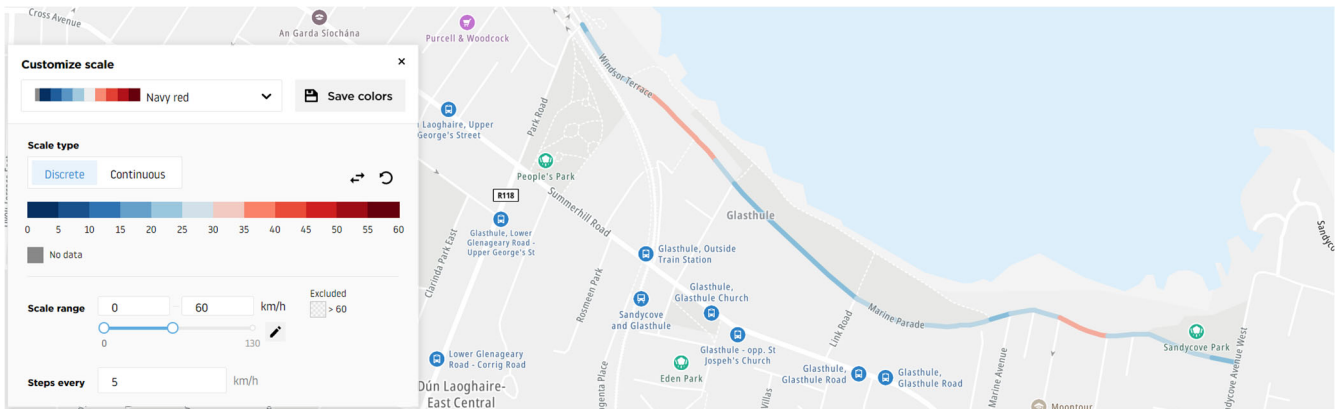
Figure 33 Median speeds (50th percentile) along Seapoint Avenue (midnight-4am), October 2021, all week (image and data from TomTom Move)



²⁸ For example, see EC European Road Safety Observatory Report, Road safety thematic Report: Speeding (2020).

²⁹ 85th percentile speeds are typically used by in traffic engineering to determine vehicle speed limits.

Figure 34 Median speeds (50th percentile) along the coastal route at Glashule (midnight-4am), October 2021, all week (image and data from TomTom Move)



There is a notable difference in vehicular speeds between the two road sections adjacent to the CMR. Despite the reduced carriageway width created by the implementation of the CMR, Seapoint Avenue and Old Dunleary Road can still have high speeds under free-flow conditions, particularly at the Clearwater Cove, Albany Avenue and Seafield Avenue junctions (pictured below), where 50th percentile speeds can exceed the current speed limit 50kph. 50km/hr speed limits are not compatible with such a high amenity location that is heavily used by pedestrians and cyclists, and there is scope to review the speed limit on this road and consider the implementation of traffic calming interventions. It is an additional concern that half of all vehicles are travelling at a speed higher than the posted legal speed limit, which itself may not be appropriate to such a mixed urban setting.

Figure 35 Old Dunleary Road (left) and junction with Cumberland St (right)



Figure 36 Seapoint Avenue adjacent to Albany Avenue



These sections of the route have long sightlines and are enclosed by walls and fences, not dissimilar to a ‘distributor’ type road, which provides few visual cues for a motorist to reduce their speed. The carriageway also widens out at several points in these areas, particularly at junctions, which sometimes have large corner radii which can encourage fast vehicular turning movement (see Figure 4.4.2 in DMURS, 2019 for example). Except for the last segment approaching the junction with Newtown Avenue (where there is a signalized junction), 50th percentile speeds tend to exceed 40kph along the length of this section.

Figure 37 Newtownsmith, Glashule



By contrast, the coastal route at Glashule shows much less capacity for speed, even under free-flowing conditions between midnight and 4am. Only two short sections, one east of People’s Park and another at Marine Parade, have 50th percentile speeds exceeding 30kph; the majority of the route sees speeds between 20kph and 30kph, owing to a tighter vehicular carriageway and higher number of visual cues, such as the presence of homes built close to and opening directly out to the street.

Free-flow speeds along the Queen’s Road and Crofton Road section between the two sections of the CMR are notably higher than at Glashule; westbound speeds approach 35 to 40 kph along Queen’s Road at the East Pier and adjacent to the bus terminus, while eastbound speeds are higher again, approaching 45kph at the bus terminus.

Figure 38 50th percentile median speeds along Queen’s Road and Crofton Road, 0am-4am, October 2021, all week, westbound direction (map and data sourced from TomTom Move)

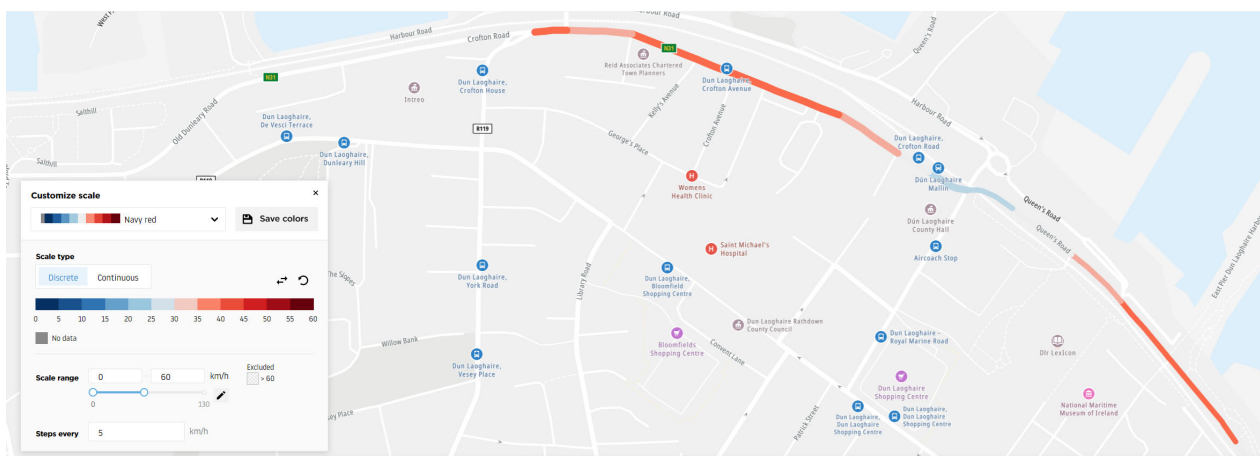
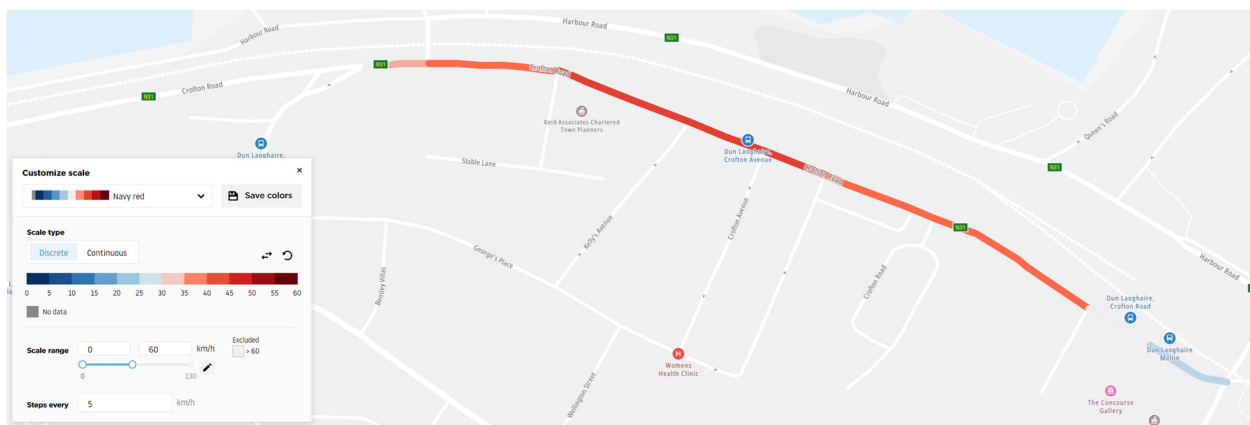


Figure 39 50th percentile median speeds along Queen’s Road and Crofton Road, 0am-4am, October 2021, all week, eastbound direction (map and data sourced from TomTom Move)



85th percentile speeds during daytime hours between 10am and 4pm show similar patterns; Figure 40 below for Seapoint Avenue and Old Dunleary Road shows the highest speeds again occur between the junction of Albany Avenue and Seafield Avenue: between 55 and 60kph. It should be noted that the 85th percentile means 85% of drivers drove at or below the speed indicated, as opposed to the 50% of the 50th percentile figures used for the overnight, free-flow conditions.

At Glathule, traffic speeds are again much lower, with the majority of vehicles travelling at 35kph at most (see Figure 41). There is a section along the coast from the Old Dunleary Road and York Road junction and Queens Road that currently does not contain a segregated cycle route. The most direct linking route here is Crofton Road, whereby the 85TH percentile speed is over 40km/hr for much of Crofton Road (see Figure 42)

Figure 40 85th percentile speeds along Seapoint Avenue and Old Dunleary Road, 10am-4pm, October 2021, all week (map and data sourced from TomTom Move)

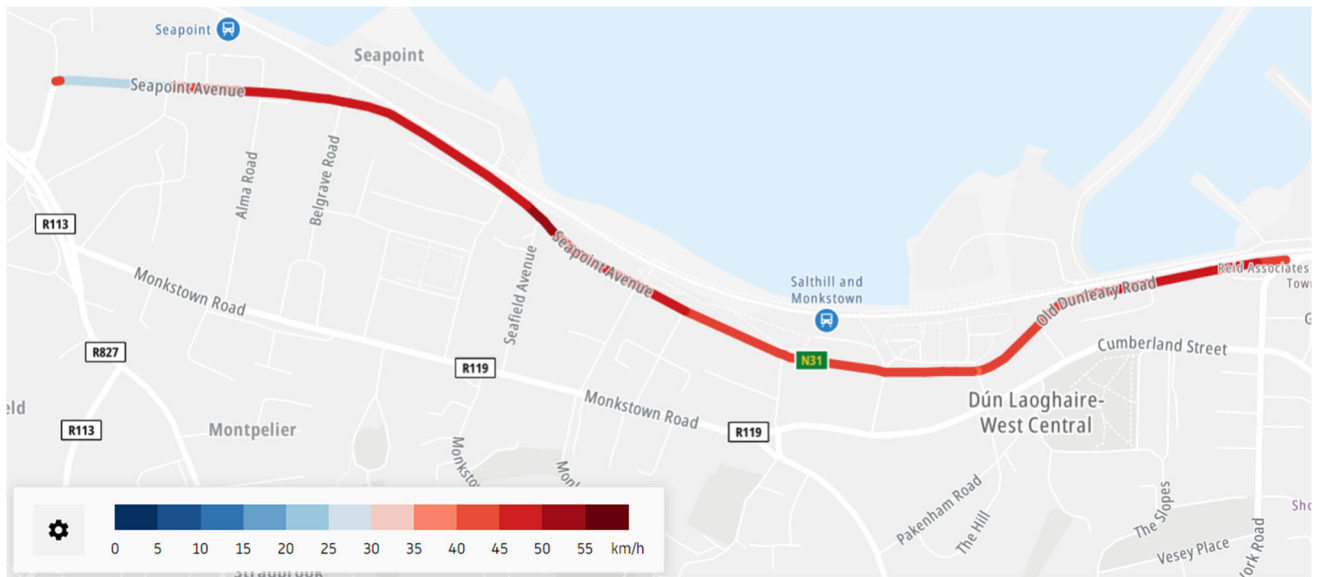


Figure 41 85th percentile speeds along the coastal route at Glathule, 10am-4pm, October 2021, all week (map and data sourced from TomTom Move)

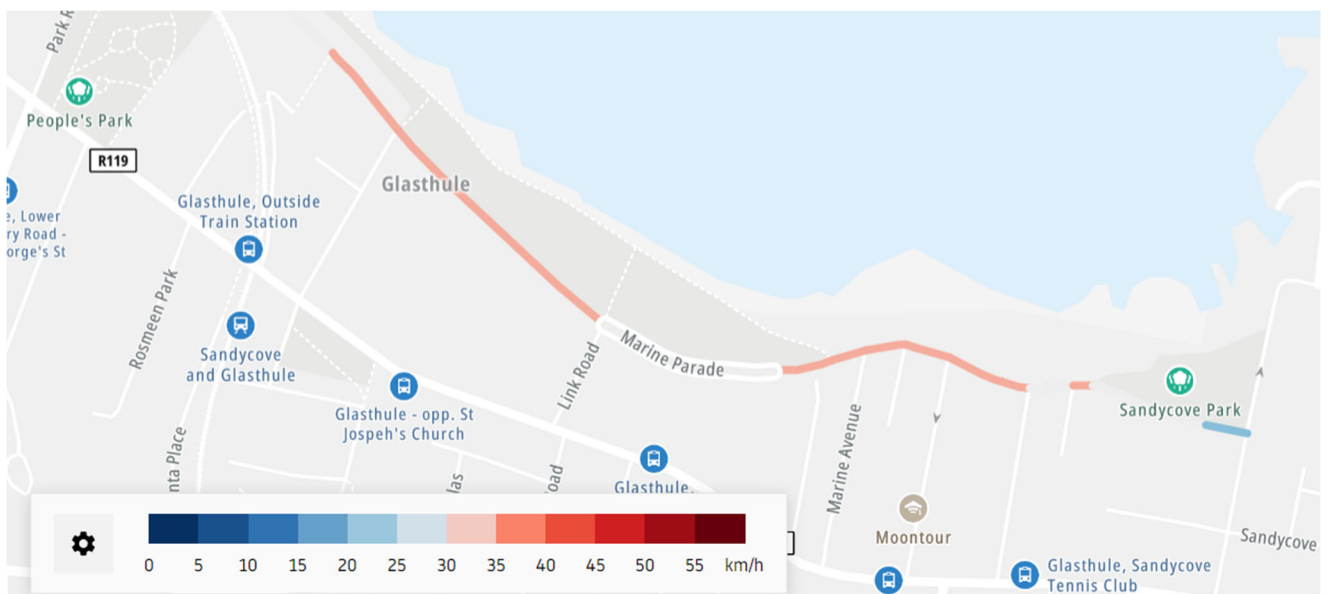
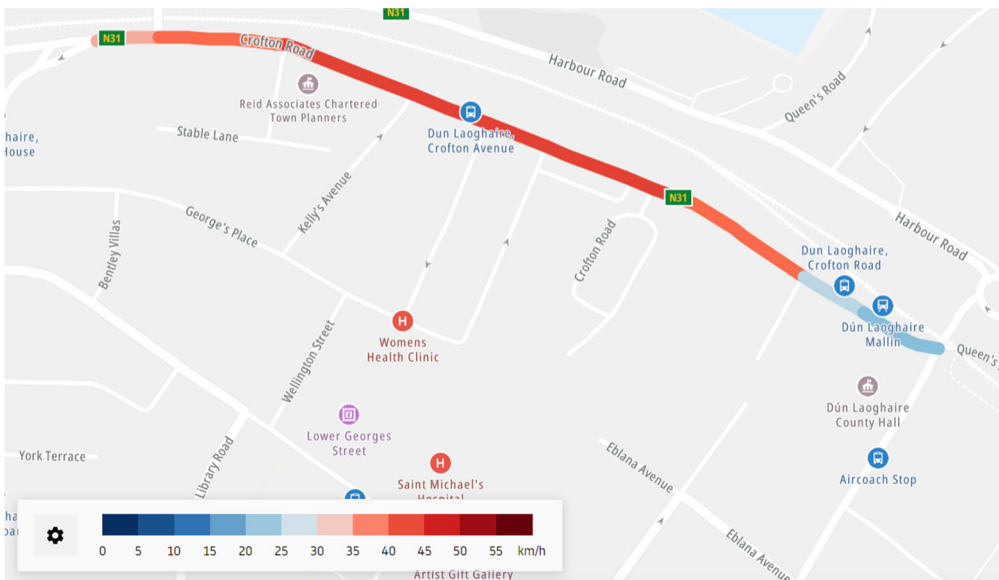


Figure 42 85th percentile speeds along the coastal route at Crofton Road and Queen's Road travelling westbound, 10am-4pm, October 2021, all week (map and data sourced from TomTom Move database)



Figure 43 85th percentile speeds along the coastal route at Crofton Road travelling eastbound, 10am-4pm, October 2021, all week (map and data sourced from TomTom Move database)



The above analysis shows there are a number of areas of excessive vehicular speeds along the CMR that would warrant **priority intervention** to: (a) slow vehicle speeds, (b) improve safety of adjacent cyclists and walkers, and (c) improve safety and comfort of pedestrians and cyclists crossing the road to and from the CMR and adjacent coastal amenities. These are:

-
- (1) **Seapoint Avenue adjacent to Albany Avenue. It is recommended that a number of interventions** are considered for priority intervention here including:
- a. **traffic calming** along the stretch of road that is shown in Figure 36. This traffic calming should include tightening of the junction with Albany Avenue, and the use of vertical and horizontal deflections and geometry tightening to slow vehicular traffic. Any traffic calming should take due cognisance of and be appropriate in terms of design quality and visual impact to the high amenity location here.
 - b. A dedicated **pedestrian crossing at the junction of Albany Avenue and Seapoint Avenue** that facilitates safe and comfortable crossing to both the pedestrian amenities along the coast (including the pedestrian connection over the rail-line), and for cyclists to join the CMR. A step-free crossing such as a zebra style crossing may be suitable in this location (and there may be space for the addition of a pedestrian island here), however due consideration must be given in terms of design quality and visual impact to the high amenity location at this location.
- (2) **Old Dunleary Road. It is recommended that a number of interventions** are considered for priority intervention here including (see Figure 35):
- **Targeted traffic calming** along the stretch of the road from Old Dunleary Hill/Wallace's Hill to York Road.
 - Dedicated **pedestrian crossings at strategic points** along this stretch of roadway. Currently there is an absence of safe, comfortable and regular pedestrian crossing facilities, particularly from the Old Dunleary Hill/Wallace's Hill junction up to the adjacent pedestrian footbridge over the rail-line; and in a mid-block location in the long and linear road stretch around Clearwater Cove.

The above analysis has been limited to the CMR, however further traffic calming and crossing facilities are likely also be warranted along the inland parallel adjacent route, such as along Monkstown Road. There is also scope for additional pedestrian improvements and pedestrian priority elements along the CMR in addition to the priority pedestrian crossings outlined above including: (a) improve pedestrian crossings at the high amenity and heavily pedestrian trafficked location adjacent to the Dún Laoghaire Baths, and (2) the use of continuous footpaths crossovers at the smaller side roads connecting onto the CMR.

There is also potential to consider some longer term planning and urban design policies and objectives along these particular stretches of the CMR. These could set out how to improve the affective and visual amenity of properties and how they address the street frontage adjacent to the CMR. While this would be a longer term planning consideration, many of the adjacent properties were planned and developed at a time when the design impact on physical and active mobility were less well understood. The DMURS manual (2019) sets out clearly how the physical design of streets and places impact on the behaviour and speed of traffic. Creating a sense of place, enclosure and well-designed edges can have a higher impact on traffic behaviour than posted legal speed limits. Future development proposals might be required to take account of provision of linkages and permeability for pedestrians and cyclists, providing ground floor activity addressing the street and providing better passive surveillance onto the route. Over time it would be hoped that any development proposals that come forward for adjacent properties would consider their impact on the behaviour of adjacent traffic and the movement of people.

2.4.4 Vehicular Traffic Movements

This part of the study investigates the distributional impact on vehicular traffic of the removal of a vehicular lane on the coastal roads adjacent to Monkstown and Glasthule. This was considered in the Ph1 Interim Report, and again as part of the mobility update. A number of OD (Origin-Destination) analyses were carried out using the TomTom Move software³⁰. This analysis, combined with more detailed cordon – link analysis, and combined with speed – congestion analysis described above, would indicate that while vehicular traffic is in a continual state of flux, the following streets have displayed certain broad trends³¹ since the introduction of the Coastal Mobility Route:

- There is an increase in the proportional use of Monkstown Road, Carrickbrennan Road, Cumberland Street, Glasthule Road, and Tivoli Road.
- There is a decrease in the proportional use of the coast road including Seapoint Avenue, Old Dunleary Road, and Newtownsmith, beyond the levels one might expect with the removal of one direction of vehicular traffic.
- There is a decrease in the proportional use of Crofton Road, despite the fact that there are two directions of travel available for vehicles.

Much of the vehicular traffic accessing and egressing the Dún Laoghaire and Monkstown area goes via Frascati Road/Temple Road (N31). Therefore, a detailed link analysis was undertaken on this route. Figure 44 to Figure 47 below illustrate how traffic using Frascati Road distributes using data from February 2022.

Traffic tends to behave differently in an eastbound versus a westbound direction. In an easterly direction, the majority of the traffic is through-traffic passing via Monkstown Road (taking a greater percentage) and Stradbrook Road (reflecting the Regional Road designation of both of these routes). However approximately 12% may be locally generated from within the Monkstown Road area as this traffic disappears from network by the end of Monkstown Rd.

Tivoli Road (designated a 'local road') appears to take c. 13% of the eastbound traffic passing through Frascati Road (from the TomTom sample data), via Carrickbrennan Road, with approximately 5% locally generated and 8% as through-traffic. This would likely represent an increase on pre-pandemic conditions. Westbound (citybound) journeys are more evenly distributed as Seapoint Avenue remains an option in this direction; Tivoli Road, Mounttown Road Lower, Cumberland Street and Crofton Road all contribute about 8% each of journeys destined from Frascati Road.

³⁰ TomTom move trips are estimated to represent between 5-15% of overall trip-making in an area.

³¹ There may be other trends also present on other streets, however these were some of the key routes examined as part of this analysis.

Figure 44 All day traffic, northbound via Frascati Road, February 2022 (source: TomTom Move)

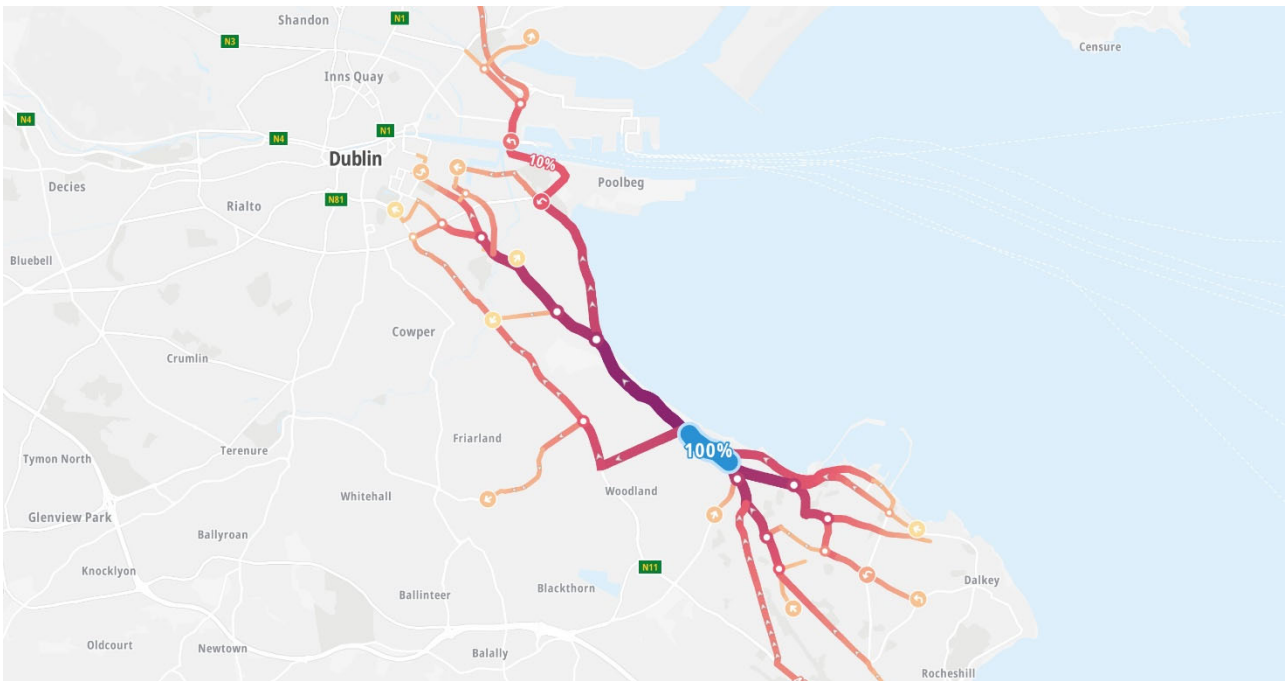


Figure 45 All day traffic, southbound via Frascati Road, February 2022 (source: TomTom Move)

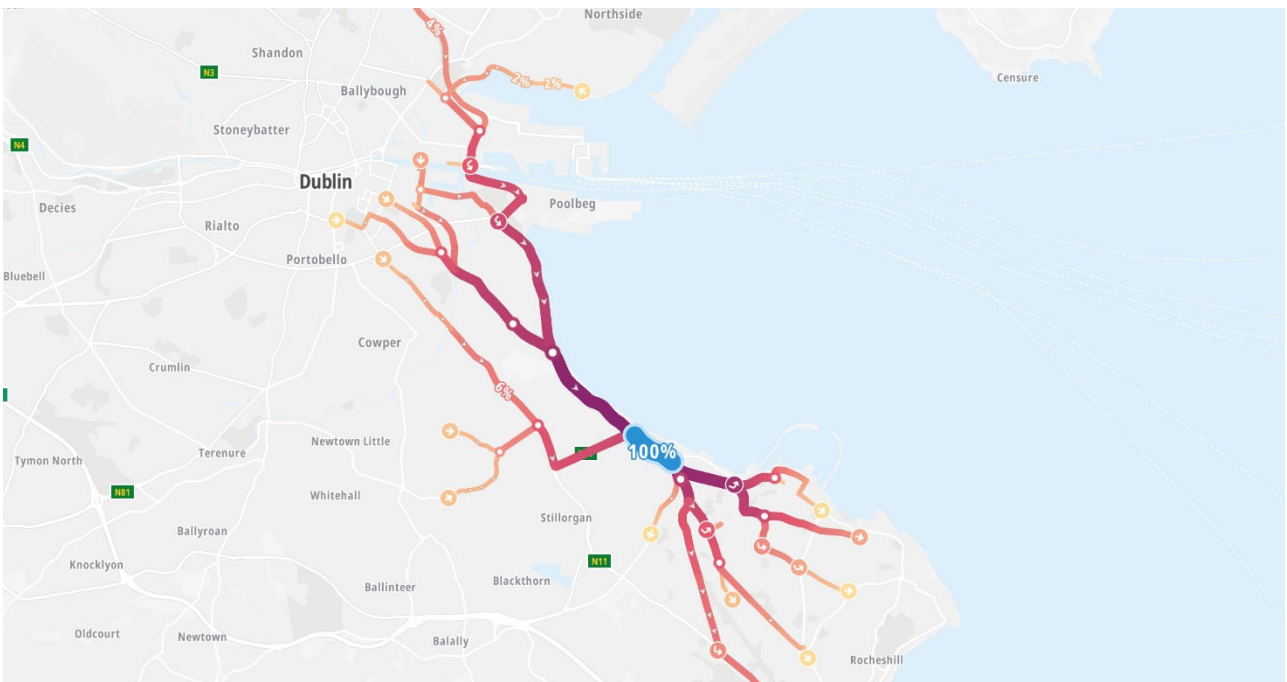
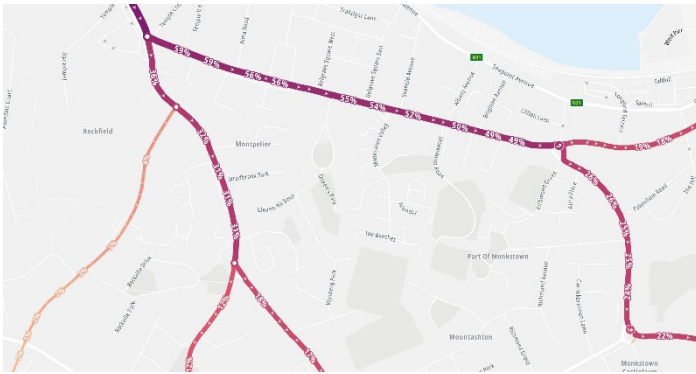
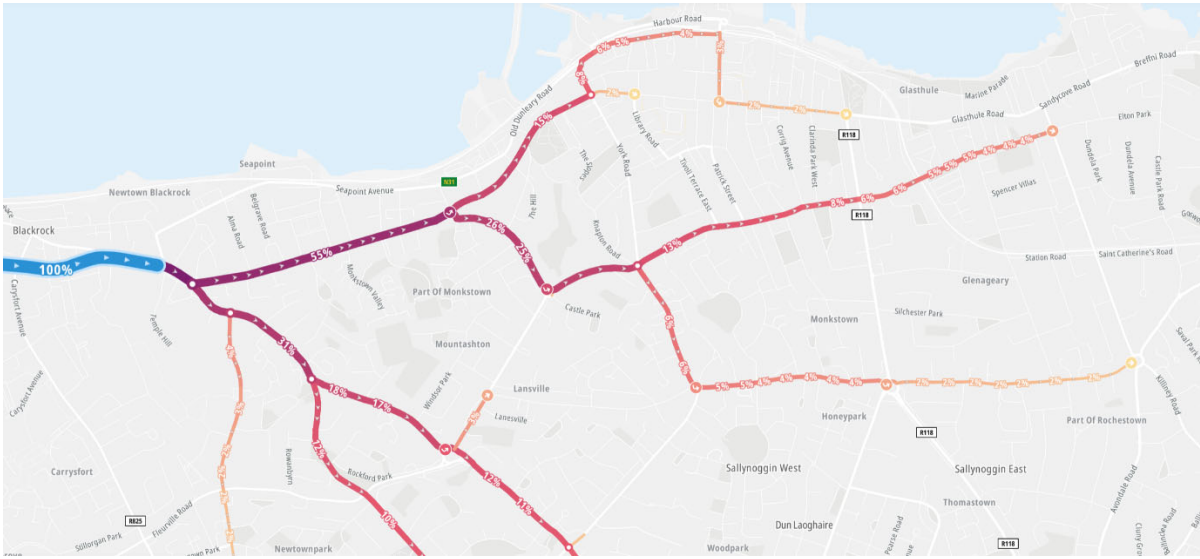
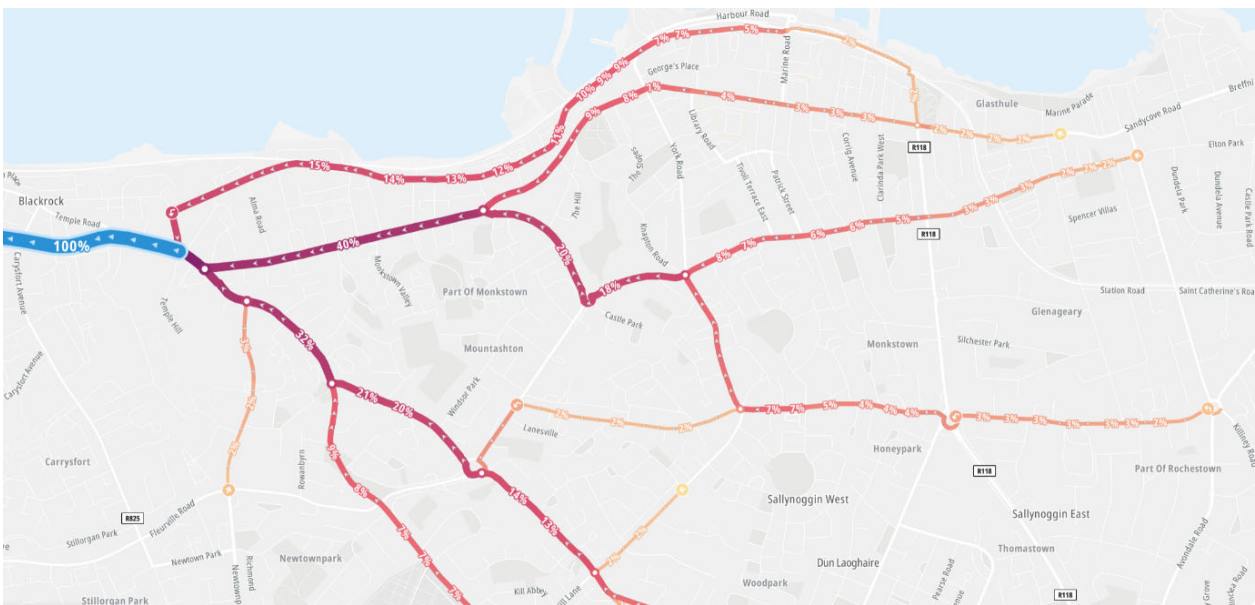


Figure 46 Distribution of eastbound journeys* using Frascati Road/Temple Road (link analysis), February 2022, all day data (top image showing wider Blackrock/Dun Laoghaire Area, and bottom image showing Monkstown in more detail) (source: TomTom Move)



*Top figure shows link averages. Figure to left illustrates sample link in more detail.

Figure 47 Distribution of westbound (city-bound) journeys using Frascati Road/Temple Road (link analysis), February 2022, all day data (source: TomTom Move)



A high proportion of trips on Frascati Road/Temple Road (N31) emanate or are destined for the Dún Laoghaire / Monkstown / Glasthule areas. Similarly, a high proportion of trips on the link are bound to or from Dublin city centre, Docklands, East Point and the Port Tunnel. This contrasts, for example, with a similar analysis of the N11 at Stillorgan (see Figure 48 and Figure 49), which shows the majority of trips on this national primary route are predominantly regional in nature.

Dún Laoghaire is a County Town and the Dún Laoghaire / Monkstown / Glasthule areas are also in an location of high amenity, and a destination for trip making, attracting both local and regional trips. For example, Figure 50 shows the regional distribution of vehicular traffic to the Dún Laoghaire area in September 2021 at weekends (the Summer Streets pedestrianisation of George's St Upper was in operation at this time). Figure 51 illustrates the same findings for the month of February 2022 (all week, all day). Figure 52 outlines the proportional distribution of trips during the same time period by distance. This illustrates both the local and regional of private vehicle trip-making and highlights the potential for modal shift to active modes for short trips, and the importance of promoting public transport priority and traffic management for longer trips. Approximately 37% of the sample vehicle journeys are 3km and under. Journeys 3km and under have particular potential for modal shift from private modes to active modes and such active mode-focused infrastructure, when well designed, is likely to have considerable local benefit in particular.

Overall, analysis of speeds, volumes and routing suggest that the road network is functioning, and that while some redistribution of vehicular trips may have occurred, these links continue to function and overall vehicular trips have reduced. This may have been in the context of the pandemic and consequent changes in movement patterns, but overall changes in traffic behaviour in the region of the CMR appear to be consistent with the wider local authority area. However, mobility management is recommended for the area (and outlined further in Section 3.1) to mitigate the impact of through-traffic as well as local traffic, and to ensure that traffic reduction overall is encouraged.

These patterns underline the importance of promoting a clear and legible public transport network connecting the area to the city centre, but also other key employment districts (e.g. Sandyford, etc.), which could remove at least some of this intra-urban traffic. While the DART provides an established metropolitan rail link to the city centre, the development of a high-quality bus network is also very important. The Bus Connects programme will be highly significant in this regard.

Continued traffic management and public realm interventions to promote mode transfer and adjust traffic routing onto higher order routes are also likely to be beneficial. Achieving sustainable urban mobility can be described as a circular process. New traffic management infrastructure helps to reduce traffic. As vehicular traffic is reduced, improvements can be made to public transport and active travel modes. These measures attract people away from private vehicles. This allows for more investment in traffic management, etc.

Figure 48 Distribution of city-bound journeys using Stillorgan section of N11 (link analysis), February 2022, all day data (source: TomTom Move)

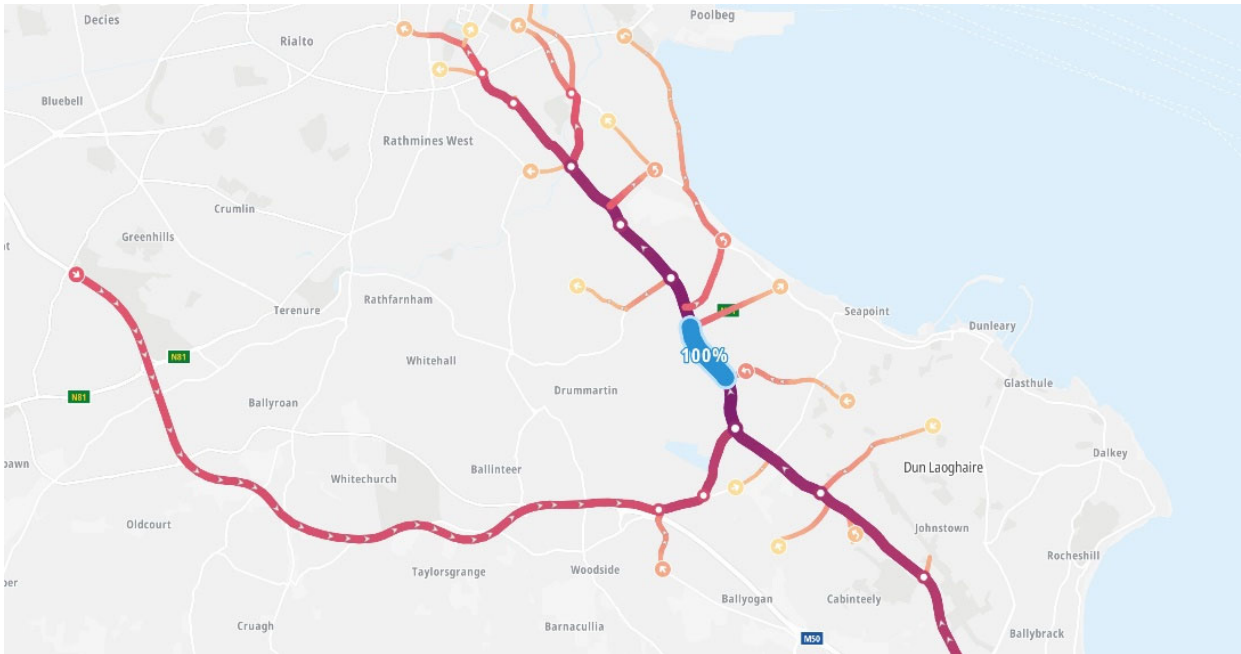


Figure 49 Distribution of out-bound journeys using Stillorgan section of N11 (link analysis), February 2022, all day data (source: TomTom Move)

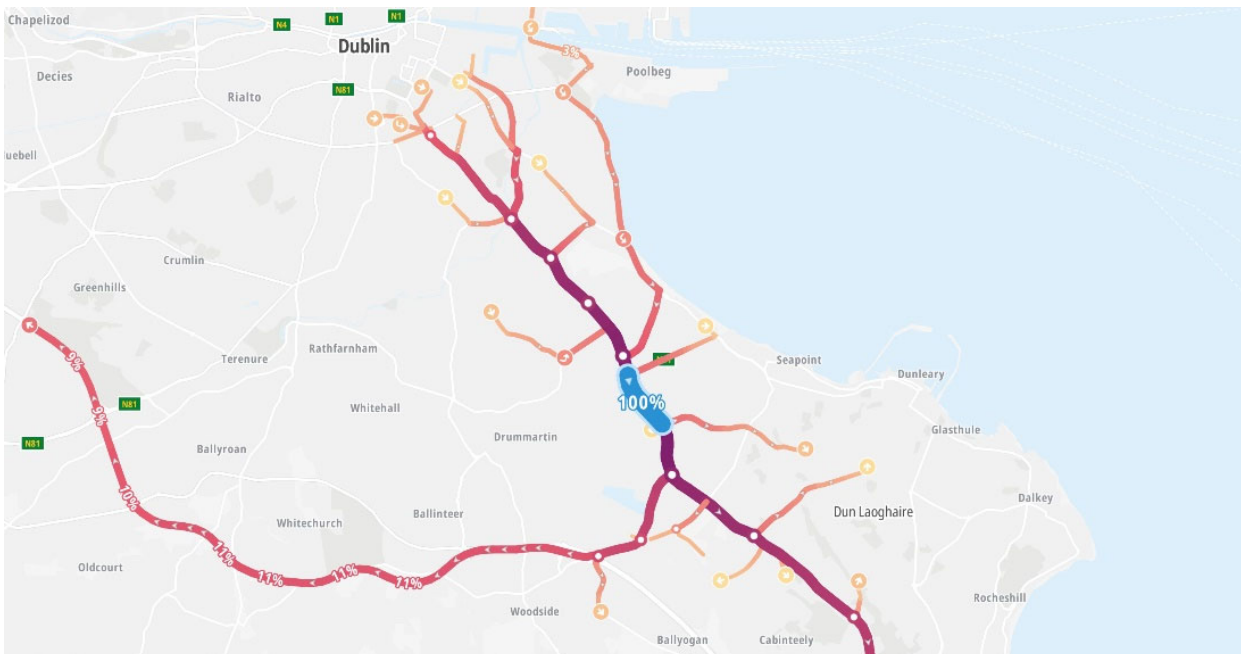


Figure 50 Dun Laoghaire area as destination for local, district and regional vehicular traffic (weekends, 8am-8pm, in September 2021) (source TomTom Move).

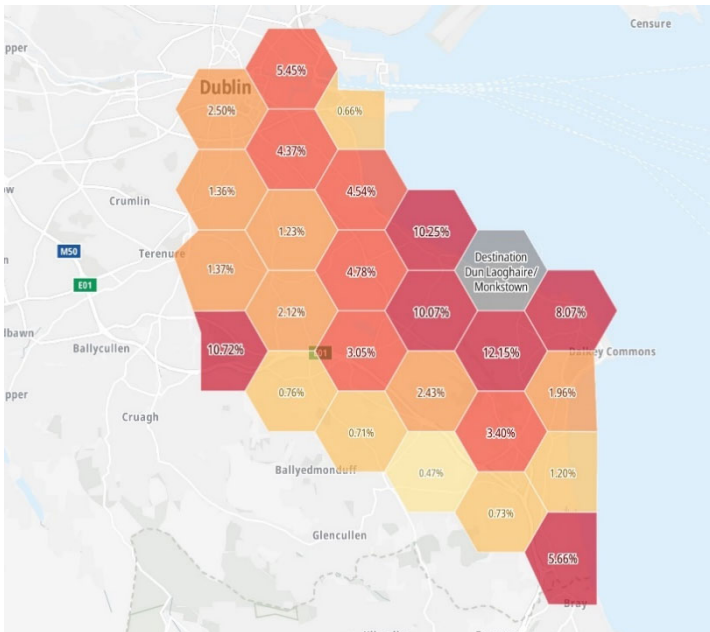


Figure 51 Journeys to Dun Laoghaire & Monkstown by origin, February 2022, 8am to 8pm (journeys from areas outside the mapped area are included in the first zone they appeared in) (source TomTom Move).

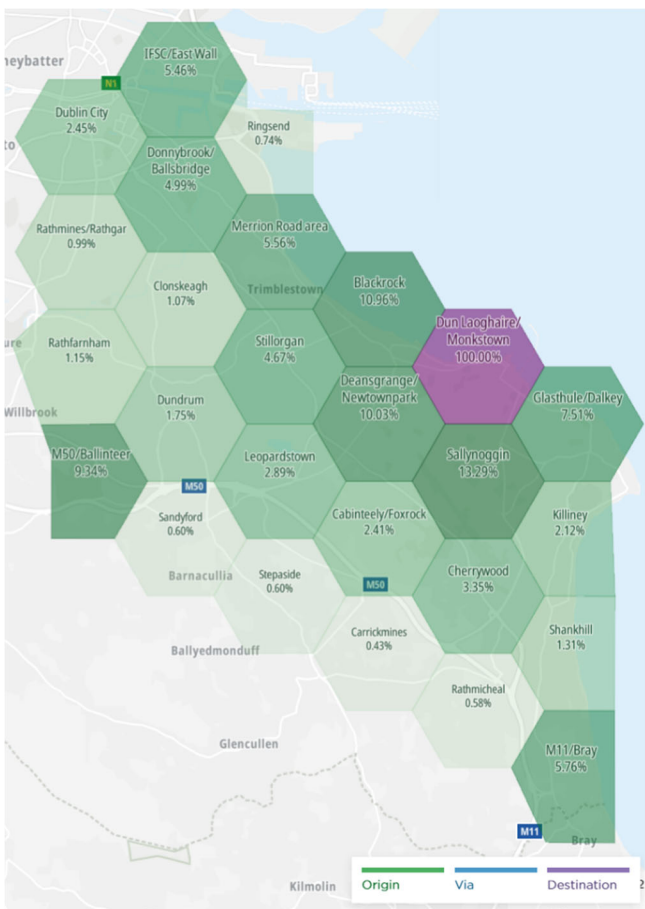
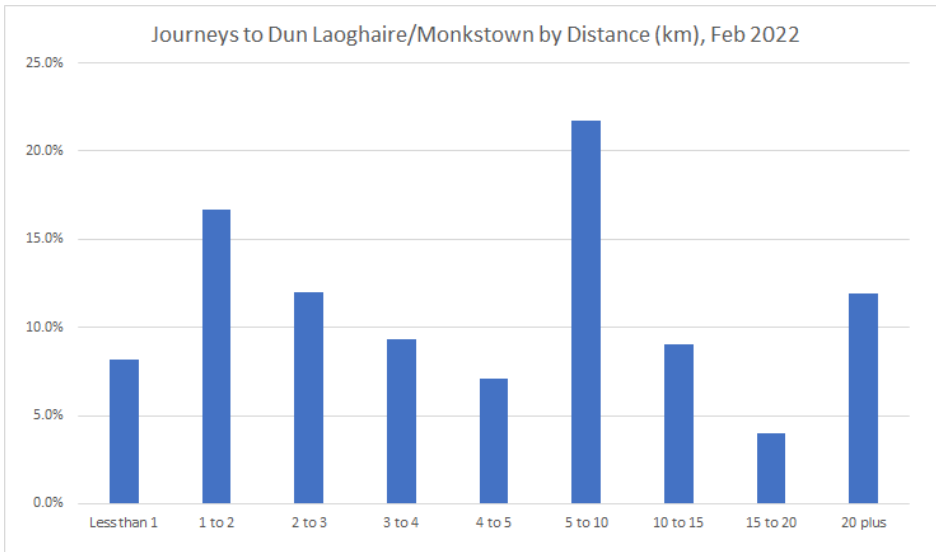


Figure 52 Vehicle journeys to Dun Laoghaire/Monkstown by distance (km), 1 Feb 2022 – 26 Feb 2022 (source data from TomTom Move).





3. DISCUSSION & CONCLUSIONS

3.1 Discussion & Conclusions

This exploratory study has focused on updating some of the key Coastal Mobility Route related mobility findings from the Ph1 Interim Findings report (2020-2021), largely focusing on the period from Summer/Autumn 2021 until late Spring/early Summer 2022. Covid-19 has resulted in an unprecedented shift in mobility patterns, not only in Ireland, but globally. These patterns, over two years later, are still in a state of flux as countries, including Ireland, adapt to the changing conditions associated with the pandemic. The wider global energy security context is also likely to have an impact on people's mobility responses, bringing additional uncertainty into the mix.

The 2020-2021 study found high levels of walking and cycling along the Coastal Mobility Route region; a large reduction in public transport passenger numbers, and vehicular traffic patterns that shifted from traditional peak-hour commuting to more locally based and off-peak trip making and a redistribution of traffic on the network. The initial study found that the route was becoming well-used by cyclists from a wide range of age-groups and a better than average gender mix. While there were limited specific pedestrian improvements made as part of the CMR's implementation, pedestrians have benefited from a safer, quieter, and less polluted environment, due to the substantial reduction in adjacent motor vehicles. The study also found that there was substantially positive feedback from key stakeholders, particularly regarding approaches to its design and implementation as an experimental active travel measure.

As Covid-19 restrictions reduced, including the lifting of 'work from home' orders for non-essential workers, there has been a shift again in the patterns of usage in all modes of transport. Pedestrian and cycling activity was particularly high during the pandemic, a phenomena that was experienced both nationally and internationally. As restriction levels have eased, pedestrian and cycling volumes have reduced and have shifted back more to a city centre focus (rather than suburban focus), and to more traditional commuter style patterns, although they are still different to before the pandemic.

Cycling

However, the CMR has become an established route in people's travel habits and there is evidence of a considerable demand for it over a wide range of time periods both on weekdays and weekends. This is evident from observational surveys, but also through cycle counter facilities. The Coastal Mobility Route has maintained its position as the highest performing cycle counter within the DLR Council area. Taking the most recently available full years data into account, **the CMR is also a key performer across the whole of the NTA's Dublin cycle counter network.**

As would be expected and like other cycle facilities, the CMR is impacted upon by the winter season and associated weather in terms of numbers of users. However, there is a core base of users of the route regardless of the season. The CMR is also used well over the full 7-days of the week, unlike more commuter-focused cycle lanes such as Clonskeagh, which have high levels of weekday use but much lower levels of weekend use. Interestingly, the Rock Road cycle lanes (an on-road traditional commuter style lane) generally now demonstrate higher weekend usage than Clonskeagh, even throughout the winter period, potentially benefiting from a network effect associated with the proximity of the CMR.

Observational and counter data indicates that the CMR is becoming well-established and provides for many types of journeys including (but not limited to) commuter journeys, education journeys, recreation,

and exercise journeys. It provides for a wider range of age groups from young to older. The route is well used by females (36% of current cyclists are female), particularly when compared to city-wide and national figures. Although there is capacity for continuous improvement here, female cycling participation on the route increased marginally by 1% from 2021. Females, children, and other vulnerable users are particularly sensitive to the provision (or lack thereof) of continuous, safe and segregated cycling facilities. For this reason, perhaps above all, **it is important to maintain and continue to expand the network of safe cycling facilities, including addressing any missing links in the network. This is particularly important to increasing levels of female participation, and use by children, older people, families and other vulnerable users.**

Pedestrian Comfort & Safety

Vehicular traffic speed analysis demonstrates that vehicle speeds are still excessive in certain locations along the route, particularly for such a high amenity coastal location. 50km/hr speed limits are not compatible with such an urban location that is heavily used by pedestrians and cyclists. **It is recommended that lower speed limits are actively considered along this route as well as on adjacent and 'competitive' inland routes.** It is important that any measures are done together, so that routes such as Monkstown Road do not become more attractive to drivers than the coast. These high vehicle speeds coupled with two-way cycle movements may present a challenge to pedestrians crossing the carriageway in certain locations. **There is scope to improve pedestrian priority and the wider pedestrian environment in several locations along the route of the CMR.** While a specific pedestrian accessibility assessment did not form the scope of this part of the study, several priority areas for traffic-calming and pedestrian crossing interventions have been identified. These are at Seapoint Avenue, at the junction with Albany Avenue; and along the stretch of road at Old Dunleary Road from the junction of Cumberland St up towards the York Avenue junction.

Additionally, due to the high levels of pedestrian and cyclist movement around the DLR Baths site, and a likely increase in movement around this amenity when it opens to the public in the near future, it is recommended that an additional pedestrian priority crossing is located at this location across the CMR and along the pedestrian desire line adjacent to Teddy's Ice-cream parlour. This is a particularly constrained area space wise along the CMR and contains a number of functions, thus careful consideration will need to be given to future mobility and public realm interventions in this area.

Vehicular Traffic Patterns & Public Transport

As evidenced in the Ph1 Interim Findings report, as well as this report, overall vehicular traffic levels and patterns have been highly impacted upon by the pandemic. As time has gone on, and restrictions ease, **traffic volumes have started to approach close to pre-pandemic levels.** However, by February 2022, they were still c. 13% down and by May 2022, still c.8% down on pre Covid times at key points within the Dun Laoghaire Rathdown network.

Overall, analysis of speeds, volumes and routing suggest that, with the CMR having been in place for some time, the local vehicular traffic network is continuing to function. While some redistribution of vehicular trips is likely to have occurred, there is also a reduction in vehicular trips on the coastal route. Overall traffic at strategic network points in the Dún Laoghaire / Blackrock area remain lower than pre-pandemic levels, but travel patterns have shifted into off-peak periods. This may have been in the context of the

pandemic and consequent changes in movement patterns. Importantly, in the context of the CMR, changes in traffic behaviour in the region of the route appear to be largely consistent with changing patterns in other parts of the local authority road network.

There is also evidence of significant new cycling trips created that are a result of the improved infrastructure. Adjacent cycling links are also recording improved and more diverse patterns of usage. This is encouraging from the point of view of developing a county-wide protected cycling network. Walking activity appears to be performing healthily along the route. Evidence from public transport operators, and data from the National Transport Authority, suggest that **public transport ridership is returning and approaching pre-pandemic levels.**

Continued traffic management and public realm interventions to promote mode transfer and adjust traffic routing onto higher order routes are recommended. Achieving sustainable urban mobility is a circular process: as vehicular traffic is reduced, improvements can be made to public transport and active travel modes. These measures can then help to alleviate vehicular traffic further.

A feature of the evolving traffic patterns is the shift away from peak traffic times towards shoulder-peak and off-peak periods. Seasonal and weekend traffic is observed to be an increasing challenge for public transport operators and traffic management generally. This is likely to continue, as new working patterns continue to evolve after the pandemic. The continued development of amenities, such as the Dún Laoghaire Baths, and festival events in Dún Laoghaire, such as the Summer Streets, will also continue to be a factor. Therefore, specific approaches to mobility management of these events and facilities may need to be considered. It will be important for such approaches to consider the promotion and enhancement of off-peak and seasonal public transport services.

Mobility patterns within the area are set to change in the future, with the planned expansion of the Core Bus Corridor along Frascati Road and Temple Road in Blackrock as part of the NTA's Bus Connects plan, ending at the confluence of Monkstown Road with Temple Hill/Stradbroom Road. The capacity of this junction for private vehicles heading eastbound/outbound will reduce, while public transport (and cycle / walking) priority will be enhanced.

Although roads such as Monkstown Road and Carrickbrennan Road are designated as Regional Routes and by that designation are intended for a level of regional or 'through-traffic' on the national road network (and traffic speed analysis suggest that the road has capacity for this function), they are also part of urban neighbourhoods and village centres. For this reason, **mobility management measures should be considered to ensure these areas maintain and enhance liveability**, including:

- (1) traffic calming and reviewing speed limits to be more appropriate to the urban context
- (2) design and installation of safe and regular pedestrian crossings
- (3) maintaining and enhancing public transport priority, especially at junctions
- (4) continued investment in active travel and public realm improvement.

Others such as Tivoli Road, are designated as local roads. Additional consideration may need to be given to the potential impact of traffic on these routes, and an appropriate mobility management plan put in place to mitigate these impacts. **Tivoli Road experiences a higher proportion of the eastbound (outbound)**

traffic originating from Frascati Road, thus particular consideration may need to be given to mitigate impacts of this traffic flow, including traffic reduction and public realm measures.

The overall **road classification system and associated signage/way-finding** in the region may warrant a review, particularly considering the N31 no longer acts in a national road capacity from Frascati Road to Dún Laoghaire.

Vehicular speed analysis was undertaken as a proxy for levels of congestion in Monkstown and Glasthule (two of the key urban villages adjacent to the CMR). This charted changes through a range of time frames including a pre-pandemic baseline in February 2020, through to October 2020, February 2021, October 2021 and February 2022. To provide further context, cross-comparisons were made with Stillorgan and Clonskeagh. While congestion levels are clearly related to the level of Covid-19 restriction levels, there were also higher congestion levels evident in October 2020 in both Monkstown and Glasthule. However, as time passed, **congestion levels appear to settle in both these areas to levels largely similar to February 2020 (pre-pandemic and pre-CMR implementation)**. Through the comparison with nearby areas that would be out of the realm of influence of the Coastal Mobility Route, no evidence was found to suggest that traffic congestion (except for the period in October 2020) is any worse in Monkstown and Glasthule, than in Stillorgan and Clonskeagh for example. **The mitigation in congestion levels that occurred may point to a settling down effect, which is a typical pattern for newly introduced and well-designed sustainable mobility infrastructure.**

Similarly public transport passenger levels were significantly impacted by the pandemic, and after a slow start have recovered well in recent months, with patronage levels for Dublin area bus services recovering to c.82% of pre-pandemic levels by mid-May 2022. This area of Dublin is served by a mix of public transport service types, including citywide bus services, local bus services and metropolitan rail (DART) services.

While operators of bus services (Go Ahead Ireland) have expressed general satisfaction with operating conditions as the CMR has become more established, in order to grow public transport patronage, priority for buses in particular will need to continue to be improved. Concerns were raised by operators about the tendency to reroute bus services to facilitate (otherwise welcomed) public events, and also the need for responsiveness of traffic authorities to manage traffic signal controls in order to prioritise bus services.

Any plans for the future development of the CMR and the BusConnects programme will clearly need to incorporate strong and effective priority for bus services in the area. An underlying principle of the BusConnects programme is interconnectivity of services, and the retention of strong interchange between modes will need to be prioritised in order to ensure that public transport is utilised to its full potential. Studies have demonstrated that the contribution of public transport, cycling and walking to the commercial life of towns tends to be underestimated and it is suggested that a similar analysis be undertaken for urban centres along the CMR route. **Protection and enhancement of public transport priority will be particularly important in the area.**

CMR Walking & Cycling

Overall, since the introduction of the CMR, there has been a large increase in cycling numbers along the route, with numbers still up c.115-126% on pre-pandemic times, while overall volumes of vehicle traffic and public transport passenger numbers are still down on pre-pandemic levels. While a route like the

CMR could induce new trip-making (for example for health and well-being reasons), that may not have happened before, it is likely that there is also some change in travel modes in the area as evidenced through the significant numbers of new bicycle journeys. Additional research will hope to investigate this further, including who is using the CMR and why, and what mode of travel would they have used prior to its introduction.

The CMR is becoming a well recognised route and it is notable how pedestrian and cycling demand on the route is high on both weekdays and weekends, throughout the course of the day. The variety of users has to be welcomed and accords widely with best-practice and several government policy areas (to promote health, diversity, inclusivity, mobility, etc.). The route has also received notable recent accolades from both local and international organisations including Chambers Ireland, Engineers Ireland, the Royal Institute of the Architects of Ireland and the European Cycling Federation³². The Phase 1 study (2021) recorded generally positive feedback for the way in which the route was designed and implemented, with a strong, open and “on-the-ground” attitude to public and community consultation (within the constraints of the early stages of Covid-19 restrictions). The temporary and experimental aspect of this implementation approach was well received by many.

Nevertheless much remains to be learned about the social and economic impacts of the route and how it has impacted on its adjacent communities and enterprises. In addition, there are mobility aspects that impact on some residents and businesses, for example, such as wayfinding, access and loading/deliveries that have not fallen within the scope of this mobility study, and hope to form part of further research. In recent times there has been a growing number of rural and inter-urban greenways developed within Ireland. These have been, for the most part, very positively received by local communities and businesses. A number of studies have been carried out indicating success in terms of increased employment, inward investment and tourism benefits³³. The potential socio-economic effects of an urban active travel route, such as the CMR, are less well understood, however, particularly within a major built-up area such as Dun Laoghaire and Dublin’s south suburban neighbourhoods. Additional research hopes to investigate these wider socio-economic impacts further.

Conclusion

The CMR was originally put in place in Summer 2020 as a Covid-19 mobility response measure, with a key objective to increase comfort and safety for those walking and cycling, to decrease reliance on the private car, and to provide an alternative to public transport at a time when capacity was significantly reduced. The context for this has evolved somewhat over the last two years, and while the pandemic is still

³² See <https://www.chambers.ie/news/cork-city-council-named-local-authority-of-the-year-2021/>; <https://www.engineersireland.ie/Engineers-Journal/More/Sponsored/engineering-excellence-winners-announced>; <https://www.riai.ie/discover-architecture/awards-archive/c-19-response-placemaking-mobility-liveability>; <https://council.ie/dlr-wins-cycling-infrastructure-award-for-coastal-mobility-route/>

³³ For example, the 2011 Great Western Greenway Economic Impact Case Study by Failte Ireland and Fitzpatrick Associates.

continuing, there is also increasing climate change and energy security concerns that further increases the importance of active transport interventions.

Based on the findings presented within this mobility update, the CMR can clearly be stated to becoming more established as a strategic active travel route serving the region, and meeting the objective of increasing comfort and safety for those walking and cycling, and providing an alternative means of travel.

While the challenge and limitations of conducting a mobility study on infrastructure implemented in response to and during a pandemic is still present, a number of observations can be made: -

- CMR range of user groups continues to be diverse, with a mix of recreational and utilitarian cyclists over different age groups. However, there is still scope for improvement in the gender balance and range of users, of which the maintenance and expansion of a safe, attractive and further interconnected cycling network is key (as well as wider behavioural change initiatives);
- Although cycling levels reduced overall across the city with the removal of Covid-19 travel restrictions, the numbers using the CMR significantly outperformed all other key cycle routes within Dun Laoghaire-Rathdown, is one of the strongest performing cycle routes in the Dublin area and performs favourably when compared with other coastal and amenity routes in the city;
- Cycling levels on adjacent routes have also remained healthy, pointing to the development of a “network effect” of cycle routes;
- The route offers increased amenity and continues to be popular for pedestrians;
- Public transport services have largely been able to operate effectively with the CMR in place and an operator of key local services has supported its retention;
- Public transport patronage levels have been seen to largely recover well in the pandemic aftermath and are approaching pre-pandemic levels;
- Analysis of vehicular traffic speed data suggests that while some congestion has been evident on links adjacent to the CMR, in most cases this has been no worse than observed in other comparable locations around Dun Laoghaire-Rathdown, and a ‘settling down’ effect is likely;
- Sample journey-time comparison across the Dun Laoghaire-Rathdown area also show vehicular traffic in the CMR region to be following a comparable set of background traffic patterns to the comparison area;
- Evidence of high traffic speeds exists in certain locations and recommendations have been made to mitigate these, particularly within the context of pedestrian movement along the CMR (for example at the section of roadway at Seapoint Avenue/Albany Avenue and Old Dunleary Road);
- Overall, analysis of speeds, volumes and routing suggest that the road network examined in this study and surrounding the CMR continues to function operationally. Some redistribution of vehicular trips are likely to have occurred from the coastal links onto nearby and inland routes, however, overall vehicular trip levels in the area have reduced. This reduction in trip levels may have been within the wider context of the pandemic and consequent changes in movement patterns, however, it is likely that some of the reduction can be attributed to the CMR, with increases in walking and cycling trips evident in particular;
- Vehicular traffic redistribution to certain links may warrant further mobility management and traffic reduction measures such as traffic calming, additional public transport priority measures, and public realm measures (for example Monkstown Road, Carrickbrennan Road, and Tivoli Road);
- In general, changes in traffic behaviour in the region of the CMR appear to be consistent with the wider local authority area.

The mobility analysis also suggests there is consistent and continued growth in seasonal and off-peak travel patterns in the aftermath of the pandemic, but also with the development of new coastal amenities, such as the Dun Laoghaire Baths, and public events, such as the Summer Streets programme. Combined with increased demand for trips, resulting from planning intensification and new housing schemes, there will be a clear need for both high quality public transport and high-quality active travel networks to provide for this growing demand.

These evolving patterns of mobility underline the importance of providing (i) a clear and legible public transport network providing connections with the city centre, but also other key employment districts and activity centres (e.g. Sandyford, etc.), and (ii) a region-wide active travel network providing mobility for all the community.

Traffic reduction over time is a process that is incremental and requires care, with every new sustainable transport investment making small additional gains. Although there is still room for further improvement, many of the mobility patterns observed to-date on the CMR and its environs are consistent with best practice traffic management and should be encouraged to continue. The implementation of the CMR can, at least in this important mobility context and its original implementation objectives, be regarded as very effective up to this point.

References

- Aldred, R., Elliott, B., Woodcock, J. & Goodman, A. (2017) *Cycling provision separated from motor traffic: a systematic review exploring whether stated preferences vary by gender and age*, *Transport Reviews*, 37:1, 29-55.
- Aldred, R., Woodcock, J., & Goodman, A. (2016) *Does More Cycling Mean More Diversity in Cycling?*, *Transport Reviews*, 36: 1, 28-44.
- An, R., Zahnow, R., Pojani, D., & Corcoran, J. (2019) Weather and cycling in New York: The case of Citibike. *Journal of Transport Geography*, 77 (May), 97–112.
- Asher, L., Aresu, M., Falaschetti, E., & Mindell, J.(2012), Most older pedestrians are unable to cross the road in time: a cross-sectional study, *Age and Ageing*, Vol. 41, Issue 5, 690-694.
- Atkins, S. & Goodwin, P., 2002, March. Disappearing traffic? The story so far. *Proceedings of the Institution of Civil Engineers-Municipal Engineer*. Vol. 151, No. 1, 13-22.
- Böcker, L., & Thorsson, S. (2014). Integrated weather effects on cycling shares, frequencies, and durations in Rotterdam, the Netherlands. *Weather, Climate, and Society*, 6(4), 468–481.
- Brown, B., Mackett, R., Gong, Y., Kitazawa, K., & Paskins, J.(2008) Gender differences in children’s pathways to independent mobility. *Children’s Geographies*, 6, 385–401.
- Cairns, S., Atkins, S., Goodwin, P. (2002). Disappearing traffic? The story so far, *Municipal Engineer*, 151, issue 1, 13-22
- Central Statistics Office (2019). *2016 Census of Population*, Ireland.
- Central Statistics Office (2022a). Personal and Work-Life Balance 2021 – Remote Working. Available at <https://www.cso.ie/en/releasesandpublications/ep/p-pwlbrw/personalandwork-lifebalance2021->
- Central Statistics Office (2022b). Press Statement Pulse Survey Our Lives Online: Remote Work November 2021. 18 January, 2022. Available at <https://www.cso.ie/en/csolatestnews/pressreleases/2022pressreleases/presstatementpulsesurveyourlivesonlineremoteworknovember2021/>
- Central Statistics Office (2022). Travel Behaviour Trends 2001. June 2022. Available at <https://www.cso.ie/en/releasesandpublications/ep/p-ntstb/travelbehaviourtrends2021/howwetravelled/>
- Egan, R. & Hackett, J., (2022) “The Social Practice and Regulation of Cycling as "A Boy’s Thing" in Irish Secondary Schools”, *Active Travel Studies* 2(1).
- European Commission (undated). *Reclaiming city streets for people: Chaos or quality of life?* Available at

https://ec.europa.eu/environment/pubs/pdf/streets_people.pdf

European Commission (2022). *Road safety thematic report: speeding*. European Road Safety Observatory. Available at https://fsr.eui.eu/wp-content/uploads/2020/12/2020-10-08-road_safety_thematic_report_speed.pdf

Failte Ireland & Fitzpatrick Associates (2011). *Great Western Greenway – Economic Impact Case Study: Final Report*, October 2011.

Fraser, S. D. S. & Lock, K. (2011). Cycling for transport and public health: a systematic review of the effect of the environment on cycling, *European Journal of Public Health*, Vol. 21, No. 6, 738–743

Hanson, S., & Hanson, P. (1977). Evaluating the Impact of Weather on Bicycle Use. *Transportation Research Record*, 629, 43–48.

Helbich, M., Böcker, L., & Dijst, M. (2014). Geographic heterogeneity in cycling under various weather conditions: Evidence from Greater Rotterdam. *Journal of Transport Geography*, 38, 38–47.

Goel, R., Oyebode, O., Foley, L., Tatah, L., Millett, C. and Woodcock, J., 2022. Gender differences in active travel in major cities across the world. *Transportation*, pp.1-17.

Government of Ireland (2019), *Design Manual for Urban Roads and Streets*, Ireland. Available at <https://www.dmurs.ie/copy-of-what-is-dmurs>

Government of Ireland (2020). *Covid 19 Pandemic Response. Design Manual for Urban Roads and Streets*. June 2020. Available at www.dmurs.ie

Government of Ireland (2020). *Resilience and Recovery 2020-2021: Plan for Living with COVID-19*.

Government of Ireland (2021). *COVID-19 Resilience and Recovery 2021 – The Path Ahead’, February 2021*. Available at <https://www.gov.ie/en/publication/c4876-covid-19-resilience-and-recovery-2021-the-path-ahead/>

Nankervis, M. (1999). The effect of weather and climate on bicycle commuting. *Transportation Research Part A: Policy and Practice*, 33(6), 417–431.

National Transport Authority (2018), *National Household Travel Survey 2017: Final Report*, Dublin. Available at www.nationaltransport.ie/wp-content/uploads/2019/01/National_Household_Travel_Survey_2017_Report_-_December_2018.pdf

National Transport Authority & SusTrans (2019). *Bike Life 2019: Dublin Metropolitan Area*. Available at www.nationaltransport.ie/wp-content/uploads/2020/07/BikeLife19_the_Dublin_Metropolitan_Area_ENG_digital.pdf

National Transport Authority (NTA) & Dublin City Council (DCC), (2020), COVID-19 Public Health Civil Emergency Enabling the City to Return to Work - Interim Mobility Intervention Programme for Dublin City. Available at https://www.nationaltransport.ie/wpcontent/uploads/2020/05/Covid_Mobility_Plan_22.5.20_FA_WEB.pdf

National Transport Authority (2022). BusConnects Dublin - Belfield / Blackrock to City Centre. Available at www.belfieldblackrockscheme.ie

National Transport Authority & Sustrans (2022). Dublin Metropolitan Area: Walking and Cycling Index 2021. May 2022. Available at https://www.nationaltransport.ie/wp-content/uploads/2022/05/220504-WACI22_DublinMetropolitanArea_v35_DIGITAL_v2.pdf

Mees, P., (2010) *Transport for Suburbia: Beyond the Automobile Age*. Earthscan, London.

McLeod, S., Babb, Co., Barlow, S. (2020). How to 'do' a bike plan: Collating best practices to synthesise a Maturity Model of planning for cycle, *Transportation Research Interdisciplinary Perspectives*. Vol. 5.

O'Connor, D., Nix, J., Bradshaw, S., Shiel, E. (2011), Shopping Travel Behaviour in Dublin City Centre. ITRN 2011, University College Cork, Cork, 31st. August-1st. September, 2011. Available at <https://arrow.tudublin.ie/comlinkoth/10/>

Rock, S., O'Connor, D, D'Arcy, L., & Reid, O. (2021), *DLR Covid-19 Mobility Review: Evaluation and Review of the Phase 1 Covid-19 Mobility and Public Realm Works undertaken by Dún Laoghaire Rathdown County Council*" . Reports. 12. Available at <https://arrow.tudublin.ie/beschsprep/12>

Sport Ireland (2021). Impact of Covid-19 Restrictions on Sports and Recreational Walking. Q1 2021. Prepared by Ipsos MRBI. Available at <https://www.sportireland.ie/sites/default/files/media/document/2021-05/covid-and-sport-april-2021-q1.pdf>

Thomas, T., Jaarsma, R., & Tutert, B. (2013). Exploring temporal fluctuations of daily cycling demand on Dutch cycle paths: The influence of weather on cycling. *Transportation*, 40(1), 1–22.

Transport for London (2017). *Small Change, Big Impact: A practical guide to changing London's public spaces*. Available at <https://content.tfl.gov.uk/small-change-big-impact.pdf>

Transport Infrastructure Ireland (TII) (2020). *Travelling in a Woman's Shoes: Understanding women's travel needs in Ireland to inform the future of sustainable transport policy and design*. Available at www.tii.ie/technical-services/research/TII-Travelling-in-a-Womans-Shoes-Report_Issue.pdf

Transport Infrastructure Ireland (TII) (2022). Traffic Count Data. Available at <https://trafficdata.tii.ie/publicmultinodemap.asp>

UKCRC Centre for Diet and Activity Research (CEDAR) (2017). *Evidence Brief 15 – Changing the way we travel – Infrastructure and our everyday transport choices – June 2017*. Available at www.cedar.iph.cam.ac.uk/resources/evidence/eb-15-changing-travel

Women4Climate (2018). Closing the Data Gap for a Cycling Scheme: A Case Study on the Use of San Francisco Bike Lanes. Paper prepared for the C40 Cities Climate Leadership Group. Summer 2018. Available at https://w4c.org/sites/default/files/2019-02/W4C_San_Francisco_Case_Study.pdf