

# METROLINK

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# A4.1

## Methodology for Potential Cycle Demand

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## 1. Introduction

This note is to review and outline the methodology to be followed to calculate the potential demand for cycling parking required at each of the stations along the proposed MetroLink alignment, from Estuary Park and Ride to Charlemont, inclusive.

For the purpose of this analysis, calculations will only be carried out on passengers classified as ‘First Boarders’ and ‘Final Destinations’.

A ‘**First Boarder**’ refers to a passenger who first accesses the public transport network via MetroLink. Therefore, passengers who transfer from bus/rail/Luas to MetroLink are not considered ‘First Boarders’.

A ‘**Final Destinations**’ passenger is someone who exits the public transport network via MetroLink. Therefore, passengers who transfer to bus/rail/Luas from MetroLink to continue their journey are not considered to be ‘Final Destinations’ passengers.

The calculations have been based on the information available at the time, and therefore represent the 2027 Opening Year from the previous model runs.

Please note further evidence will be required to support the assumption about the level of dynamic turnover that shared mobility cycle solutions provided.

## 2. Context

To calculate the number of potential cycle parking spaces required at the proposed MetroLink stations, two approaches were considered. Further examples and details of these can be found in Table 2-1.

- **Fixed:** This approach applies a flat percentage rate to all stations e.g the National Cycle Manual suggests that a rate 2.5% is applied to the number of daily boarders subject to a minimum of 10 bicycle spaces, or the Dublin City Council approach of 7 spaces per the number of trains<sup>1</sup> at the two-hour AM peak period, which must be a minimum of 100 spaces.
- **Variable:** This approach applies a bespoke percentage range to each station based on the demographic spread relevant to each location e.g., the Danish Cycling Federation suggests that bicycle parking is provided for “10-30% of train passenger numbers per day”, or “10% of passenger numbers in the morning rush hour (06:00-09:00) at bus stops and terminals”.

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<sup>1</sup> DCC approach is in the context of heavy rail only, which would have a much lower frequency than a metro system

Policy	Description
<b>National Cycle Policy Framework</b>	Overarching objective of 10% of all trips in Ireland will be made by bike by 2020.
<b>National Cycle Manual</b>	Minimum of 2.5% of number of daily boarders at the station, subject to minimum of 10 bicycle places. <i>Off-street car parks (incl. Multi-storey): 10% of total car-spaces, subject to a minimum provision of 50 spaces.</i>
<b>Dublin City Development Plan 2016-2022</b>	Dublin City Council aims to increase mode share associated with cycling to reach a minimum target of 25%. Cycle parking standards: 7 per number of trains at the two-hour AM peak period (minimum of 100 spaces)
<b>Dublin City Centre Cycle Parking Strategy Report</b>	2013 canal cordon count – 10% of total inbound vehicle traffic in the AM Peak and 4.7% of total person trips. Assumption of target mode share of 15% by 2020 and 25% by 2030 for cycling.
<b>Fingal Development Plan 2017-2023</b>	Security cycle parking facilities shall be provided in new Public Transport Interchanges. No mention regarding cycle parking numbers in Transport hubs.
<b>Danish Bicycle Parking Manual</b>	Start number of 10% of passengers numbers in the morning rushing hour (6-9) at train terminals. At train stations, the number of spaces should correspond to between 10% and 30% of passenger numbers (no. of train passengers per day)

**Table 2-1: Examples of Bicycle Parking Methodologies**

There are both advantages and disadvantages to both approaches. The fixed approach ensures that provisions are compliant with standards, and it is easy to calculate for each station. However, this approach allows for instances of over or under-supplying cycle parking provisions at stations if the demand varies considerably between stations. As a result, it is an inefficient use of resources and public space, which can be difficult to retrofit if the infrastructure is already in place.

Comparatively, the variable approach is more likely to accurately meet the demand for cycle parking at each station as it is calculated based on the respective demand for and demographic spread of the passengers at each station. Therefore, it is a more efficient use of resources and public space. However, this may require a more complex analysis to be undertaken, as the range applied is open to interpretation.

As highlighted in Table 2-1, Fingal Development Plan 2017-2023 states that secure cycle parking facilities shall be provided in new Public Transport Interchanges and Park and Ride facilities, however details of numbers required at these facilities are not included.

Therefore, J/I have chosen to develop a tailored MetroLink-specific methodology to determine the potential bicycle parking demand to be provided at each station, as there will be varied demand for provisions at each of the stations, both in terms of their predicted demand and demographic spread, and their location within Dublin.

There is a limited number of cycle parking spaces that can be provided as part of the MetroLink scheme and the remainder of the demand for cycle parking spaces will require a strategy and commitment from the respective local planning authorities to deliver.

### 3. Proposed Methodology

#### 3.1 Fixed Approach

The Project proposes to provide cycle facilities to accommodate the Opening Year, and the Opening Year + 5 Years. Passenger demand has been modelled for both 2030 (Opening Year) and 2045 (Design Year – Opening Year + 15 Years), with an approximate 15% growth between the scenarios, resulting in an approximate 5% growth between Opening Year and Opening Year + 5 Years.

Table 3-1 presents the 12hr boarding and alighting numbers for the Opening Year and the Opening Year + 5 Years and using the National Cycle Manual’s recommendation of provisions accommodating for 2.5% of daily boarders, presents the number of cycle parking spaces required to accommodate 2.5% of this demand.

**Table 3-1: Cycling provisions required as per National Cycle Manual Recommendations**

Station	Opening Year		Opening Year + 5 Years -5% Growth	
	12hr Boarding	2.5% Requirement	12hr Boarding	2.5% Requirement
Estuary P&R	105*	3	110*	3
Seatown	4,725	118	4,961	124
Swords Central	5,284	132	5,548	139
Fosterstown	5,757	144	6,045	151
Dublin Airport	23,039	576	24,191	605
Dardistown	-	-	-	-
Northwood	2,880	72	3,024	76
Ballymun	6,354	159	6,672	167
Collins Avenue	6,627	166	6,958	174
Griffith Park	2,164	54	2,272	57
Glasnevin	7,213	180	7,574	189
Mater	4,082	102	4,286	107
O’Connell Street	9,444	236	9,916	248
Tara Street	15,312	383	16,078	402
St Stephen’s Green	8,542	214	8,969	224
Charlemont	15,464	387	16,237	406

\*Estuary boarding numbers do not include those utilising the Park and Ride or the bus network to access

#### 3.2 Demand Approach

A review was undertaken of the walking catchment area around each station to understand the origins and destinations of passengers of MetroLink passengers, as those within the 10min, 15min and 15+min walking catchment are more likely to cycle. Stations along the MetroLink alignment were then categorised based on geographical location, to determine the type of cycle parking required, as shown in Figure 3-1.

The Outer Dublin stations fall within Fingal County Council boundary, from Estuary to Dublin Airport inclusive, with the Outer-City and City-Centre locations falling within the Dublin City Council boundary, with the Outer-City

range covering stations from Northwood to Glasnevin inclusive, and the City-Centre range covering stations from Mater to Charlemont inclusive.



**Figure 3-1: Types of cycle parking required for MetroLink stations**

A liaison workshop meeting was held with representatives from Transport Infrastructure Ireland, Jacobs and Dublin City Council to discuss the potential methodologies that could be adopted. Two approaches were proposed, one for the Outer Dublin and Outer City stations, and one for the City-Centre locations.

For the purposes of this analysis, calculations will only be done for one direction in each scenario. For example, for the Outer Dublin and Outer-City stations, numbers will only be quantified for people who are cycling towards the station and leave their bikes there. Similarly, for the City-Centre stations, numbers will only be quantified for people taking a bike from the stands provided and cycle away from the station, i.e. this is not a dynamic analysis.

Stations within Outer Dublin and the Outer-City will primarily be concerned with boarding numbers, and will require a mix of bike-sharing, and long-stay bike parking as they will accommodate a higher percentage of commuters travelling into Dublin City Centre.

Stations within the City-Centre will primarily be concerned with alighting numbers and will primarily require bike-sharing facilities.

The following methodology has been proposed, accounting for the volume of passengers within the various walking catchments of each of the stations, depending on their location (Outer Dublin, Outer City, or City Centre).

**Outer Dublin/Outer-City Stations** (concerned with boarding figures):

- During the AM peak period, cycling provisions will be calculated for 10% of First Boarders that have origins within the 5-10-minute walking isochrone, and 50% of First Boarders in the 10+ minute walking isochrone.
- During each of the Lunchtime (LT), School Run (SR) and PM peaks, cycling provisions will be calculated for 10% of First Boarders beyond the 5-minute walking isochrone.

**City Centre Stations** (concerned with alighting figures):

- During the AM peak period, cycling provisions will be calculated for 10% of Final Destinations that have destinations within the 5-10-minute walking isochrone, and 50% of Final Destinations in the 10+ minute walking isochrone.
- Provisions will be calculated for the AM peak period only.

**3.2.1 Estimates**

Utilising the proposed methodologies for the Outer Dublin, Outer City and City Centre locations, the potential cycle demand for the Opening Year has been calculated for each station in both the Opening Year, and Opening Year + 5 Years (approximately 5% growth in passenger demand).

As a large proportion of First Boarders at Estuary will be using the Park and Ride facility, calculations have not been carried out for this station, denoted by the ‘\*’ in the following tables.

Table 3-2 presents the potential cycle demand in the Opening Year and Opening Year + 5 Years, based on the identified methodology.

**Table 3-2: Results for Opening Year- Potential Cycle Parking Demand**

Station	Location	Boarding or Alighting Numbers Analysed	Potential Cycle Demand	
			Opening Year	Opening Year + 5 Years
Estuary*	Outer Dublin	Boarding	0	0
Seatown	Outer Dublin	Boarding	433	454
Swords	Outer Dublin	Boarding	941	988
Fosterstown	Outer Dublin	Boarding	373	391
Dublin Airport**	Outer Dublin	Boarding	0	0
Northwood	Outer City	Boarding	538	565
Ballymun	Outer City	Boarding	656	689
Collins Avenue	Outer City	Boarding	1,003	1,054
Griffith Park	Outer City	Boarding	248	260
Glasnevin – Metro+Rail	Outer City	Boarding	278	293
Mater	City Centre	Alighting	150	158
O’Connell Street	City Centre	Alighting	215	225
Tara Street	City Centre	Alighting	470	494
SSG	City Centre	Alighting	560	588
Charlemont	City Centre	Alighting	544	571

\*Cycling provisions not calculated for Estuary Station as majority of boarding passengers are utilising Park and Ride facility.

\*\*Cycling provisions not calculated for Dublin Airport due to nature of travel to/from airports

Large numbers can also be seen at Collins Avenue station as a result of the presence of Dublin City University in the 10-15 minute walking catchment, the station's key attractor in the area, which attracts a large volume of people during the AM peak period.

### **3.2.2 Shared Mobility Solutions**

Shared mobility increases levels of accessibility and connectivity across an area, increasing social and spatial equity within a city, therefore provisions must be put in place for all modes of travel within Dublin City Centre. Forms of shared cycling provisions are on the rise in Dublin including the Dublin Bike Scheme and BleeperBikes. Since the introduction of the Dublin Bike scheme, there have been over 16,000 journeys being made by Dublin Bike daily in 2017 (Irish Times). In addition, other non-fixed bike sharing schemes such as BleeperBikes have been introduced to Dublin City Centre. The trend for shared mobility solutions is on the rise across cities in Europe.

This shift towards a more dynamic bicycle user is important to note as for many it is cheaper and easier than maintaining their own personal bike all year round, especially when such flexible systems are so readily available (O. Petrik, 2017). In August 2021, Dublin City Council declared a shift to shared travel and setting up a 'shared mobility unit' after the success of a smart mobility hub at Wood Quay (Dublin Inquirer, 2021). Within Dublin, research shows that more flexible cycling options may encourage higher usage of multi modal journeys through the use public transport and cycling, as opposed to the private car (C. Médard de Chardon, 2017).

Due to the short journeys usually taken by the Dublin Bikes and Bleeper Bikes, the turnover can be very high day to day, with a station turnover ratio of slightly more than 1:5 to the station capacity (Brian Caulfield, 2018).

Due to the limited amount of available data on this rate of turnover, an assumption can be applied to this scenario whereby 1 space on a public bicycle parking rack for shared mobility could facilitate 5 shared bicycle parking events during the 3-hour peak period used for calculating the potential demand.

This assumption has subsequently been applied to this Project's proposals for cycle provisions in the City Centre location to identify the potential number of users who can be accommodated by the proposed number of spaces during the 3-hour peak period. As Glasnevin is on the boundary of the Outer City location and the City Centre, a modified assumption has been applied to this station, whereby it is assumed that 50% of the provisions will be fixed, in line with the other stations in Outer Dublin and Outer City, and 50% will be dynamic provisions in line with the City Centre.

### **3.3 MetroLink Proposals**

Table 3-3 presents the potential cycle demand per station in line with the recommendations outlined in the National Cycle Manual, the potential cycle demand based on the above methodology and the proposals identified as part of the Project. As highlighted, the City Centre locations will be primarily dynamic, shared mobility facilities, whereas the facilities in both Outer Dublin and Outer City will be primarily static, long-term storage facilities. An assumption has been made that the dynamic shared mobility solutions will have a turnover rate of approximately 5 events per space over the course of the 3-hour peak period, increasing the number of passengers that one space can accommodate. Therefore, Table 3-3 also presents the approximate total



demand that the MetroLink proposals can accommodate at the City Centre stations given the assumption of 1:5, as well as the modified assumptions made for Glasnevin.

**Table 3-3: Cycle Parking Demand for Opening Year and Opening Year + 5 Years compared to the Metrolink Proposal Figures**

Station	Location	National Cycle Manual Requirement (2.5% of 12hr boarders)		MetroLink Proposals			
		Opening Year	Opening Year +5years	Potential Cycle Demand to inform Project Proposals – Opening Year	Potential Cycle Demand Opening Year + 5 Years	No of Spaces Proposed	Demand accommodated (Based on 1:5 for City Centre Stations – due to shared mobility)
Estuary	Outer Dublin	-	-	-	-	254	254
Seatown	Outer Dublin	118	124	433	454	480	480
Swords	Outer Dublin	132	139	941	988	942	942
Fosterstown	Outer Dublin	144	151	373	391	422	422
Dublin Airport	Outer Dublin	-	-	-	-	72	72
Dardistown	Not open to public	-	-	-	-	-	-
Northwood	Outer City	72	76	538	565	204	204
Ballymun	Outer City	159	167	656	689	292	292
Collins Avenue	Outer City	166	174	1,003	1,054	370	370
Griffith Park	Outer City	54	57	248	260	176	176
Glasnevin – Metro+Rail	Outer City	180	189	278	293	120	360
Mater	City Centre	102	107	150	158	70	350
O'Connell Street	City Centre	236	248	215	225	0	0
Tara Street	City Centre	383	402	470	494	256	1,280
St. Stephen's Green	City Centre	214	224	560	588	82	410
Charlemont	City Centre	387	406	544	571	162	810

## 4. Summary

The variable approach to the bicycle parking provisions at each station is ideal in this situation due to the varying levels of users at each station location.

For all of the stations in Swords, the cumulative cycle parking demand for the stations is met with a reasonable balance provided at each of the stations; some stations are slightly above the forecasts and some slightly below but in operation this is unlikely to cause an issue.

For the outer city stations – Northwood, Ballymun, Collins Ave and Griffith Park there will be a need for additional cycle parking to be provided by other stakeholders, such as Dublin City Council. Short-term shared mobility solutions may reduce some of this cycle parking requirement, but further cycle parking will likely still be required. Locations such as DCU would be a good example of where shared mobility is likely to play a higher role.

The division of stations into city centre, outer city and outer Dublin also allow for more accurate calculations of how many bicycle parking racks to place and their likelihood to be short- or long-term stay. The short-term stays are predicted to have a higher usage of shared mobility options including the Dublin Bikes and BleeperBikes. Long term stays are more likely to be commuter journeys whereby users may cycle to a station and continue their journey by public transport.

In line with the MetroLink Proposals and the expected demand for the bicycle parking facilities, from Northwood Station through to Charlemont Station inclusive, some additional bicycle parking at each station, or within the nearby area, will need to be provided by other stakeholders, such as Dublin City Council. These figures are shown in Table 4-1 below.

**Table 4-1: Cycle parking Metrolink Proposal Figures, Demand required due to shared mobility and their difference.**

Station	Location	MetroLink Proposals		Demand accommodated (Based on 1:5 for City Centre Stations – due to shared mobility)	No of spaces to be provided by Dublin City Council
		Cycle Parking Demand	No of Spaces Proposed		
Northwood	Outer City	565	204	204	361
Ballymun	Outer City	689	292	292	397
Collins Ave	Outer City	1,054	370	370	684
Griffith Park	Outer City	260	176	176	84
Glasnevin – Metro+Rail	Assessed as: 50% Outer City 50% City Centre	293	120	360	0
Mater	City Centre	158	70	350	0
O'Connell Street	City Centre	225	0	0	45
Tara Street	City Centre	494	256	1,280	0
St. Stephen's Green	City Centre	588	82	410	35
Charlemont	City Centre	571	162	810	0