Canary Wharf East Ferry Demand Analysis

02/01/2018

1. Introduction

This note describes the latest analysis and modelling work undertaken to assess the potential impact of a new ferry to serve cyclists crossing over the Thames between Greenwich Peninsula and Canary Wharf. It will firstly describe the background to the proposed scheme including some analysis of the current cycling environment. It will then give a brief description of the tools used to assess the potential impact of the scheme. Finally, it will present the work undertaken and the findings of the analysis.

2. Background

In early 2017 some initial demand analysis was carried out using the first version of the Cycling Network Model for London (Cynemon) base year model, representing 2014.

A forecasting methodology has now been developed for Cynemon future year models representing 2021, 2031 and 2041. These models have forecast future year demand and added functionality to model trips switching from other modes to cycling as a result of infrastructure changes, building upon an updated version of the base year model. This note describes the analysis carried out using the Cynemon forecast future year models.

3. Objectives and Scope

This note summarises work carried out using Cynemon to predict the impact of a new ferry crossing between North Greenwich and Canary Wharf. This includes forecast growth in cycling trips, rerouting of trips, and trips switching to cycling from other modes as a result of the interventions. Options will be tested in 2031, with some outputs in this report shown for the AM peak hour only to avoid repetition.

4. The Cynemon Model

Cynemon is a network based cyclist assignment model that has been developed by TfL using Citilabs' CUBE software. This tool is able to estimate cyclist routes, flows and journey times.

As an in-house tool, Cynemon can provide an understanding of patterns of cycling trips across London, how these patterns are likely to change in the future, and how these patterns would be expected to change in response to network changes. Cynemon represents the movements of cyclists between origins and destinations across London and models their choice of route. It can be used to assess the impact of new schemes in terms of re-routeing of existing cyclists and people switching from other modes to cycling as a result of schemes.

There are four aspects to the forecast cycling growth in Cynemon:

- Population/employment growth – derived from GLA forecasts.

- Policy impact – trips switching from other modes to cycling as a result of committed and funded future schemes (previously represented separately in the Cycling Policy Evaluation Tool, a spreadsheet model for predicting cycling mode shift in response to infrastructure).

- Push factors – Elasticity of cycling demand relative to fuel prices, highway journey times, public transport fares and public transport journey times.

- Unexplained growth – A factor capturing unmeasured growth (for example due to 'safety in numbers', normalising the image of cycling, etc.). Data is not available to explicitly model these, so the forecast is based on the assumption that these factors continue to contribute the same percentage of cycling growth as they did from 2004 to 2014, based on a backcasting exercise. The model was applied to the period between 2004 and 2014 to estimate the growth due to population/employment growth, policy impact and push factors. This was then compared to the observed growth over the same period. The difference is taken to be the 'unexplained growth'.

5. Current Cycling Patterns

5.1 Demand

Different sources give varying estimates of the total daily cycling demand into Canary Wharf, as shown in Table 1. The Canary Wharf Travel Survey (CWTS) and Isle of Dogs Cordon Survey are observed data from employee surveys and cycle cordon counts. River Crossings Model (RCM) and Cynemon are modelled data. A comparison of census 2011 data with the CWTS data from that year confirmed a reasonable degree of consistency between the two datasets. There is a significant difference between the two observed data sources. One reason for this is seasonality. Although the data was only collected one month apart, it was in the autumn, when cycling levels drop most rapidly. The methodology is also very different. The higher value comes from a travel survey expanded to population whereas the lower value is an observed cordon count. The cordon survey would be expected to give a better measure for this value but the higher value in the survey data likely reflects some seasonal variation. It is therefore to be expected that Cynemon would be in between the two values, as is the case.

Table 1: Daily Cycling Demand into Canary Wharf

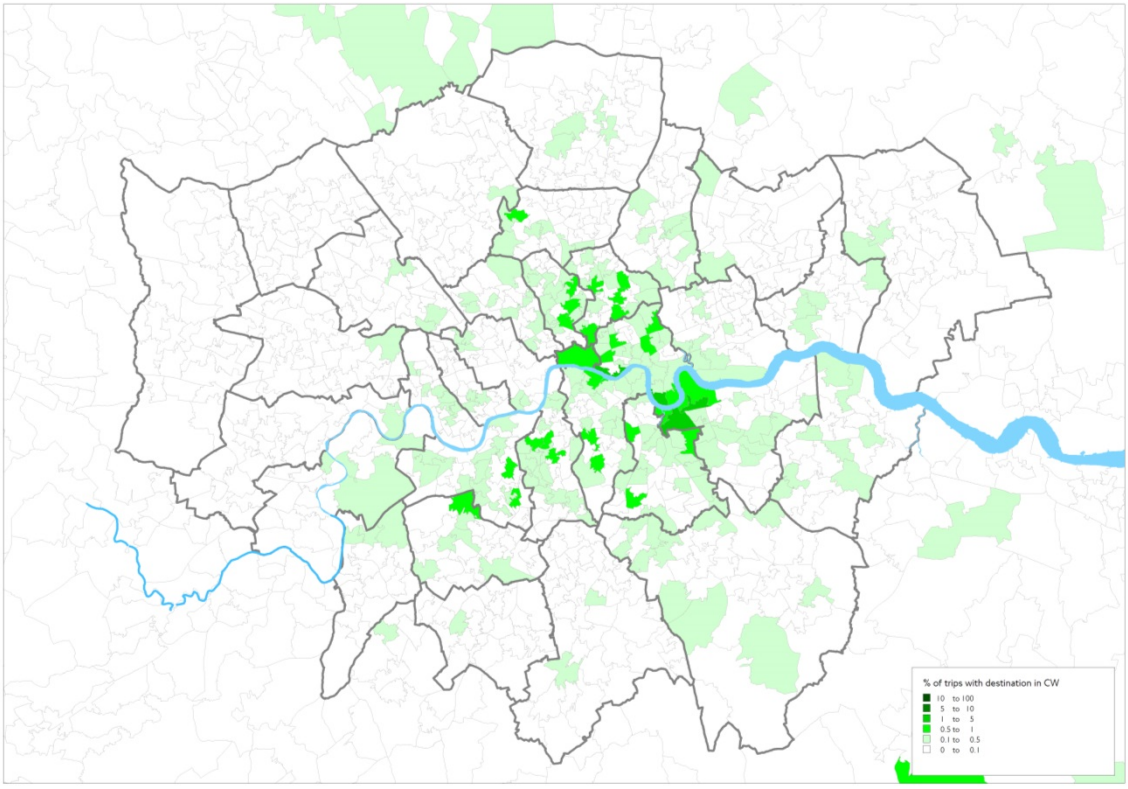
Source	Demand	Year
Isle of Dogs Cordon Survey (November 2015)	3,470	2015
Canary Wharf Travel Survey (October 2015)	4,900	2015
CYNEMON*	4,063	2014
RCM**	3,381	2013

**Cynemon demand is available for AM peak hour, interpeak average hour and PM peak hour. These have been reformulated to 12 hour daily demand using factors derived from LTDS data*

***The River Crossings Model is the bespoke demand forecasting tool used to calculate cross-river walking trips. RCM demand matrices are based on census 2011 journey-to-work data factored up to a 2013 base year*

Figure 1 shows the distribution of the origins of cycling trips to the Isle of Dogs in the Canary Wharf Travel Survey data.

Figure 1: Canary Wharf Survey Cycling Origins



The distribution of demand indicates that there is potential for existing cycling trips from North Greenwich and the south east to use a new crossing to Canary Wharf, rather than using the Greenwich Foot Tunnel, Woolwich Foot Tunnel or Woolwich Ferry.

5.2 Routeing

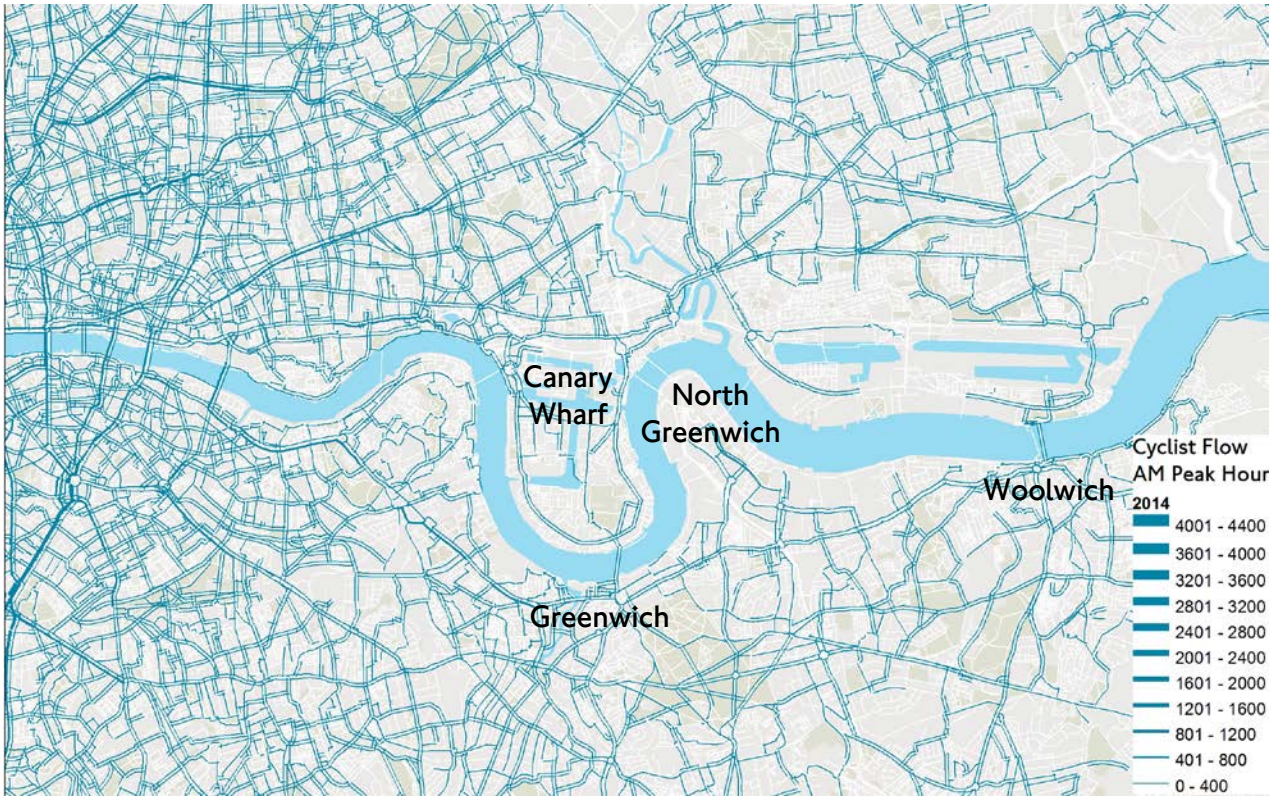
Cycle access to and from Canary Wharf from the south-east is currently restricted to two foot tunnels (Woolwich and Greenwich) and the Woolwich Ferry. Counts collected on these links vary, with the table below giving an indication of the level of cycling in the AM Peak hour drawn from a number of sources.

Table 2: AM Peak Cycling Counts

Road	Direction	Count
Greenwich Foot Tunnel	Northbound	279
Greenwich Foot Tunnel	Southbound	32
Woolwich Foot Tunnel	Northbound	10
Woolwich Foot Tunnel	Southbound	5
Woolwich Ferry	Northbound	1
Woolwich Ferry	Southbound	0

The table indicates that a reasonable level of cycling takes place on the Greenwich Foot Tunnel with very few cyclists using the Woolwich crossings to access areas north of the river. The plot below shows AM Peak cycling flow in the wider area from Cynemon.

Figure 2: 2014 AM Peak Cynemon Cycling Flows



5.3 Peak Hour Conversion Factors

London-wide factors to convert Cynemon peak hour flows to peak period or daily flows have been derived from the London Travel Demand Survey (LTDS). These are shown in table 3.

Table 3: Peak hour conversion factors

	Factor
AM Peak Hour to AM Peak Period	2.10
IP Average Hour to IP Period	6.00
PM Peak Hour to PM Peak Period	3.25
12 Hour to 24 Hour	1.19

6. Forecast Cycling Patterns

Forecast cycling flows in 2031 are shown in figure 3, and the change relative to 2014 is shown in figure 4.

Figure 3: 2031 AM Peak Cynemon Cycling Flows

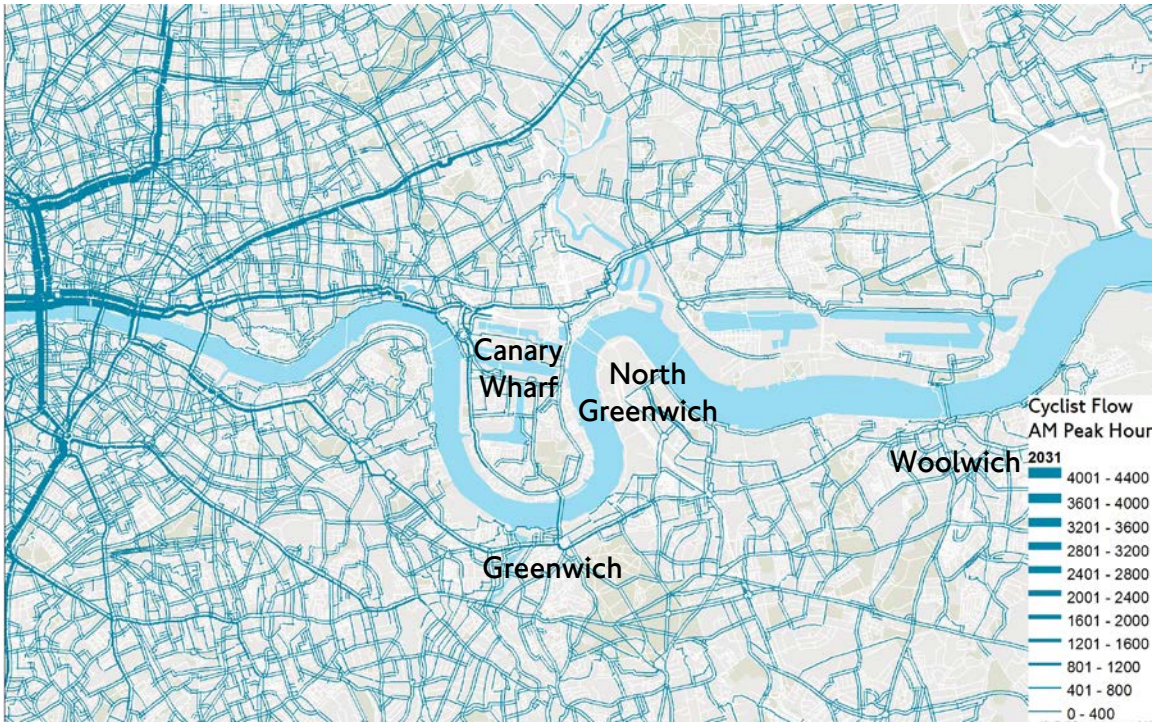


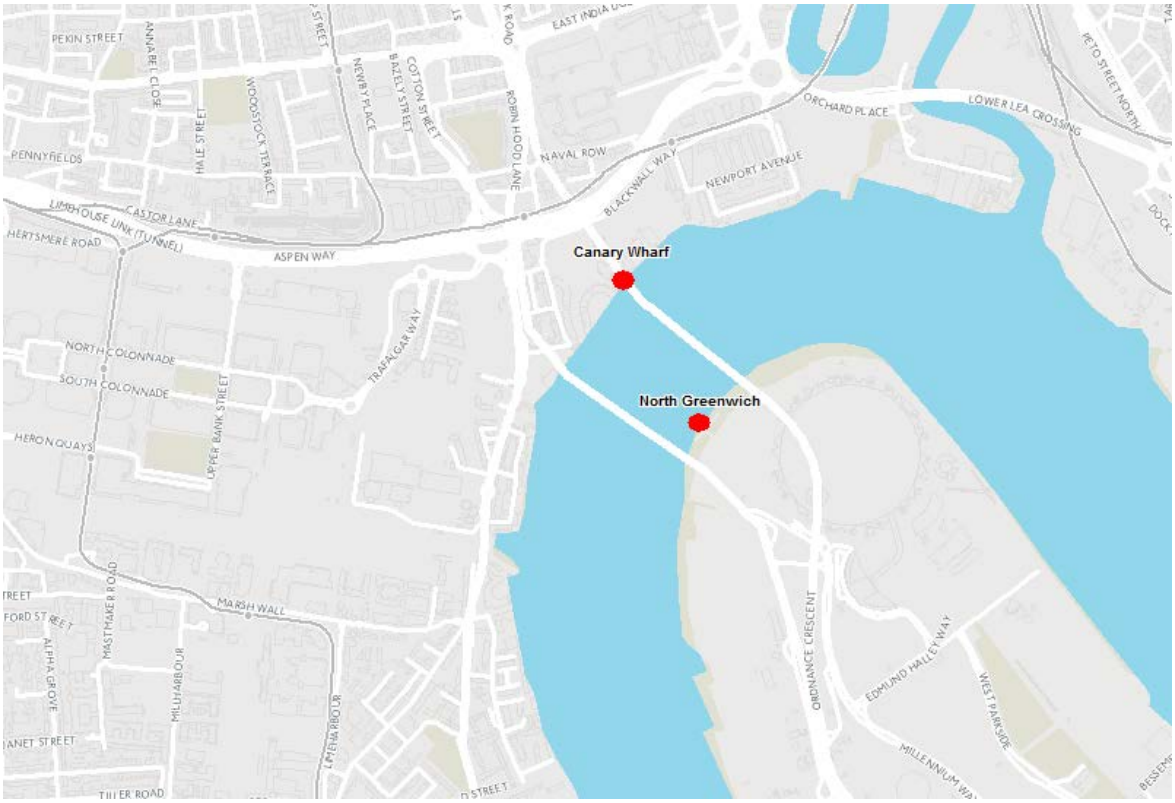
Figure 4: 2031 vs 2014 AM Peak Cynemon Cycling Flow Change

Cycling is forecast to grow across the area due to population growth, employment growth and changes in highway and public transport congestion and cost. The number of cyclists using Greenwich Foot Tunnel is forecast to almost double, with similar growth at the Woolwich crossings. Impacts from new infrastructure are focussed to the west of this area in central London.

7. Proposed Scheme

This analysis considers a ferry service between North Greenwich and the north-east of the Isle of Dogs. The pier locations are adjacent to Radisson Blu Hotel on the north side and an existing pier adjacent to Arora tower on the south side, as shown in figure 5. The ferry service is assumed to run every five minutes and take three minutes to make the crossing. The modelling work described in this note considers two options, one free and one with a fare of £1.70. For each option two tests were carried out, one with the actual waiting time for the ferry ("High"), and one with a weighted waiting time (with a factor of 2.5) to reflect people's higher value of time when waiting for a service, as used in public transport modelling ("Low").

Figure 5: Proposed Pier Locations



8. Analysis of Proposed Scheme Impacts

The scheme was tested using Cynemon to analyse the expected number of cyclists using each option in 2031, reflecting the impact of committed and funded schemes as of January 2017.

The number of cycle stages expected to use each of the options in each peak period is shown in table 4, together with the daily and annual totals. The results suggest that there is considerable potential demand for a ferry in this location. A fare of £1.70 would significantly reduce demand for the ferry, attracting less than 15% of the cyclists that a free ferry would attract. The highest demand forecast in a single direction for any time period is 176 to 336 cyclists northbound on the free ferry in the AM peak hour, which equates to 15 to 28 cyclists per ferry.

Table 4: Cycle Stages Expected to Use Each Option in 2031

	Free Ferry		Charged Ferry	
	High	Low	High	Low
AM	387	206	44	3
IP	32	14	5	1
PM	202	105	38	1
Daily	1977	1020	293	15
Annual	633,000	326,000	94,000	5,000

The AM peak hour change in cycling flows in response to the free ferry is shown in figure 4 for the high scenario. For the charged ferry the pattern of response is similar but smaller in magnitude.

Figure 4: Difference Plot of Scheme Impact (No Fare)

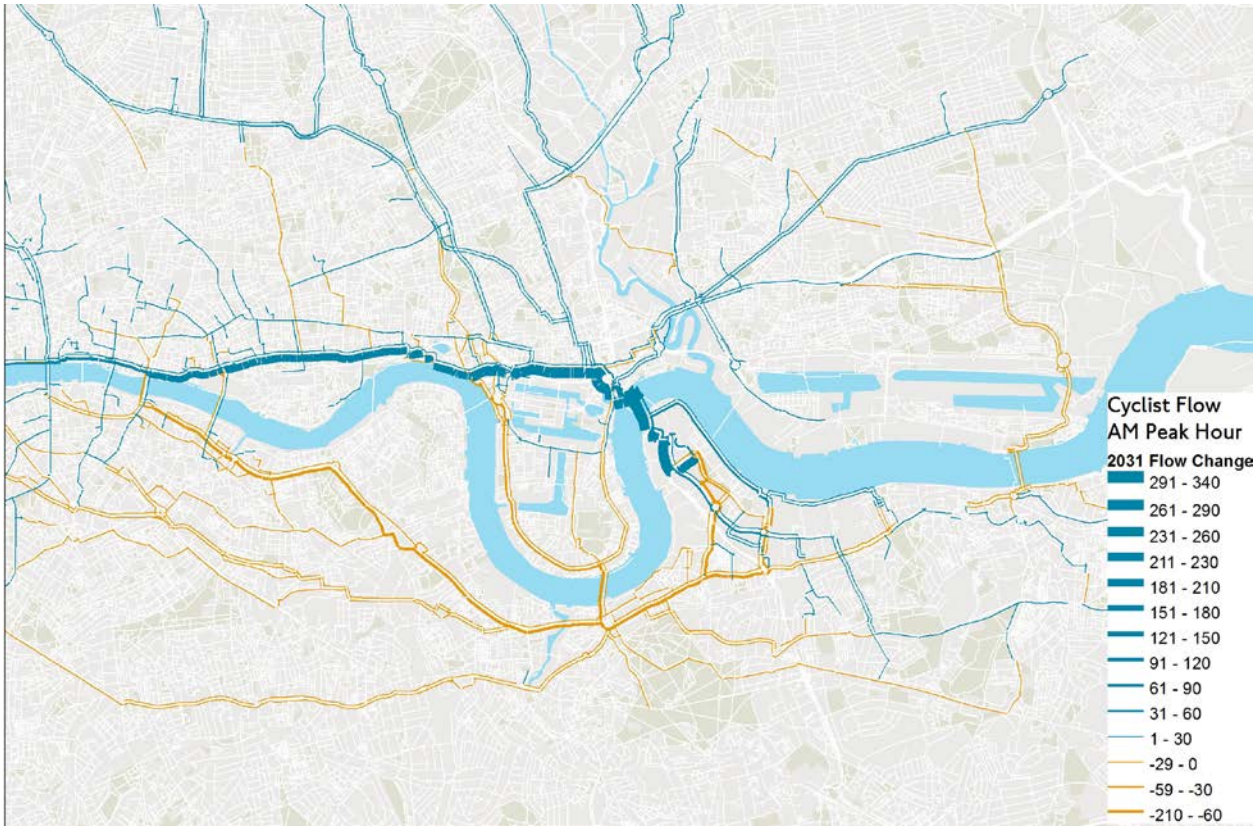
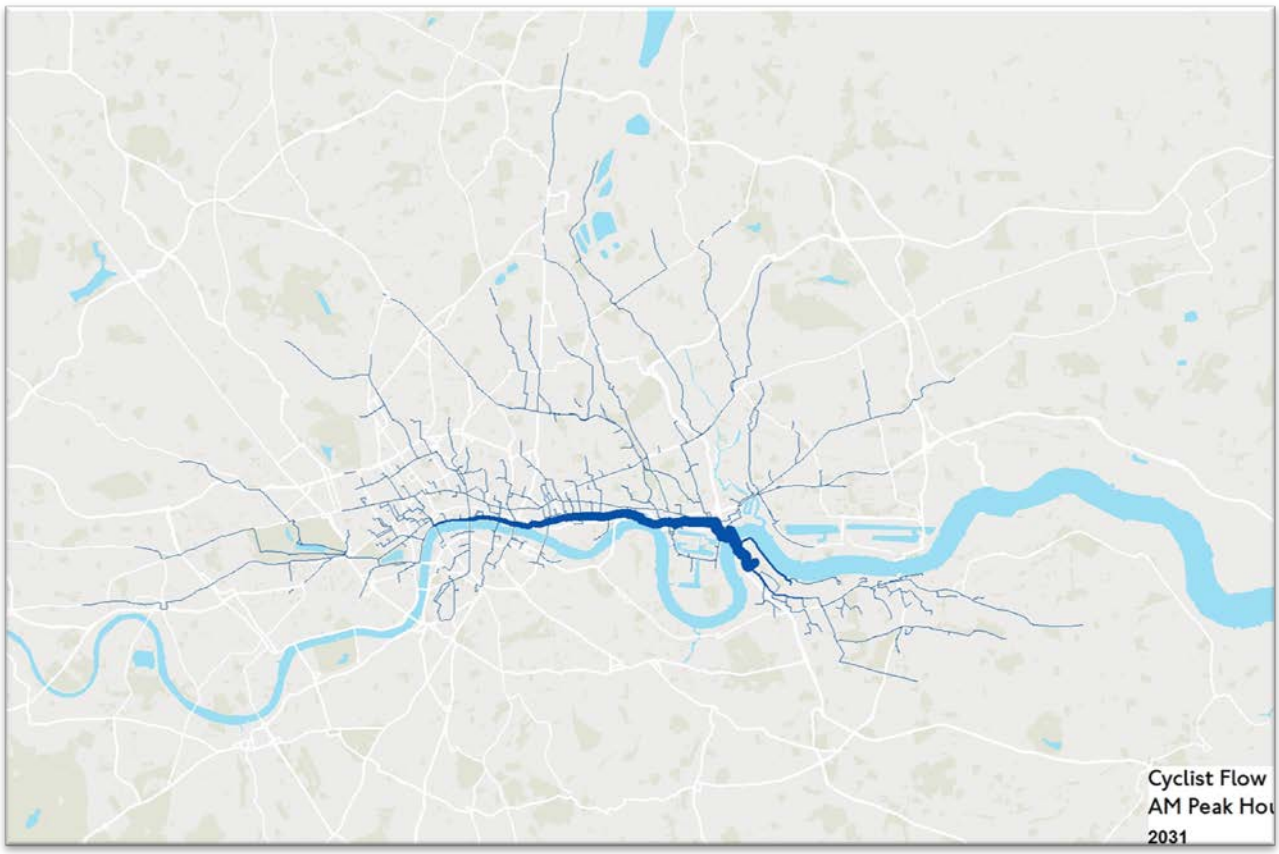


Figure 5 shows the flow of cyclists using the free ferry in the AM peak hour in the high scenario, following their whole journey from start to finish. This confirms that many cyclists are using the ferry and then continuing along Cycle Superhighway 3 to reach central London.

Figure 5: Flow of Cyclists Using Ferry (No Fare)



The table below shows the impact of the scheme on river crossing flows in the vicinity of the scheme. As indicated by the flow changes in Figure 4, the majority of ferry users have diverted from Greenwich Foot Tunnel, with smaller numbers diverting from Tower Bridge, London Bridge and the Woolwich Crossings.

Table 5: River Crossing Flows with and without a new ferry

	Number of Cyclists				
Crossing	Without New Ferry (AM Peak Hour)	With Free Ferry (AM Peak Hour)		With Charged Ferry (AM Peak Hour)	
		High	Low	High	Low
Woolwich Crossings	326	318	324	326	326
Proposed Ferry	n/a	387	206	44	3

Greenwich Foot Tunnel	654	561	596	627	652
Tower Bridge	1024	1010	1013	1020	1024
London Bridge	2251	2207	2219	2246	2251

9. Summary

The results of the analysis indicate that a free ferry would attract significant demand from cyclists, but that the vast majority of potential users would be deterred by a £1.70 fare. The cycling trips that are predicted to use the ferry are primarily trips into central London rather than Canary Wharf.

Trips from areas further south such as Kidbrooke and Welling are likely to continue using Greenwich Foot Tunnel, even in the no fare scenario, which suggests that there may be connectivity issues with the southern access to the ferry. There could therefore be opportunity for improving local connectivity and access to the ferry, leading to increased use. Further analysis would be required to determine the impact of any such interventions.