
A FEASIBILITY STUDY OF A RAPID TRANSIT CORRIDOR ROUTE FOR SOUTH DUBLIN

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Abstract

South Dublin County Council has a policy stating a number of areas in which they would like to extend the current LRT system in place. Considering the current economic climate a feasibility study of a Rapid Transit Corridor for South Dublin was undertaken (studying both LRT and BRT).

A Desktop Study was undertaken in which a number of potential feasible routes were identified. This involved identifying main trip generators and attractors, local amenities, business centres, shopping centres and schools within the study area. In order to conduct this analysis, the computer program ArcGis was employed. The Desktop Study produced a total of 7 route options.

After the route evaluation was completed a route selection synopsis could be conducted. The alignment selection was based on the analysis conducted within the Desktop Study and Route Evaluation. A weighting score of minus three to plus three was used, meaning that there are seven possible scores which could be applied to each criterion. A matrix synopsis was arranged with twenty-two criteria. The weighting was then applied to each criterion with reference to each route option, assessed under the sub-headings of 'LRT' and 'BRT'. The route options which preformed best were deemed to be the emerging preferred routes.

A ridership analysis was conducted on the emerging preferred routes which the matrix synopsis produced. An analysis was undertaken using ArcGis to assess the catchment area of each route, ascertaining the percentage of each Electoral District (ED) lying with the catchment area. It was assumed that the population spread was even, and the potential number of riders could be calculated for each route.

The Study concluded that the most beneficial system would be BRT based on cost and the Ridership Analysis. In addition, the most beneficial corridor route was also identified. The proposed corridor route and transit system complement both Local and Government policies, promoting sustainability and public transportation, while at the same time considering the current economic condition.

The introduction of the Luas boosted investment along both the Red and Green lines, with retail experiencing a rise in customers and property prices increasing. A BRT system may also attract new development and businesses, giving rise to jobs along the corridor.

With the Government tackling the fiscal crisis, the need to reduce car dependency, the promised introduction of an integrated ticketing scheme and the recent roll-out of real-time information systems, the case for bus rapid transit seems ever more viable.

1.0 Introduction

The project concerns a feasibility study of a rapid transit corridor route for South Dublin based on policies discussed below. We have seen the introduction of the Luas which has been successful. However considering the wavering economic conditions, it may be time to look at cheaper alternatives methods of transport, such as Bus Rapid Transit.

There are three policies that are central to this feasibility study as they identify transport objectives of SDCC and DLRCC which is to extend and encourage rapid transit systems in South Dublin. It is intended that these three policies act as a guide, platform and basis of this feasibility study. Transport policies T9 and T6 within DLRCC Development Plan (2010 – 2016) heavily propose transit use within South Dublin, with policy T8 [1] outlining a number of areas:

Policy T8: *Luas and Light Rail Transit (LRT) Extension – Tallaght and Rathfarnham* “It is also the policy of the Council to facilitate the extension of the Light Rail Transit (LRT) system to the **Oldbawn, Jobstown ... Killinarden, Rathfarnham, Terenure, Knocklyon, Ballycullen and Oldcourt** areas...”

There are also a number of government policies that complement a transit corridor route for South Dublin, these include

- Transport 21 (Department of Transport, 2005)
- 2010 - 2030 Vision Strategy (Department of Transport, 2010)
- Smarter Travel (Department of Transport, 2008)

Combining these policies together it is clear that the aspiration exists to extend and incorporate LRT/BRT systems throughout South Dublin

2.0 Preliminary Information & Meetings

To discuss the possibility of a transit corridor route for South Dublin a meeting was arranged with Mr David King (RPA - Transport Manager). It was identified that no work had been done concerning Policy T8. It was also discussed about potential areas for extension. Furthermore a number of specifications relating to LRT design were obtained.

The ‘Blueline’ is a Bus Rapid Transit proposal in south east Dublin, put forward by Dun Laoghaire Rathdown County Council with a feasibility study completed in 2010.

To discuss the ‘Blueline’ proposal a meeting was arranged with Claire Casey (Transport Manager). The Blueline was discussed in addition to this, Policy T6 [2] within the DLRCC Development Plan.

3.0 Desktop Study

A Desktop Study was undertaken in which a number of potential routes were identified. This involved identifying main trip generators and attractors, local amenities, business centres, shopping centres and schools within the study area.

In order to conduct this analysis, the computer program ArcGis was employed. ArcGis was used as a tool to analyse such trip generators and attractors, local amenities, business centres schools and shopping centres, which aided the process of identifying potential routes.

Identifying Termini Points

In the Railway order submitted to An Bord Plenáola in 2010 regarding Metro West it is proposed that the Luas Red Line is extended eastbound towards the junction of Belgard Road/Old Blessington Road. The extension can be seen in Figure 1, represented by a dotted red line.



Figure 1 – Termini Points

In 2008, the RPA released a feasibility study [3] concerning a Luas line connecting Dundrum to the City Centre via Rathfarnham, Terenure and Harold's Cross. In this study there was a corridor outlined for the areas of Rathfarnham, Nutgrove and Beaumont Avenue.

It is important to note that the proposed two termini points identified complement future transport proposals. The 2030 Vision Strategy [4] outlines a number of key public transport passenger interchanges which are envisaged for 2030.

By 2030 it is envisaged that the Tallaght region will be a key interchange in terms of Town Centre Interchanges, Bus and Rail. Such key public transport interchanges are also proposed for Dundrum. This means that the two termini points proposed links the two key transport interchanges thereby significantly improving public transport.

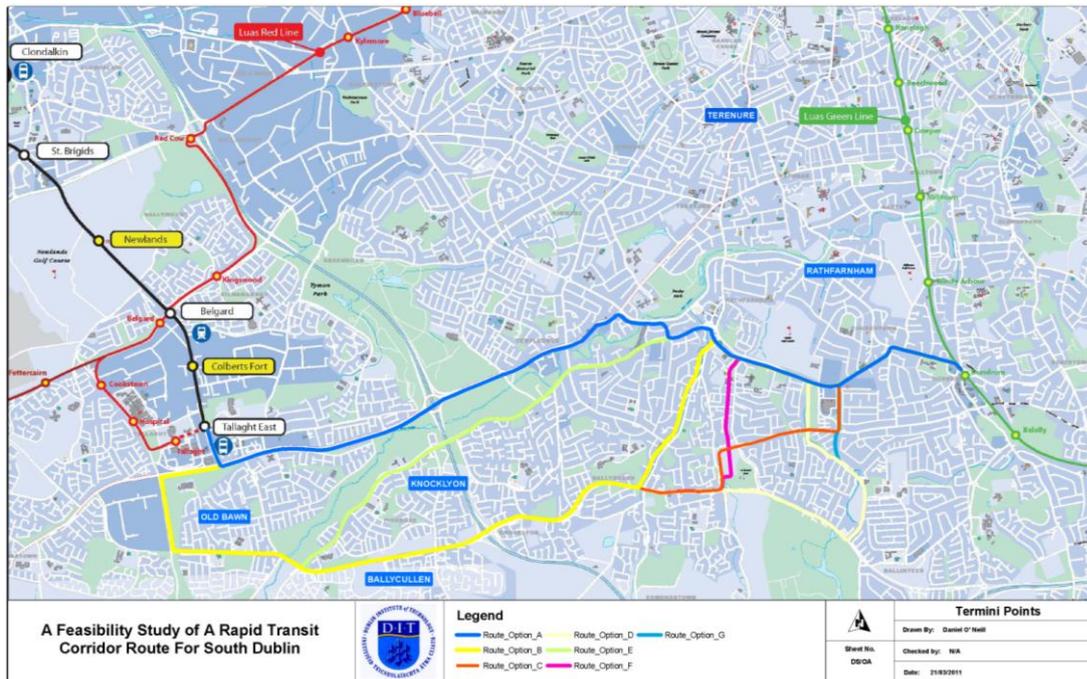


Figure 2 – Route Options

4.0 Route Evaluation

In order to find a proposed route, a 35km site was studied and the condition of infrastructure and other constraints were taken into account. From this, a number of different route options were found.

The reduction of green areas, footpaths, and use of existing bus/cycle lanes were all considered. The study showed that private land acquisition would be needed most in the area of Rathfarnham, due to road widths and high-density housing.

In some cases, it would be necessary to construct bridges, resulting in higher cost. While sharing existing roadway on river crossings would create extended delays for traffic, it may reduce the need for additional building of bridges. Such aspects were carefully considered and had a bearing on the route selection process.

5.0 Route Selection

After the route evaluation was completed a route selection synopsis could be conducted. The route selection was based on the analysis conducted following the Desktop Study and Route Evaluation.

A weighting score of minus three to plus three was used, meaning that there are seven possible scores which could be applied to each criteria. A matrix synopsis was arranged with twenty-two criteria. The weighting was then applied to each criteria with reference to each route option, assessed under the sub-headings of 'LRT' and 'BRT'.

The routes which performed best turned out to be C and G, which can be seen in Figure 3 below.

6.0 Ridership Forecasting

An initial ridership analysis was conducted on the emerging preferred routes which the matrix synopsis produced. An analysis was undertaken using ArcGis to assess the catchment area of each route by ascertaining the percentage of each Electoral District lying with the catchment area. The following Figure depicts the catchment area of each route and Electoral Districts referenced to the population. It was assumed that the population spread was even.

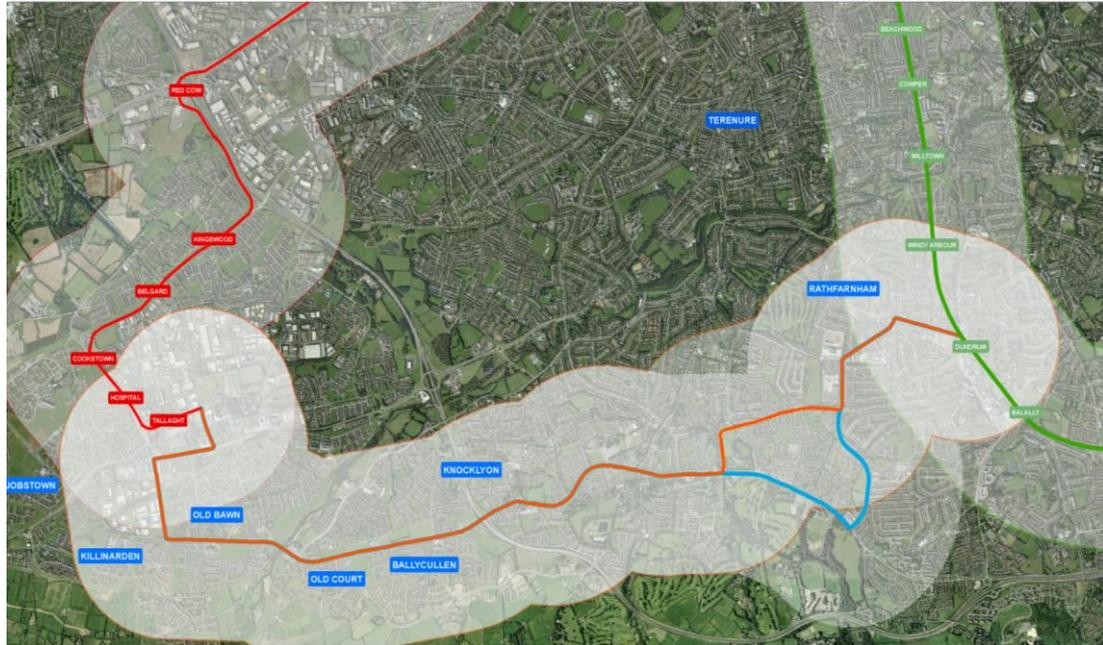


Figure 3 – Emerging Preferred Routes

Data was used from the CSO (CSO, 2006), and POWCAR (CSO, 2002 – 2006) and was applied to the calculated potential number of riders. From Census data it was identified that approximately 7.44% use the Train, DART or Luas for travelling to work. Electoral Division (ED) Census 2006 POWCAR data was assessed by Dunny (2009) [6] to compare change in travel mode for journey to work trips against the 2002 Census POWSAR data. The ED's included in the assessment were those which are contained or crossed by the Green Line between stations Ranelagh and Sandyford and the Red Line between stations Red Cow and Tallaght.

This data provides an understanding of the 2002 journey to work demand in the assessed EDs and the change in the mode of journey to work, number of journey to work trips and population in the EDs from the 2006 data, with the introduction of a light rail public transport system. The study showed that approximately that 11% (Dunny.S, 2009) shift towards the Luas when it was implemented.

	Daily Ridership		Distance (km)	Total Journey Time (min)
	CSO Data	POWCAR Data		
Route C	5983	8841	11.69	29
Route G	6423	9487	12.87	31

Table 1 – Summary of Potential Ridership Routes C & G

The journey time was calculated by using the average speed of the Luas, which is 2.44 min per km.

7.0 Preferred Route

	Impacts		Constraints		Service Provided	
	LRT	BRT	LRT	BRT	LRT	BRT
Route C	-5	-4	-11	-5	1	8
Route G	-11	-9	-9	-5	-4	2

Table 2 – Summary of Routes C & G Matrix Synopsis

Table 2 above is a summation of the weighting categories of Impacts, Constraints and Service Provided relating to the emerging preferred routes. One can see that, overall, route C performs the best.

Route C is also deemed to perform better regarding ridership as route G only carries 646 more people than route C even though it is 1.18km longer in route distance

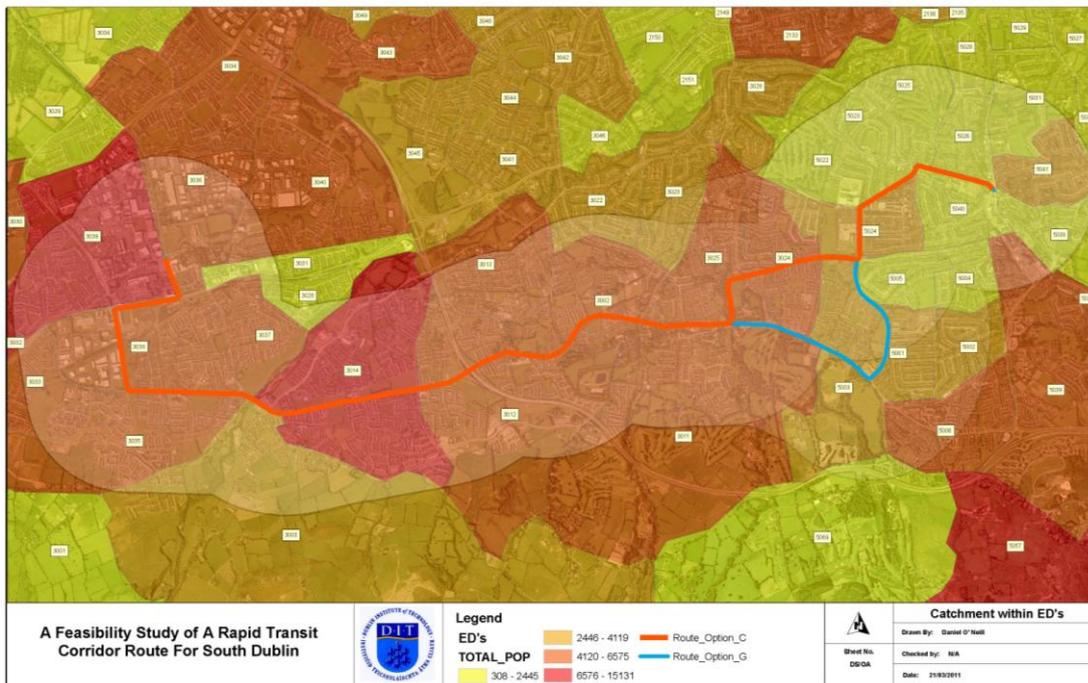


Figure 4 – Catchment Analysis (Population) of Emerging Preferred Routes

8.0 Boarding & Alighting Case Study

A case study was conducted on an existing Luas Stop, which was assumed to have the same passenger flow as a proposed stop along the preferred route. The chosen case study was the 'Blackhorse' Red Line Luas Stop as it had similar characteristics to that of a proposed transit stop at Firhouse/Ballycullen.

The observation of boarding and alighting began at 07:45 – 09:45. A total of 215 people were observed boarding and alighting from the peak hour of 08:00 – 09:00. The mean daily flow for the Luas Red and Green Lines was then used to calculate the likely total flow of the transit stop. From the document 'Transport 2007' [7] it was identified that 11.29% use the Luas during 08:00 – 09:00. As 215 (11.29%) people were observed during this time the total number of passengers was calculated to be 1888.

Within the 1000m catchment of Blackhorse Luas Stop, the population was calculated at 14,856 people. This indicates that 12% of the population within the catchment of the Blackhorse stop used the Luas.

This is an important discovery as such a figure coincides with Dunny (2009) analysis of 11% modal shift to a light rail system. It also signifies that the use of 11% is a more accurate estimate compared to the CSO figure of 7.4%, also assessed in Ridership Forecasting.

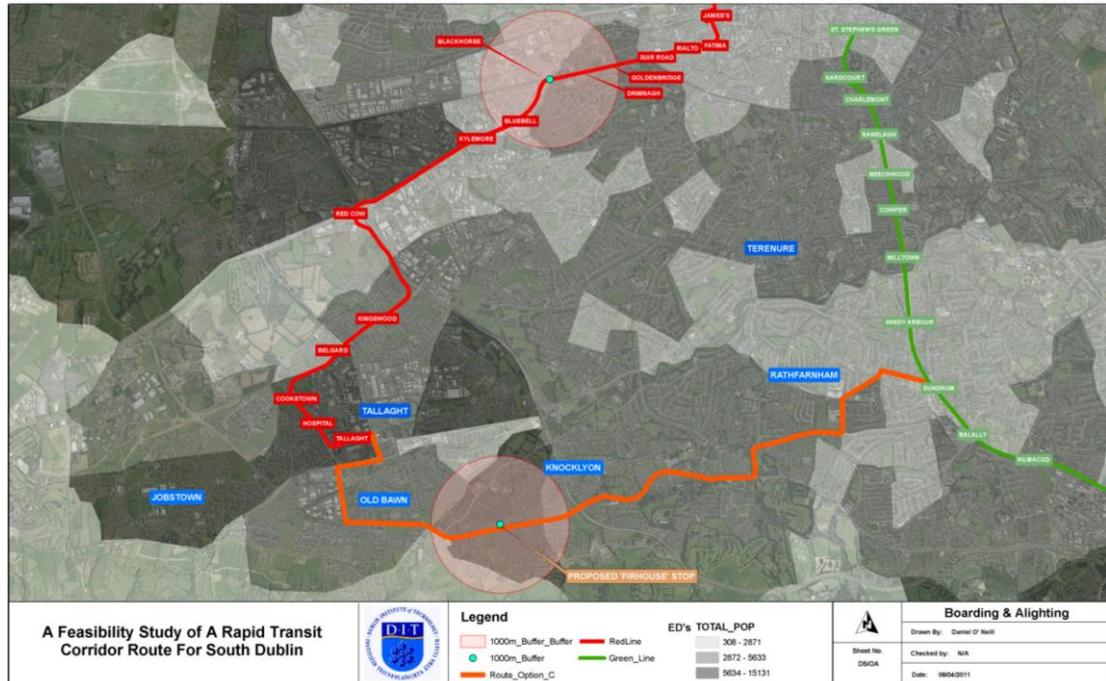


Figure 5 – Blackhorse Luas Stop & Proposed Transit Stop (Firhouse)

9.0 Conclusions & Recommendations

The preferred route does not consider environmental impacts. Therefore a full review of the matrix with the inclusion of the environmental impacts should be done. A more comprehensive analysis of ridership be conducted when new census data becomes available.

Based on the findings of this study it is recommended that South Dublin County Council make a variation to Policy T8 in which Bus Rapid Transit should also be considered with Light Rail Transit. A Detailed modelling and ridership analysis when new census data becomes available.

The following are also recommended:

- Business case in accordance with Department of Finance Guidelines
- Detailed assessment of constraints, civil engineering and local traffic management impacts associated with the transit corridor.
- Detailed capital cost estimate and assessment of land costs.

Preferred transit system and implementation

Ridership is a key factor in choosing the most beneficial mode of transport. Based on the Route C (preferred route) ridership figure of 9,000 passengers per day, the likely peak hour

figure would be around 1,000 passengers. This would produce a yearly ridership of just over 3mn passengers.

A BRT system would be capable of carrying in excess of 1,000 passengers during peak times, however if the figure neared 2,500 an LRT system may be required. Based on these figures, the most beneficial system is Bus Rapid Transit, from both a ridership and economic perspective.

Economic realism

The proposed corridor route and transit system complement both local and Government policies, promoting sustainability and public transportation, while at the same time considering the current economic condition.

The introduction of the Luas boosted investment along both the Red and Green lines, with retail experiencing a rise in customers and property prices increasing. A BRT system may also attract new development and businesses, giving rise to jobs along the corridor.

The idea of BRT as an alternative to LRT is further supported by comments made by Transport Minister Leo Varadkar on April 7(2011): "We cannot go on planning for projects without being able to fund them. I am keen to study what options exist in relation to bus rapid transit for suburban parts of Dublin. I want to be clear that no decisions have been taken to date, either by me or the Cabinet, and all options will be considered."

With the Government tackling the fiscal crisis, the need to reduce car dependency, the promised introduction of an integrated ticketing scheme and the recent roll-out of real-time information systems, the case for bus rapid transit seems ever more viable.

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