Our Case Number: ABP-314724-22

An Bord Pleanála

Donal O'Brolcain
100 Griffith Avenue
Dublin 9

Date: 05 December 2022

Re: Railway (Metrolink - Estuary to Charlemont via Dublin Airport) Order [2022]
Motrolink. Estuary through Swords, Dublin Airport, Ballymun, Glasnevin and City Centre to Charlemont, Co. Dublin

Dear Sir / Madam,

An Bord Pleanála has received your recent submission (including your fee of €50) in relation to the above-mentioned proposed Railway Order and will take it into consideration in its determination of the matter.

The Board will revert to you in due course with regard to the matter.

Please be advised that copies of all submissions/observations received in relation to the application will be made available for public inspection at the offices of the relevant County Council(s) and at the offices of An Bord Pleanála when they have been processed by the Board.

More detailed information in relation to strategic infrastructure development can be viewed on the Board's website: www.pleanala.ie.

If you have any queries in the meantime, please contact the undersigned. Please quote the above mentioned An Bord Pleanála reference number in any correspondence or telephone contact with the Board.

Yours faithfully,

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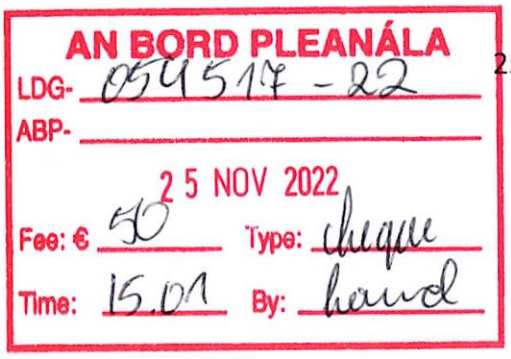
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25 NOVEMBER 2022



An Bord Pleanála

64 Marlborough Street

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Railway (Metrolink–Estuary to Charlemont via Dublin Airport) Order 2022

A Chara

I attach my

1. submission on Railway (Metrolink–Estuary to Charlemont via Dublin Airport) Order 2022
2. cheque for €50.00.

Is mise

Donal O'Brolcáin

Railway (Metrolink–Estuary to Charlemont via Dublin Airport) Order 2022

Note. In this submission, I refer documents, reports, submissions, letters and a record of a meeting with associated emails. I have attached these in two sections ie.

Section 1 - A 2019 submission to Transport Infrastructure Ireland (TII) on Metrolink, which is paginated, after the first two pages

Section 2. Other relevant material, identified by tabs.

I ask that An Bord Pleanála refuse to grant a railway order for this project on the following grounds

1. It will not enhance public transport options within those parts of the Dublin Area in which most journeys take place(see Figure 1) It is another stand-alone non integrated project which will continue to absorb resources better used elsewhere;
2. The route chosen
    a. Does not cater for the Drumcondra corridor which has the greatest demand for enhanced public transport options in the north part of Dublin city. Note the north part of our capital city has more people than Fingal, the south part of Dublin City, South Dublin and Dun Laoghaire Rathdown (see Figure 4) and has had over the past 30 years see Section 1 p.16-19.
    b. Was the outcome of a deeply flawed process run by the National Transport Authority.
3. Enhancing public transport options between Dublin City Centre and Dublin Airport can be done by methods other than this proposal given than a 2011 NTA Study of Dublin Airport passengers found that
    a. Less than one seventh (14%g) of trips were business related;
    b. Three quarters of all trips were either for holiday/leisure (nearly half) or visiting family/relatives (over one quarter);
    c. Less than one third of trips originated in Dublin City Centre/South part of Dublin City;
    d. Three quarters (75%) had journey times of less than one hour to Dublin Airport with almost half (46%) having journey time of less than 30 minutes. See Section 1 p. 20-22, 48-50

    In addition, the peak times for passengers departing and arriving do not correspond with the AM and PM peak commuting times in the Dublin Area. (Section 1 p. 22). This suggests that the passenger capacity proposed will not be needed for decades, if ever, given recent trends in working remotely from centralised offices.

In short, the vast majority of passengers at Dublin Airport are not very time-constrained in how they access the Airport landside. So travel times between Dublin City Centre and the Airport should not be a criterion by which this proposal is assessed.

Furthermore, Dublin Airport attracts lots of meeters/greeters, at all times of the year. Very few of these people are likely to use public transport to travel to the Airport.

The 2014-2015 NTA/AECOM Fingal/North Dublin Transport Study, to which Transport Infrastructure Ireland (TII) refers in this application pointed out that

Expansion of the current light rail system to serve the Study Area could present significant benefits as follows:
- Light rail is a high quality product with high capacity that has already been well received within the City;
- Expansion of the network would present significant integration benefits and maximise the overall offer presented by the network;
- Light rail integrates well into the urban environment which will be important for areas like the north inner city and Swords;
- Light rail has a proven ability to drive urban renewal and economic growth which is an important objective within the current Study Area;
- Light rail, unlike heavy rail, can have shared use sections where space is limited, although ideally it should be segregated as much as possible;
- Light rail presents a suitable option where the level of demand is between bus and heavy rail capacities;
- The current light rail network includes a number of Park and Ride facilities that will further encourage a shift from car mode for commuting trips;
- Light rail is highly legible with a high commuter awareness of routes, catchment areas as well as facilities to enable ease of utilisation; and
- Emissions from light rail are low and remote from the vehicle. [1]

In asking you to reject this project, I suggest that other options (see Section 1 p. 35-70, p. 111-132) would better serve the north part of our capital city region,including Swords and the Airport. Any option must focus on the most heavily trafficked corridor of that area ie. through Drumcondra which is primarily a residential and educational district.

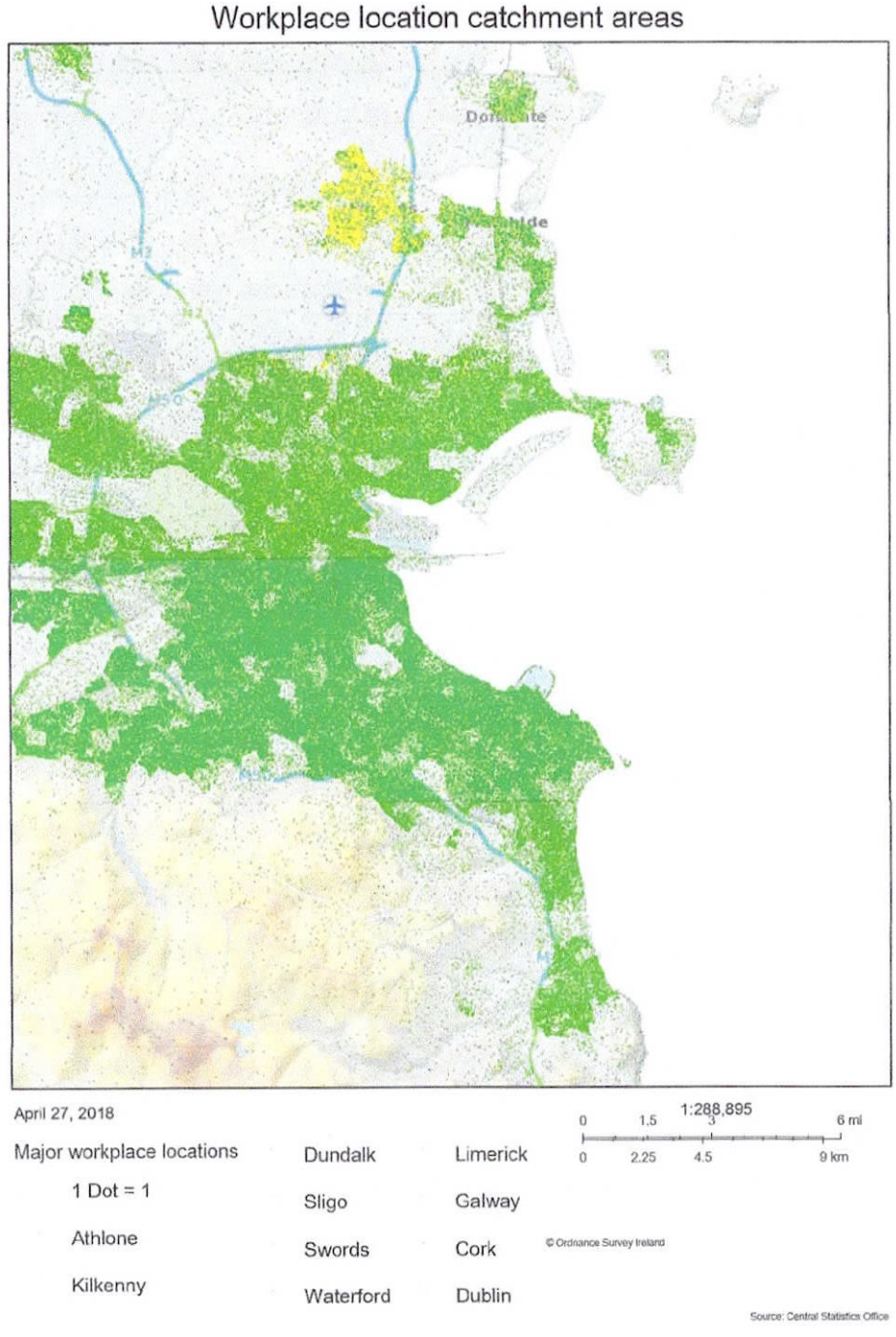
Our capital city does not need another stand alone public transport system which will not enhance our urban environment which is not well tended.

[1] Source: National Transport Authority. AECOM Fingal/North Dublin Transport Study. Stage One Appraisal Report November 2014 p.39

1. Transport options in the Greater Dublin Area

The 2016 Census found that the major workplace catchment areas are inside the M50 as shown in Figure 1

Figure 1 Dublin Area workplace location catchment areas Census 2016



2. Route Chosen

2.1. On 10th May 2018, I asked Transport Infrastructure Ireland (TII) for access to papers, documents and records (including emails and sticky notes) under the European Communities (Access to information on the Environment) Regulations 2007 – 2014, on four topics arising from the MetroLink proposal. (Section 1 p. 1-33)

2.1.1. The misleading statements in the Alignment Options Report on the origins of a Metro system for the Greater Dublin Area;

2.1.2. The misplaced emphasis on Swords, compared to the North Part of Dublin City or even the western part of Fingal around Blanchardstown;

2.1.3. The need for fast access between the City Centre and Dublin Airport;

2.1.4. Commitments and assumptions explicitly made in approving and building the Dublin Port Tunnel. I actively supported that project as one of a mutually reinforcing set of proposals which would enhance our capital city region .

2.2. TII responded on 8 June 2018 (see Section 1 second page unpaginated!) pointing out that

> **The basis for the criteria to provide a safe, high frequency, fast, efficient and sustainable public transport light rail service connecting Swords, Dublin Airport and Dublin City Centre arises from the findings of the Fingal/North Dublin Transport Study, which was commissioned by the National Transport Authority (NTA) and is available to view/download from the NTA website, www.nationaltransport.ie**

2.3. TII's application for this railway order refers to the Fingal/North Dublin Transport Study 2014-2015

2.3.1. In September 2014, I received a letter from AECOM asking me to contact them to arrange a meeting in connection with a Fingal/North Dublin Transport Study which the National Transport Authority had commissioned. I was surprised to receive this letter, as I was not aware that such a study had been commissioned.

2.3.2. On 6th October 2014, the meeting took place in AECOM offices The aim of the meeting was to present the CITY ACCESS TRANSIT (CAT) which Drumcondra 2005 had proposed in response to a public consultation in March 2001 (see Section 1 p. 96-108)

2.3.3. By prior agreement with AECOM, I was accompanied by five people, all of whom are named in the agreed record of the meeting. . See agreed record of this meeting Section 1 p. 92-95 and pre/post meeting emails clarifying some points see Section 1 107-110

2.3.4. Among those that I invited were the Howard brothers, developers based in North Dublin.

2.3.4.1. In 2006, they had commissioned a team of consultants to report on an alternative routing for the then proposed Metro North. As the work concluded, Michael Howard asked about Drumcondra 2005. By then, the residents' association which formed Drumcondra 2005 did not agree on the then proposed Metro North. Thus there was no common approach to MetroNorth, following the 2001 proposal for the DRUMCONDRA CITY ACCESS TRANSIT (CAT). I pointed that out to Michael Howard.

2.3.4.2. I had not worked or socialised with the Howards before they approached me nor have I since. When AECOM approached me in 2014, I asked Michael Howard if he would like to join me at the proposed meeting to present his proposal, as there appeared to be an opportunity to have other options re-evaluated. He accepted my invitation.

2.3.4.3. During the meeting, Michael J. Howard presented the *Metro East* proposal which he had commissioned from Roughan O'Donovan and others in 2005/2006. He also handed over a copy of that proposal to AECOM together with a submission made to the Railway Procurement Agency at the time . See Section 1 p. 133 – 197 .

2.4. The NTA/AECOM Stage One Appraisal Report was dated November 2014.

2.4.1. It is clear from the text of that NTA/AECOM report that

2.4.2. A casual reader would get the impression that Drumcondra 2005 was present at a workshop for key stakeholders held on 27th August 2014. This was not true.

2.4.3. The Roughan O'Donovan Report which the Howard brothers had presented during the October 2014 meeting was not referred at all;

2.4.4. the DRUMCONDRA CITY ACCESS TRANSIT (CAT) proposal was completely misrepresented. See Section 2. NTA/AECOM report p. par 3.12 LR* :City Access Transit (CAT) p. 59.61

2.5. In a submission (dated 19 January 2019) on that report, I called for the NTA/AECOM Fingal/North Dublin Transport Study Stage One Appraisal Report November 2014 to be rejected in full. See Section 1 p. 71-91 also Section 2 for covering letter.

2.6. It would seem that the AECOM Director who signed off on the Final Report of the NTA/Fingal North Dublin Transport Study Stage 2 Appraisal Report June 2015 was **NOT** aware that the Howards had given AECOM the final report of the Roughan O'Donovan Metro North Transportation and Engineering Review Final Revision June 2006 (known as *Metro East*) during the meeting on 6 October 2014.

2.7. This is a case of the public authorities and their consultants suppressing options that were worked out by respected professionals taken on by private citizens. If the public authorities were confident that the project proposed lacked merit, they did not state that, setting out their reasons. This suggests policy-driven evidence making in pursuit of a project favoured by insiders and incumbents. Such stealthy behaviour is not necessary and does not inspire trust in government.

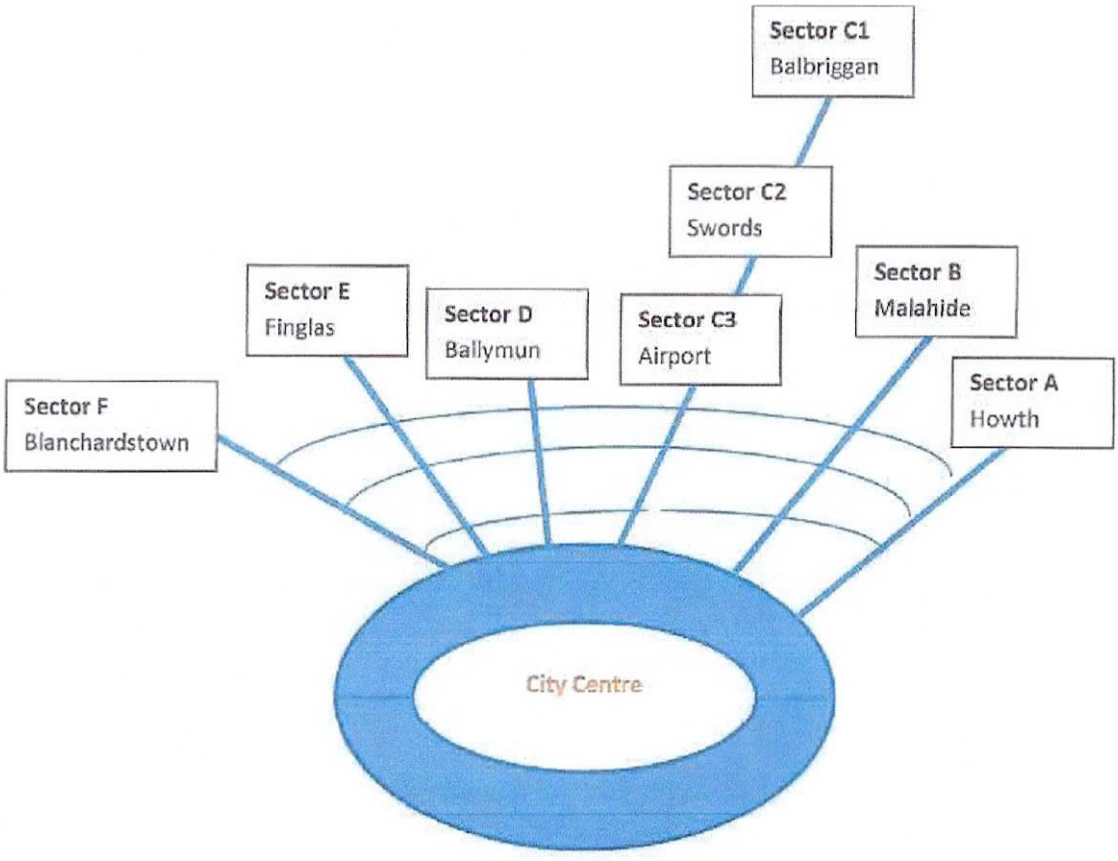
3. North LUAS Loop

3.1. Following the outrageously misleading NTA/AECOM Fingal/North Dublin Transport Study Stage One Appraisal Report November 2014, in April 2016, I sought further information from NTA. see Section 2

3.2. The key document that emerged was Draft Study of Transport Options for Fingal Corridors in advance of Metro North April 2012. see Section 2

3.3. I was taken aback when I saw that there was no consideration of Drumcondra in the Sector C1/Balbriggan Sector C2/Swords, Sector C3 Airport. This contrasted very poorly with explicit treatment of both Finglas and Ballymun, other north city suburbs. .

Figure 2 Main Fingal transport corridors to/from the City Centre



Source ; NTA DRAFT Study of Transport Options for Fingal Corridors in advance of Metro North. April 2012

3.4. This was very surprising, given a 1996 review (by Oscar Faber for the then Department of Transport, Energy and Communications, seemingly prompted by the EU Commission) of the then proposed integrated three line Light Rail system,. This review identified more trip attractors/generators per km on a line connecting the City Centre to Ballymun through Drumcondra. see Table 1 Comparison of Trip Attractors Generators on three LUAS lines 1996 see section 1. 26 . also p. 116

3.5. In a 2012 NTA report on Bus Rapid Transit (BRT) Core Network Report, NTA concluded that passenger demand on a route through Drumcondra exceeded the capacity of that particular option. No further consideration would be given to using that particular form of public transport through Drumcondra. See Section 1 p. 37, 122

3.6. As I was puzzled by the complete exclusion of Drumcondra when the public authorities were considering how to enhance public transport the north part of our capital city, I commissioned two maps based on the 2011 Census from AIRO.

3.6.1. These superimposed the then existing LUAS lines (including LUAS cross-city then under construction), heavy rail-commuter lines including DART and the Phoenix Park Tunnel (then projected to open for commuter services in 2016) and the then proposed Metro route on maps the Dublin area showing

3.6.2. the economic core, measured by >= 700 jobs km^2

3.6.3. population density;

See Figure 3

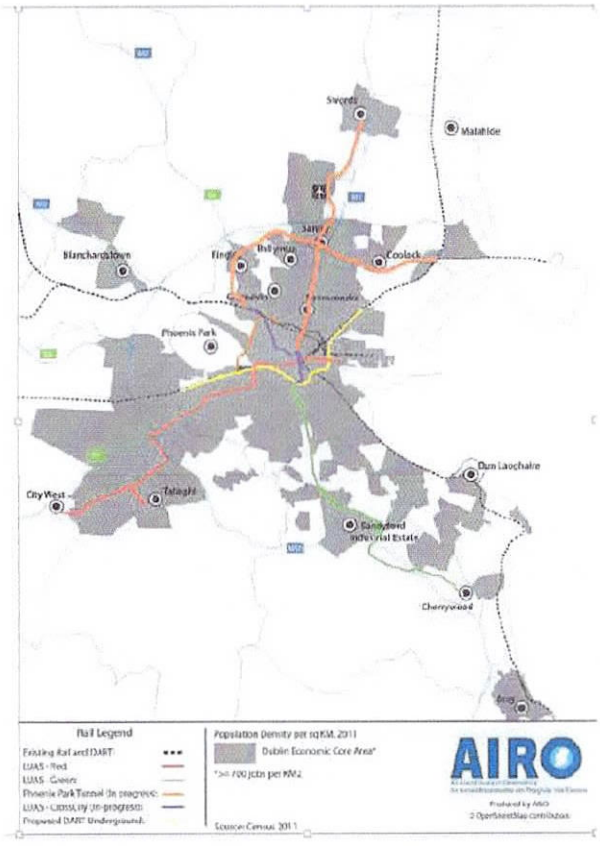
3.7. These maps formed the basis for a proposed LUAS Loop around the North City with spurs to the Airport, Swords and Howth Junction. This built on the proposal to extend LUAS from Broombridge to Finglas.

3.8. In October 2015, I presented this proposal at a session on transport at the Dublin Economic Workshop in Athlone. see. Section 1 p. 26-70, and also an article in the January 2018 issue of the Irish Journal of Social, Economic and Environmental Sustainability see Section 1p. 111 - 132

3.9. I first used the maps in an article question the need for DART Interconnector, published in the webforum *irelandafternama* published in July 2015

Does Dublin's Core Economic Area need three rail links between the Docklands and Heuston Station/Inchicore?

Figure 3 A North Dublin on-street LUAS Loop with spurs to the Airport, Swords and Howth Junction



3.10. The proposed North Dublin LUAS loop would

3.10.1. serve the northern part of Dublin's Core Economic Area comprehensively;

3.10.2. be Integrated with what already exists;

3.10.3. offer 3 rail-based ways of getting to/from the City Centre from the Airport;

3.10.4. link with the existing heavy rail commuter services are 4 different points

3.10.4.1. DART at Howth Junction;

3.10.4.2. Northern Commuter services also at Howth Junction;

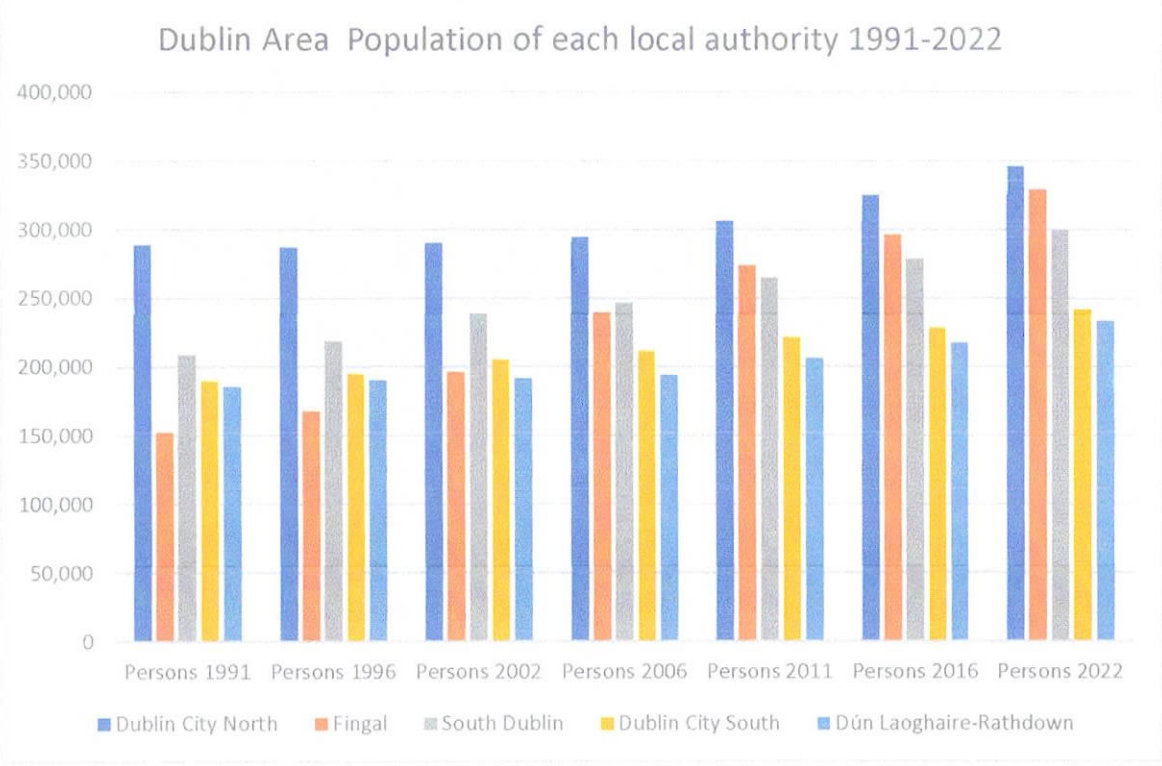
3.10.4.3. The Maynooth line at both Drumcondra and Broombridge.

3.11. This North Dublin LUAS Loop fitted the urban transport network proposed in *A Platform for Change* . This proposed a LUAS line through Drumcondra for the north part of Dublin. This line would have spurs to the Airport and Howth Junction,in addition to a spur from a circular Metro system, as part of a set of mutually re-inforcing measures to make is easier to travel around the Dublin area. see Section 1 p.13-14

4. North part of Dublin City is under-served with rail-based transport

4.1. The north part of Dublin City has the highest population of all the local authority areas in the Greater Dublin area. This has been so over the past 30 years see Figure 4

Figure 4 North Dublin City has the highest population within the Greater Dublin Area



Source: CSO Census Data. For 2022, preliminary results

4.2. Based on the Metrolink proposed in 2018, I commissioned two more maps of the same type, to take account of the results of the 2016 Census see Figure 5 and 6. I realise that the 2022 routing is slightly different to that on which these maps were based. However, both show that the optimum route has not been chosen to serve people living and working in the north Dublin .

Figure 5 Dublin Population Density 2016 with the 2018 proposed Metrolink and other rail based transport

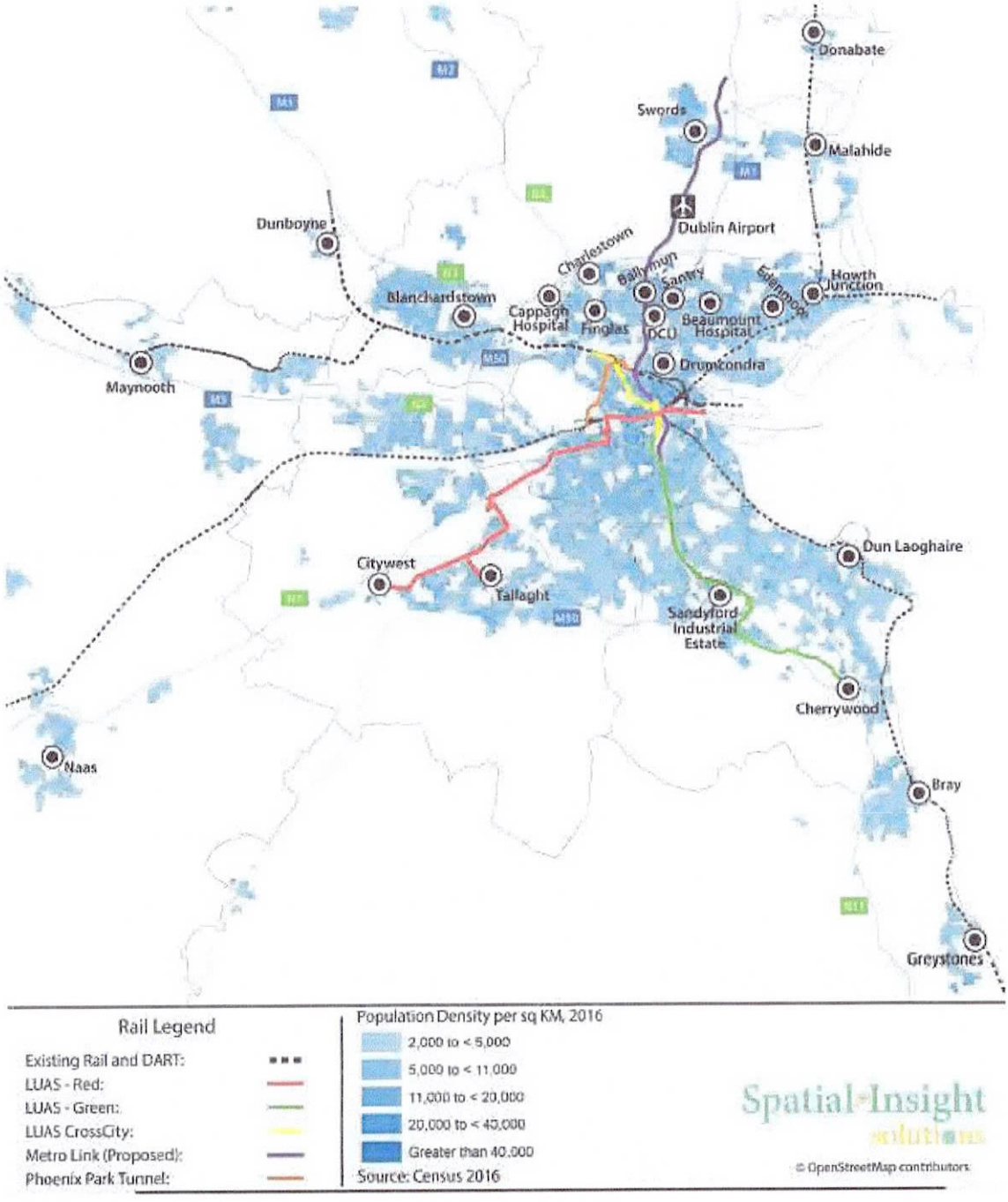
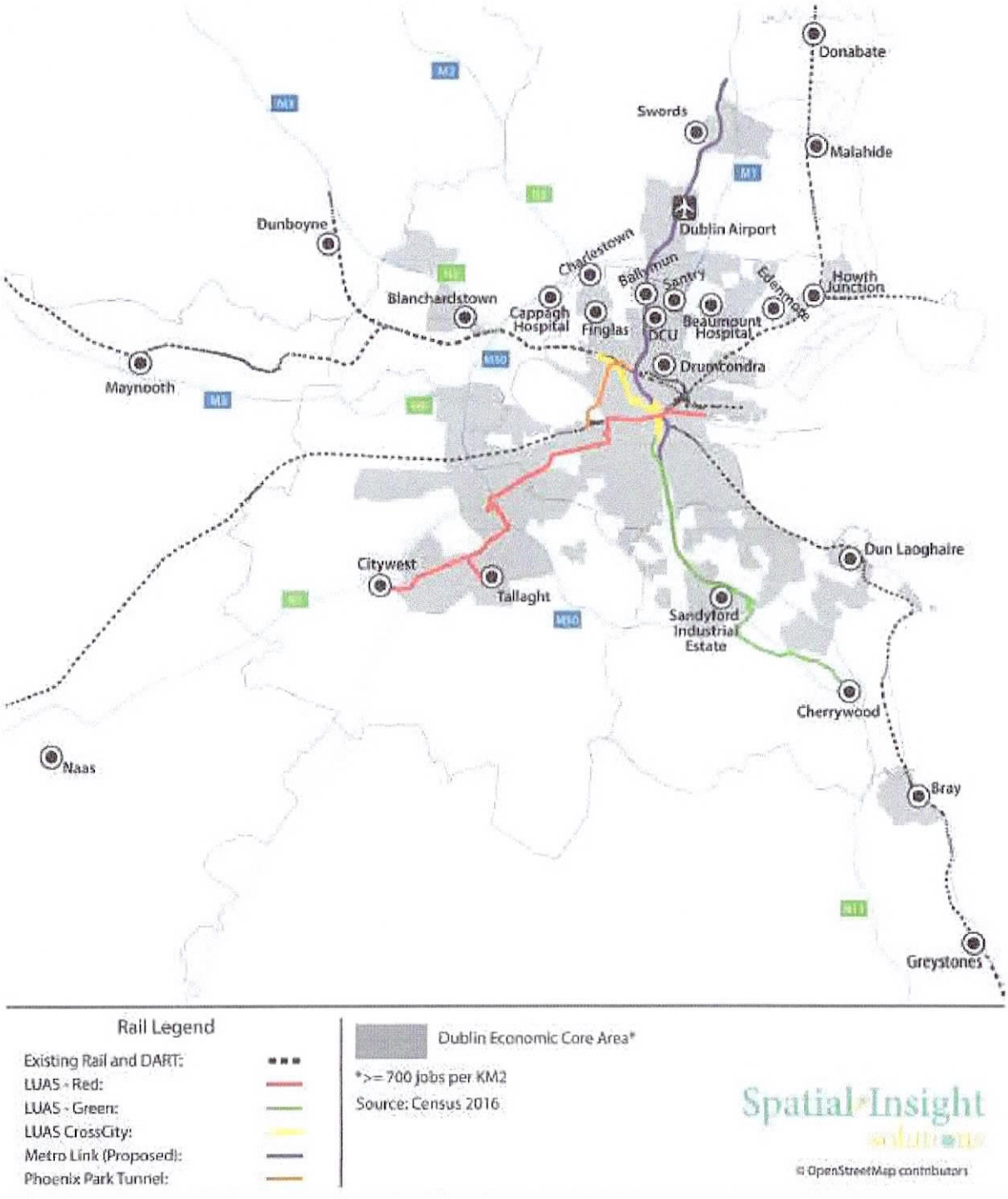


Figure 6 Dublin Core Economic Area 2016 with the 2018 proposed Metrolink and other rail based transport



4.3. In 2018, the Howards commissioned Roughan O'Donovan to compare the catchments of the then Emerging Preferred Route (for MetroLink) with the Eastern Route Variation which they had worked on and presented in 2006. This was submitted to TII during the 2018 Metrolink Public Consultation see Section 2

Comparison of the totals within the catchment of each route shows that the overall population within the catchment area of the 'Eastern Route Variation' is higher than along the current 'Emerging Preferred Route' and therefore the TII should consider the Eastern Route Variation as a viable option for MetroLink. See Figure 7

Figure 7 2016 CSO Summary Data for Metrolink 'Emerging Preferred Route' and Eastern Route Variation

Route	Emerging Preferred Route Catchment	Eastern Route Variation Catchment
Population	73,071	75,890
Employed	33,092	36,176
Education	8,883	8,501

Source: Genvest Submission to the Project Manager MetroLink May2016

If the public authorities are really trying to promote modal shift in transport, they have chosen the wrong route for this project

5. Dublin Port Tunnel

5.1. The benefits of the Dublin Port Tunnel project assumed that there would be an integrated three line LRT network in Dublin. This included a line through Drumcondra to connect the City Centre to Ballymun see section 1. p. 28

5.2. Government approved the Port Tunnel after a sworn public inquiry. The project was promoted by the then Dublin Corporation and the National Roads Authority (NRA)

5.3. After the Minister signed the order to approve the project, significant changes were made by adding an extra lane to the inbound slip road from the Coolock Lane Interchange the Shantalla Road Bridge. see section 1 p. 23-24

5.4. This was done by stealth. Apparently, NRA sought approval for this as part of an extension to the M50 in another part of the Dublin region! It is not at all clear that the impact of this change was ever assessed in terms of increased traffic through Drumcondra , with all that implies in terms of air and noise pollution. see section 1 p. 25 I suggest that this way of proceeding negated the environmental impact assessment which was the subject of the sworn inquiry.

5.5. Building a north city LUAS loop would mitigate some the harm done by this outrageous abuse of process by the public authorities.

6. Streetscape, Community Severance, Place Making

6.1. If this project goes ahead as proposed, it will be a permanent monument to the abject failure of urban planning in this state. It will serve as very real evidence of the double-think which dominates the management of our capital city.

6.1.1. As proposed, MetroLink will be in tunnel under what is Ballymun's amin street. This is now a 6 lane roadway for through traffic. It is simply incredible that our public service imposed such a barrier on a urban area which was being regenerated having been first built some 40 years previously. Such a roadway is a recognised major form of community severance.

6.1.2. Given the cost of underground stations, it is much cheaper to put such through traffic in a tunnel. This would calm Ballymun's main street with space for walking, cycling, public transport, supported by a network of sit-around hand around public parks are developed and maintained, as in Dublin 2.

6.1.3. The local and national public authorities are implementing a policy of removing traffic from Dublin City Centre. That they are not applying the same policy to Ballymun is clear evidence of lack of balance and consideration for all citizens when allocating public resources.

6.2. In determining on this application, An Bord Pleanála has a unique opportunity to begin the process of restoring public confidence that planning permissions are little more that very limited forms of building control.

6.3. In asking An Bord Pleanála to reject this application, I hope that it will help us all to re-learn what was known about place-making when Marino and Griffith Avenue were developed by our new state 100 years ago. I also hope that it will assist us to reset our way of governing ourselves to apply those lessons consistently and with equal force in all parts of our capital city's region.

100 Griffith Avenue
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Dublin
D09 T6K3
21st May 2019

MetroLink Consultations
Transport Infrastructure Ireland
Parkgate Business Centre Parkgate
Street
Dublin 8
D08 DK10.

Re. Metrolink

A chara,
Given that this project relies on a flawed report (see TII response dated 8 June 2018 Your ref. AIE/093-4/18), I re-submit that submission which I made on 10th May 2018.

The National Transport Authority (NTA)/AECOM Fingal/North Dublin Transport Study is an example of the public authorities' capacity for policy-driven evidence making. This study did not refer to a report which was given to AECOM, the consultancy company which carried out the work. It would seem that the Director of that company who signed off on that report was not aware of the privately commissioned Transportation and Engineering Review of the then Metro North completed in 2006.

As set out in my submission of last year, this proposed MetroLink does not serve the area inside the M50, which is where the greatest need for enhanced public transport is and has been for decades.

There is clear evidence of silo thinking in meeting trying to meet that need, given the one of the Bus Connect Corridors virtually follows the same route to Ballymun as Metrolink.

The NTA has shown that it acts in arbitrary ways in assessing transport needs and projects. An example is the Bus Rapid Transit(BRT) Study which found that a BRT route through Drumcondra did not have sufficient capacity meet the anticipated demand and stated that particular route should be dropped from any further consideration. Yet the NTA proceeded to a detailed study of just such a route, uniquely.

The way in which the public authorities have claimed that MetroLink is based on the *Platform for Change* (November 2011) document suggests a whimsical approach to project development and assessment. This is not acceptable in a country which has the highest per capita debt in the €urozone and the third highest per capita debt in the OECD.

Is mise

D. O'Brolcáin

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Rec'd
Mon 11 Jun 2018

Mr. Donal O'Brolcháin
100 Griffith Avenue
Drumcondra
Dublin
D09 T6K3

Dáta | Date	Ár dTag | Our Ref.	Bhur dTag | Your Ref.
8 June 2018	**AIE/093-4/18**	

Dear Mr O'Brolcháin,

I refer to your recent requests under the Access to Information on the Environment Regulations 2007 to 2014 regarding the Metrolink route and the inclusion of Swords and access to Dublin Airport. Transport Infrastructure Ireland has provided the following information in response to your request.

The basis for the criteria to provide a safe, high frequency, fast, efficient and sustainable public transport light rail service connecting Swords, Dublin Airport and Dublin City Centre arises from the findings of the Fingal/North Dublin Transport Study, which was commissioned by the National Transport Authority (NTA) and is available to view/download from the NTA website, www.nationaltransport.ie

Review of Decision.
You may request a review of this decision by writing to the undersigned at the address given below. Any request for a review must be made no later than **one month** from the date of receipt of this letter. The internal review process involves a complete reconsideration of the matter and a decision on internal review is given within one month following receipt of the request.

Yours sincerely,

Raymond Foley

Raymond Foley
Regulatory & Administration Unit

Próiseálann BIÉ sonraí pearsanta a sholáthraítear dó i gcomhréir lena Fhógra ar Chosaint Sonraí atá ar fáil ag www.tii.ie.
TII processes personal data in accordance with its Data Protection Notice available at www.tii.ie.

100 Griffith Avenue
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10 May 2018

MetroLink Consultations
Transport Infrastructure Ireland
Parkgate Business Centre
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D08 DK10.

Re. MetroLink

A Chara,

I write to propose that a mainly on-street North Dublin LUAS loop. (see Figures 1 and 2) would meet the transport requirements in the Greater Dublin Area much more cost-effectively than MetroLink,, an all-or-nothing relic of the group-think of the celtic craziness.[1]

The recent IMF finding that there is considerable room for improvement in Ireland's public investment efficiency. This assessment found that when compared with advanced economies, the efficiency gap was 58 percent. On this basis, Ireland is over one-third less efficient than the EU average in terms of delivery of the highest level of infrastructure outputs for the lowest amount of infrastructure investment over time. (Ireland. Technical Assistance Report – Public Investment Management Assessment. IMF Country Report No. 17/333. November 2017)

I suggest that MetroLink is an example of the lack of efficiency in our public investment in sustainable transport in our capital city. This has its roots in the arbitrary and whimsical way the first decisions were made on LUAS in 1998, exacerbated by Transport 21.

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[1] *In the past decade, Ireland's approach to fiscal policy, prices, costs and financial regulation were not sufficiently adapted to the disciplines of a single currency*
Press Release from National Economic and Social Council (NESC) on a report "The Euro: an Irish Perspective" 17th August 2010 . At that time, NESC was 30-person social partnership body made up of representatives of government, business, trade unions, agriculture, community and environment. The Secretary General of the Government chaired NESC. Among the seven Government nominees were the Secretaries-General of five Government Departments.
http://www.nesc.ie/dynamic/docs/The%20euro%20MEDIA%20RELEASE%20from%20NESC.pdf

The LUAS loop I propose corresponds better with travel patterns shown in Census 2016 (see Figures 3 and 4) which show clearly that Swords is an outlier of the Greater Dublin Area.

I propose extending LUAS CrossCity to create a north Dublin LUAS loop (see Figure 1)

This LUAS loop

- serves the northern part of Dublin's Core Economic Area and the populated areas comprehensively, taking in
  - Northwood, Santry, Drumcondra, North East Inner City
  - Kilmore, Beaumont, Coolock, Edenmore, Donaghmede;
  - Ballymun, Poppintree, Charlestown, Finglas
  - Beaumont, Cappagh, Mater hospitals;
  - Croke Park;
  - DCU campuses, DIT at Grangegorman ;
- is integrated with Dublin 's existing light rail system LUAS;
  as it extends LUAS CrossCity and could link with LUAS in the Docklands (North and South) using the Samuel Becket Bridge which is designed to carry LUAS;
- offers two rail-based links between the Central Business District and Dublin Airport
  - Directly on LUAS via either Drumcondra or LUAS CrossCity;
  - Using LUAS to get to Howth Junction to connect with DART services to central business district (Connolly, Tara, Pearse stations) and the south-eastern coastal strip;
- links with heavy rail services
  - at Howth Junction;, which has DART and Commuter services;
  - the Maynooth line at both Drumcondra and Broombridge.

Using the LUAS CrossCity cost of €61m per kilometre (including vehicles and stations), I estimate that this 35km LUAS loop would cost just under €2.2bn. Given that there would not be as much underpinning of existing buildings etc as in the centre city parts of LUAS CrossCity, it could be 25% cheaper, based on one part of the LUAS loop has which already been studied[2]. This recommended a 4.5km extension of LUAS CrossCity from Broombridge through Finglas to a terminus close to the N2/M50 near Charlestown[3]. This was estimated to cost €201m including €5m for new feeder bus services. This works out at €45m per kilometre, giving a total of €1.6bn. This is less than half the estimated cost of MetroLink.

[2] National Transport Authority Jacobs Systra Draft Transport Strategy for the Greater Dublin Areas. North West Corridor Study

The proposed LUAS line through Drumcondra could be used to integrate the existing Green and Red LUAS lines by having two new routings to the Docklands

- on Clonliffe Road. Poplar Row, East Wall Road to connect with the Red Line at the Docklands (serving Croke Park, the East Point Business Park)
- on Belvedere Road, North Circular Road, Portland Place, Seville Place, Guild Street (where there could be another direct link with the Red Line) to cross the Liffey using the Samuel Beckett Bridge, to connect with the Green Line at Charlemont (via Cardiff Lane, Macken Street, Grand Canal Street, Clanwilliam Place, Herbert Place, Wilton Terrace, Adelaide Road)

Figure 1 A North City LUAS Loop for Dublin's Core Economic Area (based on Census 2011)

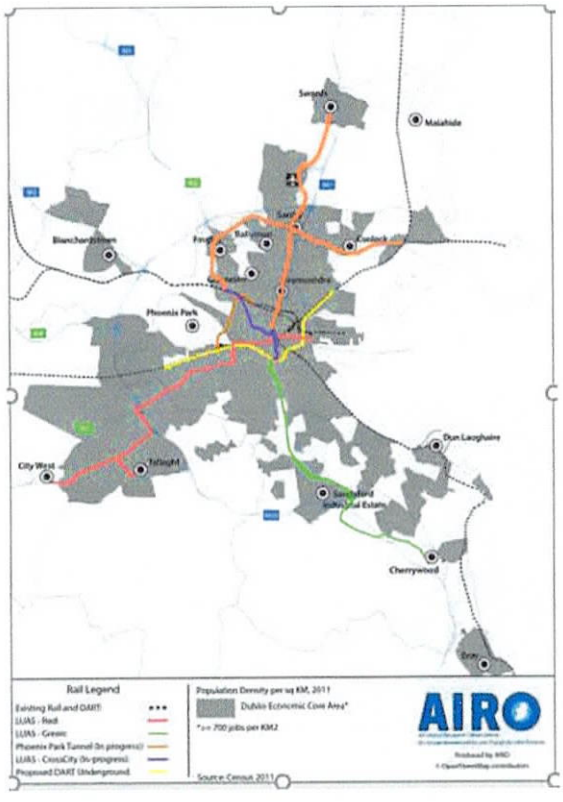
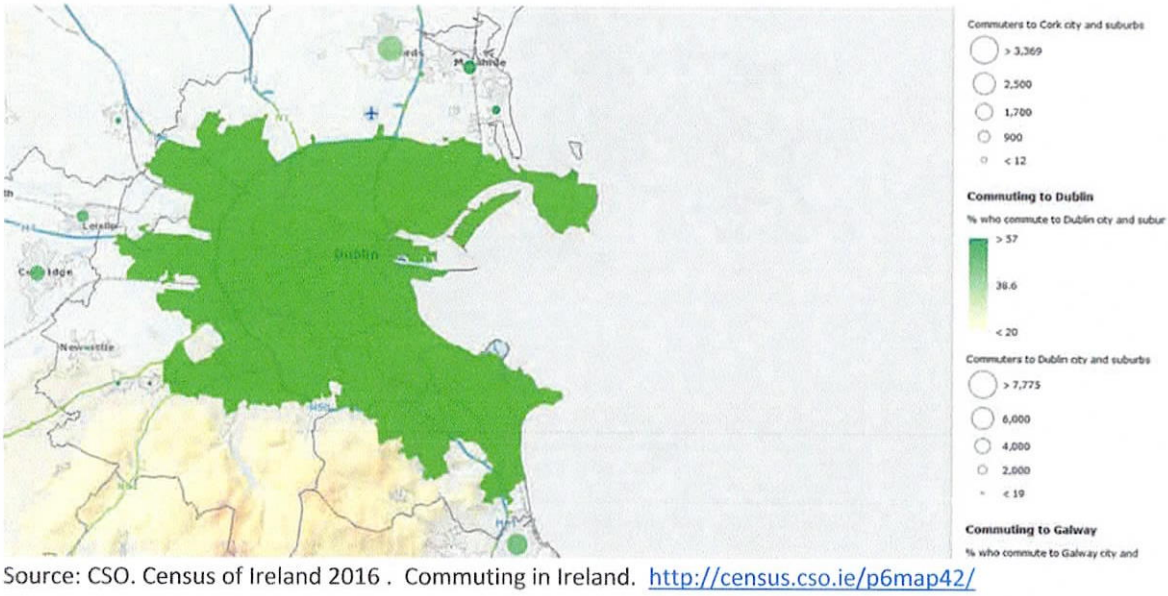


Figure 2 A North City LUAS Loop serving densely populated areas

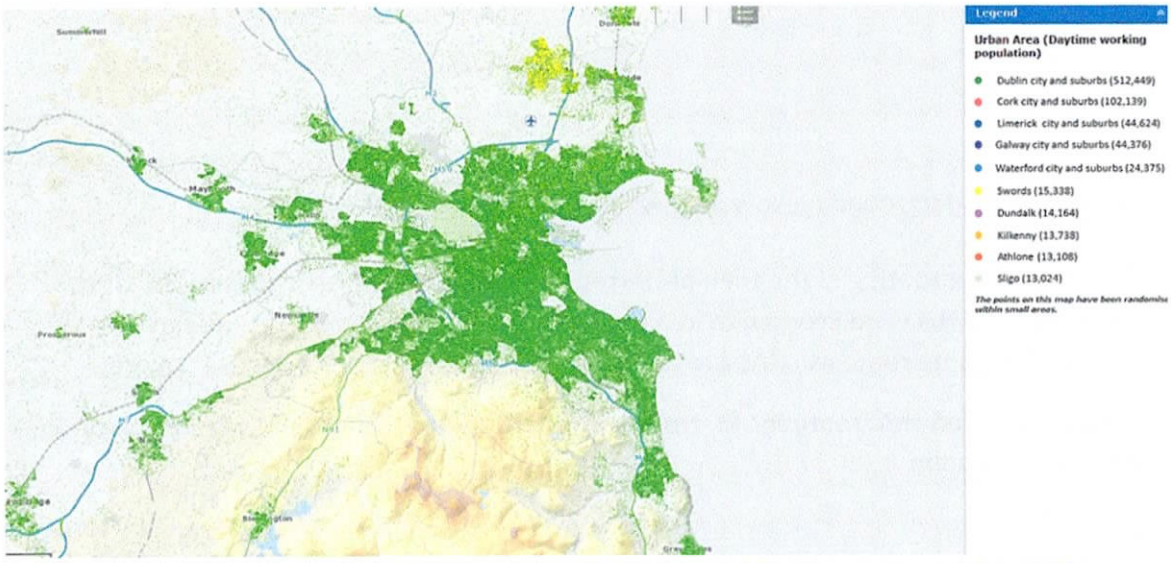


Figure 3 Feeder Towns into each City Census 2016



Source: CSO. Census of Ireland 2016 . Commuting in Ireland. http://census.cso.ie/p6map42/

Figure 4 Catchment area of major workplace location Census 2016



Source: CSO. Census of Ireland 2016 . Commuting in Ireland. http://census.cso.ie/p6map43/

To promote competitiveness and social cohesion, Dublin needs integrated and sustainable public transport. Achieving this needs quiet, consistent competence to bring working and living conditions to the levels of well-run European cities. It would be a start if our public authorities drew the appropriate conclusions from their own reports and invested accordingly, instead of carrying yet more studies based on policy-driven evidence making.

Early in 2015, I commissioned two maps from the All-Island Regional Observatory (AIRO). Maynooth University, to understand if and how the then preferred route for Metro North fitted with employment and population in the Greater Dublin Area. I asked AIRO to superimpose the existing and proposed rail-based transport on Dublin's Core Economic Area and a Population Density map (Figure 6). These maps are based on the 2011 Census.

These rail lines include

- the heavy rail commuter lines including DART shown as broken dotted lines;
- LUAS (Green and Red lines);
- LUAS CrossCity (purple line);
- the Phoenix Park Tunnel (light orange line) which links the heavy rail lines between Inchicore and Connolly;
- the then Metro North – (blue line);

- DART Underground (yellow line) which is planned over the longer term.

It is clear that the routing of the then preferred route for Metro North goes to the west of the main part of the Core Economic Area in the north city. It was also an underground service on the same route as LUAS CrossCity from Stephen's Green to Parnell Square.

The emerging preferred route for MetroLink is also to the west of Dublin's Core Economic Area in North Dublin.

Figure 5 Dublin's Core Economic Area with existing/proposed rail lines in 2015

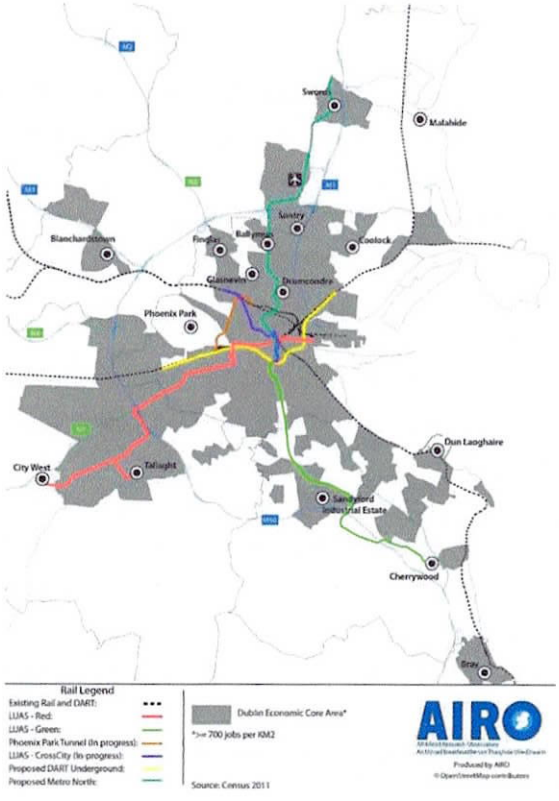
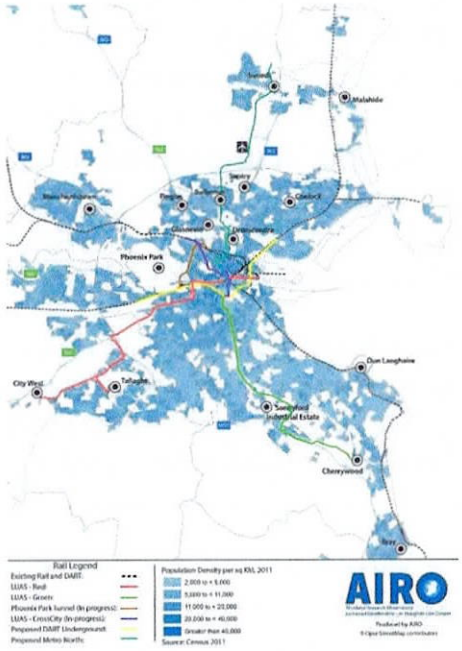


Figure 6 Existing/proposed rail lines in 2015 on a Populations Density map of the Greater Dublin Area



With this submission, I include four separate requests (in Appendix 1) for access to papers, documents and records (including emails and sticky notes) under the European Communities (Access to Information on the Environment) Regulations 2007-2014 on the following issues

1. The misleading statements in the Alignment Options Report on the origins of a Metro system for the Greater Dublin Area;
2. The misplaced emphasis on Swords, compared to the North Part of Dublin City or the western part of Fingal around Blanchardstown;
3. The need for fast access between the City Centre and Dublin Airport;
4. Ccommitments made in approving and building the Dublin Port Tunnel.

I also submit these requests separately.

There are a number of other points that I wish to make regarding this proposal

A. Ballymun
B. RAPID Areas
C. Transport Modelling and Economic Assessment Report

A. Ballymun

This Metrolink proposal does not add anything to suggest that our public authorities have any commitment to making the regeneration of Ballymun a new kind of place.

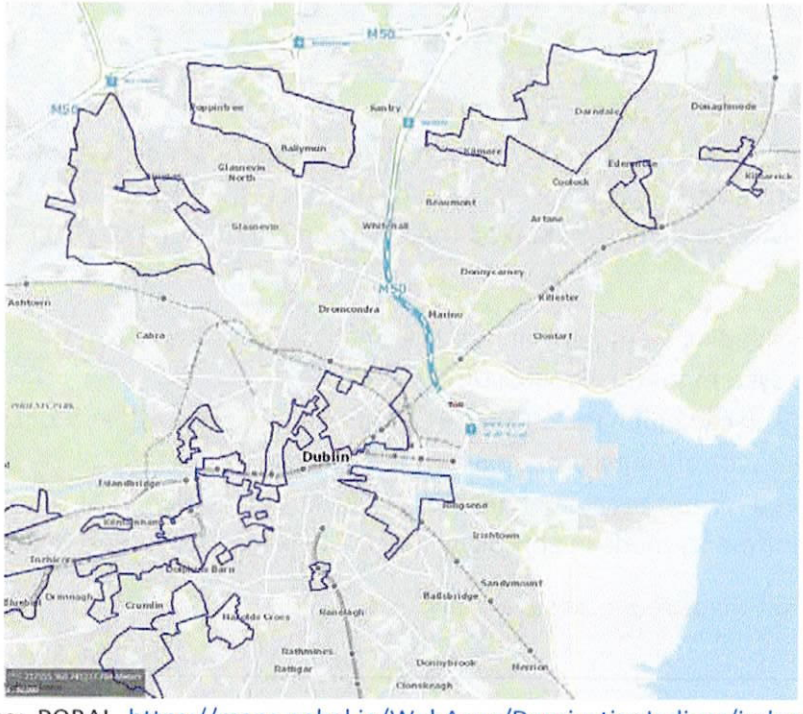
This proposal reinforces the severance of the community by maintaining a 6-lane throughway for fossil-fuelled vehicles (accessing/exiting the M50) on the main street of this 50 year old suburb. The public authorities should now redress this oversight by putting through traffic underground so that the main thoroughfare is reserved for walking, cycling, public transport and local traffic.

B. **Revitalizing Areas through Planning, Investment and Development (RAPID).**

Unlike the North City LUAS loop proposed which links all the RAPID areas in the north part of Dublin City, MetroLink does not appear to take account of the RAPID programme (see Figure 7). The Minister for Rural and Community Development relaunched this programme in November 2017.

Ballymun is the only new RAPID area which MetroLink proposes to serve. If ever there was an example of the potential power of well-considered public investment to make a difference to an area by joined-up thinking and consistent action over time, getting rid of through traffic from Ballymun's main thoroughfare would surely be a major planning gain.

Figure 7 RAPID areas in North and Central Dublin



Source: POBAL. https://maps.pobal.ie/WebApps/DeprivationIndices/index.html

C. Transport Modelling and Economic Assessment Report

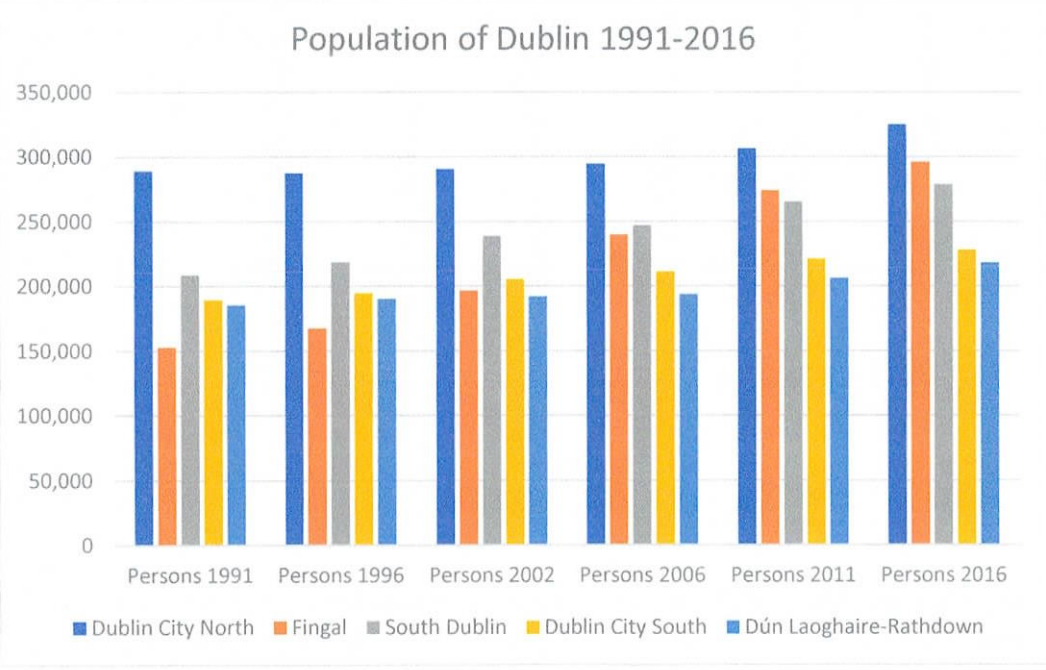
The Transport Modelling Report (Appendix 8.1) leaves a lot to be desired.

a. It is not helpful to regard Dublin City and Fingal as unitary places for transport modelling., as is done in Tables A-7 and A-8

More people live in the North part of Dublin City (325,000 in 2016) and have done over the past 25 years (see Figure 8) than in

- the South City (228,163);
- Dun Laoghaire/Rathdown (217,274);
- South Dublin (278,749)
- Fingal(296,214).

Figure 8 Dublin City North and South compared with other Dublin local authority areas.



In the 10 years 2006-2016, the population of the north part of Dublin City increased (over 30,000) by over 6 times the increase in Swords (just over 5,000).

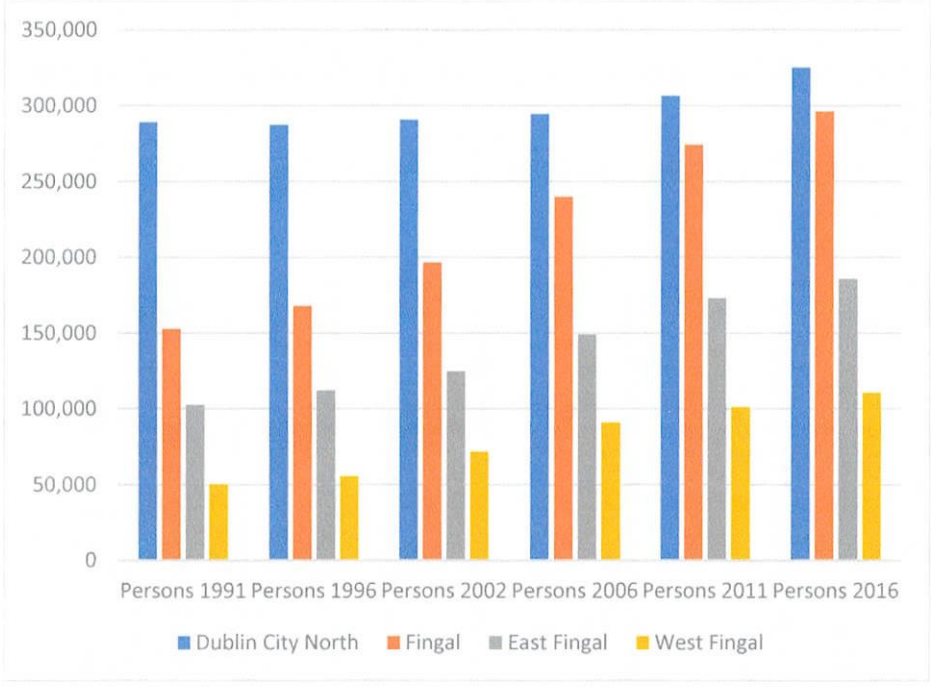
Fingal may be the fastest growing county in Ireland but only in percentage growth rate terms. Asserting that alone hides the fact that Fingal is actually two distinct areas, ie Fingal West and Fingal East, using the Ashbourne Road (M2/N2) as the border.

The NTA AECOM Fingal/North Dublin Transport Study (2015) only looked at the eastern part of Fingal. It would seem that the AECOM Director who signed off on this report was not aware of the Roughan & O'Donovan 2006. Metro North Transportation and Engineering Review, although that report was given to AECOM staff (see

Note that West Fingal (around Blanchardstown) has doubled in population in the last 20 years, whereas East Fingal (Balbriggan, Skerries, Malahide, Portmarnock, Swords) has increased by less than 70%.

In 2016, Blanchardstown had about 75,000 people whereas Swords had about 43, 000 people. Both places have doubled in population over the past 25 years. (See Figure 9), but Swords has done so from a lower base.

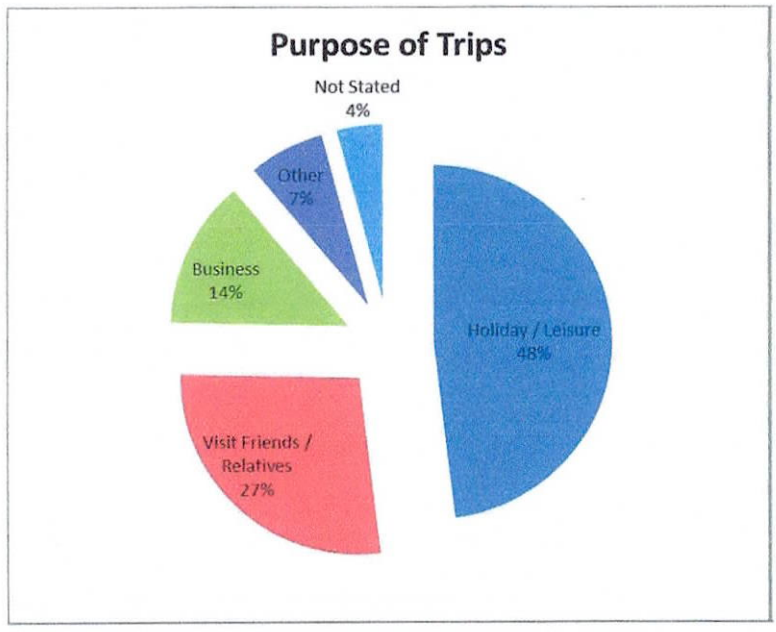
Figure 9 Dublin City North compared with Fingal, Fingal West and Fingal East 1991-2016



I have set out the basis for this analysis in a paper published in the Irish Journal for Social Economic and Environmental Sustainability (IJSEES. Vol. 1, Issue 2, January 2018)

b. This report states that (ERM Data Used Appendix 8.1 par. 3.2.1 p.22), *Travel demand over a full 24 hour period is used, as over a full day, trips origins are roughly equivalent to trip destinations – i.e. people normally return to their initial point of origin.*
To what extent must this statement be more precisely qualified, given that the transport corridor being modelled includes our country's major international airport?
The statement may be true for some Airport based-staff and some passengers, even if not all of them use the corridor.
However, given that nearly three-quarters of all trips were either for holiday/leisure (nearly half) or visiting friends/relatives (over one-quarter) (see Figure 10), it seems unsatisfactory to assume that trip origins and destinations are roughly equivalent, without much more specification of what *roughly* means for this transport corridor.

Figure 10 Why people travel to/from Dublin Airport?



Source: National Transport Authority Survey at Dublin Airport 2011.Fig.3.11 p.22

In support of the North City LUAS Loop, I attach the following in Appendix 2

1. *Does Dublin's Core need more rail links?* Paper presented at the Dublin Economic Workshop Athlone 17th October 2015

2. Submission to the National Transport Authority on the NTA/AECOM Fingal/North Dublin Transport Study (June 2015)

3. *A LUAS loop for North Dublin's Core Economic Area instead of Metro North* Irish Journal for Social, Economic and Environmental Sustainability (IJSEES) Vol. 1 Issue 2 January 2018 p.62-99. submitted in March 2017

4. Roughan & O'Donovan 2006. Metro North Transportation and Engineering Review. Final Revision. Dublin

5. *Keeping LUAS on Track.* letter published in Irish Times on 14 December 2017

6. The covering letter of my submission to the Regional Spatial and Economic Strategy of the Eastern and Midland Regional Assembly (submitted in February 2018) which included the papers listed submission to the

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Donal O'Brolcáin

10 May 2018

Appendix 1.

Requests for access to papers, documents and records (including emails and sticky notes) under the European Communities (Access to information on the Environment) Regulations 2007 – 2014, on four topics arising from this MetroLink proposal.

1. The misleading statements in the Alignment Options Report on the origins of a Metro system for the Greater Dublin Area;
2. The misplaced emphasis on Swords, compared to the North Part of Dublin City or even the western part of Fingal around Blanchardstown;
3. The need for fast access between the City Centre and Dublin Airport;
4. Commitments and assumptions in approving and building the Dublin Port Tunnel.

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Re. Metrolink Origins

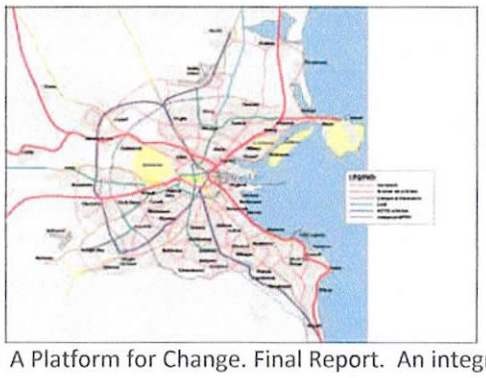
A chara,

Given the misleading context presented in the preamble of the National Transport Authority / Transport Infrastructure Ireland report on the New Metro North Alignment Options Report 252252-ARP-RL-SW-RP-RC-0016 Issue 1 15 March 2018 Arup Par .1.1 p.7)
regarding the context for 2001 origin of a Metro system for the Greater Dublin Area,
The objective to provide a Metro connection between Dublin City Centre, the Airport and onwards to Swords was identified in the 2001 Dublin Transportation Office's (DTO) 'A Platform for Change (An integrated transportation strategy for the Greater Dublin Area 2000 to 2016)'. Based on this initial objective, a scheme called Metro North was proposed for development as part of the Government's 'Transport 21' investment programme in 2005 and a Railway Order for the scheme granted in 2010.

I seek access to all documents, papers and records (including emails, sticky notes etc) under the European Communities (Access to Information on the Environment) Regulations 2007 to 2014 held by Transport Infrastructure Ireland (as the successor body to the Railway Procurement Agency and the National Roads Authority) , on the consideration of changes to the DTI integrated rail transport system (see Figures 1 and 2 below. Attached extract) between

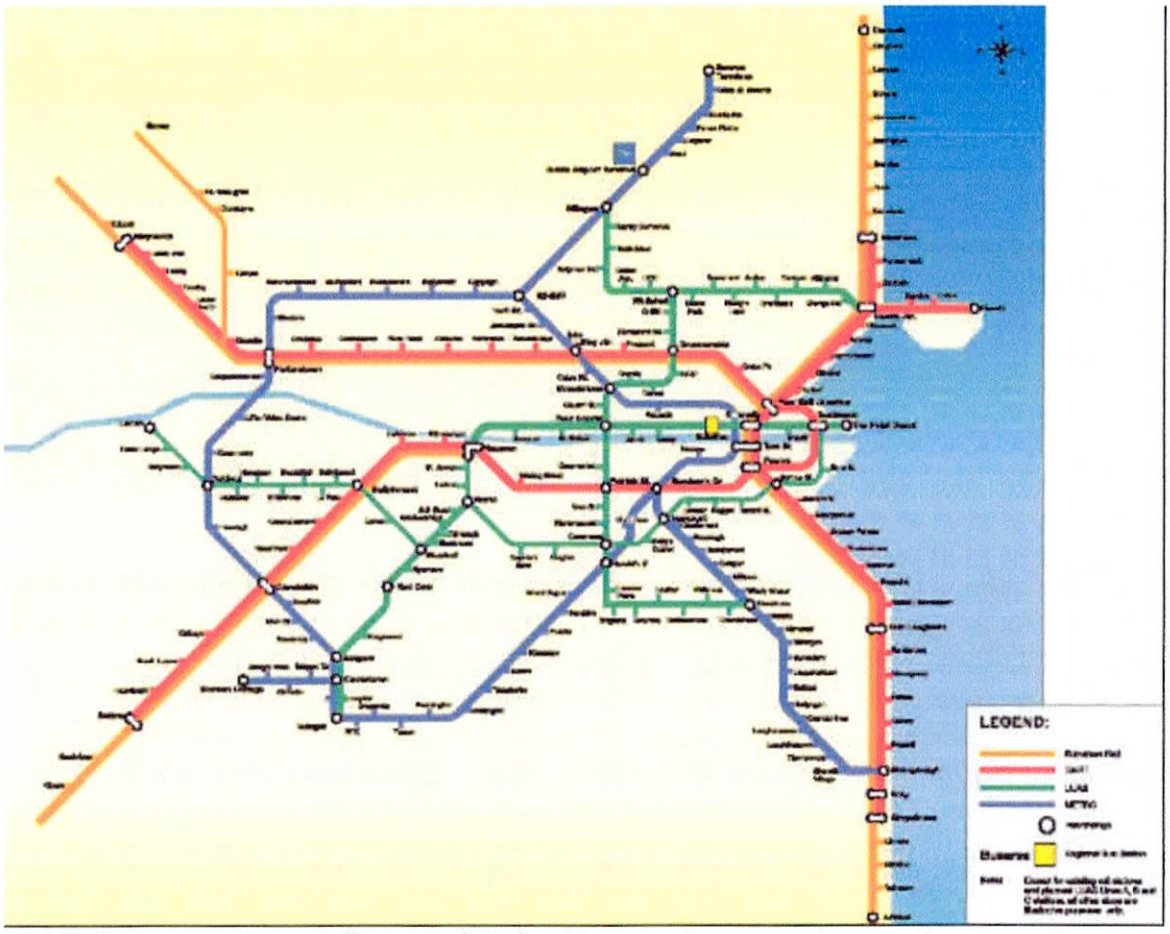
1. 1 November 2001, the date of the DTO Final Report *A Platform for Change*

Figure 1 DTO A Platform for Change. Nov 2001 Integration Fig 5.5



Source: Dublin Transportation Office A Platform for Change. Final Report. An integrated transportation strategy for the Greater Dublin Area 2000 to 2016. November 2001 Figure 5.5 p. 58

Figure 2 DTO A Platform for Change 1 November 2001 Integration Fig. 5.6



Source: Dublin Transportation Office A Platform for Change. Final Report. An integrated transportation strategy for the Greater Dublin Area 2000 to 2016. November 2001 Figure 5.6 p. 59
https://www.nationaltransport.ie/downloads/archive/platform_for_change_2001.pdf

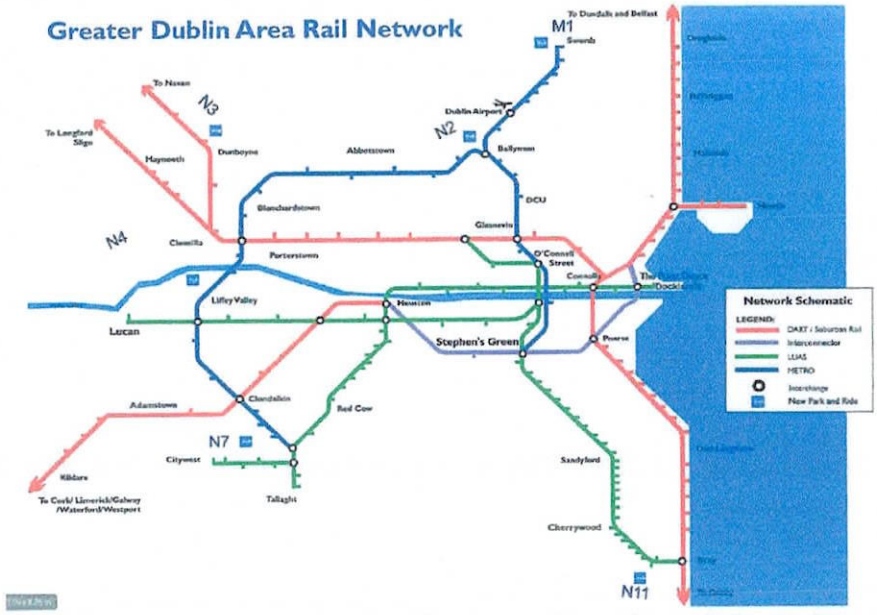
given that both Figures clearly show

a) Metro, as a loop, taking in the western and southwestern parts of the Greater Dublin Area with
   - south-north spurs to Swords and Shanganagh;
b) The Metro link from Stephen's Green to the Airport was via Broadstone (see attached Report from Light Rail advisory group)
c) One LUAS line through Drumcondra with two spurs linking with Howth Junction and the then proposed Metro at Ballymun;
d) A City-centre LUAS loop taking in the Docklands

and

2. 1 November 2005, the date of the launch of Transport 21 (see Figure 3) which did not include
   a. the LUAS line through Drumcondra;
   b. the Metro loop as it omitted the from Stephens' Green to Tallaght section

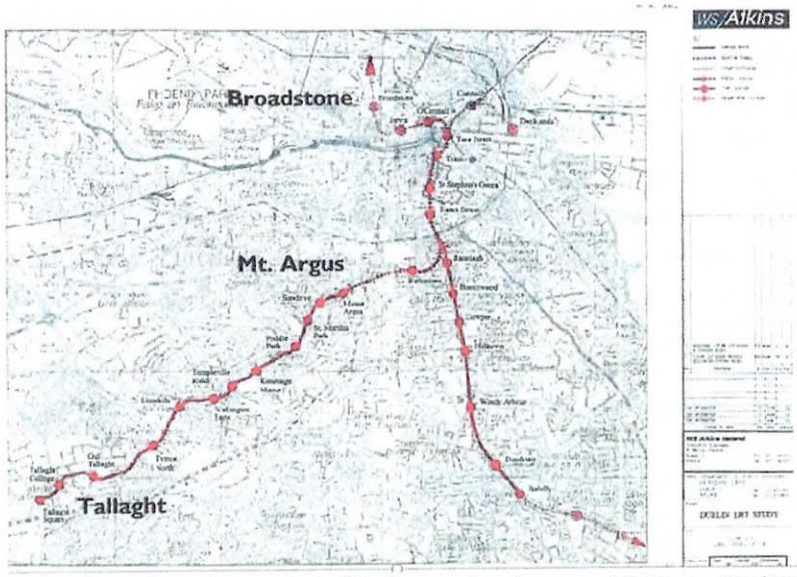
Figure 3 Transport21 Greater 1 November 2005



Source: Papers accompanying speeches by Tánaiste Mary Harney TD and Martin Cullen TD, Minister for Transport at launch of Transport21 in Dublin Castle on 1 November 2005

3. including the consideration given to the Core Tunnel Option (see Figure 4) put forward in the report commissioned by the Department of Public Enterprise in 1997

Figure 4 Core Tunnel Option 1998



Source: WS Atkins. Dublin Light Rail. Appraisal of Surface and underground Options. Final Report. April 1998. Commissioned by the Department of Public Enterprise

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MetroLink – the North Part of Dublin City has more people than Swords or all of Fingal

A chara,

I am puzzled by the continued inclusion of Swords in proposals and plans for enhancing public transport in the North part of Dublin, particularly Metro North, Optimised Metro North and most recently MetroLink.

Accordingly, under the European Communities (Access to Information on the Environment) Regulations 2007 to 2014, I seek access to all papers, documents and record (including emails and sticky notes), held by Transport Infrastructure Ireland (as the successor body to the Railway Procurement Agency and the National Roads Authority), setting out the case for

- including Swords,
- excluding the north part of Dublin city inside the M50;
- the area around Blanchardstown

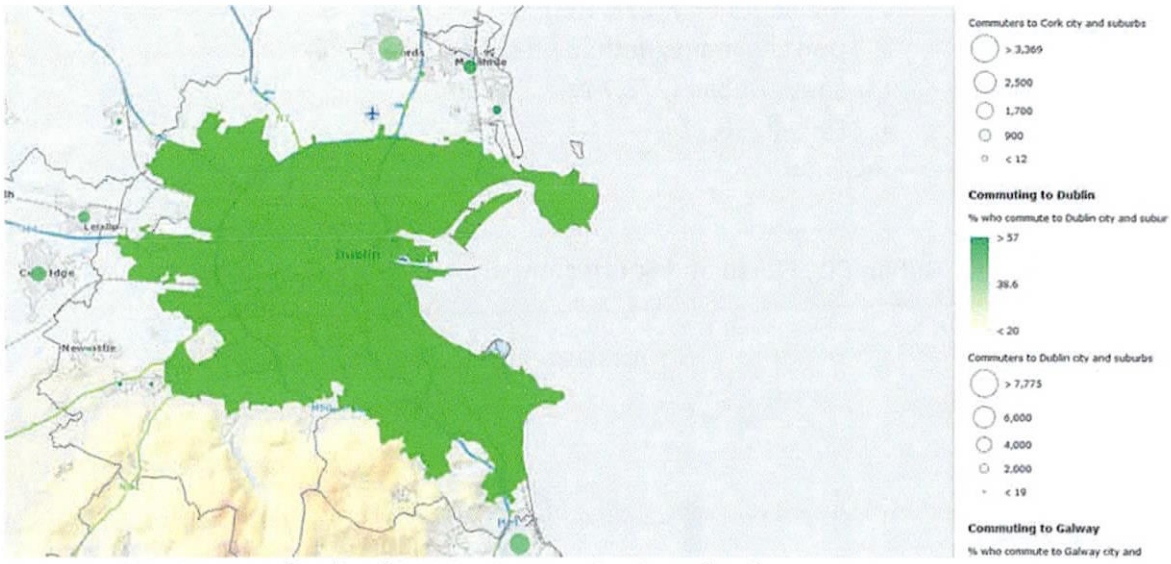
in the terms of reference for both

a) National Transport Authority/Transport Infrastructure Ireland report on the New Metro North Alignment Options (252252-ARP-RL-SW-RP-RC-0016 Issue 1 15 March 2018 Arup);
b) National Transport Authority/AECOM Fingal/North Dublin Transport Study;
c) and other studies carried out since the Dublin Transportation Office finalised *A Platform for Change* in November 2001

given that

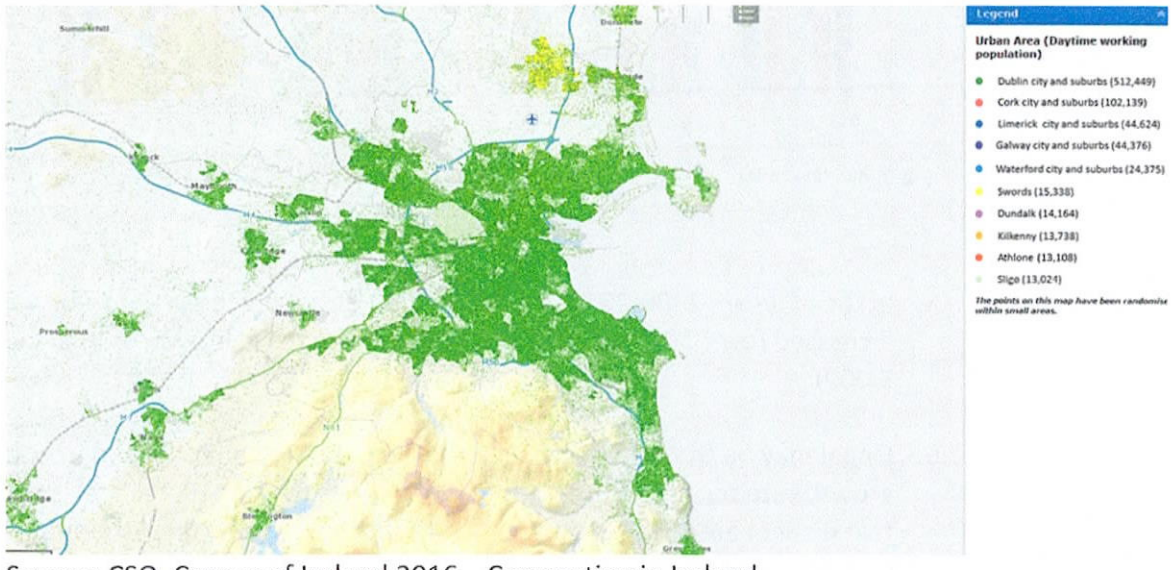
1. Census 2016 shows that Swords is an outlier in terms of both *Feeder towns to Dublin City* (Figure 1) and *Catchment areas of major workplace locations* (Figure 2), while it is clear from this data that most travel is within the M50

Figure 1 Feeder Towns into each city Census 2016



Source: CSO. Census of Ireland 2016 . Commuting in Ireland.
http://census.cso.ie/p6map42/

Figure 2 Catchment areas of major workplace locations Census 2016



Source: CSO. Census of Ireland 2016 . Commuting in Ireland.
http://census.cso.ie/p6map43/

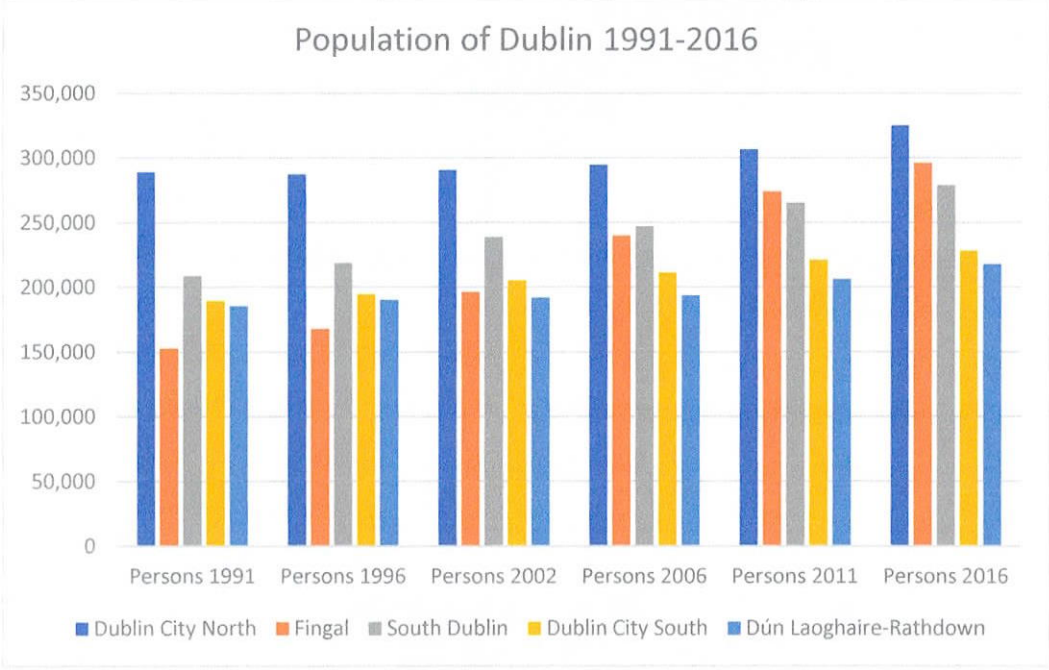
2. Swords had less people (about 43,000) than Blanchardstown (about 75,000) according to Census 2016, although both have more than doubled in population in the past 25 years;

3. In the past 10 years, the Blanchardstown population has increased by over 11,000 compared with an increase of less half that in Swords (just over5,000);

4. More people live in the North part of Dublin City (325,000) than in
   - the South City (228,163);
   - Dun Laoghaire/Rathdown (217,274);
   - South Dublin (278,749)
   - Fingal(296,214)

   see Figure 3

Figure 3 Dublin City North and South compared with other Dublin local authority areas

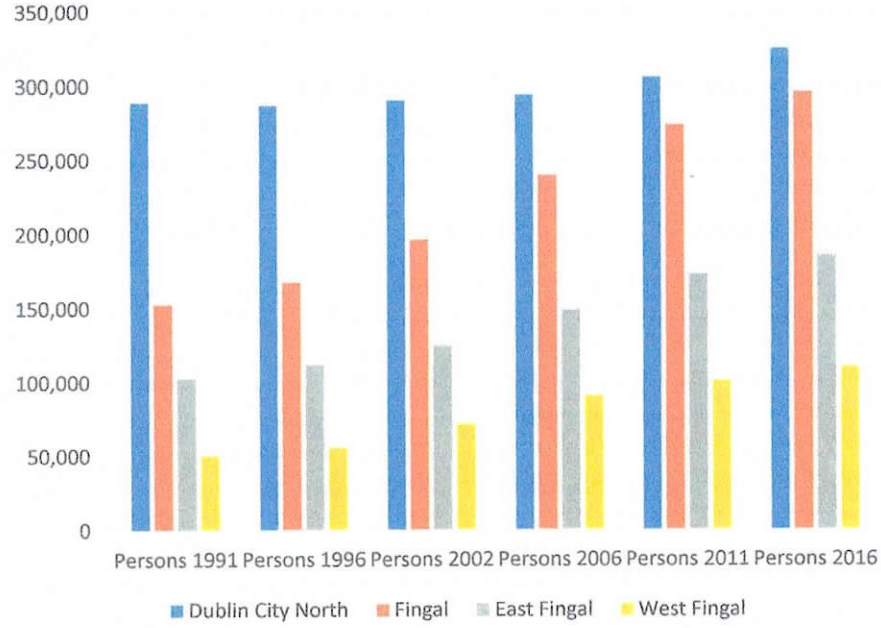


5. In the 10 years 2006-2016, the population of the north part of Dublin City increased (over 30,000) by over 6 times the increase in Swords (just over 5,000).

6. Fingal may be the fastest growing county in Ireland but only in percentage growth rate terms. Asserting that alone hides the fact that Fingal is actually two distinct areas, ie Fingal West and Fingal East, using the Ashbourne Road (M2/N2) as the border

   West Fingal (around Blanchardstown) has doubled in population in the last 20 years, whereas East Fingal (Balbriggan, Skerries, Malahide, Portmarnock, Swords) has increased by less than 70%. In 2016, Blanchardstown had about 75,000 people whereas Swords had about 43, 000 people. Both places have doubled in population over the past 25 years. (see Figure 4)

Figure 4 Dublin North City compared to Fingal, Fingal West and Fingal East 1991-2016



7. The recent IMF finding that there is considerable room for improvement in Ireland's public investment efficiency. This assessment found that when compared with advanced economies, the efficiency gap was 58 percent. On this basis, Ireland is over one-third less efficient than the EU average in terms of delivery of the highest level of infrastructure outputs for the lowest amount of infrastructure investment over time. (Ireland. Technical Assistance Report – Public Investment Management Assessment. IMF Country Report No. 17/333. November 2017).

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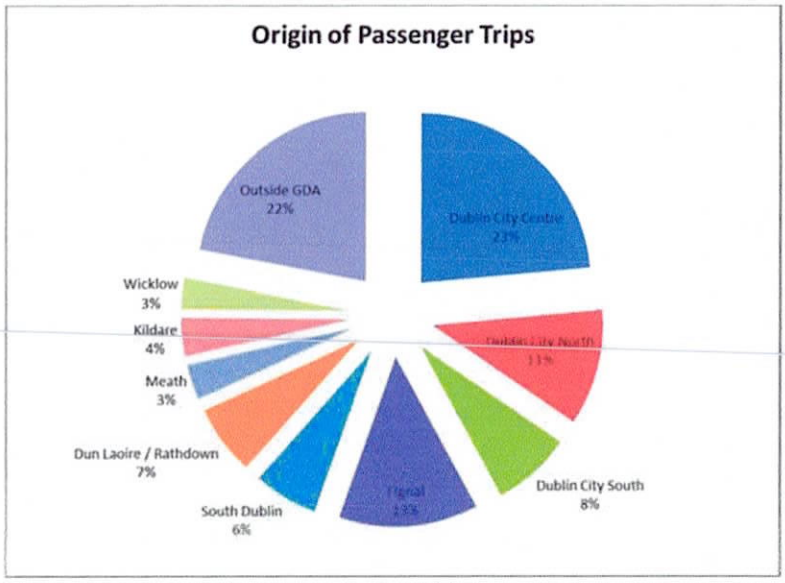
Metrolink and Airport Access

A chara,

Given that providing *a safe, high frequency, fast, efficient and sustainable public transport light rail service connecting Swords, Dublin Airport and Dublin City Centre* is an objective of this study, I seek access to all documents, papers and records (including emails, sticky notes etc) under the European Communities (Access to Information on the Environment) Regulations 2007 to 2014 held by Transport Infrastructure Ireland (as the successor body to the Railway Procurement Agency and the National Roads Authority) , setting the basis for for these criteria, given that

1. Less than one third of the trips originated in City Centre/South part of Dublin City see Figure 1

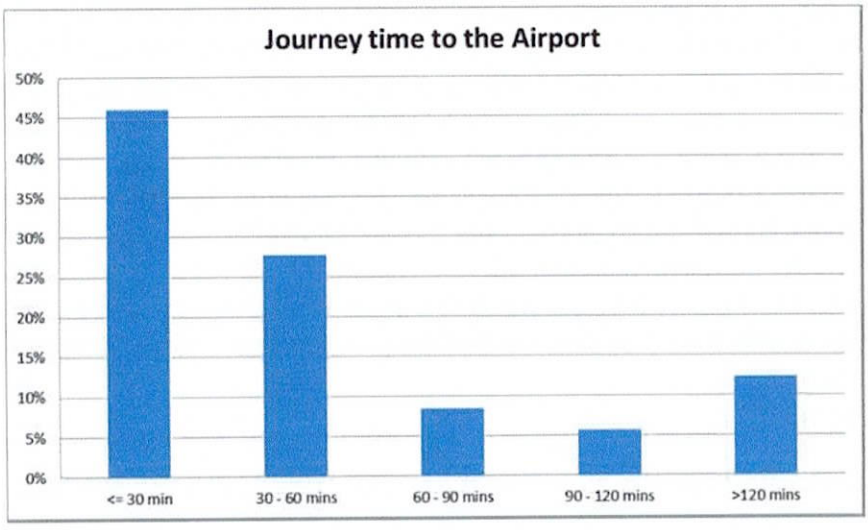
Figure 1 Where, in Ireland, do Dublin Airport passengers come from?



Source: National Transport Authority .Survey at Dublin Airport 2011 Figure 3.6 p.15

2. Three quarters (75%) had a journey time of less than one hour to the Airport, with almost half (46%) having a journey time of less than 30 minutes see Figure 2

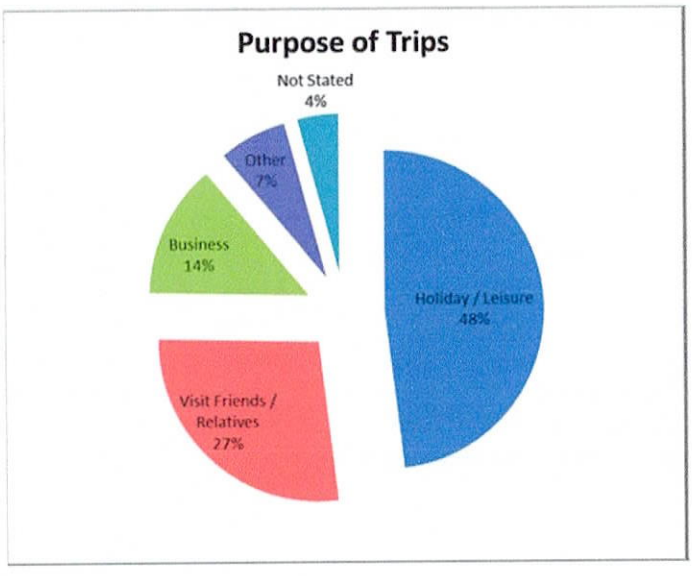
Figure 2 How long did passengers originating in Ireland take to get to Dublin Airport?



Source: National Transport Authority .Survey at Dublin Airport 2011 Figure 3.5 p.13

3. Three quarters of all trips were either for holiday/leisure (nearly half) or visiting friends/relatives (over one-quarter). See Figure 3. This has scarcely changed since a similar study was done during the late 1990s.

Figure 3 Dublin Airport - Why did people travel?



Source: National Transport Authority Survey at Dublin Airport 2011.Fig.3.11 p.22

4. Less than one seventh of trips (14%) were business related see Figure 3. Those that time-pressed to access/exit the city centre have the options of using the Port Tunnel and/or taxis which can use bus-lanes.

5. The peak hours for passengers departing and arriving **do not correspond** with the AM and PM peak commuting times in the Greater Dublin Area, according to a current Dublin Airport Authority (DAA) document see text below and Figures 4 and 5

> *In terms of daily traffic movements to the long term car parks at Dublin Airport,* ***the peak hours of entries and exits to each car park tend to be outside of the AM and PM commuter peak periods.*** *.....the peak hour entry movements associated with the long -term car parks occurs during the 04:00 to 06:00 period.* ***This corresponds with the first wave of early morning flights, the busiest time at the airport,*** *as passenger arrive to the Airport in time to check in and pass security. This also corresponds with times at which public transport is generally not available..... The exit profile steadily increases during the afternoon and evening periods for each car park.* ***The peak period for the Holiday Blue occurs during 23:00 to 01:00 hours and the peak period associated with the wider Express Red complex generally occurs during the 21:00 to 23:00 period.***
> *(my emphasis)*

Figure 4 DAA Hoilday Blue. Hourly Car Park Profile (by Entry and Exit)

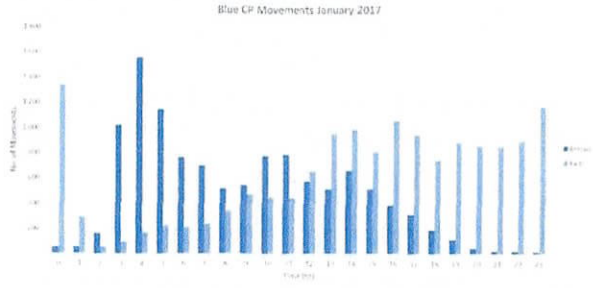
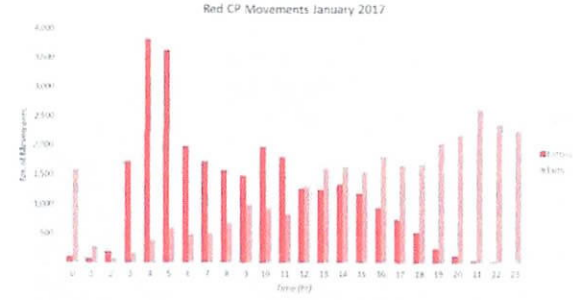


Figure 5 DAA Wider Express Red Complex - Hourly Car Park Profile (by entry and Exit)



Source: Dublin Airport Authority. Environmental Impact Assessment Report, Holiday Blue & Express Red (Zones Y and Z) long-term car parks. 13 April 2018. Atkins 31 Jan 2018 5158366. p.. 119-120. Submitted to An Bord Pleanála Reg. Ref. PL06F.301458

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Metrolink and Dublin Port Tunnel

A chara,

Given the commitments and assumptions made in the Environmental Impact Statement for the Dublin Port Tunnel, on which the then Minister for the Environment and Local Government signed an order approving the Dublin Port Tunnel Motorway (DPTM 1999) scheme on 22 Dec 1999,and the seeming lack of any reference to these commitments in the documentation for this project, - apart from an out-out of context reference to the Dublin Transport Office 1991 document "A Platform for Change" - , I seek access to all papers, documents and records (including emails and sticky notes) held by Transport Infrastructure Ireland (as the successor body to the Railway Procurement Agency and the National Roads Authority), under the European Communities (Access to Information on the Environment) Regulations 2007 to 2014, which refer to the

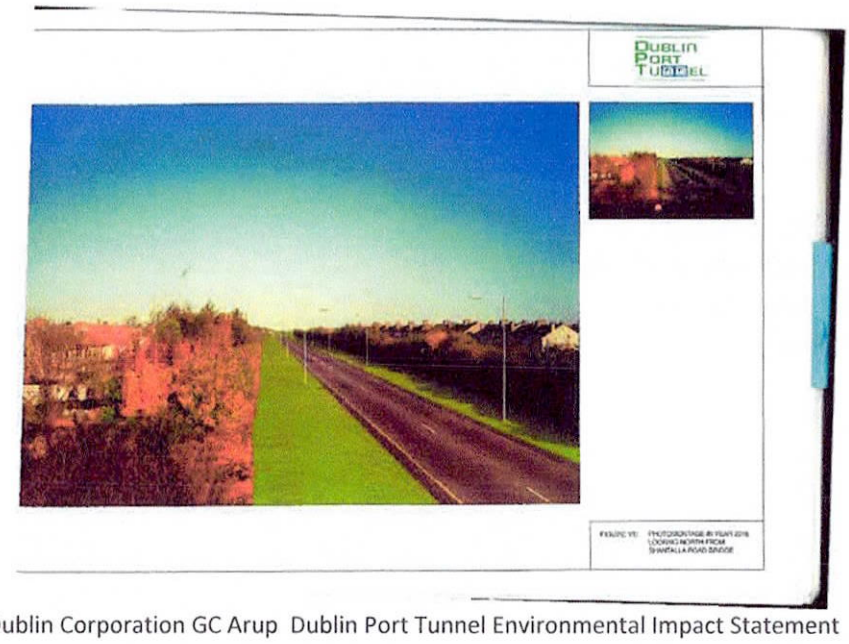
1. The powers under which the DPTM 1999 Ministerial order was changed by the inclusion of a second southbound lane between Coolock Lane Interchange and Shantalla Road Bridge, which is at variance with what was explicitly set out in the Dublin Port Tunnel Tunnel Environmental Impact Statement (See Figures 1-4)

Figure 1 Single Slip Lane between Coolock Interchange and Shantalla Bridge

From Coolock Lane Interchange to Shantalla Road Bridge, new slip roads would be constructed on top of the cut & cover tunnels in order to connect Swords Road to the M1 and Coolock Lane Interchange. Single lane slip roads are proposed, with adequate space to allow passing of broken-down vehicles.

Source: Dublin Corporation GC Arup Dublin Port Tunnel Environmental Impact Statement Volume 1 July 1998 par. 2.5.2 p.13

Figure 2 Looking North from Shantalla Bridge



Source: Dublin Corporation GC Arup Dublin Port Tunnel Environmental Impact Statement

Figure 3 Looking North from Shantalla Bridge, using Google Street View



Figure 4 Slip Road at Shantalla Bridge showing two southbound lanes Google Earth



2. The steps taken to seek authorisation for this change, with specific reference to
   2.1. the impact of air quality and noise on human health arising from traffic on the following locations set out in the DPTM Environmental Impact Statement
      2.1.1. Swords Road
         2.1.1.1. at Collins Avenue Junction;
         2.1.1.2. between Collins Avenue Junction and Griffith Avenue junction;
      2.1.2. Collins Avenue – between Swords Road and junction of Grace Park/Beaumont Roads
      2.1.3. Grace Park Road –
         2.1.3.1. north of Griffith Avenue;
         2.1.3.2. south of Griffith Avenue;
      2.1.4. Griffith Avenue
         2.1.4.1. between Swords/Drumcondra Roads and Grace Park Road junctions;
         2.1.4.2. the junction with Glandore Road and Philipsburg Avenue;
      2.1.5. Drumcondra Road at the bridge over the Tolka;
      2.1.6. Richmond Road east of Grace Park Road;
      2.1.7. Philipsburg Avenue;
      2.1.8. Malahide Road between Griffith Avenue and Collins Avenue junctions

   2.2. what the public authorities did to consult with and inform residents of the roads likely to be affected by a significant change to an already approved motorway project;

   2.3. what steps the public authorities took to ensure that the other measures set out in the DPTM Environmental Impact Statement (see attached), particularly those that would provide for a sustainable modal shift in travel patterns in the DPT catchment area, with particular reference to a Light Rail Transit (LRT, now LUAS) line through Drumcondra, on- street, given the clear results of a 1996 study which showed that there were more trip attractors/generators on for a Light Rail Transit line from the City Centre through Drumcondra to Ballymun than there were on the Tallaght and Dundrum lines (see Table 1). This was published two years before the DPTM Environmental Impact Assessment was published.

   2.4. What steps our public authorities took when a privately funded proposal for a LUAS line linking the City Centre -through Drumcondra – to the Airport, was developed and presented in 2006 (see attached summary of Roughan & O'Donovan. Metro North Transportation and Engineering Review. Final Revision)

Table 1 Comparison of Trip Attractors Generators on three LUAS lines 1996

Table 4.3 Intensity of Use Indicators

Section	Density of Major Attractors/Generators number per route km	Frontage Density metres per route metre
Tallaght Sq. - Treepark	1.44	0.09
Treepark - Fox & Geese	.44	0.01
Fox & Geese - Davitt	7.96	1.26
Davitt - Inchicore	2.60	1.72
Inchicore - Kilmainham	3.31	2.09
Kilmainham - Heuston	20.00	1.88
Heuston - Chancery St.	18.32	1.42
Chancery St. - O'Connell St.	21.56	2.73
Tallaght Route	7.79	1.01
O'Connell St. - Trinity College	3.33	2.02
Trinity College - Harcourt	21.33	1.96
Harcourt - Charlemont	20.00	1.85
Charlemont - Dundrum	0.00	0.00
Dundrum Route	7.81	0.68
O'Connell St. - Parnell	30.36	1.42
Parnell - Gardiner	15.7	1.91
Gardiner - St. Alphonsus	7.27	1.81
St. Alphonsus - St. Patrick's	3.90	2.49
St. Patrick's - Griffith	4.92	2.16
Griffith - Collins	15.12	1.55
Collins - DCU	2.86	1.89
DCU - Glasnevin	1.59	2.22
Glasnevin - Ballymun	9.68	2.59
Ballymun Route	9.61	2.00

Source: Department of Transport, Energy & Communications. A Comparative Socio-Economic Evaluation of the Tallaght-Ballymun/Dundrum Light Rail Lines. Final Report 1996. Oscar Faber. Table 4.3

Is mise

Donal O'Brolcáin

In the case of the traffic assessment all traffic forecasts have been specified as daily traffic flows in passenger car units (pcus) where

1 Car	=	1 pcu
Heavy Goods Vehicle or Bus	=	3 pcu

Pcus rather than vehicles are used in the traffic model as it allows a weighting to be attached to larger vehicles reflecting the greater impact which they have on road capacity.

4.8.7.3 ASSUMPTIONS AND TECHNICAL LIMITATIONS

The 1991 DTI model was established on the basis of forecast planning scenarios operating until 2011 based upon land use scenario B (DTI, para. 7.2.6). New planning scenarios were produced as part of the 1996 update to the year 2016, and embedded into a trip attraction/generation model (TAGM) managed by the DTO. The TAGM produced the basis for the 2003 and 2018 traffic forecasts used in the evaluation of the proposed DPT.

While the base year 1996 model was taken to be fully validated, the future highway network was modified in the locality of the scheme to reflect current proposals.

Given the consistent degree of congestion on the highway network during peak periods the extensive 1995 observed traffic surveys were taken as a good representation of a base case traffic volumes for this impact study. Update surveys were however undertaken in 1997 for the junctions at Shantalla and Coolock to assess the traffic effects of the northern cross route on base flow on Swords Road/M1. These traffic data were also used to assess the relative change in noise and air quality, during the 1995-1997 period.

Proposed highway schemes, quality bus corridors and LRT lines (see Table 4.1), included in the model for the DTI have been assumed to be valid for the purposes of evaluating the effects of the proposed scheme. The DTI highway and public transport schemes, listed in Table 4.1, are incorporated within the DTO 'do-something' model.

Other management measures, including Park & Ride sites, environmental traffic cells and traffic calming are set out in Table 11.1 'DTI Strategy and Investment Programme' of the DTI Final Report.

Cal Coll Wed 5 July '98
(DTO) Sean McGrath.
Probably assumes LRT
a - Drumcondra Road.
DTO Model assumes 2006/2016

Table 4.1: Principal Highway and Public Transport Schemes Within the DTO Forecast Year Do-Strategy Model 2006/2016

Highway Schemes		Public Transport
• Northern Cross Route (M50)	• Blackhorse Avenue	• QBC City Centre to Bray
• Northern Cross Route extension to Malahide Road(M50)	• Ballybrack	• QBC City Centre to Churchtown
• Southern Cross Route (M50) inc. Green Route	• Ratoath Road	• QBC City Centre to Tallaght
• South Eastern Motorway Southern Section	• Coombe Relief Road	• QBC City Centre to Clondalkin
• Northern Motorway, Airport to Five Roads (M1)	• Cork Street to Dolphin's Barn	• QBC City Centre to Lucan
• Lucan to Kilcock (N4)	• Dundrum Relief Route	• QBC City Centre to Blanchardstown
• N7 Interchanges	• Macken Street Bridge	• QBC City Centre to Finglas
• Kilmacanogue - Glen O'Downs (N11)	• Naas Road – Blessington Road	• QBC City Centre to Swords
• Tallaght By-Pass Extension (N81)	• Newlands/Fonthill Road	• QBC City Centre to Malahide
• **Dublin Port Tunnel**	• Nangor/Fox & Geese	• LRT City Centre to Ballymun /Airport
• North Road Finglas (N2)	• Walkinstown – Saggart	• LRT City Centre to Tallaght
• White's Cross - Knocksinna (N11)	• Grange Road	• LRT City Centre to Cabinteely
• Ballinclea/Wyatville Road	• Kilmahuddrick Road	

QBC - Quality Bus Corridor,
LRT - Light Rail Transport

Wid Swag Tel Coll. Heagl Grogan (DPT) confirmed that Macken St Bridge is not part of DPT model runs!

4.1 Conclusions

From the brief technical review undertaken for this report it appears that the Drumcondra – Beaumont Metro (East Route Variant) is superior to the RPA Central Route for the following reasons relevant to Passenger Volumes, Capital Cost and Ease of Construction:

a) There is higher passenger demand of up to 3.5 million per annum more along the route corridor because of the greater existing and potential future population in the East Route Catchment;

b) The East Routes fill a major gap in the Dublin Transport Network, while the Central Route duplicates the Ballymun QBC. The Metro project provides an ideal opportunity to bring a high quality public transport service to the Beaumont/Kilmore/Clonshaugh areas of north Dublin that would otherwise be difficult to serve appropriately.

c) The East Routes provide access to key facilities including Croke Park, St.Patrick's College, Dublin City University, Beaumont Hospital and 4 major hotels;

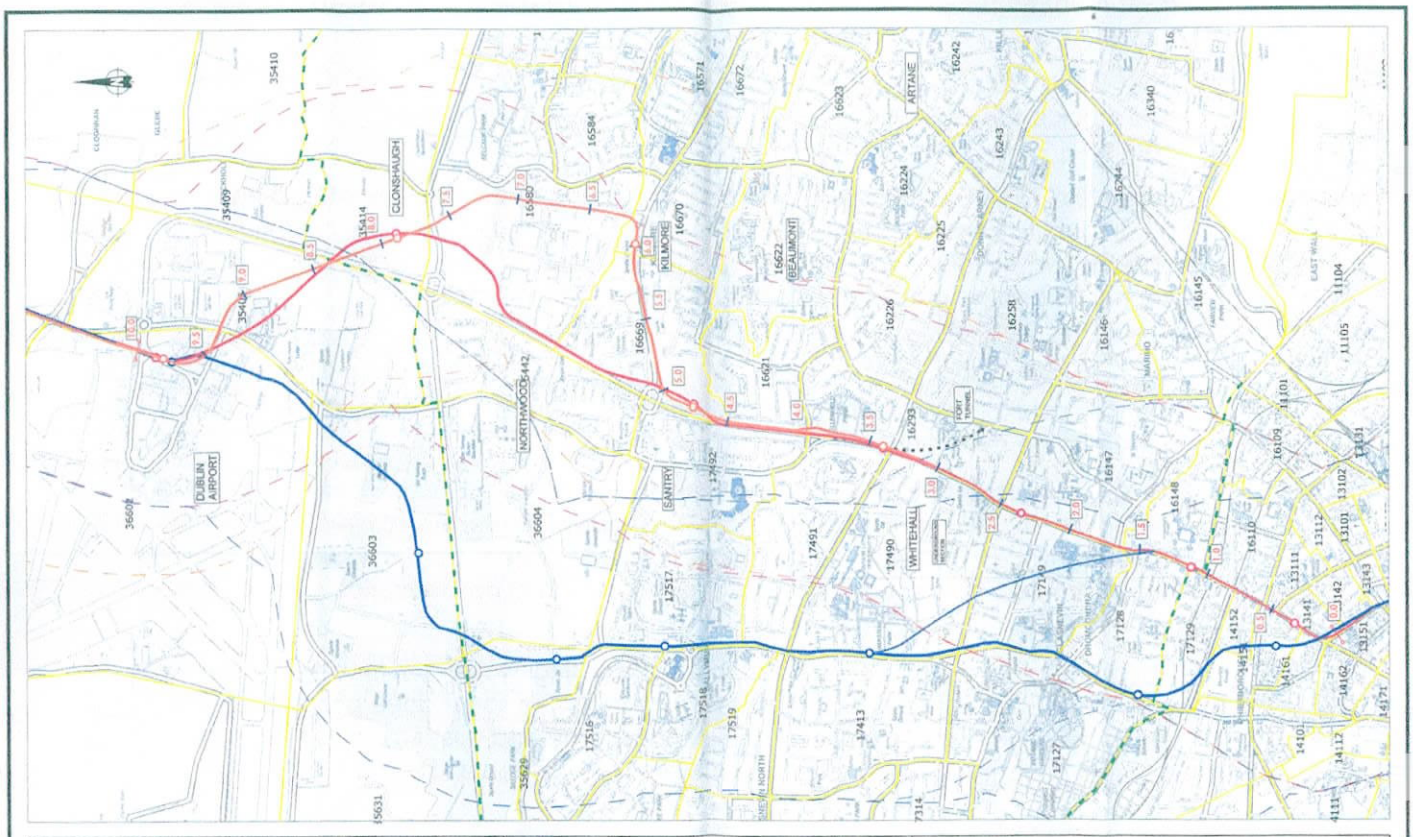
d) Either the RPA East Route or the East Route Variant would be integrated with other public transport routes, such as the Maynooth Rail Line, leading to a wider network for flexible journey planning. There is also scope to provide a connection to the proposed Orbital Metro to Blanchardstown;

e) The cost of serving the existing terminal at Dublin airport directly would be in the order of €100m cheaper along the proposed East Route Variant, than along the Central Route. This figure would rise to €450m should the section through Ballymun be required to be constructed in tunnel.

f) It would be easier to construct the East Route or East Route Variant with less disruption for the local population as the route follows the M1 motorway and passes through industrial lands or open spaces, rather than the Central Route which would bring several more years of construction disruption through the middle of Ballymun Town Centre.

g) Following on from the above, 24 hour tunnelling would be more acceptable along the East Route or East Route Variant, as the route does not pass under any properties. This would lead to significant time and cost savings. These cost savings have not been assumed in the analysis contained herein.

The outcome of this review suggests that the case for the East Route, and in particular the East Route Variant, known as the Drumcondra – Beaumont Route, should be re-examined to ensure that the best route is chosen for the Metro North project.


CLONSHAUGH
KILMORE
BEAUMONT
ARTANE
NORTHWOOD
SANTRY
DUBLIN AIRPORT
WHITEHALL
FOXTROT TUNNEL
EAST WALL
MARINO
LEGEND
RPA CENTRAL ROUTE
RPA EAST ROUTE
EAST ROUTE VARIANT
RPA ALTERNATIVE ROUTE
RPA CENTRAL ROUTE STATION
RPA EAST ROUTE STATION
EAST ROUTE VARIANT STATION
RPA ALTERNATIVE ROUTE STATION
1KM CATCHMENT ZONE - RPA CENTRAL ROUTE
1KM CATCHMENT ZONE - RPA EAST ROUTE
1KM CATCHMENT ZONE - RPA ALTERNATIVE ROUTE
1KM CATCHMENT ZONE - EAST ROUTE VARIANT
EXTENTS OF STUDY ZONE
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METRO NORTH
TRANSPORTATION AND ENGINEERING REVIEW
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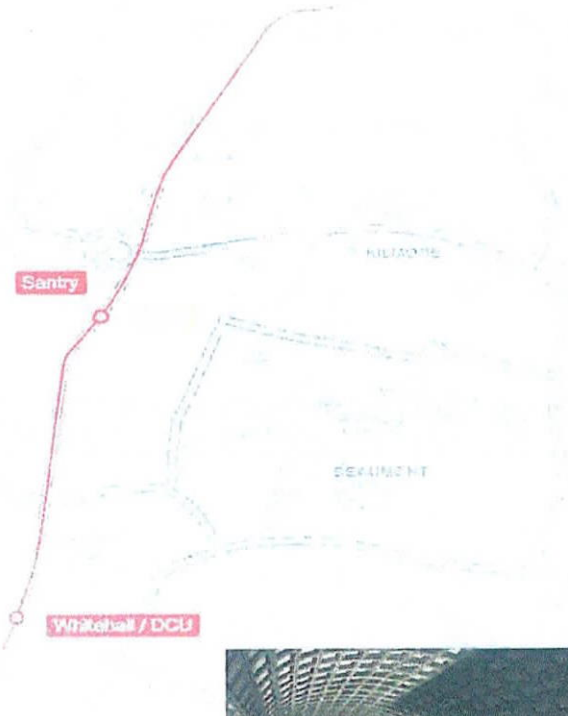
10 May 2018

Roughan & O'Donovan
CONSULTING ENGINEERS

METRO NORTH

TRANSPORTATION AND ENGINEERING REVIEW

FINAL REVISION





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10 May 2018

Metro North

Transportation and Engineering Review

Document No: 06.145.10c

Made: ..... Eoin Ó Catháin (EOC)

Checked: ..... Seamus Mac Gearailt (SMG)

Approved: ..... Seamus Mac Gearailt (SMG)

Description	Issue No.	Made	Checked	Approved	Date
Final Report	1	EOC	SMG	SMG	22/05/06
Final Report	2	EOC	SMG	SMG	02/06/06
Final Revision following initial public consultation and further cost analysis	3	EOC	SMG	SMG	27/06/06

Metro North

Transportation and Engineering Review

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Appendix A Route Maps

Appendix B Cost Analysis

Appendix 2

1. *Does Dublin's Core need more rail links?* Paper presented at the Dublin Economic Workshop Athlone 17th October 2015

2. Submission to the National Transport Authority on the NTA/AECOM Fingal/North Dublin Transport Study (June 2015)

3. *A LUAS loop for North Dublin's Core Economic Area instead of Metro North* Irish Journal for Social, Economic and Environmental Sustainability (IJSEES) Vol. 1 Issue 2 January 2018 p.62-99. submitted in March 2017

4. Roughan & O'Donovan 2006. Metro North Transportation and Engineering Review. Final Revision. Dublin

5. *Keeping LUAS on Track.* letter published in Irish Times on 14 December 2017

6. The covering letter of my submission to the Regional Spatial and Economic Strategy of the Eastern and Midland Regional Assembly (submitted in February 2018) which included the papers 1, 3, 4.5 listed here.

Does Dublin's Core need more rail links?

Donal O'Brolchain

Dublin Economic Workshop Athlone 17th October 2015

Dublin's economic core is set out in Figure 1[1]. This is one of two maps I commissioned from the All-Island Research observatory in NUI Maynooth when I was trying to understand what the National Transport Authority (NTA) was actually doing about enhancing public transport in the north part of our capital city. At the time it seemed not to be planning transport in accordance with evidence, as claimed the Robert Watt, Secretary General of the Department of Public Transport and Reform as evidence of civil service reform. *(Commentary on public service reform is mired in the past* Sunday Business Post 22 February 2015).

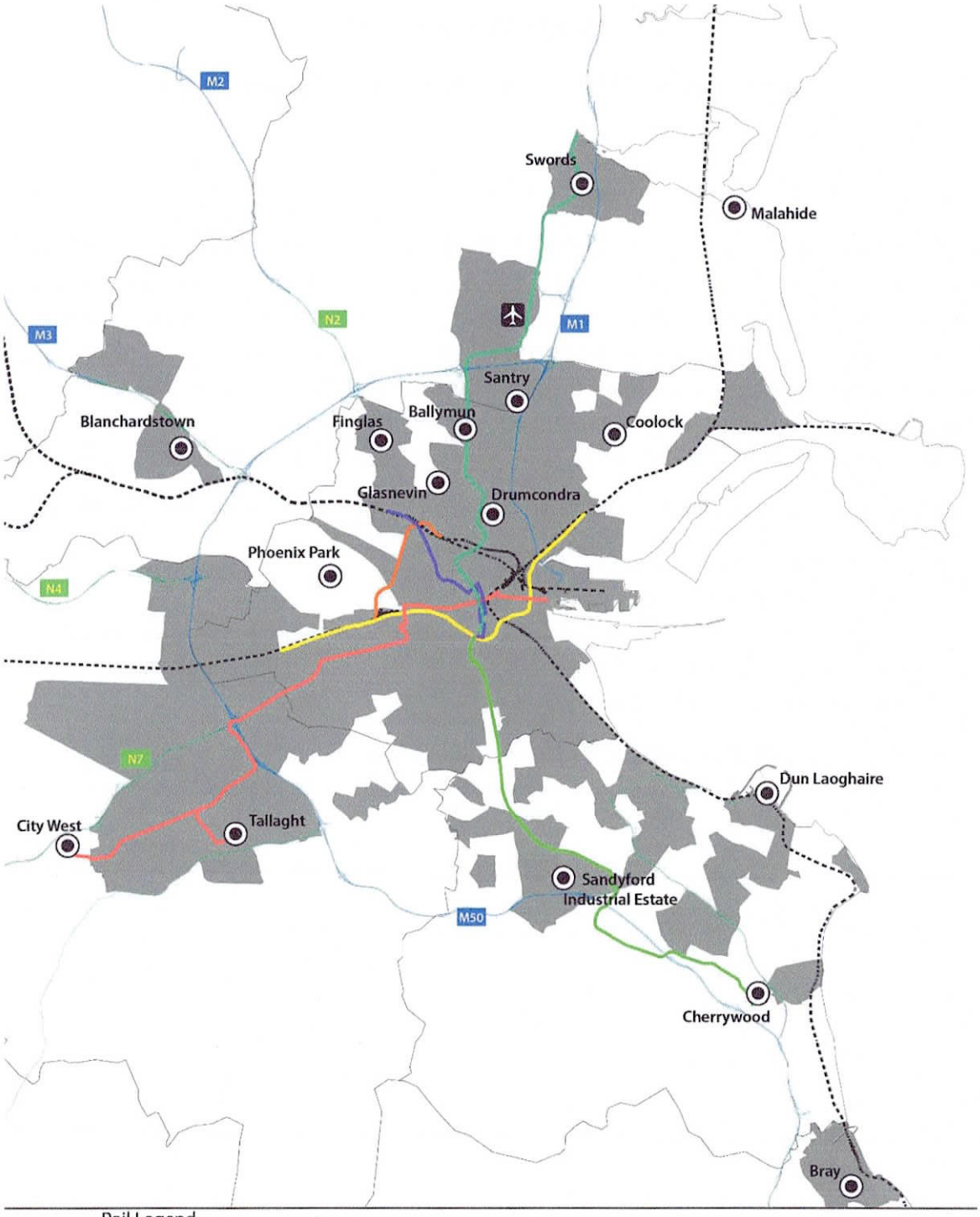
I asked AIRO to superimpose the existing and proposed railway lines in Dublin. This included

- the heavy rail commuter lines including DART;
- LUAS including LUAS Cross City now being built;
- the Phoenix Park Tunnel which is due to reopen for passenger services next year;
- the now deferred DART Underground. At the time, I had been led to believe that the public authorities had decided on this project.

Last week, I asked AIRO to update this map by adding Metro North.

[1] The Dublin Economic Core definition is effectively a 2011 update of the work done by Cormac Walsh and Brendan Whelan in UCD. See *Cormac Walsh, Brendan Williams and Ian Boyle* Mapping the true extent of Dublin's functional urban region – What the best available evidence tells us. Posted 21 December 2010 on IrelandafterNama : https://irelandafternama.wordpress.com/2010/12/21/mapping-the-true-extent-of-dublins-functional-urban-region-what-the-best-available-evidence-tells-us/

Figure 1 Dublin's Core Economic Area Census 2011



National Transport Authority's odd behaviour

In an October 2012 report on Bus Rapid Transit(BRT), NTA stated

It is on the northern section of this corridor – between Swords and the City Centre – that the high levels of demand arise.... ***Overall, the link between the city centre and Swords has demand levels that exceed the capacity of a moderate capacity BRT system, in the longer term.*** *While BRT may provide an interim partial transport solution in the shorter term, a higher capacity rail solution, such as a metro system, will ultimately be required on this corridor.* ***In light of this, the Swords to City Centre BRT section has not been progressed to the later costing and appraisal sections of this feasibility study report.***

The demand on the Swords to City section greatly exceeds the capacity that can be provided by a BRT system. Based on this level of demand a BRT solution does not cater for the public transport needs of the northern section of this corridor over the longer term. Accordingly, the Swords to City Centre section was not progressed further within this report

Bus Rapid Transit (BRT) Core Dublin Network (BRT Report). National Transport Authority October 2012.
http://www.nationaltransport.ie/wp-content/uploads/2012/11/Bus-Rapid-Transit-Core-Network-report.pdf

The September 2012 NTA Board Minutes noted

The Authority will ***now start work*** *with a view to securing statutory approval in 2013 for* ***two cross-city BRT corridors which have been identified as feasible****. The implementation of those corridors will be subject to the availability of the necessary funding in the future*

http://www.nationaltransport.ie/wp-content/uploads/2012/04/Minutes-of-Board-Meeting-21st-September-1.pdf

Less than one year later, the June 2013 NTA Board minutes report that

4. Serving Swords by Bus Rapid Transit
Mr Gallagher outlined the work currently being undertaken by the Authority to upgrade the existing Quality Bus Corridor ***between Swords and Dublin City Centre, which is one of the busiest bus corridors in Dublin.*** *An outline business case has been completed and is very positive. Detailed planning work, including the preparation of an Environmental Impact Statement will now be progressed in preparation for the submission of an application to An Bord Pleanála under the Strategic Infrastructure Act.*

https://www.nationaltransport.ie/wp-content/uploads/2013/04/Minutes-of-Board-Meeting-June-21st.pdf

Two years later, NTA stated

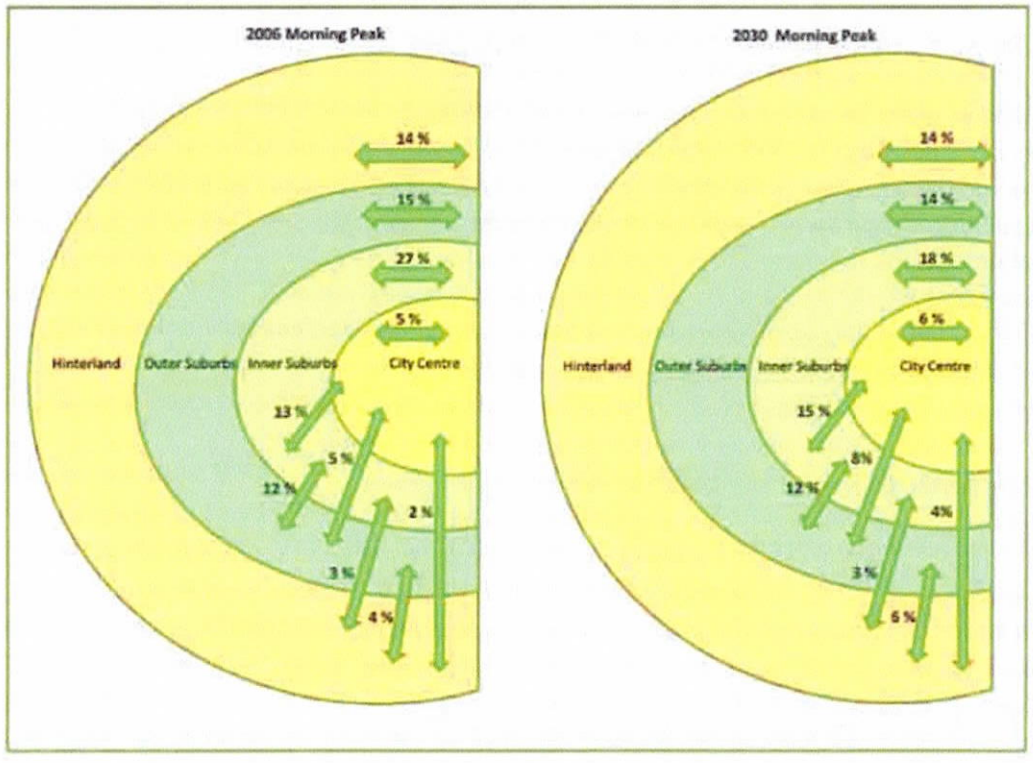
Later in 2014, ***we will apply for permission to An Bord Pleanála for the Swords/Airport to City Centre scheme****, with applications for the Blanchardstown to UCD and the Clongriffin to Tallaght schemes to follow in 2015.*

NTA employed three major consulting engineering firms to draw up a Route Options Assessment Report for BRT on the Swords/Airport-Drumcondra-City Centre.

What are the broad travel patterns within Dublin's Core Economic Area?

Earlier this year, NTA sought comments a re-published *Greater Dublin Area Transport Strategy 2011-2030 2030 Vision,* first published in April 2012[2] [3]

Figure 2 Travel Patterns in the Greater Dublin Area (morning peak period) 2006 and 2030



Source: National Transport Authority Greater Dublin Area Draft Transport Strategy 2011-2030 2030 vision April 2012. Chap 4 p.9
https://www.nationaltransport.ie/wp-content/uploads/2011/12/Draft_Transport_Strategy_for_the_Greater_Dublin_Area_2011-2030.pdf

This NTA report (Figure 2) shows that travel demand is greatest inside the M50 during the morning peak ie.

1. between the canals and the M50 - the Inner Suburbs - with
   27% of journeys in 2006;
   18% in 2030;
2. inside the canals - between the Inner suburbs and the City Centre with
   13% in 2006;
   15% in 2030.

[2]www.nationaltransport.ie/consultations/public-consultation-on-the-preparation-of-a-new-transport-strategy-for-the-greater-dublin-area/

[3] www.nationaltransport.ie/wp-content/uploads/2011/12/Draft_Transport_Strategy_for_the_Greater_Dublin_Area_2011-2030.pdf

Figure 3 Greater Dublin Area

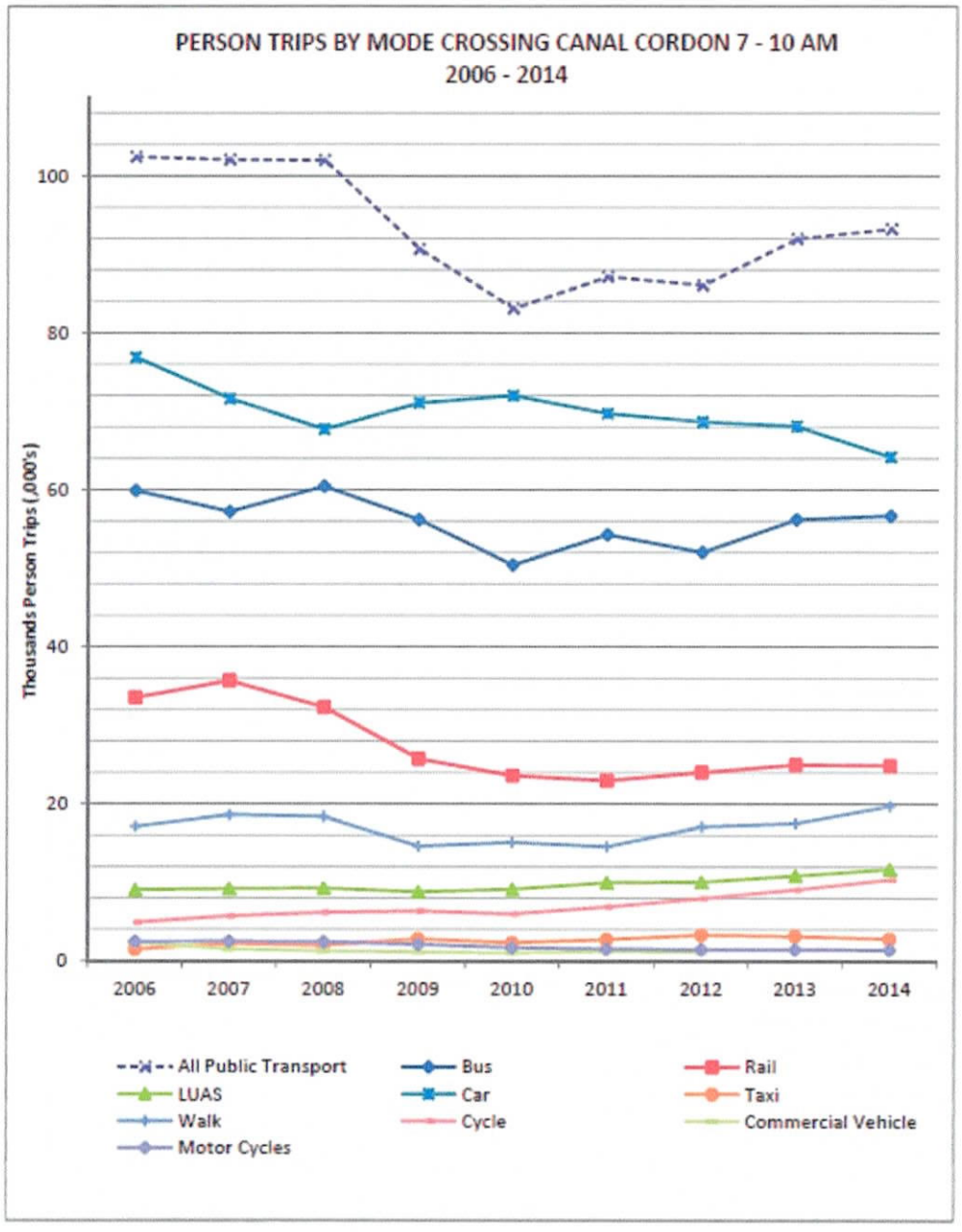


Source: National Transport Authority Greater Dublin Area Draft Transport Strategy 2011-2030 2030 vision April 2012. Chap 4 p.3
https://www.nationaltransport.ie/wp-content/uploads/2011/12/Draft_Transport_Strategy_for_the_Greater_Dublin_Area_2011-2030.pdf

So how are people travelling?

The largest single group travel by car, but has decreased by 16% since 2006. The next largest group travel by bus. Walking has increased such that in 2014 it was at the highest level since the 1997 Cordon Canal Count started. Both the number of cyclists and the number of people using taxis have more than doubled, even if the share of taxis is small in overall terms. This is summarised in Figure 4

Figure 4 How people crossed the canal cordon during morning peak 2006-2014



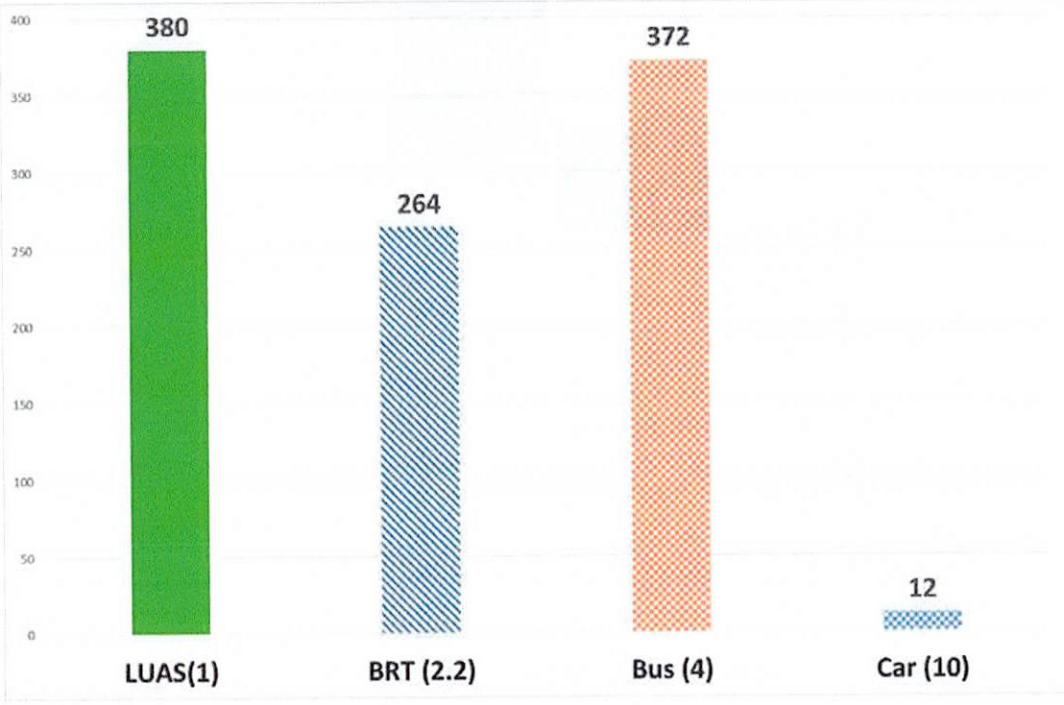
Source: Dublin City Council National Transport Authority. Report on trends in mode share of vehicles and people crossing the Canal Cordon 2006 -2014 March 2014 Fig. 2.3 p.14

https://www.nationaltransport.ie/wp-content/uploads/2013/10/Report_Canal_Cordon_Trends_2006-2014.pdf

Most people are travelling by car.

Let us just compare the use of streetspace by cars, buses the proposed Bus Rapid Transit and LUAS. See Figure 5

Figure 5 Passengers on one 40m LUAS tram compared with capacity of buses, BRT vehicles and cars using the same street space.



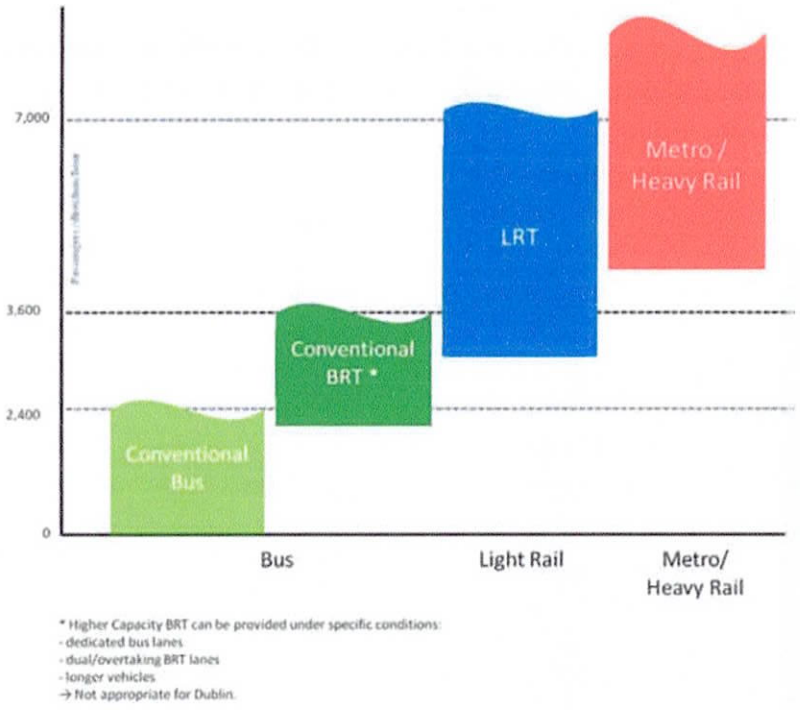
Basically, in the street space taken by a 40m me tram carrying 380 people, we can get

- just under 2.2 buses (18m long) of the type proposed for Bus Rapid Transit (BRT), each of which carries 120 people;
- 4 of the latest buses which Bus Átha Cliath bought, each of which carries 93 people;
- 10 cars, each of which carries 1.21 people.

The issue then becomes how best to allocate the limited street space, including consideration of adding another plane to that space and not ignoring the extra investment needed for both BRT and LUAS.

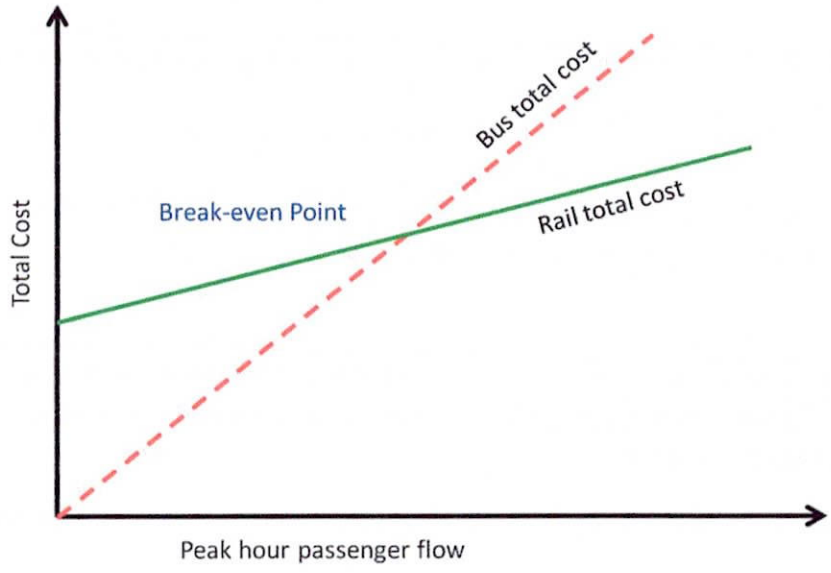
Figures 6 – 8 set out a basis for comparing various public transport modes in urban areas.

Figure 6 Passenger Capacity of urban public transport (passengers per direction per hour ppdph)



Source: National Transport Authority: Bus Rapid Transit (BRT) Core Dublin Network. October 2012. Fig.3 p.4
http://www.nationaltransport.ie/wp-content/uploads/2012/11/Bus-Rapid-Transit-Core-Network-report.pdf

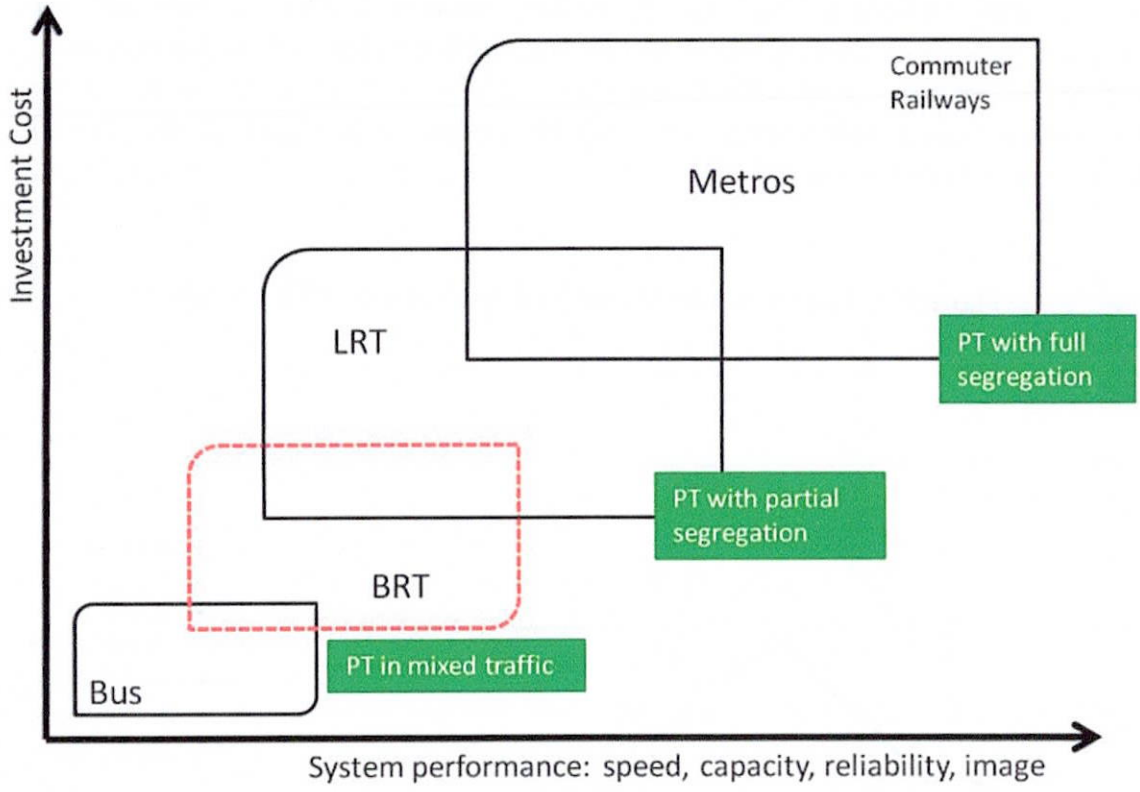
Figure 7 Cost of Peak Hour Passenger Flow Rail v Bus



Source: National Transport Authority: Bus Rapid Transit (BRT) Core Dublin Network. October 2012. Fig.21 p. 27

http://www.nationaltransport.ie/wp-content/uploads/2012/11/Bus-Rapid-Transit-Core-Network-report.pdf

Figure 8 Investment cost versus performance (speed, capacity, reliability)



Source: National Transport Authority: Bus Rapid Transit (BRT) Core Dublin Network. October 2012. Fig.2 p.3
http://www.nationaltransport.ie/wp-content/uploads/2012/11/Bus-Rapid-Transit-Core-Network-report.pdf

Figure 9 Transport Demand on Swords-Airport-Drumcondra-City Centre-Tallaght Corridor

4.6 Summary of Results

Figure 41 presents a summary of the results of the demand analysis. These results include the AM peak hour demand presented in the previous section together with a summary of the % above or below different capacities. The AM peak period boardings are also included.

Alignment	Scenario	Peak Lineflow	% above 15vph Capacity (1,800)	% above 20vph Capacity (2,400)	% above 30vph Capacity (3,600)	AM Peak Boardings
Blanchardstown to UCD	Base Year	3,369	87%	40%	-6%	9,482
	2030 Curr Inf	3,877	115%	62%	8%	14,577
	2030 Strategy Inf	2,564	42%	7%	-29%	11,838
Swords to Tallaght	Base Year	3,482	93%	45%	-3%	17,224
	2030 Curr Inf	5,845	225%	144%	62%	22,120
	2030 Strategy Inf	3,963	120%	65%	10%	17,828
Clongriffin to Tallaght	Base Year	2,754	53%	15%	-24%	11,899
	2030 Curr Inf	3,954	120%	65%	10%	14,618
	2030 Strategy Inf	3,638	102%	52%	1%	12,792

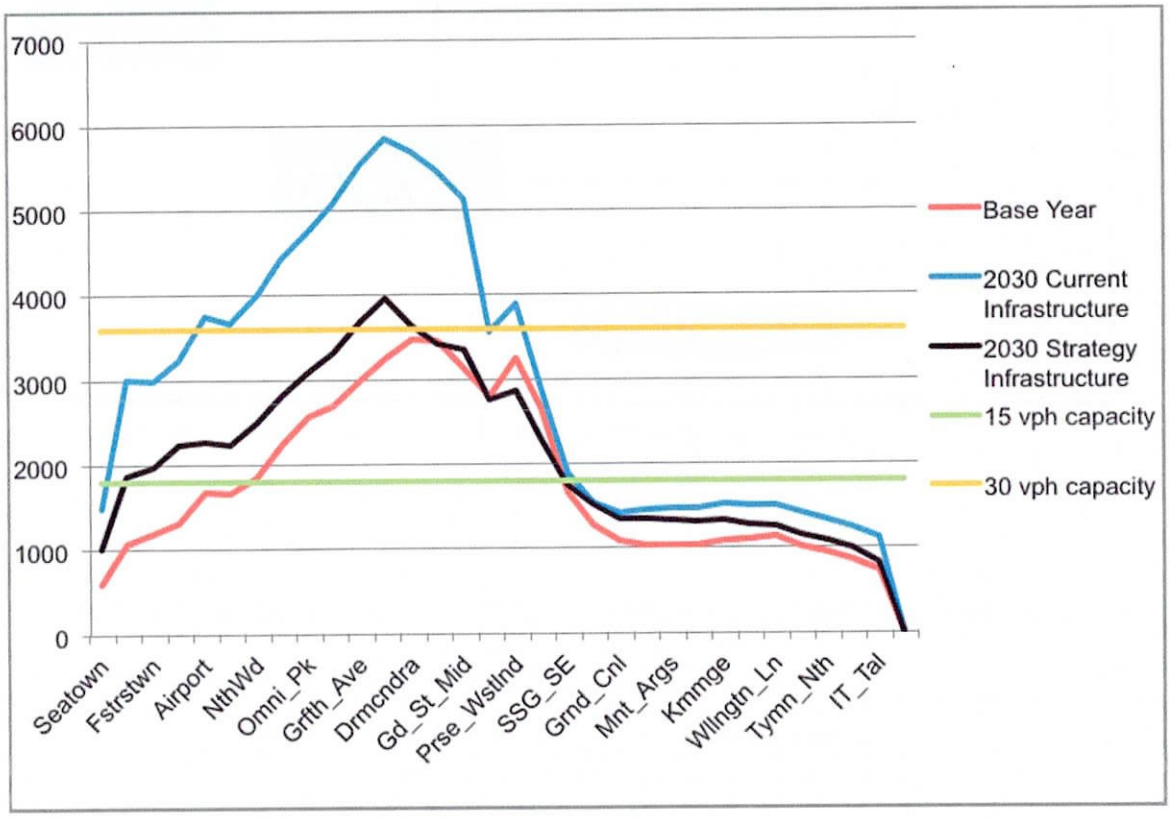
Figure 41 Summary of Results

The results show that the Swords to Tallaght cross city alignment has the highest overall forecast demand, particularly in the 2030 Current Infrastructure scenarios. Demand to/from the Swords area and the Airport is high in these scenarios, resulting in a peak demand of nearly 6,000 ppdph, which far exceeds the capacity of the proposed BRT service. Forecast demand on the Clongriffin to Tallaght and the Blanchardstown to UCD service also exceeds capacity in the 2030 Current Infrastructure scenario by 8% and 10% respectively. The Blanchardstown to UCD service has the lowest demand of the alignments tested.

Source: National Transport Authority: Bus Rapid Transit (BRT) Core Dublin Network. October 2012. Figure 41 p.53
http://www.nationaltransport.ie/wp-content/uploads/2012/11/Bus-Rapid-Transit-Core-Network-report.pdf

Figure 9 summarises the passenger demand on options which NTA studies in its Core Network Report for a Bus Rapid Transit system in Dublin. A later study (ie.a Route Options Assessment on the Swords/Airport-City Centre BRT November 2014) shows that, with one exception, passengers forecast exceed the proposed BRT capacity. This report assumes that the present bus network will still be in place. This means that regular bus services will still run on the same roads as the two separate BRT services on the Dublin Airport/Sword-Drumcondra-City Centre route.[4]

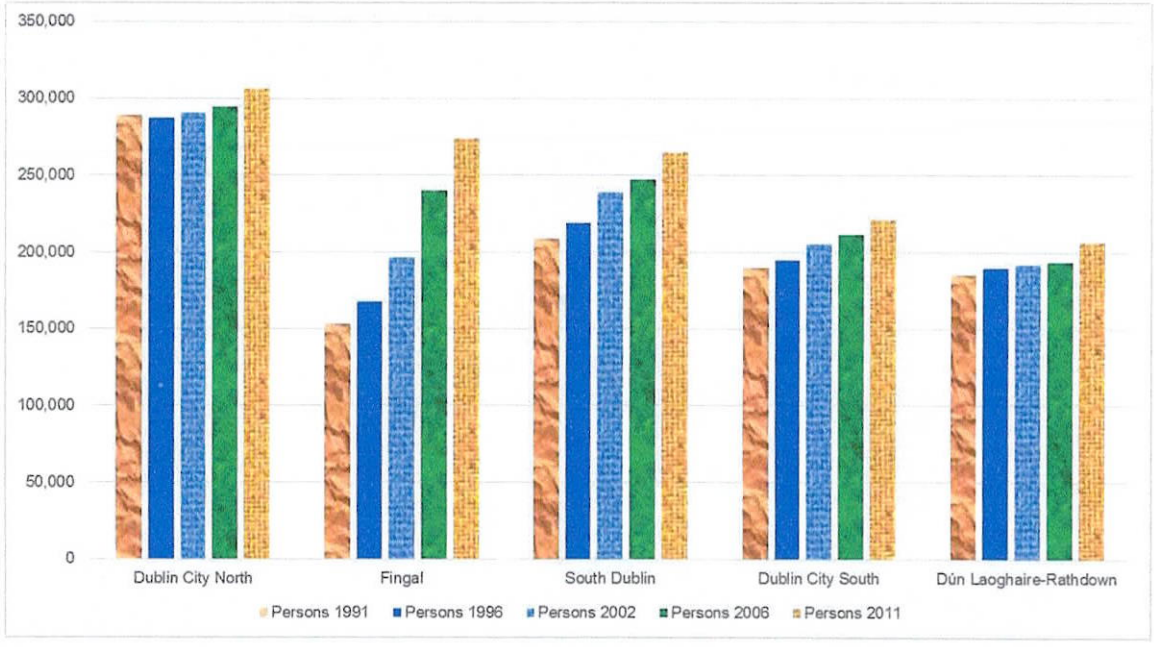
Figure 10 Transport Demand in key North Dublin corridor



Source: National Transport Authority: Bus Rapid Transit (BRT) Core Dublin Network. October 2012. Figure 37 p.50
http://www.nationaltransport.ie/wp-content/uploads/2012/11/Bus-Rapid-Transit-Core-Network-report.pdf

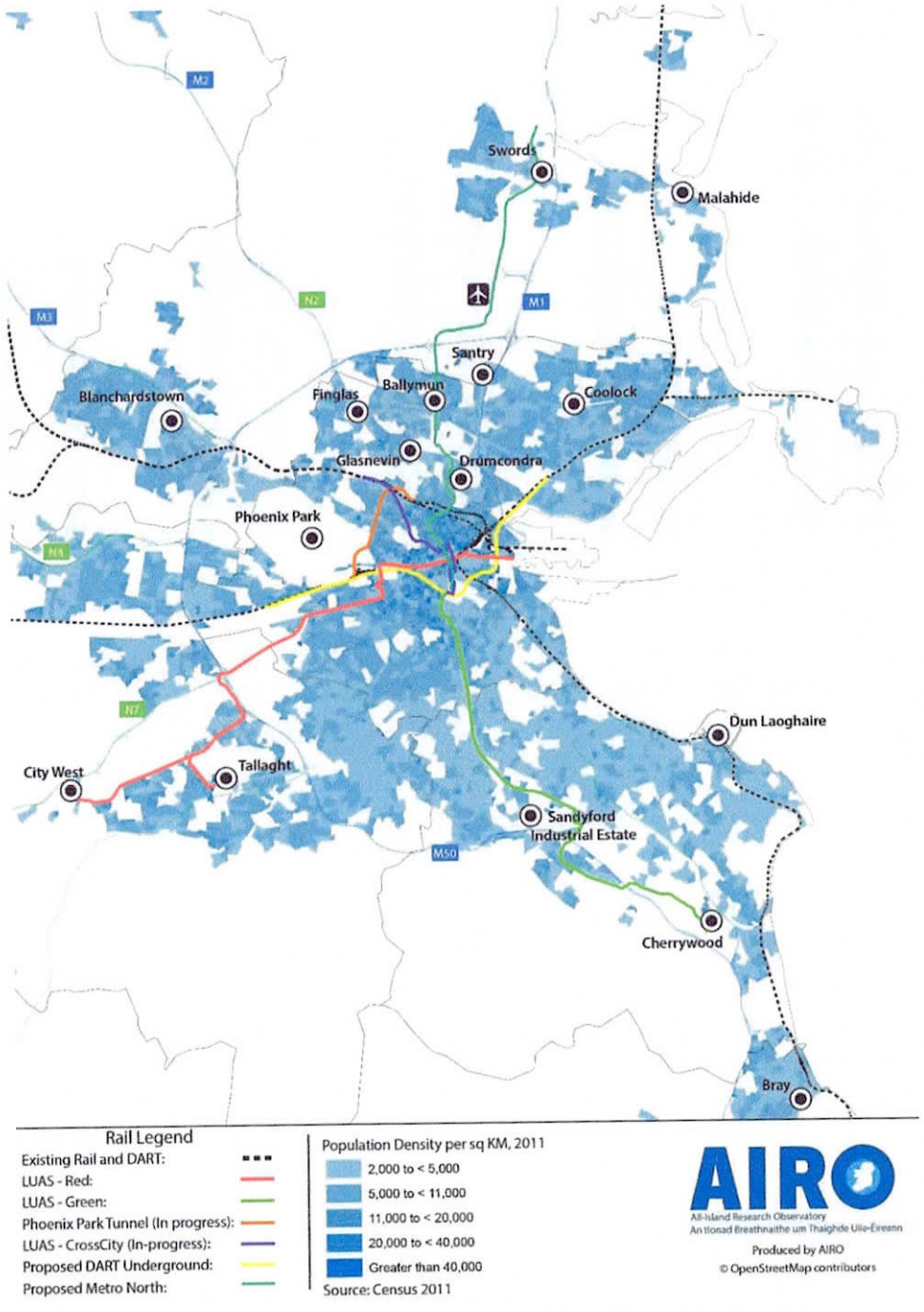
[4] Summary tables 10.5 and 10.6 for the result for the opening year 2018 and the forecast year 2033 for 2 route options. National Transport Authority Swords/Airport to City Centre. Route Options Assessment Volume 1 : Main Report (October 2014 p. 187
http://www.nationaltransport.ie/wp-content/uploads/2014/10/Route_Options_Assessment_Report.pdf

Figure 11 GDA Population 1996-2011



More people live in the north part of Dublin city (306,425 in Census 2011) than in either the south city (221,186), Dun Laoghaire/Rathdown (206,261), South Dublin (265,205) or Fingal (273,991). Figure 11 shows that this has been so for the last 20 years.

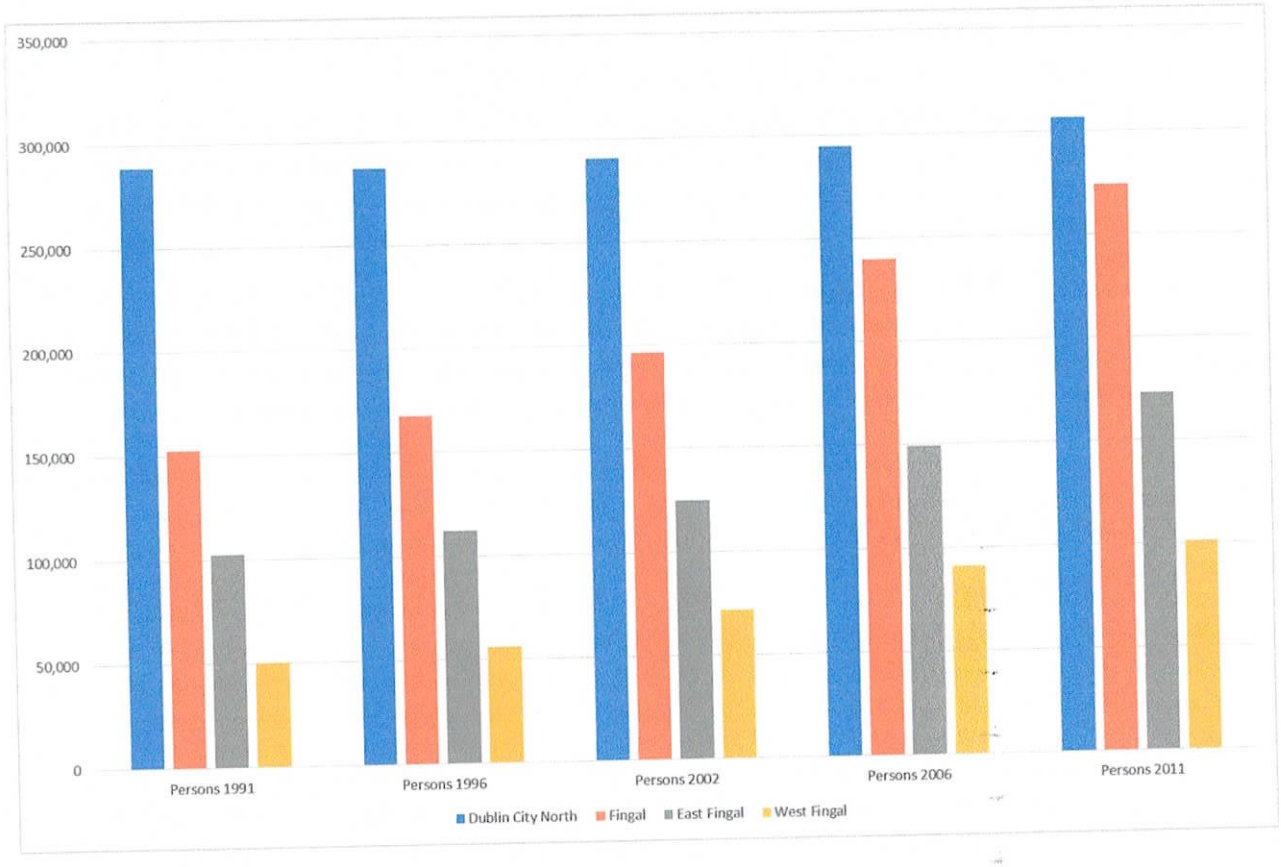
Figure 12 Population Density (2011 Census)



One justification for Metro North is that Fingal is the fastest growing county in Ireland. True. Asserting that alone hides the fact that Fingal can actually be split in what I call Fingal West and Fingal East, using the Ashbourne Road (M2/N2) as the border. Fingal East is the only part of Fingal which the NTA focused on when it commissioned the Fingal/North Dublin Dublin Transport Study.

Note that West Fingal has doubled in population in the last 20 years. Blanchardstown has nearly 70, 000 people whereas Swords has 40,000 people.

Figure 13 Population Dublin City North, Fingal East and West



Swords is obviously noisier that Blanchardstown. Despite the origins of urban transport policy making in elections, how is that the thisgovernment won one of the two by-elections in West Dublin since 2011, without promising to electrify the Maynooth commuter line ie. bringing the DART to Blanchardstown?

Many of you realise that

- DART - the first electrification of rail transport in the Republic was promised in the first direct elections to the European Parliament in 1979;
- DART was extended to Greystones as a result of a by-election in Wicklow in 1995[5];
- The LUAS we got – the early 21st century non-networked phenomenon was the result of the 1998 North Dublin by-election following the resignation of Ray Burke. This came about as the PDs – then in government- introduced a Dublin Transport policy for that election, despite not having any transport or environmental policy in the 1997 General Election manifesto. This audience will be amused when I tell that the ad-hoc transport policy had about a page and half entitled covering economics and finance. But there were no figures or calculations in that section.

Dublin Airport

Dublin Airport is a major employment centre with about 15,000 servicing the 22m passengers who travelled through the Airport in 2014

An NTA study of Dublin Airport passengers found that:

1.
   a) Less than one seventh of trips (14%) were business related;
   b) Three quarters of all trips were either for holiday/leisure (nearly half) or visiting friends/relatives (over one-quarter);
   See Figure 14
2. Less than one third of the trips originated in City Centre/South part of Dublin City;
   See Figure 15

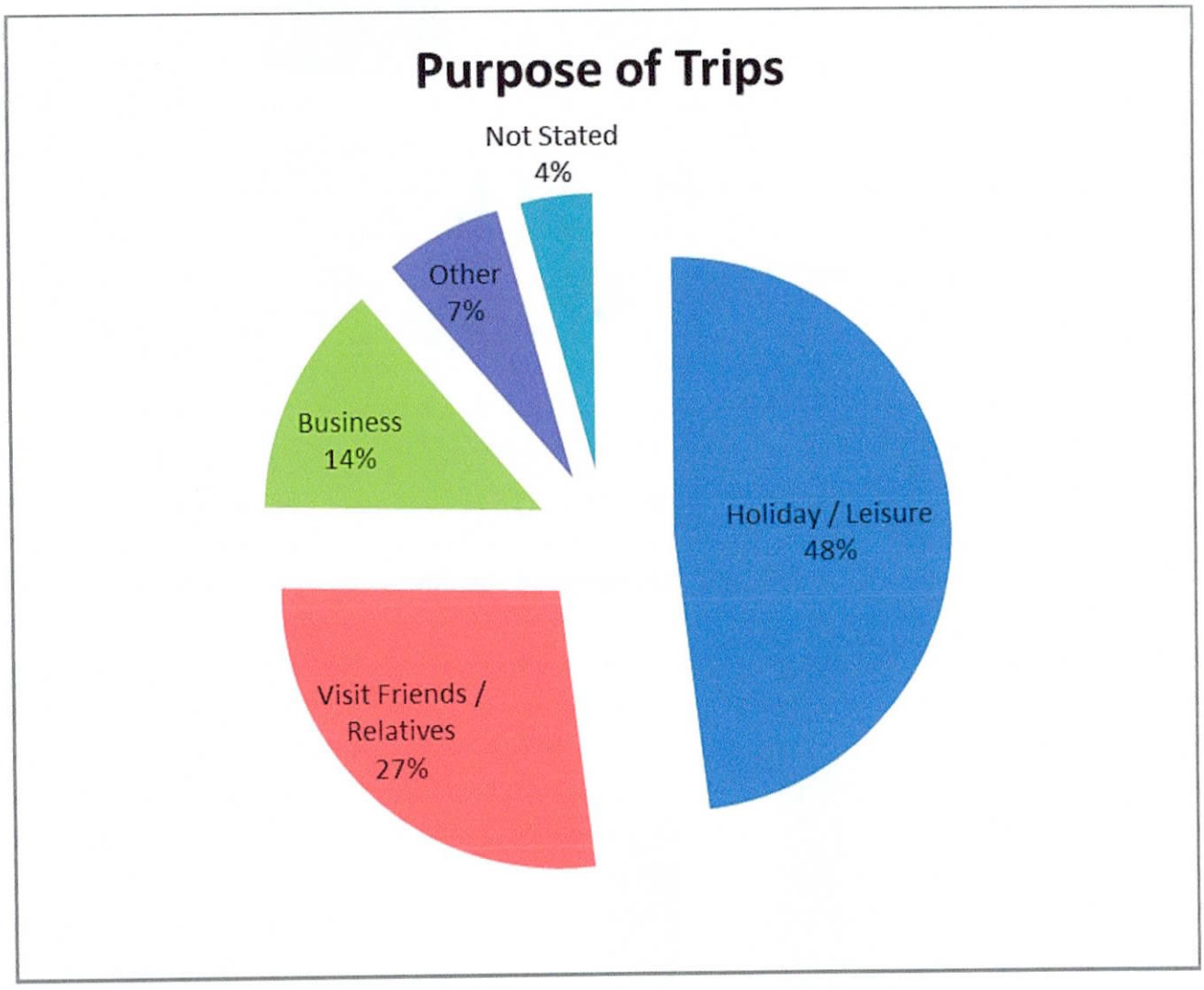
3. Three quarters (75%) had a journey time of less than one hour to the Airport, with almost half (46%) having a journey time of less than 30 minutes;
   See Figure 16

All this suggests that the vast majority of passengers using Dublin Airport may not be very time-constrained in how they access the Airport. Most passengers are not bound for our capital's Central Business District. Those passengers who are time-constrained have the option of taxis (which can use bus lanes) and/or using the Dublin Port Tunnel to access Central Business District.
Why do the public authorities insist that travel times between the City Centre and the Airport should the major criterion, if not the sole criterion?

[5] In July 1995, I wrote about this in an OpEd piece in the Irish Times. While I cannot be sure, I gather it this article had three effects. 1) Nora Owen, then Minister for Justice and living in Malahide sert about ensuring that DART was brought to Malahide. 2) Bertie Ahern saw to it that Drumcondra Station (on the Maynooth line) was reopened. 3) Some nudging from the EU commission led to a study of the planned LUAS system which found that there were more trip attractors/generators on the proposed line from the City Centre through Drumcondra to Ballymun than there were on the then planned networked lines Dundrum through the City Centre to Tallaght.

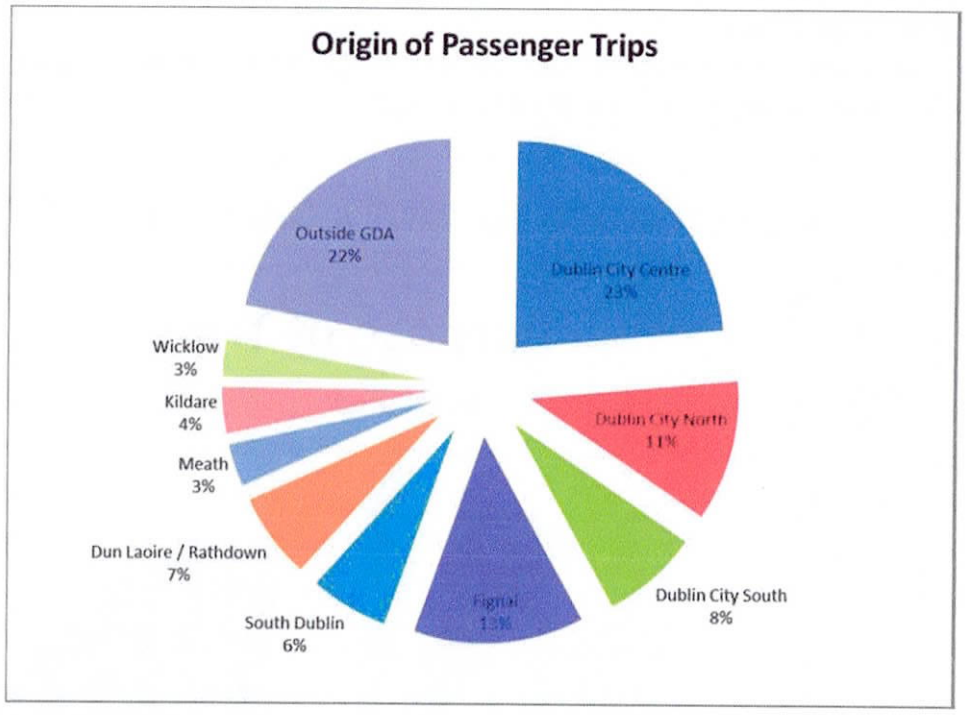
Is it really worth spending €2.5bn on a single channel which is to the west of the central part of the Dublin's Economic Core?
What is it about our transport policy makers that they opt to build yet another non-networked urban transport railway in our capital city?

Figure 14 Dublin Airport Why did people travel?



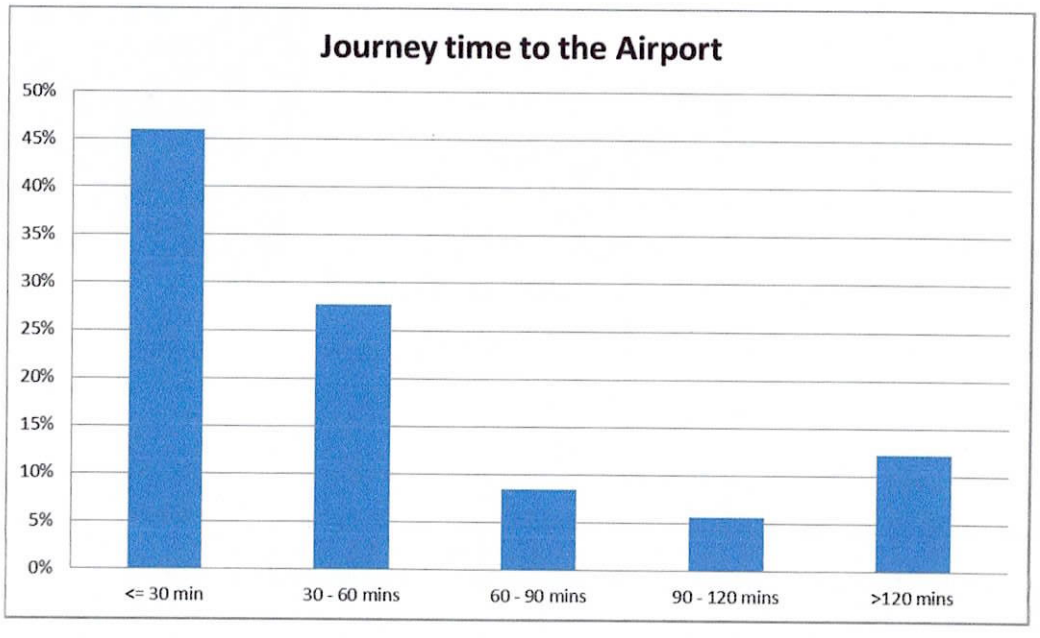
Source: National Transport Authority Survey at Dublin Airport 2011.Fig. 3.11 p. 22
http://www.nationaltransport.ie/wp-content/uploads/2012/04/NTA-Survey-at-Dublin-Airport-20112.pdf

Figure 15 Dublin Airport. Where in Ireland do they come from?



Source: National Transport Authority . Survey at Dublin Airport 2011 Figure 3.6 p. 15
http://www.nationaltransport.ie/wp-content/uploads/2012/04/NTA-Survey-at-Dublin-Airport-20112.pdf

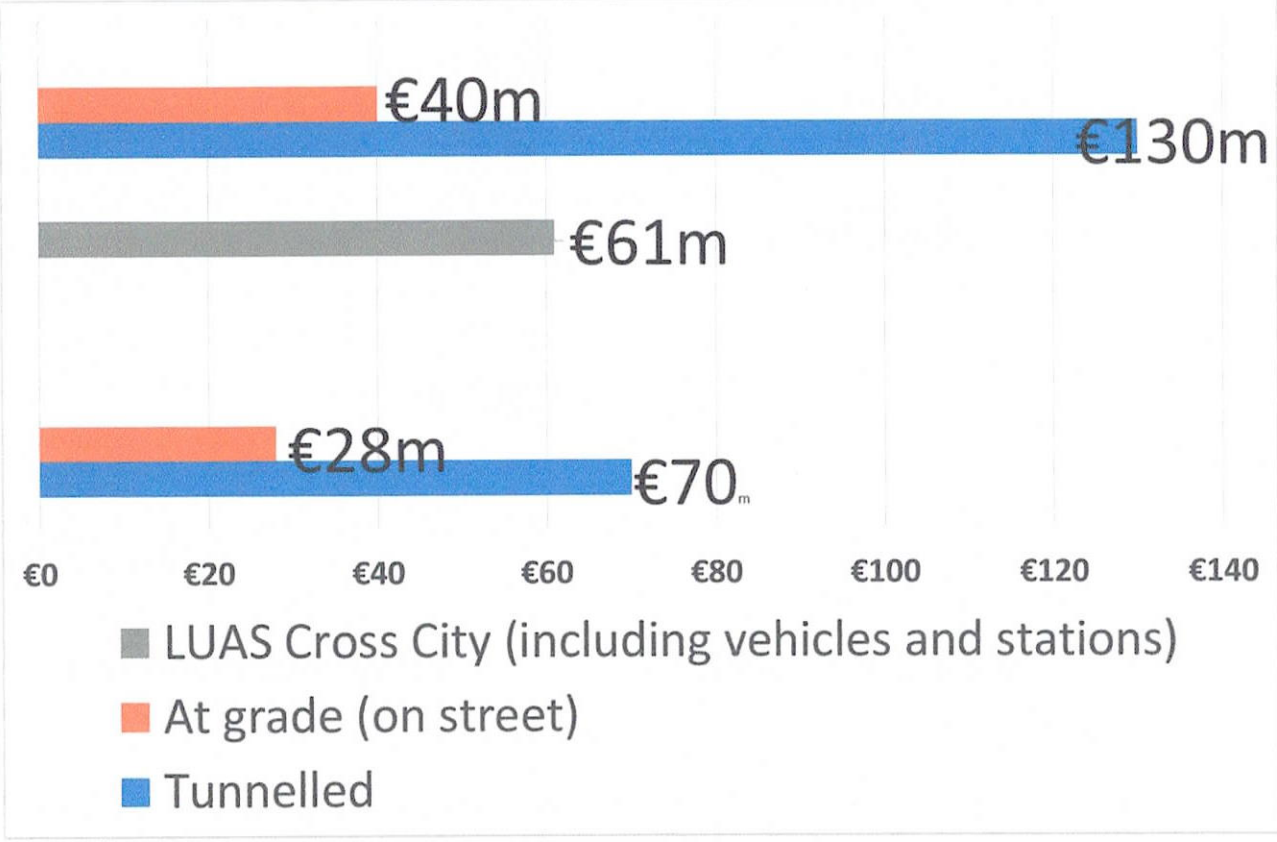
Figure 16 Dublin Airport. How long to get there?



Source: National Transport Authority . Survey at Dublin Airport 2011 Figure 3.5 p. 15
http://www.nationaltransport.ie/wp-content/uploads/2012/04/NTA-Survey-at-Dublin-Airport-20112.pdf

Assume that €2.5bn is the budget for enhancing public transport in Dublin's Core Economic Area with a focus on Airport-City Centre links, what could be done for the money?

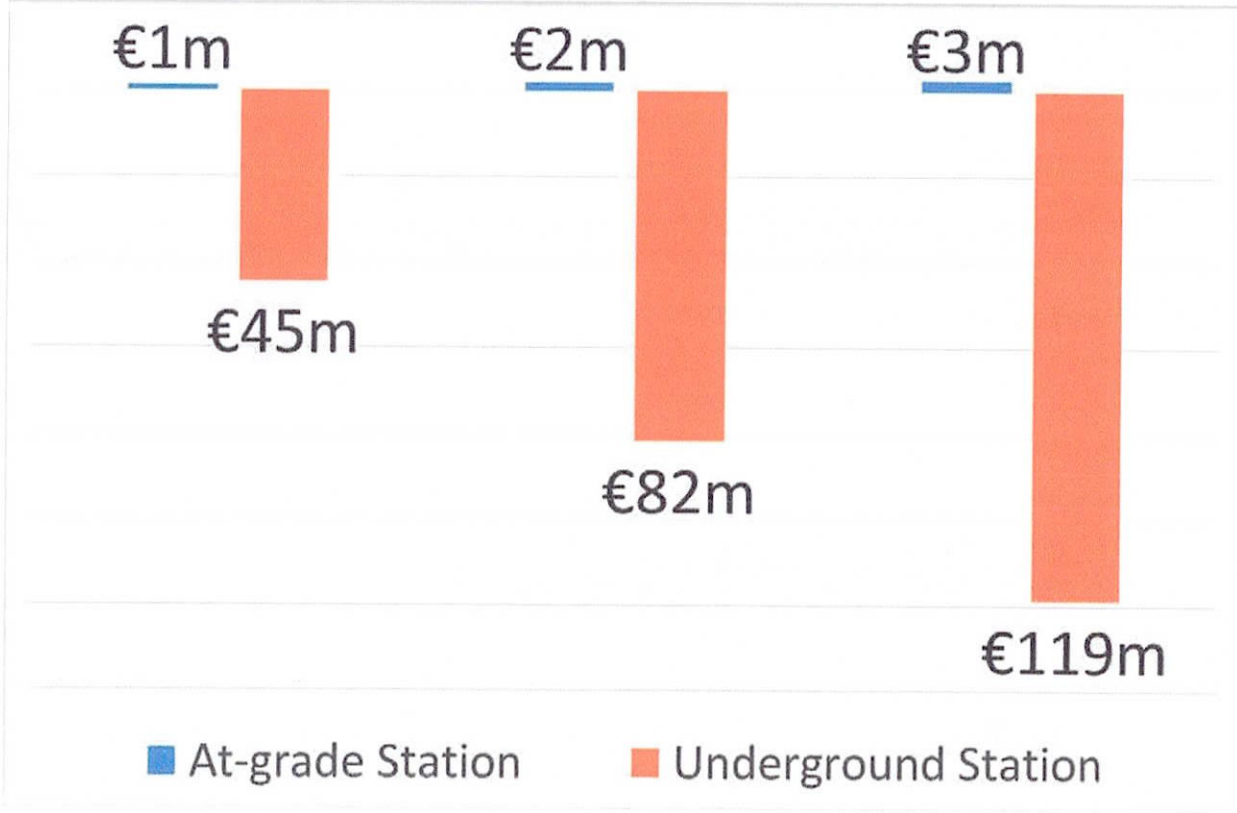
Figure 17 Comparative costs. LUAS CrossCity (including vehicles and stations) with estimated costs for on-street and tunnelled rail (excluding vehicles and stations (€m/km)



Source: National Transport Authority AECOM. North Dublin/Transport Study. Stage One Appraisal Report Nov 2014. Table 6.5 p. 82

Figure 17 compares the max and minimum costs (€m/km) of on-street and tunnelled LUAS (as set in an NTA AECOM report) with the reported costs of LUAS Cross City now being built. While LUAS Cost City costs include stations and trams, the NTA/AECOM estimates do not. The costs of stations and vehicles have to be added to costs which the NTA/AECOM estimated. Figure 18 shows the comparative costs of stations only. Suffice to say that an underground station costs 40 times more than an on-street station. Of course the less stations you have, the less attractive it is for passengers.

Figure 18 Comparative Costs of LUAS stations onstreet and Metro stations underground



Source: National Transport Authority AECOM. North Dublin/Transport Study. Stage One Appraisal Report Nov 2014. Table 6.5 p. 82

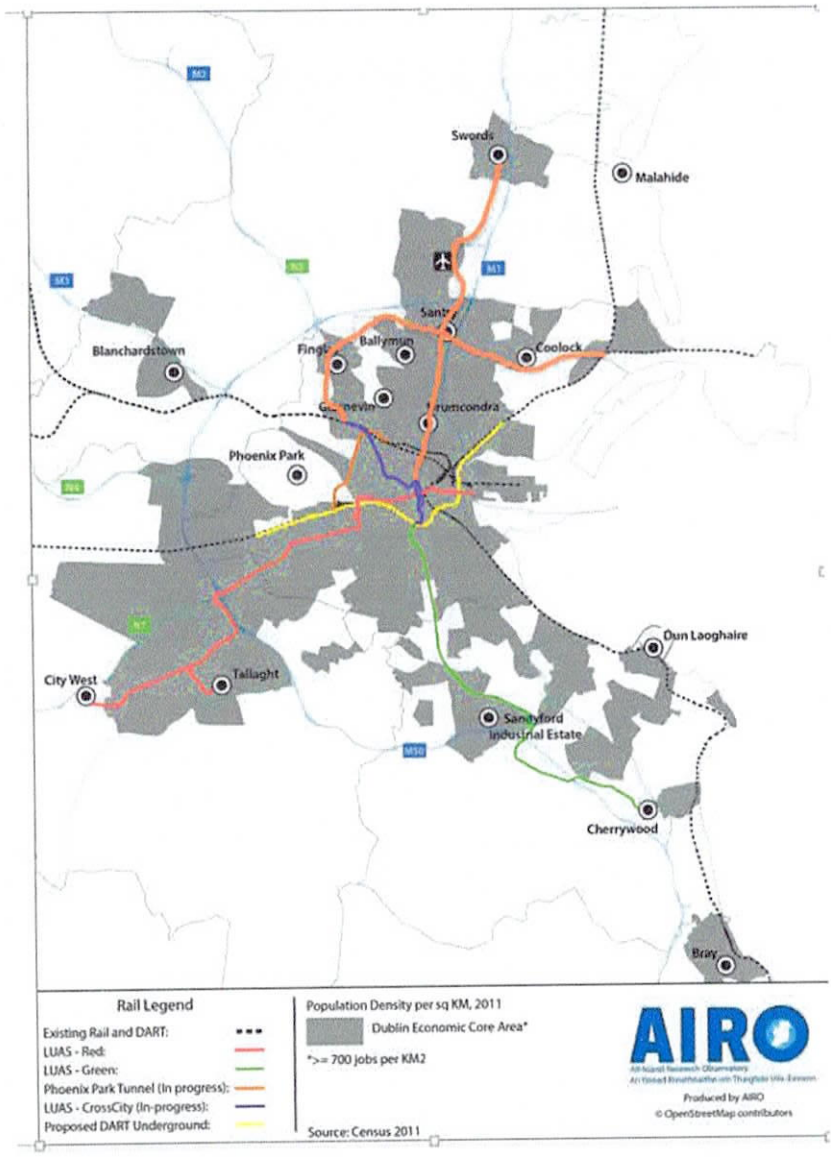
In Figure 19, I present a LUAS loop around North Dublin, with spurs to Airport, Swords and Howth Junction. Howth Junction is the station where the DART to Howth splits from the main northern line. It is also a station at which non-DART commuter services (eg. Skerries, Drogheda, Dundalk) stop.

Using the LUAS CrossCity cost of €61m per kilometre (including vehicles and stations), I estimate that this 35km line would cost just under €2.2bn.

The advantage is that

- It serves the northern part of Dublin's Core Economic Area comprehensively;
- Integrated with what already exists;
- It offers 3 rail-based ways of getting to/from the City Centre from the Airport;
- It links with
    - DART at Howth Junction;
    - Northern Commuter services also at Howth Junction;
    - The Maynooth line at both Drumcondra and Broombridge;

Figure 19 A North Dublin on-street LUAS Loop with spurs to Airport, Swords and Howth Junction



To promote competitiveness and social cohesion, Dublin needs integrated and sustainable public transport. Achieving this needs quiet, consistent competence to bring working and living conditions to the levels of well-run European cities. It would be a start if our public authorities drew the appropriate conclusions from their own reports and invested accordingly.

Appendix 1

Wrong Steer on city's traffic needs

Irish Times 19 July 1995

Wrong steer on city's traffic needs

I. Times Wed. 19 July 1995

The development of public transport in north Dublin has failed to keep pace with the reality on the road, argues **Donal O Brolcháin**

THE recent decision to extend the DART to Greystones raises questions on how decisions on Dublin's public transport are made.

By-elections aside, why give Greystones, with a population of 13,000, priority for a DART extension over Malahide/Portmarnock (20,000), Clondalkin (38,000), Blanchardstown (49,000) or Maynooth/Leixlip (19,000)?

And how closely do the public authorities monitor and respond to changes in traffic? Take the situation regarding access to Dublin Airport. Passenger numbers at the airport have increased by over one million in the past year and now total almost seven million per year.

Since all land access to the airport is by road, it is thought that up to 2,000 *additional* cars used the airport every day last year. And yet the Greystones DART is justified on the grounds that it may take about 600 cars off the roads daily!

What hope does official thinking offer to north Dublin? Not much, if the last available Dublin Transport Initiative (DTI) report is anything to go by. It gave no weight to traffic generated by Dublin Airport in terms of improved access by road or rail during the current EU-funded National Development Programme.

Yet the DTI noted that the airport was the single largest employment complex in the east region, with 8,000 staff. As DTI has not yet published the annexe on Light Rail (LRT), we still don't know the basis for the Government's apparent decision not to build LRT lines linking the city-centre to Ballymun, Dublin Airport and Swords during the current National Development Plan.

Provision of public transport in north Dublin is not keeping pace with developments. In addition to the airport, other developments continue to put pressure on north Dublin's infrastructure. Among these are Beaumont Hospital (2,000 staff, 650 beds and many visitors, suppliers etc) and Dublin City University (over 5,000 students on campus and 650 staff).

Other pressures include the GAA increasing Croke Park's capacity by 15,000 and continuing growth of industry in Santry, Coolock and Swords.

North Dublin is not the only place that transport authorities seem to deal with in a less than balanced way.

It is worth looking at what DTI said about DART. In contrast to other DTI documents, the latest available working copy of the Final Report (May 1994) did not specify any priority regarding DART extension.

The Interim Report (December 1993) noted that "the distances involved between the city-centre and the western towns which are prime candidates for new DART services (approximately 9 km) are *too short* to allow more than a few conveniently-sited intermediate stations on a metro-type system; in consequence, the economics of DART lines to Tallaght, Blanchardstown and Clondalkin are poor."

The question now is this: are the economics of a DART extension to Greystones better than one serving the growing population and industrial centres around Blanchardstown and north Kildare, using the Maynooth line and its intermediate stations? Why did DTI suggest that Leixlip/Maynooth — on a single rail track (just like Greystones) — get an improved diesel service instead of a DART extension?

The rapid growth in north Dublin and north Kildare demands that the Government re-examine the priorities assigned to public transport investment. Improving access to the country's major international airport is critical, given that the aim of EU cohesion and structural funds is to improve our capacity to trade internationally in the single European market.

Prioritising the north Dublin LRT and DART projects is essential if public investment is properly focused on, and consistent with, securing what DTI called a "European model of the urban region, with a strong city-centre at the heart served by a balanced transportation system in which public transport provides for mass transportation needs".

How does the Greystones DART provide better balance in the transportation system than an LRT linking Ballymun (population 22,000), Swords (population 20,000) and Dublin Airport?

Why not bring the following forward during the current national development programme?

* LRT to Ballymun, Dublin Airport and Swords.
* DART extension to Portmarnock/Malahide with a fast, frequent link (possibly LRT) to the airport and Park 'n' Ride at the proposed Marino/Fairview station.
* Reopening Drumcondra station on the Blanchardstown-Leixlip-Maynooth line.

I see these as complementary to the Northern Cross section of the M50 (now being built) and the four-lane port access tunnel agreed by the Government last October.

At present, it seems that some decisions are being taken without regard to what is happening to traffic on the ground.

Donal O Brolcháin is secretary of Drumcondra 2005, an environmental project organised by seven residents' associations

10 May 2018

Appendix 2

The Drumcondra

CITY ACCESS TRANSIT

(CAT)

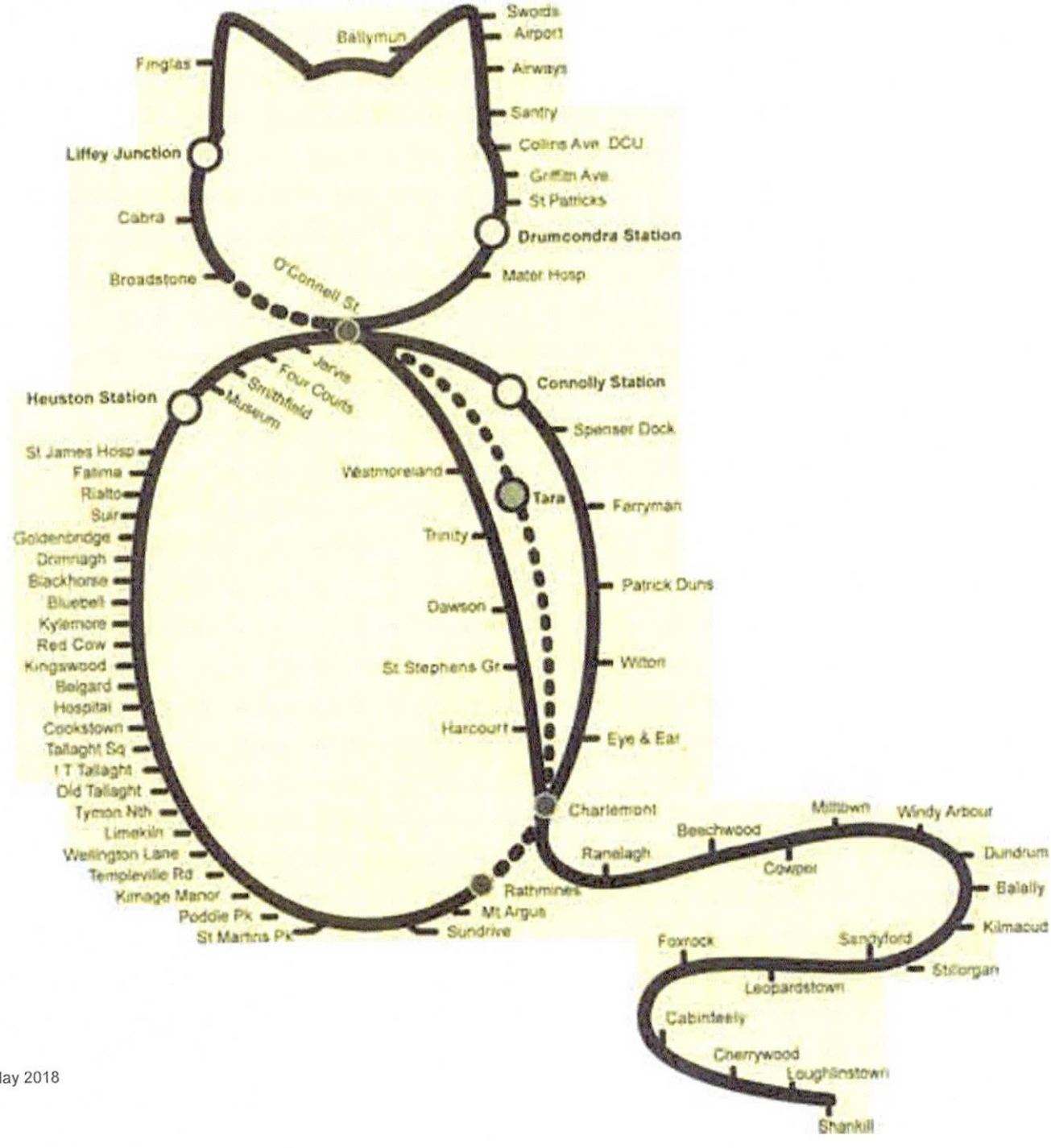
A response to a call for submissions in 2001

DRUMCONDRA
2005

A ten year project to help shape the future of Drumcondra and its associated districts

CITY ACCESS TRANSIT

The public authorities have been pussyfooting on public transport for Dublin for years. Our capital needs a CITY ACCESS TRANSIT (CAT) system with a coherent design. The CAT proposed here hits the ground running as 20 per cent of it is based on that part of LUAS which the Government has already approved. Dublin can purr with this CAT.



10 May 2018

DRUMCONDRA 2005

A ten year project to help shape the future of Drumcondra and its associated districts

c/o 100 Griffith Avenue
Dublin 9
May 2001

Strategy Development Group
The Light Rail Project Office
Heuston Station
Dublin 8.

Further to your recent advertisements, we demand that the proposed Light Rail line from Ballymun to the City Centre be routed through our areas to O'Connell Street to connect directly with the already approved lines to Tallaght and Sandyford.

We strongly object to the proposed routing away from the city centre to Broadstone and west. None of the many bus routes going through our areas take such a route. Neither do the Quality Bus Corridors follow such a route.

We want a CITY ACCESS TRANSIT with a coherent design, as the DTI proposed and as set out in the attached. We draw your attention to the 1996 Oscar Faber report which showed that a LRT line through our areas had more trip attractors/generators than did the Tallaght or Dundrum lines.

We point out that the DTO refused to give us data justifying the rerouting of the line through our areas away from the city centre.

In addition, we ask that you immediately propose to Government a city centre surface line to connect the already approved Tallaght and Sandyford lines. Otherwise, you will be repeating the mistakes made about 150 years ago when railways were first built in Dublin.

Tony Killeen Chairman, Beneford Residents association 19-05-01
D O'Brolchain, Secretary, Drumcondra 2005 20.05.01
Ms M. Geraghty, chairman, Gracepark Community Assoc. 19/5/01
Jim Wallace, Chair, Gaeltacht Park Ass. 19/05/01
Patricia Lee Chair Drumcondra 2005 19/05/01
Robbie Dale CHAIR All Hallows 20/5.01
Kathryn Mulhead Secretary all Hallows Area Assoc. 19/5/01
Br. McLaughlin CHAIR I.D.R.A. 14/5/01
Joe L W Harvey CHAIR Courtlands Residents Assoc 20-5-
Barrs Ford Residents Chairman Drumcondra Res Ass

Organisers include the Residents Associations of All Hallows, Courtlands, Drumcondra, Gaeltacht Park, Gracepark, [redacted] and Iona & District

City Access Transit

SUMMARY

CAT is **street wise and clean**. It offers a coherent framework for

- **Park 'n Ride sites on all the main national roads**
- **Interchange with DART, Arrow and other mainline rail services**
- **access to Dublin Airport and Port**
- **redesigning bus services**
- **becoming fatter, with bells, whiskers and even kittens.**

CAT serves all the main road, rail and air access points to Dublin. It links many industrial, office and commercial areas with residential areas. The network also links many educational and cultural institutions as well as hospitals. CAT makes it easy to run continuous services in a single system.

Dublin's public transport (including buses) needs **a current cost subsidy** at the same level as other European capitals. A Dept. of Public Enterprise paper reported that Dublin's public transport gets less than one quarter of the subsidy rate in Helsinki and Stockholm. Other studies suggest that European capital cities have public transport subsidy rates of about 50 per cent.

We need **quiet competence - not grand gestures**. We must have a coherent strategy for the next 20 years. During that time, further options for the future can be developed, studied, designed, costed, debated and decided. By having three different policies in the three years since it took office, this government has shown itself incapable of coherent thought, competent planning and considered action on Dublin transport. Consider the following

- The proposal for a LUAS line linking Ballymun, Drumcondra to Broadstone! At present buses from these areas go into the city centre. If Broadstone did not exist, who would create this place well away from the city centre!
- The proposed LUAS link with DART near Shankill. This seems to assume using an old rail junction. This area is now built up. Does this new plan imply demolition of houses in Shanganagh?
- "The future of urban transport policy lies not in expansion but in the intelligent use of existing traffic areas. The objective of ensuring mobility for people when travelling to work and shoppingf and during leisure time requires imaginative urban traffic management based on modern information technology". Ernst Joost, Deputy Director, Zurich Transport Authority, speaking in Dublin in June 1999.

Both the **motoring and taxi lobbies want better public transport** instead of more parking charges and road-pricing. Judge Sean O'Leary, Inspector for the LUAS public inquiries, found that **buses alone cannot do the job**. John Henry, DTO Director told the same inquiries that light rail has a proven capacity to attract car drivers. As citizens of the Celtic Tiger, CAT **improves our standard of living** by making it easy to travel around our capital in **less polluting** ways.

CAT links different parts of Dublin using a mainly surface light rail transit. Many centre city stops are those already approved for the Tallaght and Sandyford lines, as are the stations on those lines. Government consultants studied a line linking Tallaght to Kimmage, going underground to Rathmines, Ranelagh, Tara St, O'Connell St and Broadstone. CAT includes that line. The LUAS vehicles already ordered are being built for underground running.

CAT is **cost effective.** Surface LUAS is **costs one-seventh** that of underground (see p. 5). The Government has already committed over 20 per cent of the cost by deciding to build the Tallaght and Sandyford LUAS lines at a cost of £353m for 23km. This CAT will cost £1.628bn. as follows:

On-street LUAS 70kms @ £15m per km	=£1,050m
Underground LUAS 6kms @ £38m per km	= £228m
Underground stations say 5 @ £70m each	= £350m

GET ON WITH IT!

CLEAN AND HEALTHY

Being electric-powered, CAT pollutes less at point of use and is quieter. Given the different ways of generating electricity, CAT need not contribute to climate change, as it does not emit any environmentally damaging greenhouse gases directly.

CAT will help Dublin to become a healthier city. Traffic is now the largest single air pollutant in urban areas. Some have estimated that traffic-generated air pollution causes over 20,000 deaths in Europe every year.

PARK 'N RIDE ON THE MAIN ROADS.

CAT provides a clear framework for Park 'n Ride sites. It links all the main roads into Dublin with much of the city, as follows

- Airport/Belfast road(N1) at Swords, the Airport, Collins Ave and Drumcondra;
- Ashbourne/Slane/Derry road (N2) at Finglas;
- Navan/Cavan road(N3) at Cabra;
- Lucan/Maynooth road(N4) along the quays e.g. Museum on the Tallaght LUAS;
- Naas/Kildare road(N7) between Red Cow and Grand Canal (with stations at Kylemore Road, Bluebell and Blackhorse on the already approved Tallaght line)
- Blessington/Tullow(N81) road at Tallaght;
- Bray/Wicklow(N11) at Loughlinstown and Cabinteely;
- M50 at two places, ie. between Kingswood and Red Cow(on the Tallaght line), between the Airport and Finglas between CAT's ears.

INTERCHANGE WITH DART, ARROW AND OTHER RAIL SERVICES

CAT has direct interchanges to the existing rail services at four different places. It links with

- DART by underground stations at Tara St or Connolly (Tara St station cannot cope with existing peak hour passengers. It is not clear that CIE's development plans for Tara St. include increasing the capacity for passengers).
- Heuston. This links with Kildare Arrow services and mainline rail services from Dublin to all parts of Ireland.
- The Western line at Drumcondra Station and a proposed station at Liffey Junction. Liffey Junction is between Cabra and Finglas. It where the railway line under the Phoenix Park joins the Western Suburban (Kilcock-Maynooth-Barrow St) line. This serves such rapidly growing areas as Blanchardstown in North-West Dublin and Leixlip in North Kildare.

DUBLIN AIRPORT

CAT serves Dublin Airport directly. It does so from two directions, as the Airport is on a loop. One part of this loop is mostly off street ie. from Harold's Cross to the Airport via Rathmines, Ranelagh, Tara Street, Broadstone, Cabra, Finglas. This would make it easy to run express and/or limited stop services to/from the Airport. This means a predictable travel time to and from the Airport. It shortens the total journey time, including the time spent looking for parking at Dublin Airport. CAT gives people another option on the cost and inconvenience of Airport parking.

For years, all Governments have ignored key facts about the Airport in planning Dublin transport. A recent Ove Arup report confirmed what the Dublin Transportation Initiative found in 1993 - that there is a lot of traffic **to** the Airport during the morning peak commute hour. This complements the city bound flow making this an ideal route for public transport.

A 1998 Aer Rianta/CIE Air-Rail study reported that over three-quarters of Dublin Airport passengers are making journeys for leisure purposes.(see p.6) Passengers who want non-stop Airport access would have the options of their own cars or taxis or bus services. All could use either the Port Tunnel or the complete M50 or the Eastern By-Pass, if it is ever built!

BUSES

Dublin needs a redesign of bus services. Bus drivers need comfortable places to work from and in which to take breaks. One Dublin Bus depot(Broadstone) is on CAT, while another three (Ringsend, Summerhill, Cunningham Rd) are very near it. This would help get rid of bus parking on city centre streets.

A FATTER CAT - BELLS AND WHISKERS, EVEN KITTENS

By adding bells and whiskers, and a kitten or two, CAT could serve other areas. One obvious area is between the M1 and the northern railway line. This whisker would take in industrial areas at Clonshaugh and Coolock in addition to Northside Centre and Beaumont Hospital. An extra bell could take in the Point, East Wall and the ferry terminal at Dublin Port, perhaps connecting with the Coolock whisker! Similarly, a west side kitten could take in Clondalkin and Citywest.

BEING STREET WISE,

CAT makes better use of the space available. (see p.7). A 30m CAT vehicle carries 60 people seated in the same street space as 6 cars. These 6 cars carry less than 9 people as each car carries an average of 1.42 people during the morning peak in Dublin according to the DTO.

100,000 new vehicles were registered in Dublin between January and October. Traffic planners allow over 5 metres per car. This suggests that Dublin needs over 12 km (7.5 miles) of street space each week to cater for these vehicles. On this basis, you might have to go to Cork to park!

CAT OR A *WOMBAT*?

CAT is a single network. As all parts are connected, there will be no need to build maintenance depots for the separate lines needed by this government's policy. Why build two separate depots for the Tallaght and Sandyford lines? The present policy does not to connect these lines. This repeats the mistake made when railways were first built in Ireland. The lines into Dublin did not interconnect then. Continuing this is a ***w***aste ***o***f ***m***oney, ***b***rains ***a***nd ***t***ime - a *wombat*. Approving this "in principle", means dithering! This indecisiveness drives up costs. It makes life uncomfortable and unpleasant!

A PURRING CITY

All public transport has to be pleasant, easy to use, predictable and reliable. This means easy access for all and being clean.

Ease of use will be greatly enhanced when the Dept. of Public Enterprise brings in **integrated ticketing** for public transport. Smart cards (like telephone call cards) may be used. This will allow people to use a single card for any public transport journey within the Greater Dublin area, regardless of how many changes of mode (eg. from CAT to bus, DART, Arrow or suburban and vice versa) are needed.

Predictability means having up-to-the-minute information on the next service arriving at each public transport stop. DART has this. But CAT will run mainly on streets, where traffic conditions can make time tables more aspirational than real. **Real-time information** is necessary at each stop as in cities like Gothenburg.

Reliability demands that all public transport (CAT, buses) in Dublin must get **automatic priority at traffic lights**. Dublin Corporation staff resist this, despite the lessons of wealthy cities like Zurich.

GET ON WITH IT!*

CAT is one of a set of mutually-reinforcing measures which should make it easy for people to move around the Greater Dublin Area. We need the Government to get on with CAT by deciding, immediately, to

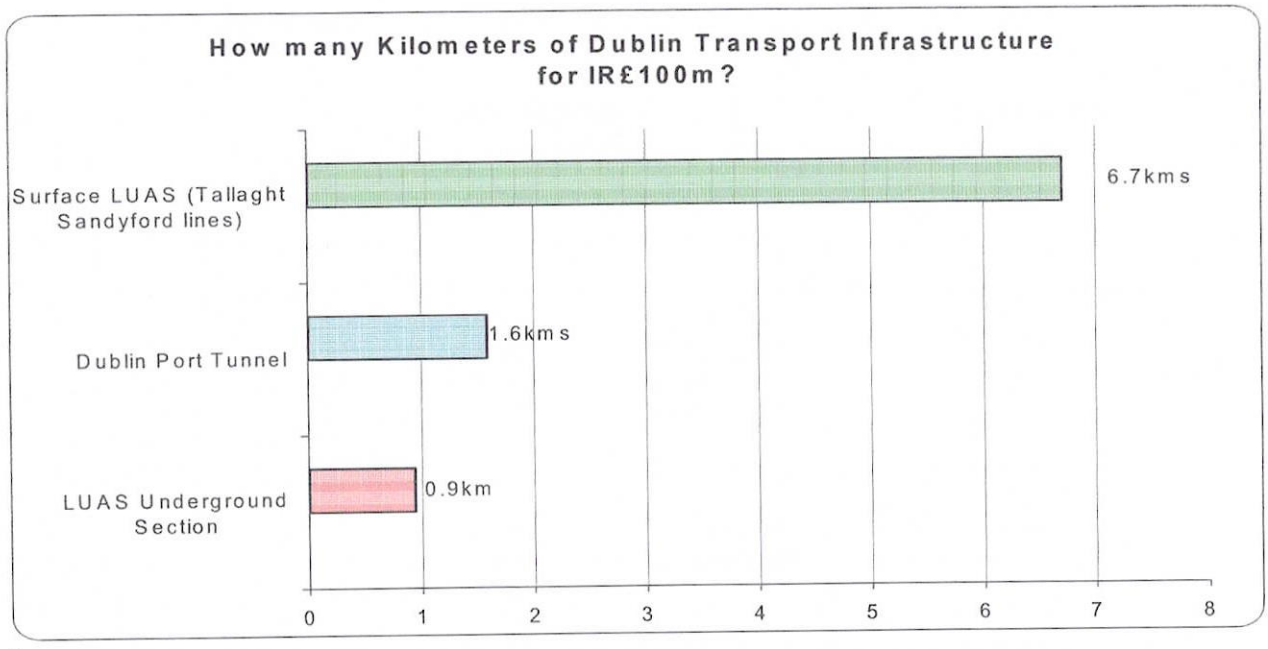
1. hold a public inquiry on a surface link (via Dawson, Nassau,Grafton and Westmoreland Streets) between the Sandyford and the Tallaght lines
2. fund full detailed design on
    - the northside loops serving the Airport, Swords and the suburbs between them and the city centre;
    - the Docklands loop linking Connolly to Ranelagh via the new Guild Street - Macken St. bridge;
    - a new line from Tallaght (via Templeogue, Kimmage, Harold's Cross Rathmines) to the city centre and Broadstone outlined by Atkins in 1998. This includes a tunnel from Mount Argus through to Broadstone (with underground stations at Rathmines, Ranelagh, Tara Street);
    - extensions to City West, Clondalkin, Coolock, East Wall and the Dublin Port passenger terminal.
3. Provide an operational cost subsidy of at least 50 per cent for all mass public transport - regardless of who owns or operates it.

*CAT is based on the following:

- the 1994 Dublin Transportation Initiative (DTI) final report.
- the 1996 Oscar Faber comparative study on Dublin's LRT lines.
- the 1997 Dublin Docklands Master Plan
- the 1998 Atkins study on surface/underground options for Dublin's light rail.
- the 1998 CIE-Aer Rianta Air-Rail link Report.
- the 1998 Dublin Corporation Review of Existing Air Quality and proposals for additional monitoring of traffic related emissions in Dublin City. issued by the Office of the Director of Traffic
- the 1998 DTO Final Report on Park and Ride Strategy for the DTI area
- CIE - Light Rail Project Office. Environmental Impact Statements
    1. Line A. Tallaght - Middle Abbey Street. July 1998
    2. Line B. St. Stephen's Green - Sandyford Industrial Estate. December 1998
    3. Line C. Abbey Street - Connolly Station. September 1999
- Findings of Inquiry
    1. Dublin Light Rail Line A. December 1998
    2. Dublin Light Rail Line B. June 1999
    3. Dublin Light Rail Line C. January 2000
- the 1999 Dublin City Development Plan
- the 1999 National Development Plan
- the 1999 Strategic Planning Guidelines for the Greater Dublin Area
- the January 2000 Atkins McCarthy report on the underground section of LUAS/LRT between Stephen's Green and Broadstone.
- the June 1999 lecture Economy and Ecology are not Contradictions - Lessons in Transportation Planning from Zurich by Ernst Joos, Deputy Director, Zurich Transport Authority organised by the Swiss Embassy and others.
- the March 2000 Ove Arup report Dublin Suburban Strategic Rail Review.
- the April 2000 UCD report Comparison of Subvention levels for Public Transport Systems in European Cities, commissioned by the Dept. of Public Enterprise.
- the April 2000 report by Environmental and Transport Planning (UK) Bus or Light Rail: Making the Right Choice.
- the May 2000 Dept. of Public Enterprise report on Regulation of the Bus Market in the Greater Dublin Area. prepared for the Cabinet Committee on Infrastructural Development and Public Private Partnerships.
- the June 2000 Dublin Corporation proposal for a bridge in the Docklands
- the September 2000 article on Public-health impact of outdoor and traffic-related air pollution: a European assessment Lancet (UK) 2 Sept 2000 (Vol. 356 No.9232)
- the September 2000 DTO Platform for Change Strategy 2000-2016
- the October 2000 National Greenhouse Gas Strategy published by the Minister for the Environment and Local Government.

Donal O Brolcáin
Secretary Tel:(H) 837 1753 (after 19.00) email: donalobrol@clubi.ie

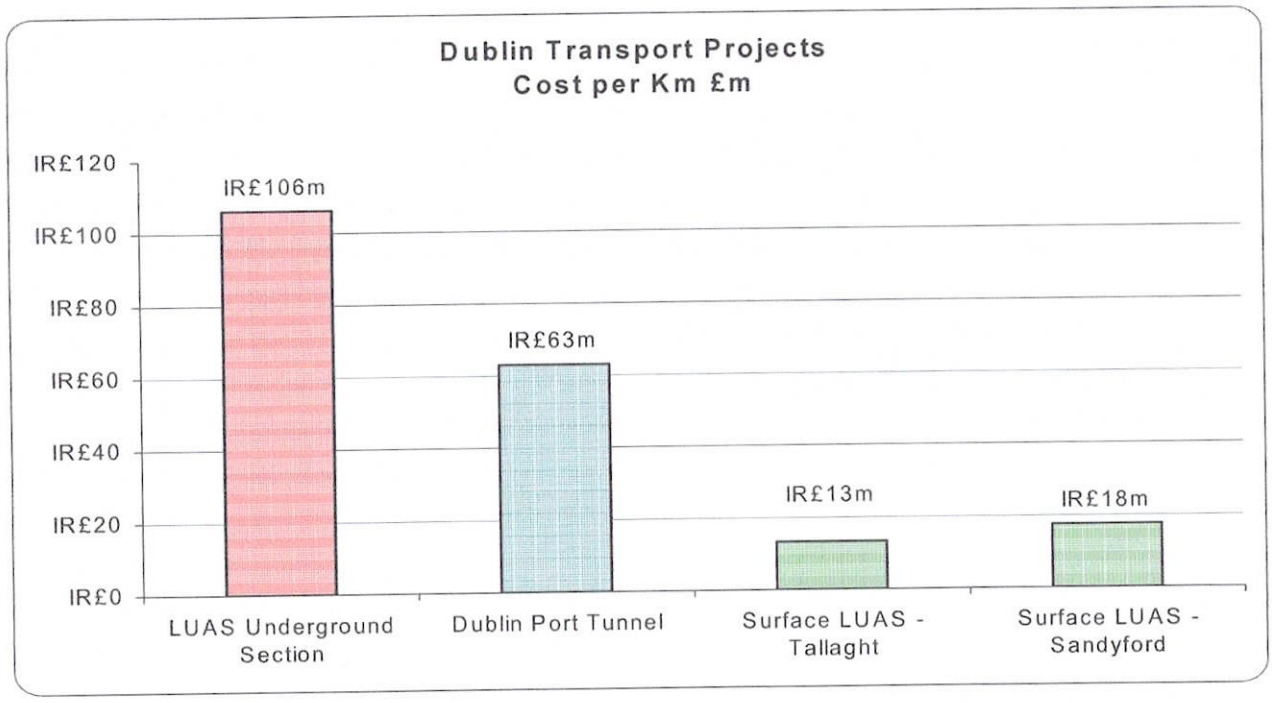
It is still cheaper to put cars/trucks underground than to put LUAS/Metro underground, even with the doubling of the cost of the Port Tunnel!
Putting LUAS/Metro underground is the most expensive option.



Sources:

LUAS Underground Section:	3 underground and 2 surface stops. Atkins McCarthy report for CIE. January 2000	2.85kms	£303m
Dublin Port Tunnel:	Dual carriageway with 4.5km in tunnel. Dublin Corporation Press Release. 11 October 2000	5.6kms	£353m
Surface LUAS:	Tallaght-Middle Abbey St line. Dáil Debates. 29 March 2000	14kms.	£185m
	Sandyford-Stephens Green Mary O'Rourke, TD Minister for Public Enterprise. 31 July 2000	9kms	£158m

CIE. Environmental Impact Statements.



DUBLIN AIRPORT

Profile of Passengers (1)

1999 Passengers (excluding transit)(2) 12,657,047
(say 12.65m.)

Purpose of Journey(3)

	Business	Leisure
	24.4%	75.6%
Irish	(11.7%)	(33.3%)
Non-Irish	(12.7%)	(42.3%)

Origin/Destination of Air Travellers(4)

Dublin	50.7%	(say 6.42m)
Leinster	23.9%	
Munster	11.7%	
Connacht	7.9%	
Ulster	5.8%	

Dublin Area 'air passenger'(5)(subject to note)

Contiguous to	DART network	45%	(say 2.89m.)
	Northside	15%	(say 960,000)
	Southside	30%	(say 1,925,000)

Note. "A closer review of the Dublin area airport 'air passenger' traffic highlights that approximately 45 per cent of the traffic is contiguous to the DART network…Similar information is not available for 'non-Irish' travellers through the Airport. However, market research indicates that up to 70 per cent of foreign travellers visit Dublin at some stage of their Irish trip. A review of the 1996 Bord Fáilte approved hotels and guest houses in Dublin highlights the very high concentration of bed spaces in the central area and the south east quadrant. The distribution of beds within these areas is summarised in Table 4.2 below. It is clear from this table that the south east city centre area (Dublin 2) along with the Ballsbridge and Donnybrook areas (Dublin 4) are the prime locations in terms of accommodation availability." (from par 4.3 of Source 1. Below)

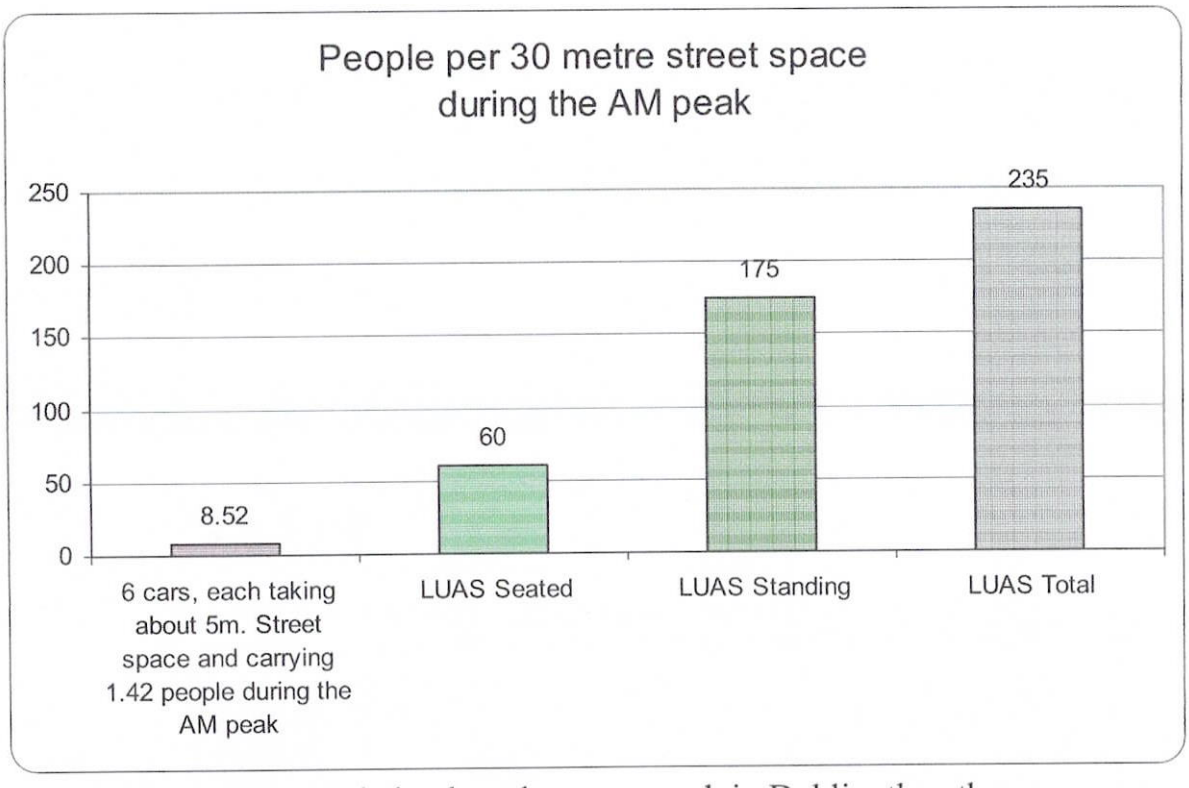
Surface Access (mode of use) by Air Passengers(6)

Private Car	67.6%
Taxi	12.2%
Bus/Coach	19.2%
Other (HGV, Motorcycle)	1%

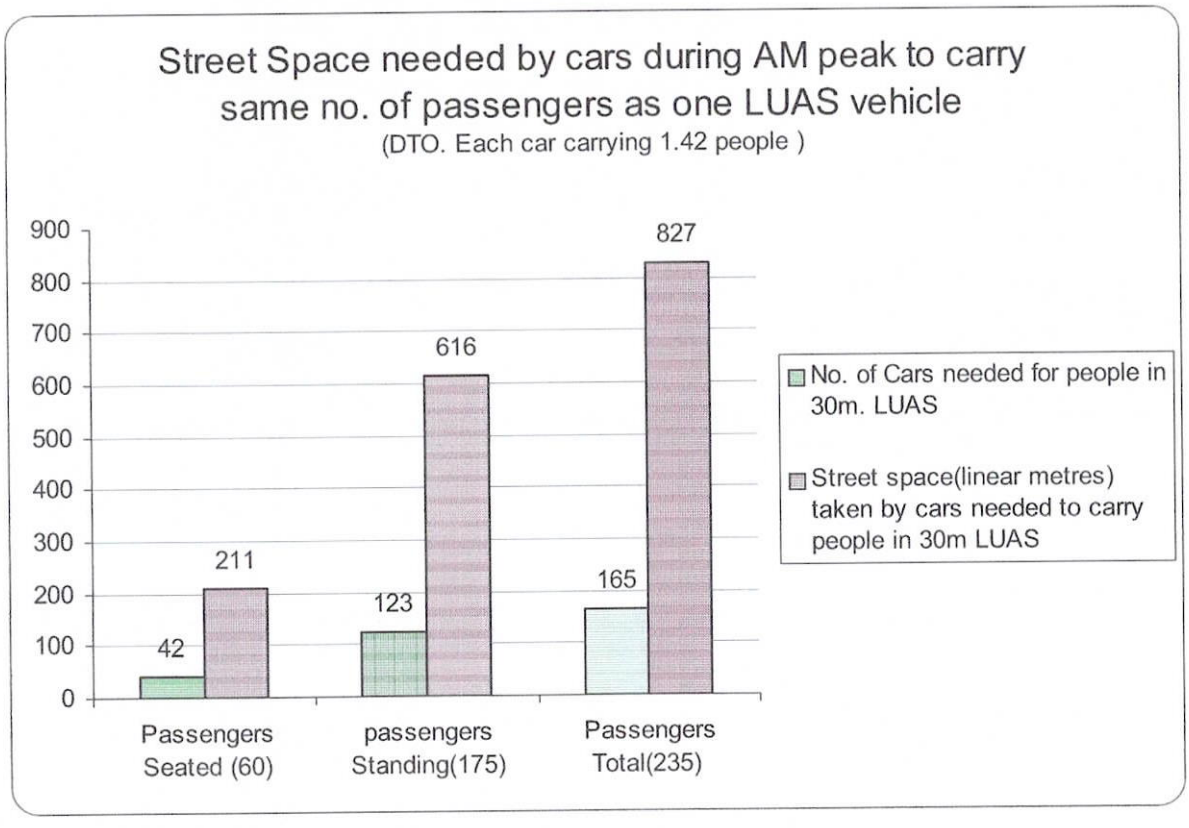
Sources

1. Drawn from CIE/Aer Rianta. Dublin Airport Air-Rail Link Study. Final Report. April 1998. (Air-Rail Link Study)
2. Aer Rianta Press releases on 1999 Passengers though its Airports. 28th January 2000
3. Air-Rail Link Study. Table 3.4. p.12
4. Air-Rail Link Study. Figure 4.1 p.19
5. Air-Rail Link Study. Section 4.3. p.19
6. Air-Rail Link Study. Table 4.4. p.25

STREETWISE!



If 1,000 new cars are being bought every week in Dublin, then these occupy 5km (3 miles) of street space. It is cheaper to provide new street space underground, in road tunnels, than it is to put LUAS/Metro/Rail/CAT underground (see p. 5)



LUAS

DUBLIN LIGHT RAIL (LUAS) AND METRO SYSTEMS

Preliminary Public Consultation - *Invitation for Written Submissions*

Good progress is being made with construction of the Luas - a flagship project of the National Development Plan (NDP). The initial lines will serve Tallaght and Sandyford Industrial Estate and will link the three main city centre public transport hubs at Heuston, Connolly and Busáras.

This notice relates to future development of the Luas system and the introduction of a Metro system to meet the growing demand for high quality public transport.

In October 2000 the Dublin Transportation Office(DTO) published a strategy framework document entitled "A Platform for Change" which includes outline proposals for future Luas and Metro lines.

The Government has indicated its acceptance of the broad thrust of this strategy framework document and has requested the Light Rail Project Office to study the DTO outline proposals.

The Light Rail Project Office has commenced this study and is interested in receiving written submissions relating to the envisaged Luas and Metro systems as outlined in the accompanying map.

Written submissions should be sent to the following address for receipt by 30th May 2001:

Strategy Development Unit,
The Light Rail Project Office,
Heuston Station,
Dublin 8.



Luas & Metro Lines

Luas Lines:

- A north-south line from Ballymun via Whitehall, City Centre, Harold's Cross, Terenure and Rathfarnham to Dundrum with an extension north of Ballymun to Sillogue. A spur at Whitehall via Cootoock to Kilbarrack.
- An east-west line from Lucan via Ballyfermot, Dolphin's Barn and South City Centre to Docklands

Metro Lines:

- a line from Swords to Shanganagh serving Dublin Airport, Finglas, Broadstone, City Centre, Ranelagh, Sandyford and Cherrywood incorporating some underground sections and integrating with Luas south of Ranelagh
- A line from Tallaght West via Tallaght and Kimmage entering the city centre tunnel in the south city
- An orbital line from Finglas to Tallaght via Blanchardstown and Clondalkin

Oifig Chumscaithe an Iarnróid Stáit
Light Rail Project Office

NDP

CIE Group of Companies

10 May 2018

Appendix 3

LUAS needs joined-up thinking

Sunday Times 26th September 2010

- 1
- 1

Next page
Show all

Think tank: Luas needs joined-up thinking

Our governing classes refuse to learn from their mistakes. Spin, hype and bluster cannot disguise the fact that quiet competence is missing

Donal Ó Brolcáin
Published: 26 September 2010

-
- Recommended (1)



Luas cannot be a network without integrating the lines (Gareth Chaney Collins)

The property-induced economic crisis has given us an opportunity to scrap Metro North and the proposed Dart Interconnector, and instead expand the Luas system in Dublin. Within the next few weeks, the Railway Procurement Agency (RPA) will open the Luas Green line extension to Cherrywood. This includes two fully equipped stations that will not be used. Recently, Iarnrod Eireann said it will not open a newly built station on the Kildare line. In both cases, the reason is that expected property development did not take place.

Metro North and the Interconnector are also predicated on development assumptions that no longer hold. Meanwhile, the government has dropped plans to link the two existing Luas lines for passenger services. This perpetuates the folly of the decision made in 1998 to build two separate Luas lines.

To meet the aims of government transport policy — to ensure the provision of a well-functioning, integrated public transport system that enhances competitiveness and contributes to social cohesion — I propose an integrated Luas, which would create an on-street loop around the central business district; access Dublin airport from all parts of the network, including a link to Dart; and fill the transport void in north Dublin with three Luas lines, all on the surface and cheaper per kilometre than Metro North.

Luas cannot be a network without integrating the Green and Red lines. This means a full interchange at the O'Connell Street-Abbey Street junction. This is no more radical a suggestion than the RPA-Iarnrod Eireann proposal to uproot St Stephen's Green as part of their plans for two lines (Metro North, Dart Interconnector) underneath that part of Dublin.

Integrating the Green and Red lines needs two tracks on-street from Stephen's Green to Broadstone, as RPA proposes. It would transfer to the unused line that joins the Western line (Maynooth, with the new Dunboyne line) at Broombridge.

Last Friday, An Bord Pleanála was due to hold a preliminary hearing on RPA's application to build another Luas line, one that will not connect the existing lines for passenger services. The plan includes a bridge across the Liffey, joining Marlborough Street and Hawkins Street. This is silly, as it ignores the Samuel Beckett bridge, designed to take Luas vehicles. Why build yet another bridge that does not extend the Luas catchment area? Such a proposal goes against the notion of cost-effective improvement of public transport in the built-up parts of the capital.

The Docklands loop that I am proposing would use the Samuel Beckett bridge to integrate this new city quarter. Running on-street, it would connect the catchment areas of the Green line (Sandyford- Cherrywood) to the docklands, linking up the newly opened National Conference Centre, O2, Busaras, Connolly station and the Abbey theatre. It would connect the Red line (Tallaght-O2) to the south docklands, allowing easier access to the Grand Canal theatre, Shelbourne Park, the Aviva stadium, the Eye and Ear Hospital and National Concert Hall. It would require a new Dart interchange at Barrow Street on the southside, complementing Connolly Station on the northside.

The North Dublin loop would start from the joined-up Luas lines in O'Connell Street, run up Dorset Street, Drumcondra, Whitehall, Collins Avenue/DCU to Ballymun, onto the airport and back through Finglas to join the extended Green line at Broombridge. The airport can be linked to the Dart at Clongriffin, with a Luas line taking in Coolock, Beaumont Hospital and the North Fringe. That would put Dublin airport on a loop connecting it to the central business district from two directions. The airport can be also linked to the Dart at Clongriffin, with a Luas line taking in Coolock, Beaumont Hospital and the North Fringe.

Our governing classes love grand gestures, usually involving the feuding public-sector baronies of CIE companies, the RPA, National Roads Authority, local authorities, government departments and the newly created National Transport Authority. They refuse to learn from the mistakes made when railways were first built in Ireland.

Spin, hype and bluster cannot disguise the fact that quiet competence is missing. Dublin needs an integrated Luas network to show the "joined-up thinking" of which we have heard so much, and to get us out of the crisis caused by reliance on property development.

Donal Ó Brolcáin was secretary of Drumcondra 2005, a group of residents' associations that campaigned to remove through traffic and for more public open space

Submission to National Transport Authority

on

Fingal/North Dublin Transport Study

Stage one appraisal Report Nov 2014 produced by AECOM

I call for this report to be rejected in full as

- The terms of reference set by the National Transport Authority are flawed;
- The consultants fail to meet even these flawed terms of reference
- the report is seriously misleading in its presentation of options;
- the report is tendentious in its assessments of the options presented;
- the conclusions do not match the complete terms of reference.

1. Flawed Terms of Reference

1.1. The terms of reference

On 23rd September 2014, the consultants (AECOM) invited me to meet them to discuss the Drumcondra CITY ACCESS TRANSIT(CAT) proposal. Prior the meeting which took place on 6th October 2014 AECOM sent (at my request) the terms of reference of the project[1]

The Introduction and Background to these terms of reference are:

The National Transport Authority (the "Authority") is proposing the development of a Bus Rapid Transit (BRT) scheme along the Swords / Airport to City Centre corridor, with a projected opening year of 2017.

The purpose of this feasibility study is to assimilate the transport planning work previously carried out in relation to this sector of Dublin and to identify the appropriate long-term public transport solution along the general scheme corridor, which is represented by the area bounded by:

- *R107 Malahide Road in the east (but including the Northern Rail line);*
- *Dublin City Centre (Grand Canal) in the south;*
- *R135 / N2 Finglas Road / North Road in the west; and*
- *Lissenhall Junction (on the M1 motorway) and Ashborne in the north.*

References in this Schedule B to the "General Scheme Corridor "shall be taken to be references to the above defined area.

[1] Email from AECOM (Elaine Brick) 3rd October 2014

The focus of the study shall be the north south radial movements connecting the key origin / destination points in the General Scheme Corridor including connecting to and from Dublin City Centre. The horizon year for the study should be 2035.

The overall objective of the study is to identify the optimum medium term / long term public transport solution connecting to Dublin City Centre, which serves the key destinations in the General Scheme Corridor, including, in particular, Dublin Airport and Swords.

1.2. The major flaw in these terms of reference is that the focus is oriented to both Swords (one part of Fingal) and Dublin Airport.

1.2.1. It is clear that this and other NTA studies have placed an exaggerated focus on Swords. It is clear that Swords is important. But is it any more important that other parts of Fingal eg.Blanchardstown which is not part of this study, even though it too is a major employment and residential part of Fingal?

1.2.2. It is highly debatable that Swords is uniquely and specially more important that the whole corridor between the City Centre and Dublin Airport as is clear from this figure

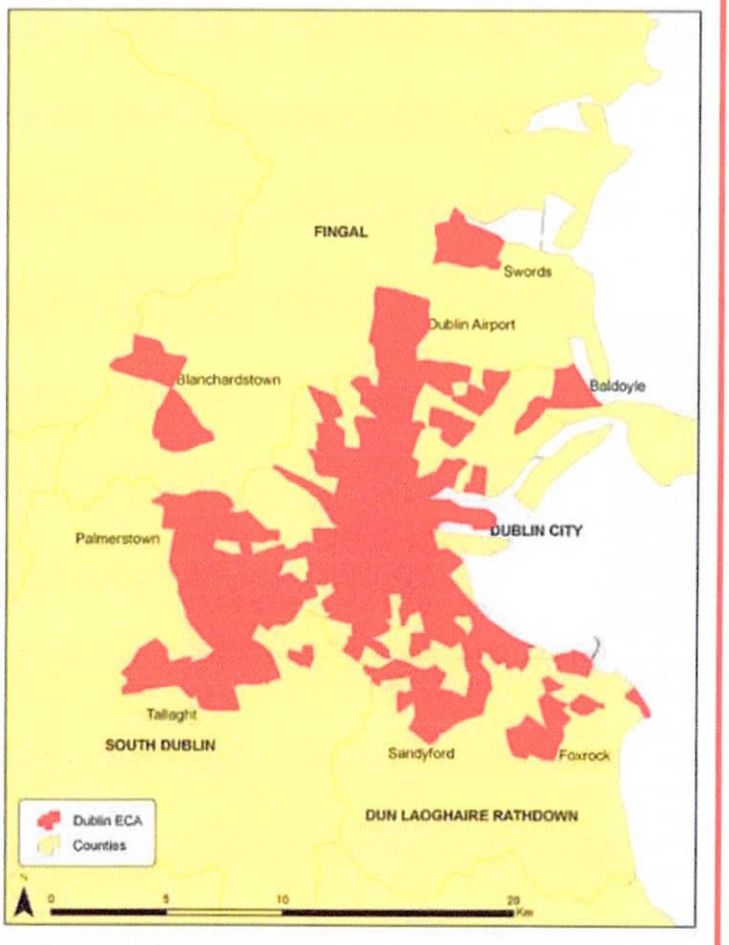
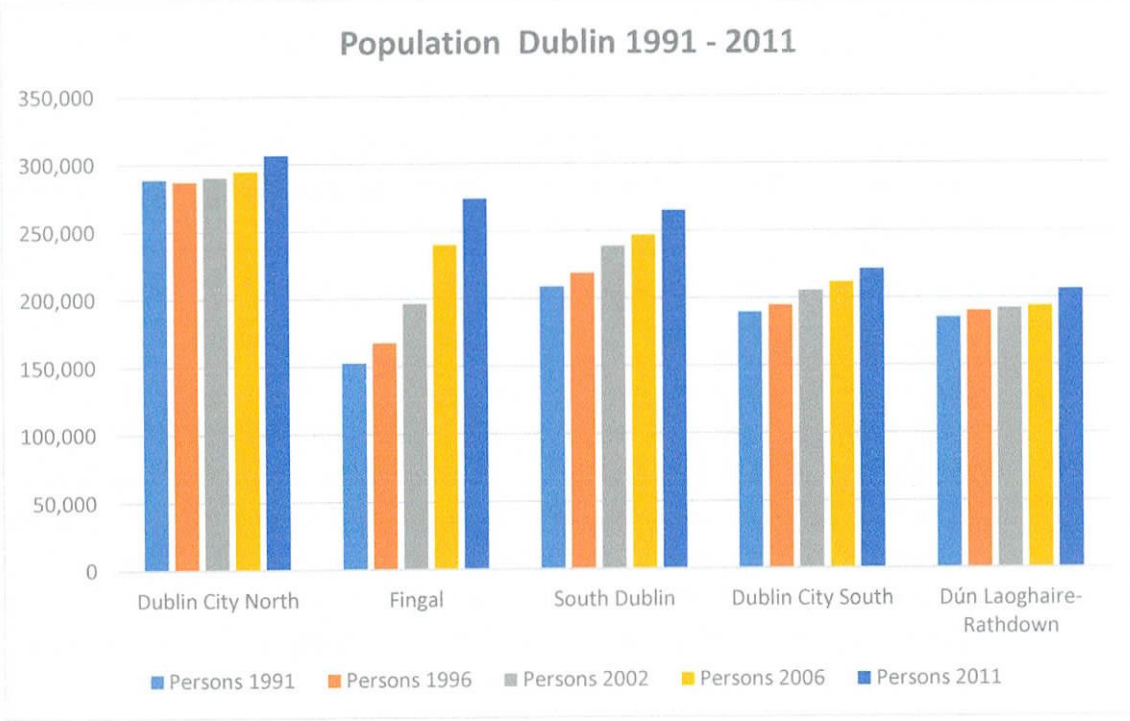


Figure 1: Dublin Economic Core Area. Source: Census of Population 2006 POWCAR dataset OSi boundary datasets, OSi permit no. MP009006(c) Government of Ireland

1.2.3. North Dublin City is and has been more heavily populated that South Dublin City, Fingal, Dun Laoghaire-Rathdown and South Dublin (see Fig. 1) . By focusing on one corridor only, it limits consideration of how to optimise the modal shift to public transport in the complete North City in order to implement Government policy.

Figure 1 Population of North Dublin compared to other parts of Dublin 1996-2011



1.2. Basic Assumption does not make sense ie proposed Bus Rapid Transit(BRT) along the Swords/Airport to City Centre Corridor

Every map in the report shows a Bus Rapid Transit on the Swords-Dublin Airport-Drumcondra-City centre corridor. National Transport Authority studies show that this proposal is completely without merit. It is clear that the proposed Bus Rapid Transit will not meet the demand forecast on this "scheme corridor".

The consultants (AECOM) were involved in a recent report (October 2014) which made that clear[2]. This report shows that, with one exception, passengers forecast exceed the proposed BRT capacity even with the existing bus network still in place. This report assumes two separate BRT services south of the Airport, with maximum

[2] National Transport Authority Swords/Airport to City Centre. Route Options Assessment Volume 1 : Main Report (October 2014)
http://www.nationaltransport.ie/wp-content/uploads/2014/10/Route_Options_Assessment_Report.pdf

capacity of 2,700 ppdph. ie. 22.5 vehicles/hour on the Dublin Airport-Drumcondra-City Centre route, instead of the 15 vehicles/hour cited for BRT[3]. These lack adequate capacity for the passengers forecast ie.

1. 1,800 passengers per direction per hour (ppdph@4 minute frequency) is **exceeded by**
   - 40% in 2018 - the opening year for this proposed BRT;
   - 80% in 2033 – the forecast year.
2. 2,700 ppdph (@2.7 minute frequency) **exceeded by**
   - 22% in 2033 – the forecast year

   while being
   - at 95% capacity in 2018, the opening year for this proposed BRT.

This assumes that the existing Dublin Bus Network remains in place. But is also states that ***it anticipates that demand will increase following a re-organisation of Dublin Bus Routes***[4]. (my emphasis)

This follows an earlier National Transport Authority study which found

It is on the northern section of this corridor – between Swords and the City Centre – that the high levels of demand arise. The southern section – Tallaght to City Centre – is within BRT capacity. This section of the corridor is common to the Clongriffin to Tallaght proposal which is dealt with in subsequent paragraphs. ***Overall, the link between the city centre and Swords has demand levels that exceed the capacity of a moderate capacity BRT system, in the longer term. While BRT may provide an interim partial transport solution in the shorter term, a higher capacity rail solution, such as a metro system, will ultimately be required on this corridor. In light of this, the Swords to City Centre BRT section has not been progressed to the later costing and appraisal sections of this feasibility study report.***[5] (my emphasis)

It is incredible that any public authority should decide to allocate public funds to study an option which their own study decided not to progress any further.

Why shoehorn a new transport system which cannot meet demand onto streets already shared with other transport systems?

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[3]National Transport Authority Swords/Airport to City Centre. Route Options Assessment Volume 1 : Main Report (October 2014) Transport Demand Analysis (Summary tables 10.5 and 10.6 p. 187) gives the result for the opening year 2018 and the forecast year 2033 for 2 route options.

[4]National Transport Authority Swords/Airport to City Centre. Route Options Assessment Volume 1 : Main Report (October 2014) Transport Demand Analysis Summary tables 10.5 and 10.6 p. 187 footnotes.

[5] National Transport Authority. Bus Rapid Transit Core Network Report. Oct 2012 p. 50 http://www.nationaltransport.ie/wp-content/uploads/2011/12/Bus-Rapid-Transit-Core-Network-Report.pdf

1.3. Strategic Context.

1.3.1. Modal Shift

Because the consultants worked with flawed terms of reference, it is clear that this report does not contribute to promoting Government policy which *favours modal shift away from private car use and promotion of public transport.*[6]

Furthermore the report points out that *"Modelling of passenger demand was not possible at this preliminary appraisal stage"* [7]

No explanation is given for this failure to comply with the terms of reference which set out clearly that such modelling is to be done.

The Consultant shall undertake transport modelling using the Authority's GDA Transport Model to identify the transport impacts of the various identified options.

In utilising the Authority's GDA Transport Model, the Consultant will be provided with access to the Authority's model in the Authority's offices. The model that will be used will be the NTA 2006 model which has been updated to reflect the current day transport network and 2011 matrices based on the 2011 POWSCAR data. However, the Consultant will be required to further check and refine the model in the vicinity of the Project corridor, focussing in particular on checking and ensuring that key junctions and road links along the corridor are correctly coded.

The Consultant shall model the current year scenario and a future assessment year of 2035 (or such other alternative year that may be agreed with the Authority).

The Consultant shall carry out do-nothing model runs (both the am peak period and the off-peak period) for the existing year to reflect the current situation and do-minimum model runs (am peak period and off-peak period) for the future assessment year, incorporating the above transport schemes.

Thereafter for each option under assessment, the Consultant shall carry out do-something model runs for each identified feasible transport option, comprising both the peak period and the off-peak period.

In respect of the base case do-something model runs, the Consultant shall do equivalent model runs for one alternative lower population/growth scenario and one alternative higher population/growth scenario. The Authority shall provide the model demand matrices to be used in these two sensitivity scenarios.

---

[6] National Transport Authority AECOM Fingal/North Dublin Transport Study Stage One ~Appraisal Report November 2014. P.3

[7] National Transport Authority AECOM Fingal/North Dublin Transport Study Stage One ~Appraisal Report November 2014. P.79

The failure to model passenger demand is puzzling, given that such modelling appears to have been done for other NTA studies which focused on this corridor. Is this an example of policy –driven evidence making?

1.3.2. Compatibility with Land Use planning policy

The key assumption (ie. existence of an inadequate BRT on the main corridor) in the terms of reference is further undermined by the uncertainty of the impact of BRT on land use distribution, which this report notes.

A further consideration is the extent to which different options have the capacity to deliver the required land use distribution. Land use decisions are made by private decision-makers, whether property developers or consumers such as house buyers or companies setting up commercial premises. While there is a general consensus that rail systems have land use impacts that ordinary bus services do not, it is not clear that this conclusion holds for BRT services.[8]

Given our experience in Dublin of the impact rail-based system on land use distribution, it is not using public monies to good effect that the acceptability of BRT is still maintained as an unquestioned assumption in this study.

2. Finglas/Ashbourne – ruled out although explicitly mentioned in terms of reference.

The consultants conclude by proposing an option (C1) which completely ignores Finglas and Ashbourne. This is flawed. It is highly questionable that the option proposed is based on the analysis contained in other parts of the report, tendentious though that analysis is.

They seem to have arrived at this conclusion by failing to be consistent is applying the same freedom to propose options that they seem to have done in respect of other possibilities. Examples of this are

- A heavy Rail link from Malahide to the Airport via Swords (option HR3. p.17-18);
- A heavy rail link from Maynooth Line (Broombidge) to Swrods via Airport (option HR7 p.27-28);
- A combination of bus rapid transit options (option BRT 5 p. 74-75)

[8] National Transport Authority AECOM Fingal/North Dublin Transport Study Stage One ~Appraisal Report November 2014. P.78

3. Options Presented

3.1. Schemes presented for Appraisal – incomplete and misleadingly presented.

The report included 25 public transport options in what it termed its "sketch appraisal" (par 1.5. p. 5). These are listed on Table 1.2 (p.8). The report claims to present each in a similar format, including "details of the scheme promoter or developer" (p. 7).

The report also states that it held a workshop for key stakeholders on 27 August 2014 (p. 5). From Table 1.1 (p.5), it could be inferred that "Drumcondra 2005" was present at this workshop. Drumcondra 2005 was not present at this workshop. As one of those heavily involved in Drumcondra 2005, I only became aware of this work when I got an unsolicited letter from AECOM (dated 23rd September 2014) inviting me to present the Drumcondra CITY ACCESS TRANSIT(CAT)to AECOM. Following this invitation, I attended one meeting with AECOM on Monday 6th October 2014 (see agreed record of meeting attached in Appendix 1).

It is significant that the list of schemes in Table 1.2 (p. 6) omits the Metro East proposal which was presented by the promoters to AECOM at that meeting. This proposal was developed by the Howard brothers in 2005/6 as a response to the Metro Norrth proposal. The Howards did not have any involvement whatsoever in Drumcondra 2005, at any stage.

3.2. Light Rail

In Section 3.0 of this report (on Light Rail p. 39), the report states

The following sections present a series of light rail options which have been proposed either by the RPA or AECOM for the study area and in general build on the planned LRT network for the City.

Despite the criteria which AECOM set out to describe each option, the consultants do not present who the promoters are for LR2 (Broombridge to Swords via Dublin Airport and Finglas see. P.42-43) and LR3/4/5 (Route Options for LUAS Line D2).

This failure to explicitly follow their own criteria leaves at lot to be desired. No promoters are given for

- Seven (7) of the 10 Heavy Rail options reviewed;
- All of the 5 BRT options reviewed;
- One of the 6 Light rail options reviewed.

As set out above, the consultants did not describe or separately assess the Metro East light rail proposal developed by the Howard brothers.

4. Assessment of light rail options to Airport through Drumcondra, including Metro East and City Access Transit(CAT) is tendentious

4.1.Cast of mind

In assessing Light Rail options, AECOM has

- Completely ignored the Metro East proposal,
- Chosen to assess only one aspect of the Drumcondra CAT;

neither of which were proposed by RPA or AECOM.which was stated be a criterion fore assessing light rail projects.as set down on p. 39;

- Not developed any Light Rail option on their own initiative, as they did for one Heavy Rail option (HR3 p. 17-18) and also for

4.2.Metro East

4.2.1. During the period 2005-2006 Michael J. Howard and his brother developed this proposal for a light rail linking the City Centre, Drumcondra, Whitehall, Coolock, Clonshaugh and Dublin Airport. In doing so, they employed the services of professional engineering companies (ie. Roughan and O'Donovan), experienced town planners and others. Drumcondra 2005 was not involved in any stage of this process nor to my knowledge, was anyone previously active in Drumcondra 2005.

4.2.2. This resulted in a seriously developed proposal which was documented. This resulted in meetings with the Railway Procurement Agency(RPA) which was then heavily committed to Metro North. As far as I know, the Howards submitted this proposal to An Bord Pleanála for consideration during the Bord's assessment of the original Metro North proposal (see LR6 p.51-55).

4.2.3. When AECOM invited me to present the Drumcondra CAT , having asked AECOM staff if I could ask others (unspecified) to join me, I asked the Howards to join me for the meeting in AECOM offices (Grand Canal Street) on Monday 6th October 2014.

4.2.4. During that meeting, Micheal Howard outlined the Metro East proposal to AECOM staff. He also handed over a copy of the full Metro East proposal and another document given the RPA at that time to the consultants. This is noted in the record of that meeting (see Appendix 2)

4.2.5. It is completely unacceptable that AECOM did not consider this proposal, on its own, in compliance with the terms of reference for this study. This suggests a lack of professionalism which does not do support the credibility of this report.

4.3.Drumcondra CITY ACCESS TRANSIT(CAT)

4.3.1. In March 2001, the Strategy Development Unit of the then Light Rail Project Office published an invitation for written submissions on the Dublin Light Rail (LUAS) and Metro Systems (attached in Appendix 2).

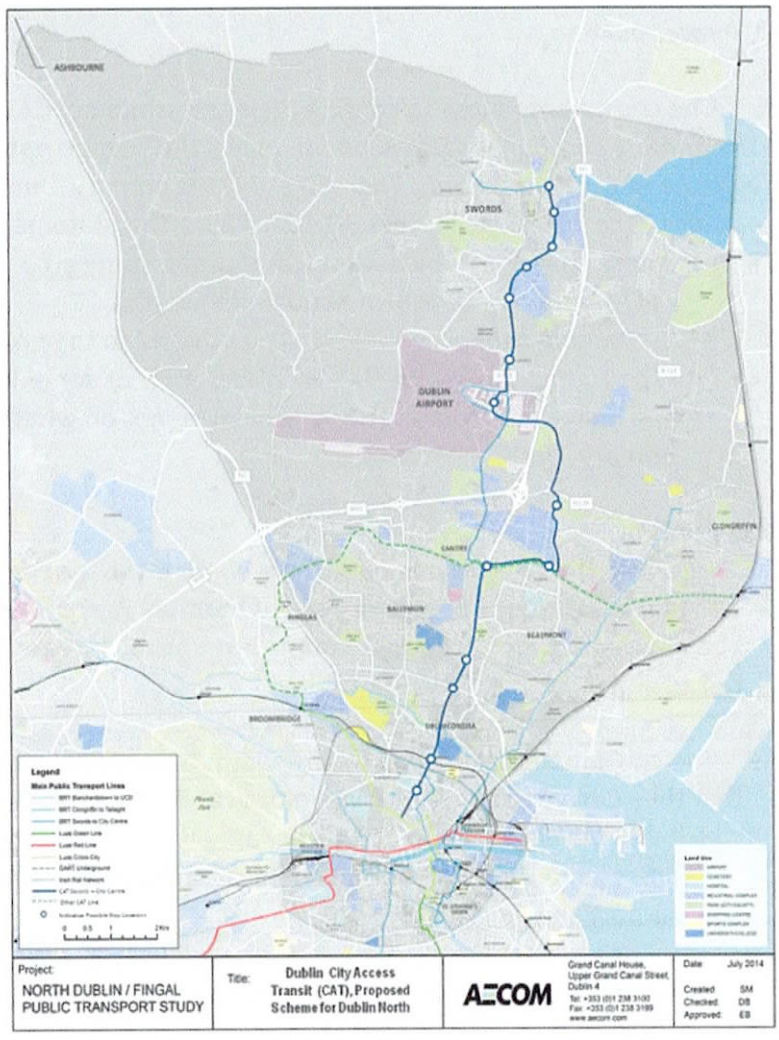
4.3.2. In May 2001, I submitted the Drumcondra CAT in response to this invtation. From the signatures of those then involved in Drumcondra 2005 (all dated between 14 and 20 May 2001), it is clear that this proposal was made long before there was any public mention of Metro North.

4.3.3. Prior to the October 2014 meeting, I sent the text of the 2001 Drumcondra CAT submission to AECOM (see Appendix 3).

4.4.AECOM description and general assessment of Drumcondra CAT.

4.4.1. The consultants have considered this as LR8 described in par. 3.12 (p. 80) together with a map (p. 61) which I agreed with AECOM (see emails in Appendix 4)..

Figure 3.9: LR8 – City Access Transit (CAT)



4.4.2. From the preceding paragraphs, it is clear that the consultants were aware of the date and origins of this proposal. Yet the report states that it was proposed as an alternative to Metro North, which was not in the public domain when CAT was proposed in the spring of 2001.

4.4.3. Furthermore, the consultants do not describe the proposed CAT accurately. They describe what I considered to be an integral part of the proposal as *a secondary routing in order to link the Finglas and Ballymun areas to the wider public transport network, through a further extension of the Luas Cross-City at Broombridge (Liffey Junction).* (par. 3.12.2). Note that the LUAS Cross City proposal was not in the public domain in the 2001, when CAT was proposed. This clearly misrepresents the following part of the CAT proposal ie. *CAT serves Dublin Airport directly. It does so from two directions, as the Airport is on a loop. One part of this loop is mostly off street ie. from Harold's Cross to the Airport via Rathmines, Ranelagh, Tara Street, Broadstone, Cabra, Finglas. This would make it easy to run express and/or limited stop services to/from the Airport. This means a predictable travel time to and from the Airport. It shortens the total journey time, including the time spent looking for parking at Dublin Airport. CAT gives people another option on the cost and inconvenience of Airport parking.*

4.4.4. The consultants chose to confine their assessment of CAT to what they termed *The primary corridor, via Drumcondra, meets the brief in that it links the City Centre with the Airport and Swords. Therefore only the primary route would be considered as part of this assessment.* (par 3.12.2 .p.59). This statement

- ignores the brief which was clear that the study area was bounded by *R135 / N2 Finglas Road / North Road in the west;*
  ....and Ashbourne – which is on the N2 to the north;
- is not compatible with their consideration of some light rail(LR1 and LR2) and heavy rail projects (HR 7) which are not on what they chose to call the *primary route*.

4.5. Other options

4.5.1. **Why did the consultants choose to confine the assessment of Drumcondra CAT to one corridor instead of doing what they had chosen to do in respect of both heavy rail and bus rapid transit options ie. create and assess new light rail options?**

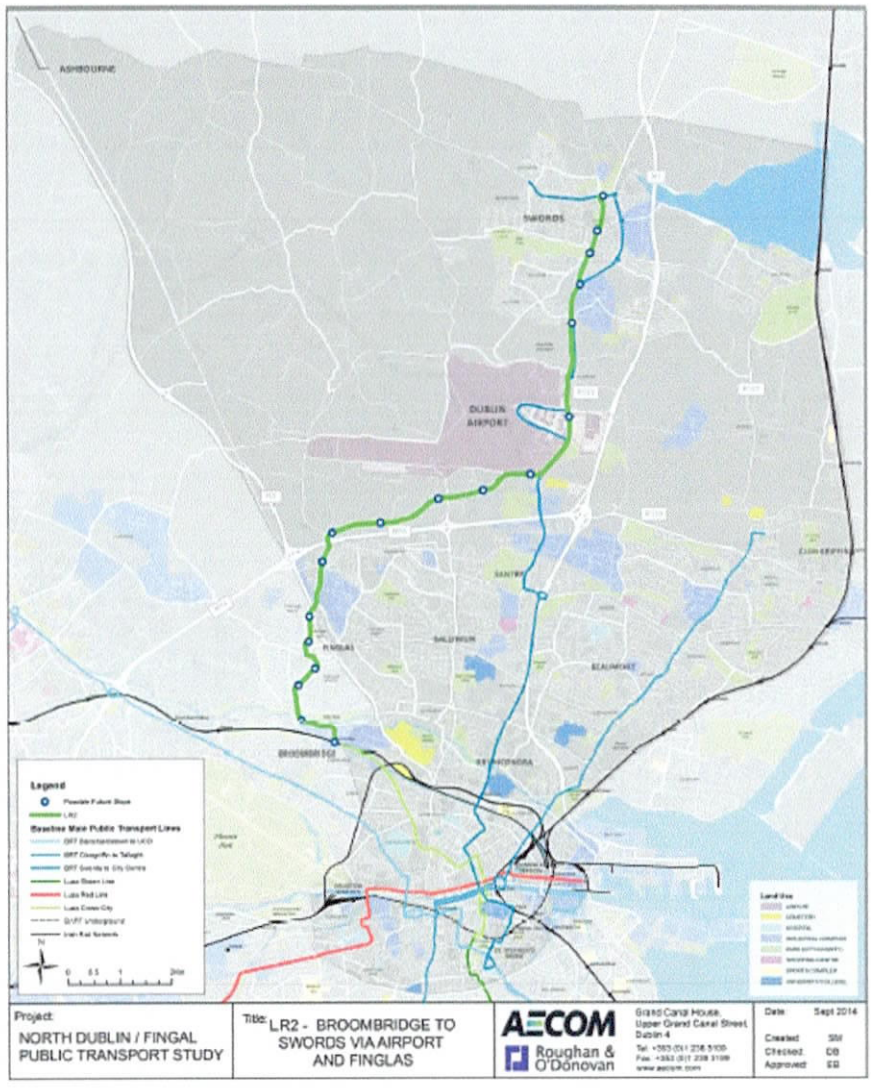
4.5.2. The consultants clearly had the freedom to assess any options, including those that they developed on their own initiative. This is clear from option HR3 (p. 17) which *was developed by AECOM.* Having

- assessed a Light Rail option connecting Broombridge to Swords via Dublin Airport and Finglas (LR2. p. 42);
- mapped the Drumcondra CAT option (LR8 p. 61) in such a way that it would not take any significant effort to combine it with Option LR2 (see map above);

why did the consultants not develop their own light rail option, given the data available in

- the 1996 Oscar Faber study of alternative options for light rail in North Dublin
- the Metro North work of the RPA;
- the Metro East report prepared by Howards;
- studies done in connection with BRT?

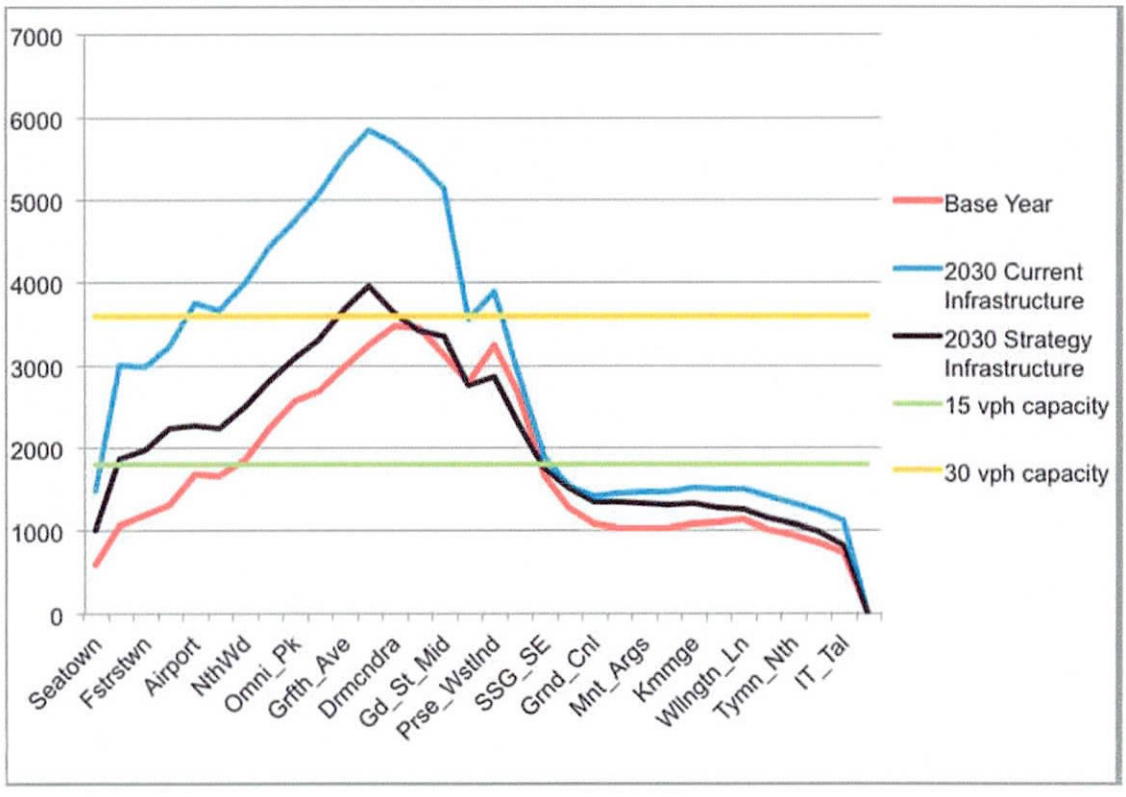
Figure 3.3: Option LR2 Broombridge to Swords via Dublin Airport and Finglas



4.5.3. Other NTA studies (including at least one in which AECOM was involved) have reported on work done on the Swords-Airport-Drumcondra- City Centre route. Why then does AECOM refuse to use this work to assess the Drumcondra CAT proposal?

4.5.4. These studies (eg. the BRT Core Network Study) show clearly that there is a very high potential passenger demand for public transport on the City Centre-Drumcondra-Dublin Airport corridor. This is shown clearly by the following taken from that study

Figure 2 Transport Demand City Centre-Drumcondra-Dublin Airport-Swords



Source: National Transport Authority: Bus Rapid Transit (BRT) Core Dublin Network. October 2012. Figure 37 p.50[9]

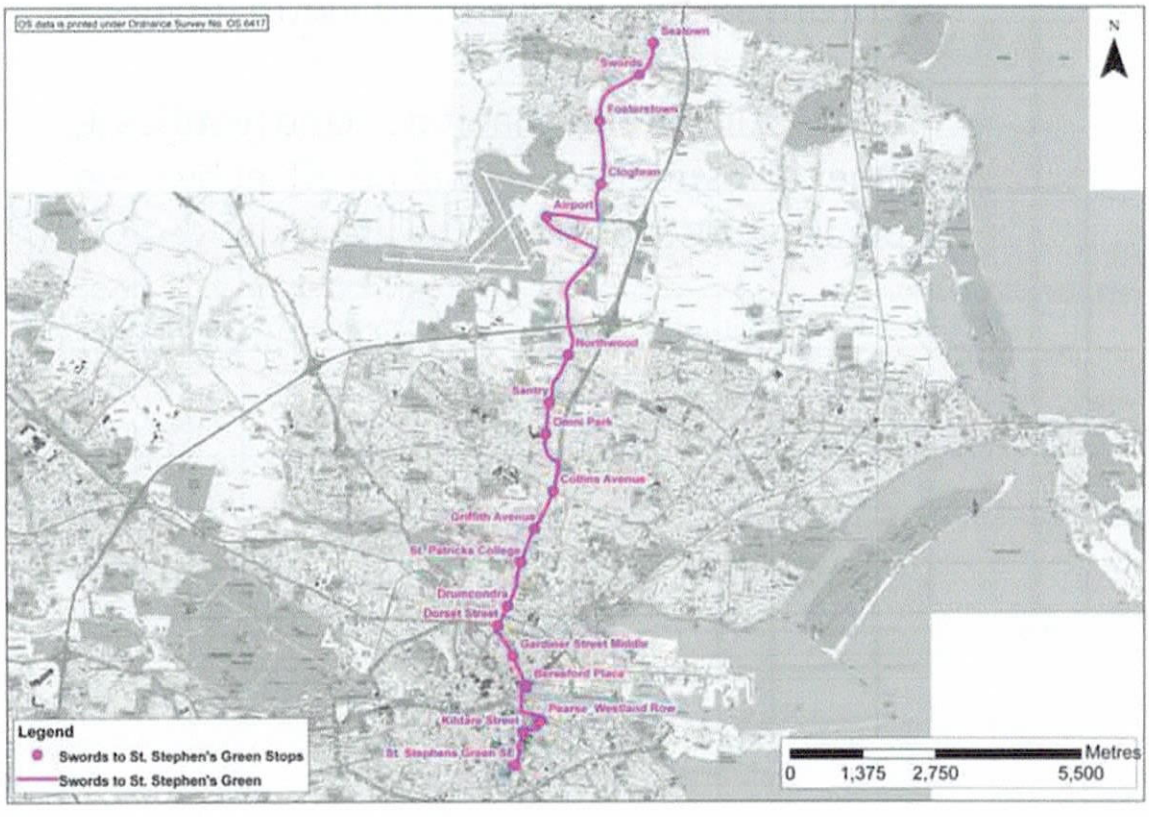
[9] http://www.nationaltransport.ie/wp-content/uploads/2011/12/Bus-Rapid-Transit-Core-Network-Report.pdf

Table 1 North Dublin Passenger Demand

Alignment	Scenario	Peak Lineflow	% above 15vph Capacity (1,800)	% above 20vph Capacity (2,400)	% above 30vph Capacity (3,600)	AM Peak Boardings
Blanchardstown to UCD	Base Year	3,369	87%	40%	-6%	9,482
	2030 Curr Inf	3,877	115%	62%	8%	14,577
	2030 Strategy Inf	2,564	42%	7%	-29%	11,838
Swords to Tallaght	Base Year	3,482	93%	45%	-3%	17,224
	2030 Curr Inf	5,845	225%	144%	62%	22,120
	2030 Strategy Inf	3,963	120%	65%	10%	17,828
Clongriffin to Tallaght	Base Year	2,754	53%	15%	-24%	11,899
	2030 Curr Inf	3,954	120%	65%	10%	14,618
	2030 Strategy Inf	3,638	102%	52%	1%	12,792

Source: National Transport Authority: Bus Rapid Transit (BRT) Core Dublin Network. October 2012. Figure 41 p.53[10]

Figure 3 BRT route proposed for which passenger demand has been assessed



[10] http://www.nationaltransport.ie/wp-content/uploads/2011/12/Bus-Rapid-Transit-Core-Network-Report.pdf

[10] http://www.nationaltransport.ie/wp-content/uploads/2011/12/Bus-Rapid-Transit-Core-Network-Report.pdf

Extract from NTA BRT Core Network Report

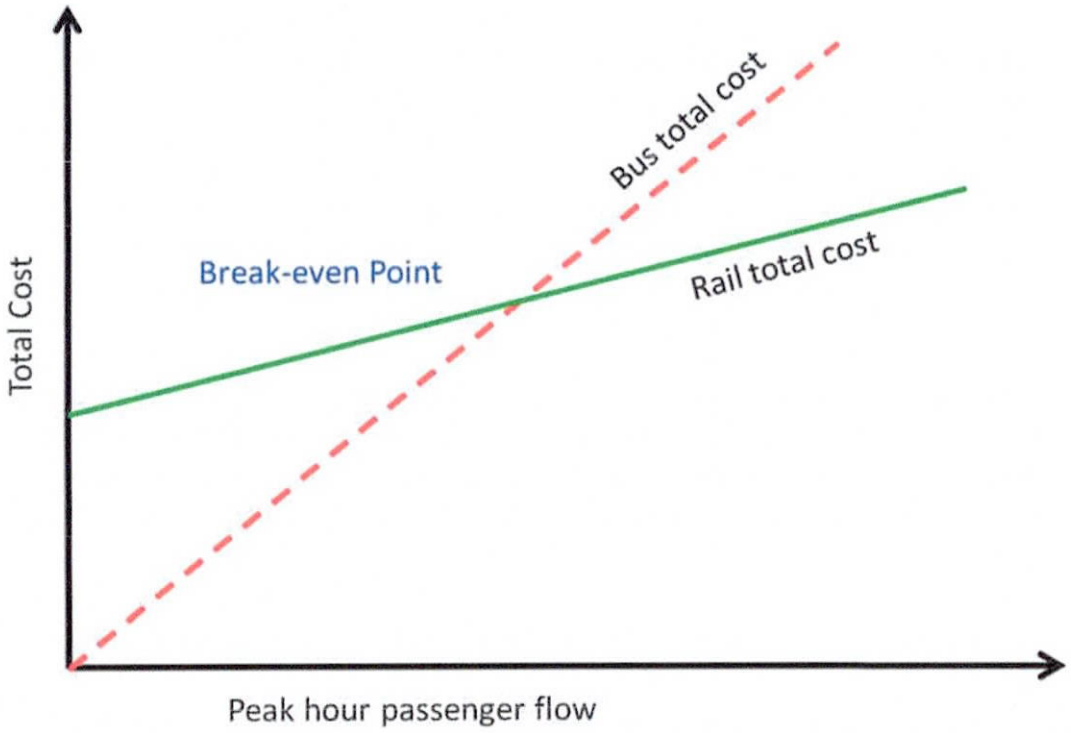
In general it can be said that higher investment costs in LRT are offset by lower operation costs.
When choosing the appropriate mode for particular corridors efficient ratios of passengers per driver result in lower operation costs. The driver numbers are dictated by the number of vehicles required to operate the system, and this is directly proportional to the capacity of the vehicles proposed. For example, to carry 10,000 ppdph in the order of 90 bus drivers would be required against 30 tram drivers for LRT versus 10 metro drivers.

Figure 21 illustrates that if demand justifies it, higher investment costs will be offset by lower operating costs over the full life cycle.

Source: National Transport Authority: Bus Rapid Transit (BRT) Core Dublin Network. October 2012. p. 26-7[11]

[11] http://www.nationaltransport.ie/wp-content/uploads/2011/12/Bus-Rapid-Transit-Core-Network-Report.pdf

Figure 4 Public Transport Passenger Demand versus Cost



Source: National Transport Authority: Bus Rapid Transit (BRT) Core Dublin Network. October 2012. Fig.21 p. 27[12]

With this wealth of data from authoritative sources, it is simply incredible that the consultants did not propose an additional light rail option along what the *central corridor* as an alternative to the clear inadequacies of the proposed BRT. As the German writer Brecht put it.

Intelligence is not to make no mistakes, but quickly to see how to make them good

It is extraordinary that the overview appraisal table on 8 Light Rail options (Table 7.2 p.91) shows all options for light rail to have high degrees of natural heritage/environmental constraints. This assessment is not supported by the descriptions of these light rail options on p.38-81.

Dublin Airport

Similar consideration apply to the way in which Dublin Airport is described (eg. par 3.9.3 p. 46). It is noted that a one-way LRT loop could be looked at. Surely, this should be looked at, even if it does result in a reduction of some road capacity. If the aim is to promote modal shift, then reducing road capacity is normal when road

[12] http://www.nationaltransport.ie/wp-content/uploads/2011/12/Bus-Rapid-Transit-Core-Network-Report.pdf

space is allocated to cyclists (eg. along the Grand Canal in Dublin), QBCs, LUAS and even the proposed BRTs.

In a lecture in Dublin in June 1999, the then Deputy director of the Zurich Transport Authority noted that

> *The future of urban transport policy lies not in expansion but in the intelligent use of existing traffic areas. The objective of ensuring mobility for people when travelling to work and shopping and during leisure time requires imaginative urban traffic management based on modern information technology.*

In deciding to the Drumcondra CAT in the way chosen, the consultants assert that *the route is relatively circuitous...leading to journey times in the area of 1 hour from the City Centre to the Airport. This could not provide a competitive service as journey times are expected to be in the region of 40 minutes by bus and 20 minutes by taxi (par. 3.12.6 p. 60).*

While this may be true, it should be noted that an NTA study of Dublin Airport found that

- Three quarters (75%) of all trips were either for holiday/leisure (nearly half) or visiting friends/relatives (over one-quarter) (see fig. 5).
- Less than one quarter of the trips originated in City Centre (23%)(see Fig. 6). Even if one includes other areas of Dublin, just over 40% of Airport trips could be originating in the business districts of Dublin City.[13]

This suggests that the vast majority of passengers using Dublin Airport may not be very time-constrained in how they access the Airport. As the consultants point out, those that are time-constrained have the option of using taxis.
In summary, the consultants ignore other evidence available in the public domain. This is simply not an acceptable basis on which to assess public transport options for North Dublin.

[13] http://www.nationaltransport.ie/wp-content/uploads/2012/04/NTA-Survey-at-Dublin-Airport-20112.pdf

Figure 5 Dublin Airport Passengers. Purpose of trips.

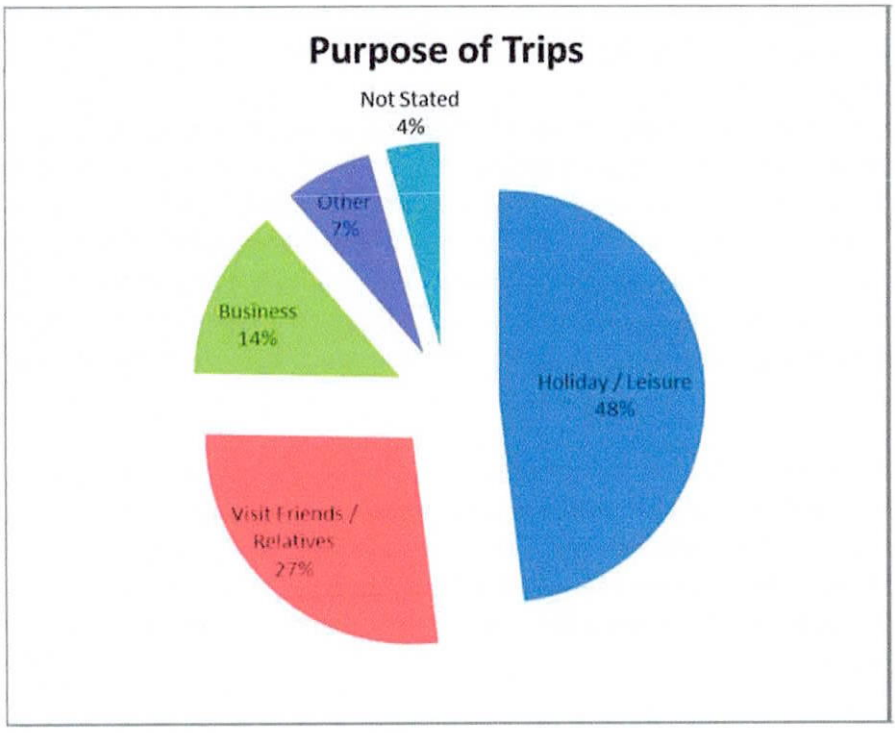
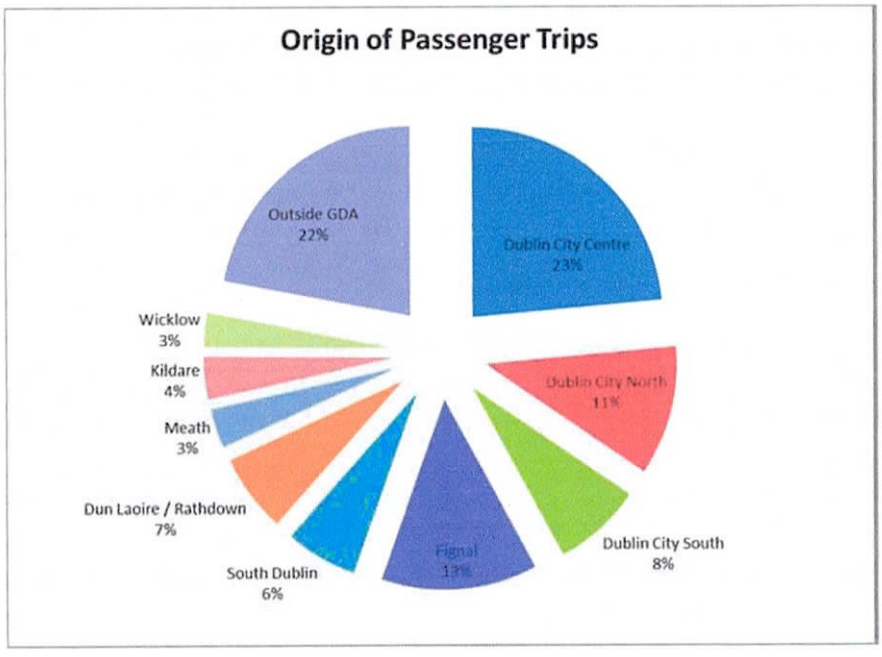


Figure 6 Dublin Airport Passengers. Origins



4.6. Other considerations

4.6.1. The assessment of *Infrastructural considerations* (par 3.12.3 p. 59) leaves a lot to be desired.

It is strange that a study aimed at implementing a government policy to promote modal shift states that "*The implementation of a light rail scheme along this route would require the full removal of the QBC/BRT lanes along Dorset Street and Drumcondra Road, and would also require the removal of (mainly) right turning facilities at many junctions. While physically possible to provide the LRT route along this corridor the traffic impact would be significant, particularly for local movements due to the reduction in the number of turning facilities.*

NTA studies on BRT on this route (in which AECOM has been involved) show clearly that BRT capacity is not fit for purpose on this route, which is heavily congested, Yet, there has been little acknowledgement that the implementation of the inadequate BRT would also give rise to constraints and costs, similar to those needed for a light rail option to be installed on this corridor.

These assertions do not suggest that public funding is being used to good effect on this project or on a previous NTA sponsored project on which these consultants (and others) worked ie. BRT Swords/Airport to City Centre Route Options Assessment October 2014. This report blandly states that *As the route south of Santry to the Royal Canal (F1) is a fixed section where no feasible alternative exists, the 'Stage 2' assessment considers Santry route options only.*[14]

It is extremely puzzling that the proposed BRT (which is not fit for purpose) is not subject to the same level of analysis as the consultant applied to the Drumcondra CAT and also LR 5 (par 3.9 p45-47, 49).

4.6.2. There is also another statement that does not bear comparison with practice elsewhere ie. *In addition, the trees along this section of the route would be negatively impacted by the overhead cables and the possible widening of the carriageway.*

- Why is that the widening of the carriageway on this corridor is not needed for BRT?
- Where else in Dublin has the corridor been widened to accommodate on-street LUAS/light rail?

[14] NTA and others. Swords/Airport to City Centre. Route Options Assessment volume 1: Main Report (page 100). Oct 2014 http://www.nationaltransport.ie/wp-content/uploads/2014/10/Route_Options_Assessment_Report.pdf

- Why can Helsinki have light rail on narrow tree-lined streets shared with other traffic as shown the following photographs?
- Are those who govern us and the consultants they employ incapable of the same degree of care and attention to the provision of fit-for-purpose public transport as those who govern another small country at another edge of Europe?

Figure 7 Helsinki Light Rail 1

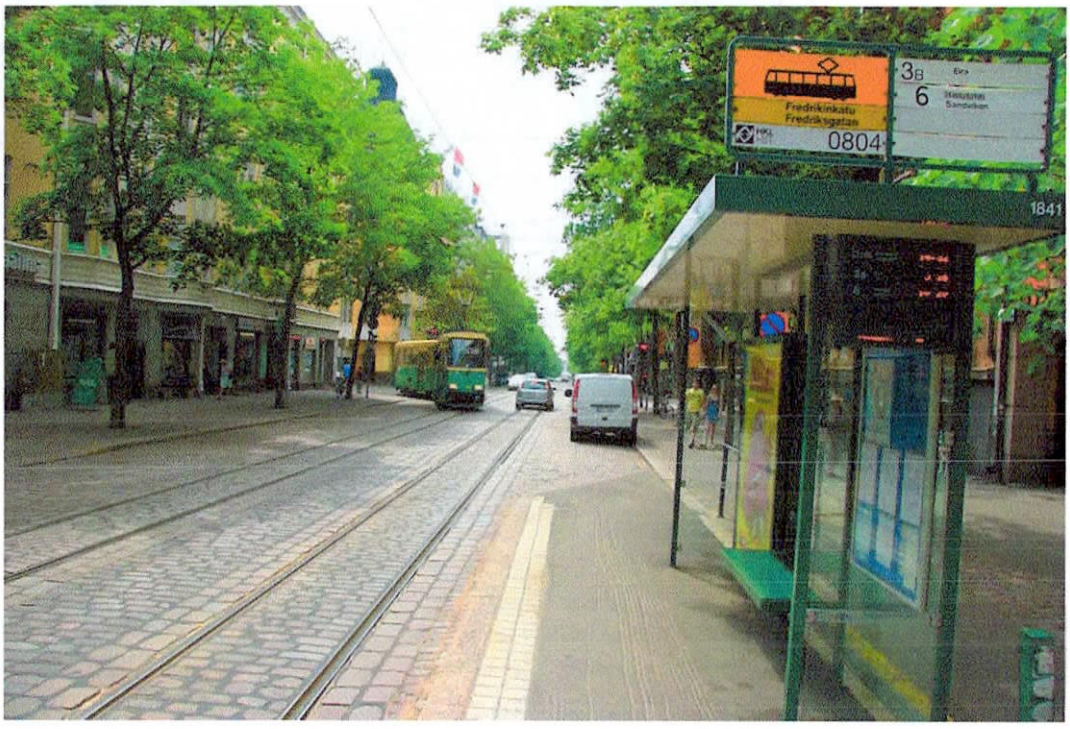


Figure 8 Helsinki Light Rail 2



Figure 9 Helsinki Light Rail 3



4.6.3. It lacks merit to assert that *Construction impacts on Dorset Street and Drumcondra Road would be very significant as space to facility diverted traffic is not available over much of its length.* (par 3.12.4 p. 60). This simple assertion shows a lack of attention to the possibilities of using routes for diverted traffic while the means to promote modal shift are put inplace eg.

- *Dublin Port Tunnel;*
- *Malahide Road;Clontarf and Alfie Byrne Roads*
- *Ballymun Road and Botanic Avenue*
- *Even the M50 for south Dublin bound traffic.*

Appropriate city-wide traffic management could lessen the inconvenience of having to divert traffic by eliciting the co-operation of other public authorities.

- Tolls throughout Dublin could be dropped during the construction period;
- Public transport fares could be moderated to give people options on how they travel and even when they travel.

It is significant that the proposed cross–city on-street BRT routes are not subject to the same comments, particularly when they converge on the city centre.

4.6.4. It is not acceptable that this report assumes that a light rail on this route would be *central running.* No basis is given to support this assertion. It is completely unprofessional to overlook our experience of light rail lines in Dublin city centre. LUAS is not constrained by *central running* on

- Abbey Street;
- Harcourt Street;
- Stephen's Green;
- LUAS Cross City now being built eg. Dawson Street, O'Connell Street.

Conclusion

Dublin still needs the Drumcondra CITY ACCESS TRANSIT CAT which involves

1. Two mainly on-street light rail lines looped around the North City, including the Airport and Swords;
2. A Docklands loop linking the existing Green and Red on-street LUAS lines;
3. A light rail link from the proposed North Dublin loop to Howth Junction;
4. A complete redesign of bus services Dublin area.

Only thus can Dublin become easier to move around in for all those who live and work in here in addition to those who visit our capital city for business or leisure or some other reasons.

This latest report continues the pussyfooting that the public authorities have engaged in for years as they persist in trying to placate the many feuding baronies now involved in public transport in our capital city. This report leaves a lot to be desired in terms of the quiet competence we need.

The public authorities must get a grip to ensure on this situation to ensure that our city achieves and sustains an internationally attractive place in which to live, work, play and visit.

Appendix 1.

Agreed Record of meeting with AECOM Monday 6th October 2014

Meeting with AECOM 2pm Monday 6th October 2014
Grand Canal House, Grand Canal Street Upper, Dublin 4

Report

Present: Joe Seymour, AECOM (JS)

Dónal Ó Brolcháin (DÓB)
Tom Coffey (TC)
Michael N Howard (MNH)
Michael J Howard (MJH)
Brian MacEochaidhin (BMacE)
John Roden (JR)

The meeting arose from an invitation from Ms. Elaine Brick, Associate Director, Transportation, AECOM to DÓB to present the City Access Transit (CAT) proposal.

As Ms. Brick was unable to attend, Joe Seymour (JS), Regional Director, AECOM, took the meeting, as he is Project Manager for the study AECOM is currently carrying out into public transport options for the North Dublin area on behalf of the NTA.

DÓB introduced himself, followed by the others who joined the meeting at Donal's invitation, following Elaine's prior agreement.

JS explained the scope of the current AECOM study, which is focussed on public transport options between Dublin City Centre, Dublin Airport and Swords. He stated that all possible options were being considered, across all transport modes, and that so far his team had identified 24 different options.

These were being developed at a general, conceptual level. By Nov 2014 they hope to have narrowed these down to 5 or 6 routes, with a "Preferred Option" selected by early 2015.

Options included variations to the Metro North proposal, "light metro", heavy rail, light rail, bus rapid transit, and indeed a combination of modal options. Many different routes are also being considered.

JS acknowledged that the Swords – Airport – City Centre BRT route being currently developed by the NTA (upon which public consultation is to begin in the next two weeks) is only a short-term solution, in its current form, but a larger scale BRT is part of the options being considered for medium to long term solution. AECOM's current work was on developing medium- to long-term solutions in this area.

JS indicated that their work assumes the introduction of the DART Underground project. BMacE asked if their interpretation of this included the proposed heavy rail link to Dublin Airport, and JS responded that it did not.

DÓB then presented the Drumcondra City Access Transit (CAT) proposal. This presentation showed how the NTA's own data indicated that a BRT scheme did not have adequate capacity for the passengers projected on the Swords – Airport – City Centre corridor. DÓB's view is that this calls for two new LUAS lines looped around the northside. This loop would continue from the LUAS CrossCity terminus at Broombridge to take in Finglas, Charlestown, Ballymun, Santry, Clonshaugh, Coolock and back to the city centre via Whitehall and Drumcondra. There would be a spur to Dublin Airport and Swords as well as another to link with DART and Commuter services at Howth Junction. This would serve people in Dublin's north city, as well as Dublin Airport passengers and staff. The presentation emphasised, using previous DTI and DTO data, how similar LUAS proposals have been in existence for many years, and yet have been repeatedly ignored by government.

The presentation highlighted the ongoing transport void in the Dublin north city area, which has the highest number of people in the Dublin area and has had for the last 20 years. It also showed that because only 14% of Airport trips were business-related, a dedicated high-speed metro-standard link was not actually required, and that LUAS would be a far better fit for City Centre – Airport journeys. Other options exist for those who need fast access to the Central Business District and IFSC.

MJH presented the Metro East proposal, developed in 2005/2006. This proposed a route from the City Centre through Drumcondra to Whitehall, Santry, Kilmore, Clonshaugh, the Airport and Swords. This privately funded proposal includes economic, land use and engineering data they had commissioned at the time, from Roughan O'Donovan and other consultants. (JS commented they often worked with them). MJH gave JS a copy of the Proposal, accompanied by a Submission made to the RPA at the time.

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Concerned that AECOM may be focussing on a narrow "single corridor" approach, BMacE commented that the strong message coming through was that both the Beaumont / Kilmore / Clonshaugh and Ballymun / Finglas areas had to be served by high-quality public transport and that the standard approach was to consider a core route with one or more branches, a core route with a loop, or two or more distinct routes, rather than trying to follow a "one size fits all" approach.

JS asked DÓB about disruption in Drumcondra caused by LUAS construction. DÓB pointed out that there will always be objections and outlined his experience of campaigning, on behalf of residents' associations, for the Dublin Port Tunnel project.

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TC outlined how the Dublin City Business Association (DCBA) (from which he has recently retired) supported on-street LRT from its inception. DCBA looked beyond the short-term disruption caused by its construction to the great benefits it conferred on retailers and life in the city centre. He also explained how younger people, especially today, were becoming more urbanised, preferring to live in cities like Dublin, or emigrating abroad, and more and more did not need or want access to cars in urban areas, preferring instead high-quality public transport and taxis.

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There was further discussion on additional routes for northside LUAS, such as linking the proposed line through Drumcondra, Whitehall, Kilmore and Clonshaugh to the Airport with Howth Junction via Oscar Traynor, Tonlegee and Kilbarrack Roads.

BMacE also circulated an outline map that synthesised the CAT and Metro East proposals, illustrating how these could be implemented in LUAS form.

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Appendix 2.

Drumcondra CITY ACCESS TRANSIT(CAT)

LUAS

DUBLIN LIGHT RAIL (LUAS) AND METRO SYSTEMS

Preliminary Public Consultation - *Invitation for Written Submissions*

Good progress is being made with construction of the Luas - a flagship project of the National Development Plan (NDP). The initial lines will serve Tallaght and Sandyford Industrial Estate and will link the three main city centre public transport hubs at Heuston, Connolly and Busáras.

This notice relates to future development of the Luas system and the introduction of a Metro system to meet the growing demand for high quality public transport.

In October 2000 the Dublin Transportation Office(DTO) published a strategy framework document entitled "A Platform for Change" which includes outline proposals for future Luas and Metro lines.

The Government has indicated its acceptance of the broad thrust of this strategy framework document and has requested the Light Rail Project Office to study the DTO outline proposals.

The Light Rail Project Office has commenced this study and is interested in receiving written submissions relating to the envisaged Luas and Metro systems as outlined in the accompanying map.

Written submissions should be sent to the following address for receipt by 30th May 2001:

Strategy Development Unit,
The Light Rail Project Office,
Heuston Station,
Dublin 8.



Luas & Metro Lines

Luas Lines:

- A north-south line from Ballymun via Whitehall, City Centre, Harold's Cross, Terenure and Rathfarnham to Dundrum with an extension north of Ballymun to Sillogue. A spur at Whitehall via Cootoock to Kilbarrack.
- An east-west line from Lucan via Ballyfermot, Dolphin's Barn and South City Centre to Docklands.

Metro Lines:

- a line from Swords to Shangonagh serving Dublin Airport, Finglas, Broadstone, City Centre, Ranelagh, Sandyford and Cherrywood incorporating some underground sections and integrating with Luas south of Ranelagh.
- A line from Tallaght West via Tallaght and Kimmage entering the city centre tunnel in the south city.
- An orbital line from Finglas to Tallaght via Blanchardstown and Clondalkin.

Light Rail Project Office

NDP

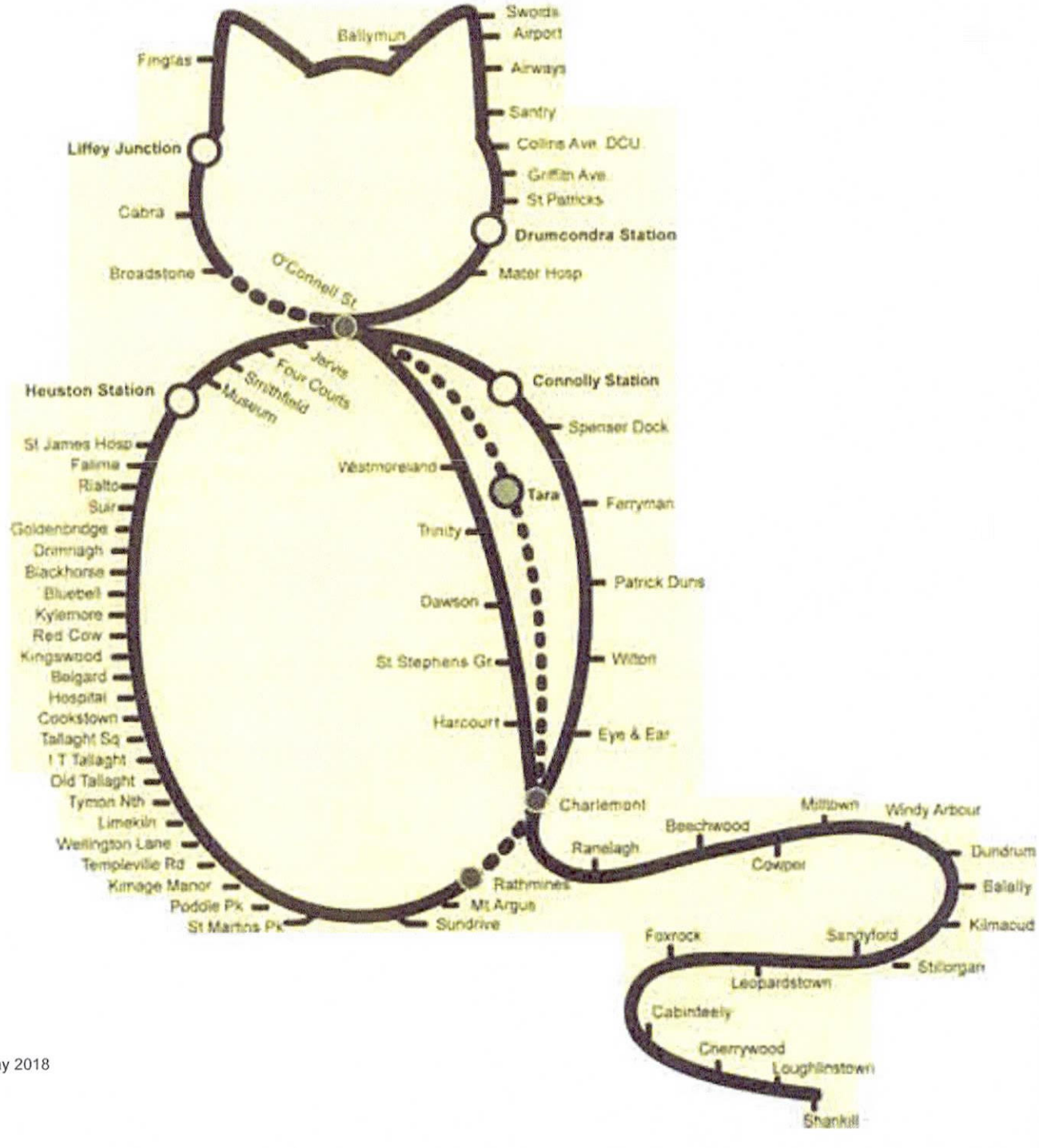
CIE Group of Companies

10 May 2018

DRUMCONDRA
2005
A ten year project to help shape the future of Drumcondra and its associated districts

CITY ACCESS TRANSIT

The public authorities have been pussyfooting on public transport for Dublin for years. Our capital needs a CITY ACCESS TRANSIT (CAT) system with a coherent design. The CAT proposed here hits the ground running as 20 per cent of it is based on that part of LUAS which the Government has already approved. Dublin can purr with this CAT.



DRUMCONDRA
2005
A ten year project to help shape the future of Drumcondra and its associated districts

c/o 100 Griffith Avenue
Dublin 9
May 2001

Strategy Development Group
The Light Rail Project Office
Heuston Station
Dublin 8.

Further to your recent advertisements, we demand that the proposed Light Rail line from Ballymun to the City Centre be routed through our areas to O'Connell Street to connect directly with the already approved lines to Tallaght and Sandyford.

We strongly object to the proposed routing away from the city centre to Broadstone and west. None of the many bus routes going through our areas take such a route. Neither do the Quality Bus Corridors follow such a route.

We want a CITY ACCESS TRANSIT with a coherent design, as the DTI proposed and as set out in the attached. We draw your attention to the 1996 Oscar Faber report which showed that a LRT line through our areas had more trip attractors/generators than did the Tallaght or Dundrum lines.

We point out that the DTO refused to give us data justifying the rerouting of the line through our areas away from the city centre.

In addition, we ask that you immediately propose to Government a city centre surface line to connect the already approved Tallaght and Sandyford lines. Otherwise, you will be repeating the mistakes made about 150 years ago when railways were first built in Dublin.

Tony Killeen Chairman Berresford Residents association 19-05-01
D. O'Brolchain Secretary Drumcondra 2005 20.05.01
D. W. Geraghty chairman, Gracepark Community Assoc. 14/5/01
Jim Wilson. Chair. Gaeltacht Park Ass. 19/05/01
Patricia Ker Chair Drumcondra 2005 19/05/0
Robbie Dale CHAIR All Hallows 20/5.01
Kathryn Mulhead Secretary All Hallows Area Assoc. 19/5/
Brian McLaughlin CHAIR I.D.R.A. 14/5/01
Joe L W Harvey CHAIR Courtlands Residents Assoc 20-5-
Chairman Drumcondra Res Ass
10 May 2001 Berresford Residents

City Access Transit

SUMMARY

CAT is **street wise and clean**. It offers a coherent framework for

- **Park 'n Ride sites on all the main national roads**
- **Interchange with DART, Arrow and other mainline rail services**
- **access to Dublin Airport and Port**
- **redesigning bus services**
- **becoming fatter, with bells, whiskers and even kittens.**

CAT serves all the main road, rail and air access points to Dublin. It links many industrial, office and commercial areas with residential areas. The network also links many educational and cultural institutions as well as hospitals. CAT makes it easy to run continuous services in a single system.

Dublin's public transport (including buses) needs **a current cost subsidy** at the same level as other European capitals. A Dept. of Public Enterprise paper reported that Dublin's public transport gets less than one quarter of the subsidy rate in Helsinki and Stockholm. Other studies suggest that European capital cities have public transport subsidy rates of about 50 per cent.

We need **quiet competence - not grand gestures**. We must have a coherent strategy for the next 20 years. During that time, further options for the future can be developed, studied, designed, costed, debated and decided. By having three different policies in the three years since it took office, this government has shown itself incapable of coherent thought, competent planning and considered action on Dublin transport. Consider the following

- The proposal for a LUAS line linking Ballymun, Drumcondra to Broadstone! At present buses from these areas go into the city centre. If Broadstone did not exist, who would create this place well away from the city centre!
- The proposed LUAS link with DART near Shankill. This seems to assume using an old rail junction. This area is now built up. Does this new plan imply demolition of houses in Shanganagh?
- "The future of urban transport policy lies not in expansion but in the intelligent use of existing traffic areas. The objective of ensuring mobility for people when travelling to work and shoppingf and during leisure time requires imaginative urban traffic management based on modern information technology". Ernst Joost, Deputy Director, Zurich Transport Authority, speaking in Dublin in June 1999.

Both the **motoring and taxi lobbies want better public transport** instead of more parking charges and road-pricing. Judge Sean O'Leary, Inspector for the LUAS public inquiries, found that **buses alone cannot do the job**. John Henry, DTO Director told the same inquiries that light rail has a proven capacity to attract car drivers. As citizens of the Celtic Tiger, CAT **improves our standard of living** by making it easy to travel around our capital in **less polluting** ways.

CAT links different parts of Dublin using a mainly surface light rail transit. Many centre city stops are those already approved for the Tallaght and Sandyford lines, as are the stations on those lines. Government consultants studied a line linking Tallaght to Kimmage, going underground to Rathmines, Ranelagh, Tara St, O'Connell St and Broadstone. CAT includes that line. The LUAS vehicles already ordered are being built for underground running.

CAT is **cost effective.** Surface LUAS is **costs one-seventh** that of underground (see p. 5). The Government has already committed over 20 per cent of the cost by deciding to build the Tallaght and Sandyford LUAS lines at a cost of £353m for 23km. This CAT will cost £1.628bn. as follows:

On-street LUAS 70kms @ £15m per km	=£1,050m
Underground LUAS 6kms @ £38m per km	= £228m
Underground stations say 5 @ £70m each	= £350m

GET ON WITH IT!

prepared by Donal O Brolchain for Drumcondra 2005. November 2000

CLEAN AND HEALTHY

Being electric-powered, CAT pollutes less at point of use and is quieter. Given the different ways of generating electricity, CAT need not contribute to climate change, as it does not emit any environmentally damaging greenhouse gases directly.

CAT will help Dublin to become a healthier city. Traffic is now the largest single air pollutant in urban areas. Some have estimated that traffic-generated air pollution causes over 20,000 deaths in Europe every year.

PARK 'N RIDE ON THE MAIN ROADS.

CAT provides a clear framework for Park 'n Ride sites. It links all the main roads into Dublin with much of the city, as follows

- Airport/Belfast road(N1) at Swords, the Airport, Collins Ave and Drumcondra;
- Ashbourne/Slane/Derry road (N2) at Finglas;
- Navan/Cavan road(N3) at Cabra;
- Lucan/Maynooth road(N4) along the quays e.g. Museum on the Tallaght LUAS;
- Naas/Kildare road(N7) between Red Cow and Grand Canal (with stations at Kylemore Road, Bluebell and Blackhorse on the already approved Tallaght line)
- Blessington/Tullow(N81) road at Tallaght;
- Bray/Wicklow(N11) at Loughlinstown and Cabinteely;
- M50 at two places, ie. between Kingswood and Red Cow(on the Tallaght line), between the Airport and Finglas between CAT's cars.

INTERCHANGE WITH DART, ARROW AND OTHER RAIL SERVICES

CAT has direct interchanges to the existing rail services at four different places. It links with

- DART by underground stations at Tara St or Connolly (Tara St station cannot cope with existing peak hour passengers. It is not clear that CIE's development plans for Tara St. include increasing the capacity for passengers).
- Heuston. This links with Kildare Arrow services and mainline rail services from Dublin to all parts of Ireland.
- The Western line at Drumcondra Station and a proposed station at Liffey Junction. Liffey Junction is between Cabra and Finglas. It where the railway line under the Phoenix Park joins the Western Suburban (Kilcock-Maynooth-Barrow St) line. This serves such rapidly growing areas as Blanchardstown in North-West Dublin and Leixlip in North Kildare.

DUBLIN AIRPORT

CAT serves Dublin Airport directly. It does so from two directions, as the Airport is on a loop. One part of this loop is mostly off street ie. from Harold's Cross to the Airport via Rathmines, Ranelagh, Tara Street, Broadstone, Cabra, Finglas. This would make it easy to run express and/or limited stop services to/from the Airport. This means a predictable travel time to and from the Airport. It shortens the total journey time, including the time spent looking for parking at Dublin Airport. CAT gives people another option on the cost and inconvenience of Airport parking.

For years, all Governments have ignored key facts about the Airport in planning Dublin transport. A recent Ove Arup report confirmed what the Dublin Transportation Initiative found in 1993 - that there is a lot of traffic **to** the Airport during the morning peak commute hour. This complements the city bound flow making this an ideal route for public transport.

A 1998 Aer Rianta/CIE Air-Rail study reported that over three-quarters of Dublin Airport passengers are making journeys for leisure purposes.(see p.6) Passengers who want non-stop Airport access would have the options of their own cars or taxis or bus services. All could use either the Port Tunnel or the complete M50 or the Eastern By-Pass, if it is ever built!

BUSES

Dublin needs a redesign of bus services. Bus drivers need comfortable places to work from and in which to take breaks. One Dublin Bus depot(Broadstone) is on CAT, while another three (Ringsend, Summerhill, Cunningham Rd) are very near it. This would help get rid of bus parking on city centre streets.

A FATTER CAT - BELLS AND WHISKERS, EVEN KITTENS

By adding bells and whiskers, and a kitten or two, CAT could serve other areas. One obvious area is between the M1 and the northern railway line. This whisker would take in industrial areas at Clonshaugh and Coolock in addition to Northside Centre and Beaumont Hospital. An extra bell could take in the Point, East Wall and the ferry terminal at Dublin Port, perhaps connecting with the Coolock whisker! Similarly, a west side kitten could take in Clondalkin and Citywest.

BEING STREET WISE,

CAT makes better use of the space available. (see p.7). A 30m CAT vehicle carries 60 people seated in the same street space as 6 cars. These 6 cars carry less than 9 people as each car carries an average of 1.42 people during the morning peak in Dublin according to the DTO.

100,000 new vehicles were registered in Dublin between January and October. Traffic planners allow over 5 metres per car. This suggests that Dublin needs over 12 km (7.5 miles) of street space each week to cater for these vehicles. On this basis, you might have to go to Cork to park!

CAT OR A *WOMBAT*?

CAT is a single network. As all parts are connected, there will be no need to build maintenance depots for the separate lines needed by this government's policy. Why build two separate depots for the Tallaght and Sandyford lines? The present policy does not to connect these lines. This repeats the mistake made when railways were first built in Ireland. The lines into Dublin did not interconnect then. Continuing this is a ***w***aste ***o***f ***m***oney, ***b***rains ***a***nd ***t***ime - a *wombat*. Approving this "in principle", means dithering! This indecisiveness drives up costs. It makes life uncomfortable and unpleasant!

A PURRING CITY

All public transport has to be pleasant, easy to use, predictable and reliable. This means easy access for all and being clean.

Ease of use will be greatly enhanced when the Dept. of Public Enterprise brings in **integrated ticketing** for public transport. Smart cards (like telephone call cards) may be used. This will allow people to use a single card for any public transport journey within the Greater Dublin area, regardless of how many changes of mode (eg. from CAT to bus, DART, Arrow or suburban and vice versa) are needed.

Predictability means having up-to-the-minute information on the next service arriving at each public transport stop. DART has this. But CAT will run mainly on streets, where traffic conditions can make time tables more aspirational than real. **Real-time information** is necessary at each stop as in cities like Gothenburg.

Reliability demands that all public transport (CAT, buses) in Dublin must get **automatic priority at traffic lights**. Dublin Corporation staff resist this, despite the lessons of wealthy cities like Zurich.

GET ON WITH IT!*

CAT is one of a set of mutually-reinforcing measures which should make it easy for people to move around the Greater Dublin Area. We need the Government to get on with CAT by deciding, immediately, to

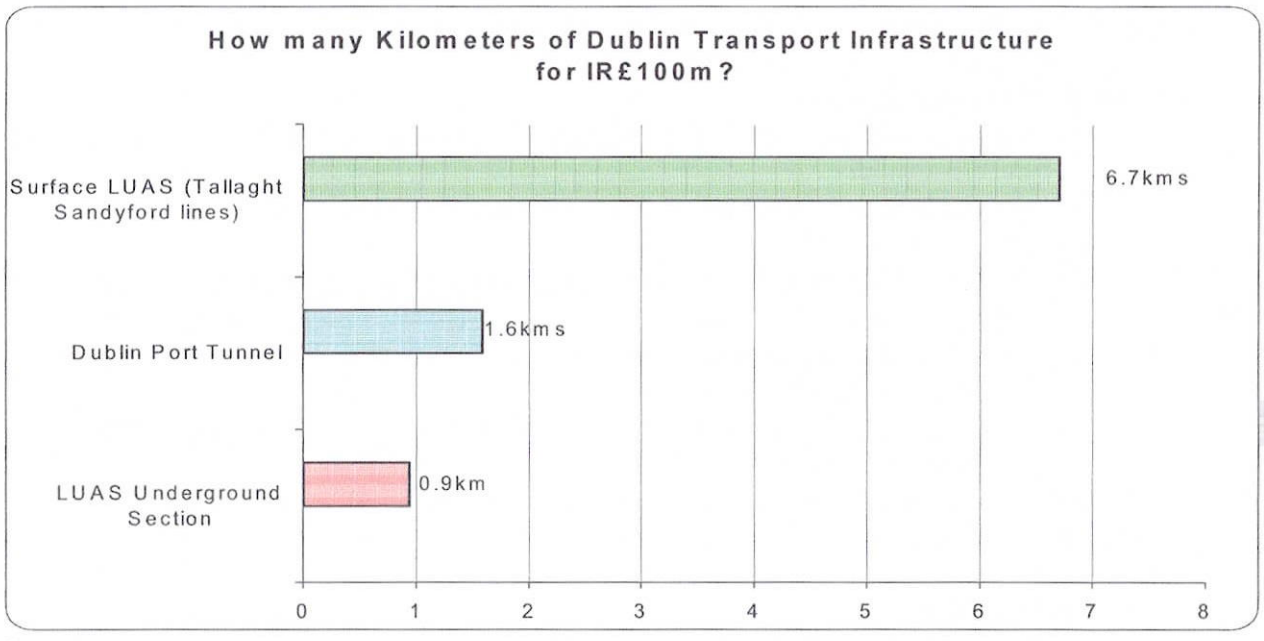
1. hold a public inquiry on a surface link (via Dawson, Nassau,Grafton and Westmoreland Streets) between the Sandyford and the Tallaght lines
2. fund full detailed design on
    - the northside loops serving the Airport, Swords and the suburbs between them and the city centre;
    - the Docklands loop linking Connolly to Ranelagh via the new Guild Street - Macken St. bridge;
    - a new line from Tallaght (via Templeogue, Kimmage, Harold's Cross Rathmines) to the city centre and Broadstone outlined by Atkins in 1998. This includes a tunnel from Mount Argus through to Broadstone (with underground stations at Rathmines, Ranelagh, Tara Street);
    - extensions to City West, Clondalkin, Coolock, East Wall and the Dublin Port passenger terminal.
3. Provide an operational cost subsidy of at least 50 per cent for all mass public transport - regardless of who owns or operates it.

*CAT is based on the following:

- the 1994 Dublin Transportation Initiative (DTI) final report.
- the 1996 Oscar Faber comparative study on Dublin's LRT lines.
- the 1997 Dublin Docklands Master Plan
- the 1998 Atkins study on surface/underground options for Dublin's light rail.
- the 1998 CIE-Aer Rianta Air-Rail link Report.
- the 1998 Dublin Corporation Review of Existing Air Quality and proposals for additional monitoring of traffic related emissions in Dublin City. issued by the Office of the Director of Traffic
- the 1998 DTO Final Report on Park and Ride Strategy for the DTI area
- CIE - Light Rail Project Office. Environmental Impact Statements
    1. Line A. Tallaght - Middle Abbey Street. July 1998
    2. Line B. St. Stephen's Green - Sandyford Industrial Estate. December 1998
    3. Line C. Abbey Street - Connolly Station. September 1999
- Findings of Inquiry
    1. Dublin Light Rail Line A. December 1998
    2. Dublin Light Rail Line B. June 1999
    3. Dublin Light Rail Line C. January 2000
- the 1999 Dublin City Development Plan
- the 1999 National Development Plan
- the 1999 Strategic Planning Guidelines for the Greater Dublin Area
- the January 2000 Atkins McCarthy report on the underground section of LUAS/LRT between Stephen's Green and Broadstone.
- the June 1999 lecture Economy and Ecology are not Contradictions - Lessons in Transportation Planning from Zurich by Ernst Joos, Deputy Director, Zurich Transport Authority organised by the Swiss Embassy and others.
- the March 2000 Ove Arup report Dublin Suburban Strategic Rail Review.
- the April 2000 UCD report Comparison of Subvention levels for Public Transport Systems in European Cities, commissioned by the Dept. of Public Enterprise.
- the April 2000 report by Environmental and Transport Planning (UK) Bus or Light Rail: Making the Right Choice.
- the May 2000 Dept. of Public Enterprise report on Regulation of the Bus Market in the Greater Dublin Area. prepared for the Cabinet Committee on Infrastructural Development and Public Private Partnerships.
- the June 2000 Dublin Corporation proposal for a bridge in the Docklands
- the September 2000 article on Public-health impact of outdoor and traffic-related air pollution: a European assessment Lancet (UK) 2 Sept 2000 (Vol. 356 No.9232)
- the September 2000 DTO Platform for Change Strategy 2000-2016
- the October 2000 National Greenhouse Gas Strategy published by the Minister for the Environment and Local Government.

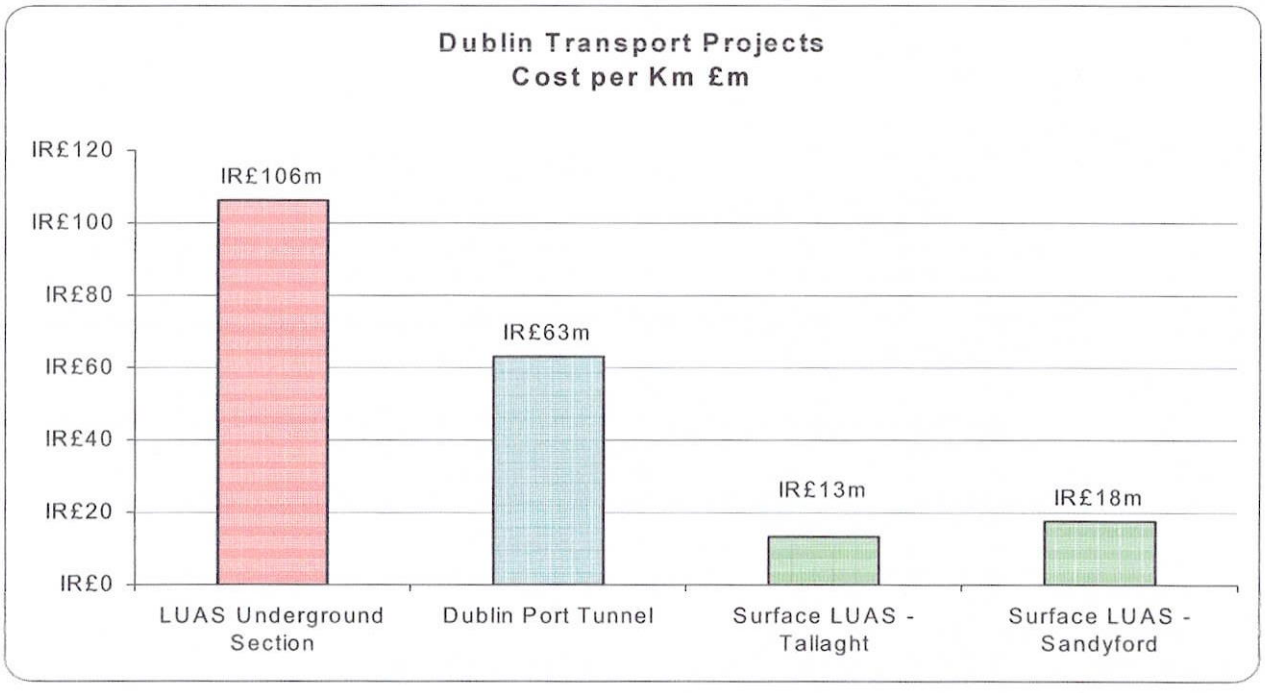
Donal O Brolcáin
Secretary Tel:(H) 837 1753 (after 19.00) email: donalobrol@clubi.ie

It is still cheaper to put cars/trucks underground than to put LUAS/Metro underground, even with the doubling of the cost of the Port Tunnel!
Putting LUAS/Metro underground is the most expensive option.



Sources:

LUAS Underground Section:	3 underground and 2 surface stops. Atkins McCarthy report for CIE. January 2000	2.85kms	£303m
Dublin Port Tunnel:	Dual carriageway with 4.5km in tunnel. Dublin Corporation Press Release. 11 October 2000	5.6kms	£353m
Surface LUAS:	Tallaght-Middle Abbey St line. Dáil Debates. 29 March 2000	14kms.	£185m
	Sandyford-Stephens Green Mary O'Rourke, TD Minister for Public Enterprise. 31 July 2000	9kms	£158m
	CIE. Environmental Impact Statements.		



DUBLIN AIRPORT

Profile of Passengers (1)

1999 Passengers (excluding transit)(2) 12,657,047 (say 12.65m.)

Purpose of Journey(3)

	Business	Leisure
	24.4%	75.6%
Irish	(11.7%)	(33.3%)
Non-Irish	(12.7%)	(42.3%)

Origin/Destination of Air Travellers(4)

Dublin	50.7%	(say 6.42m)
Leinster	23.9%	
Munster	11.7%	
Connacht	7.9%	
Ulster	5.8%	

Dublin Area 'air passenger'(5)(subject to note)

Contiguous to DART network	45%	(say 2.89m.)
Northside	15%	(say 960,000)
Southside	30%	(say 1,925,000)

Note. "A closer review of the Dublin area airport 'air passenger' traffic highlights that approximately 45 per cent of the traffic is contiguous to the DART network…Similar information is not available for 'non-Irish' travellers through the Airport. However, market research indicates that up to 70 per cent of foreign travellers visit Dublin at some stage of their Irish trip. A review of the 1996 Bord Fáilte approved hotels and guest houses in Dublin highlights the very high concentration of bed spaces in the central area and the south east quadrant. The distribution of beds within these areas is summarised in Table 4.2 below. It is clear from this table that the south east city centre area (Dublin 2) along with the Ballsbridge and Donnybrook areas (Dublin 4) are the prime locations in terms of accommodation availability." (from par 4.3 of Source 1. Below)

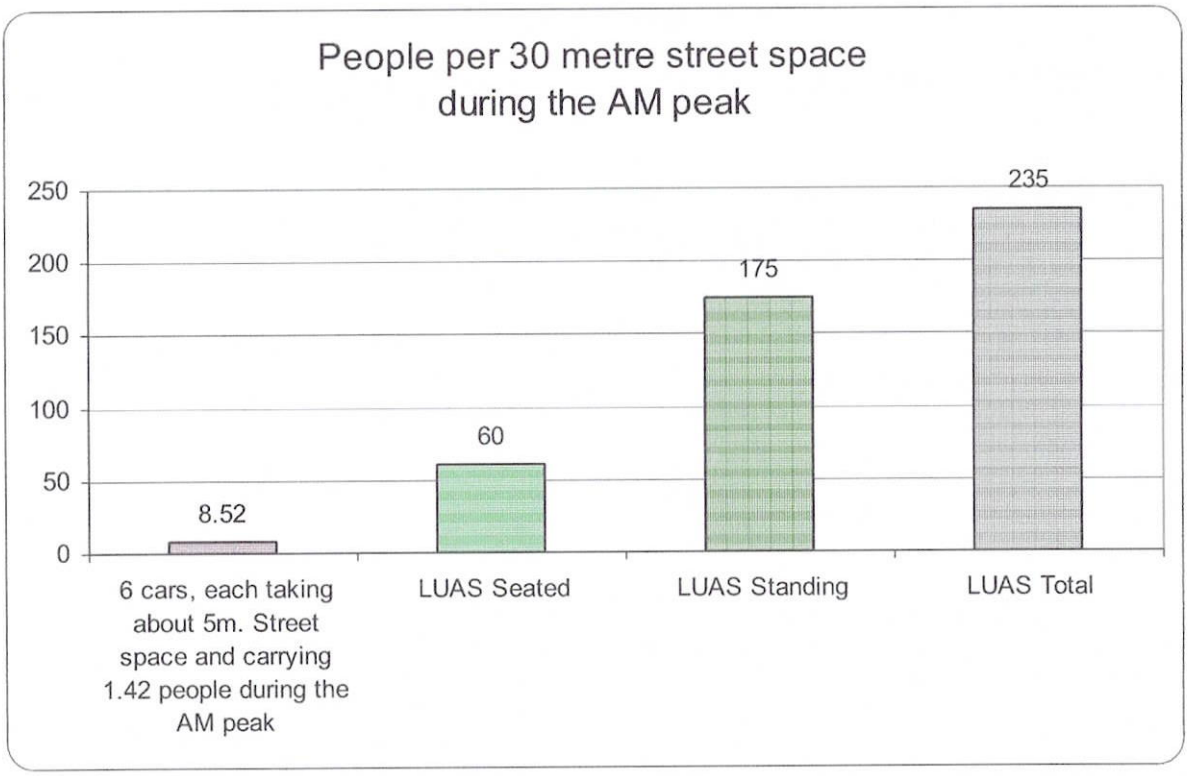
Surface Access (mode of use) by Air Passengers(6)

Private Car	67.6%
Taxi	12.2%
Bus/Coach	19.2%
Other (HGV, Motorcycle)	1%

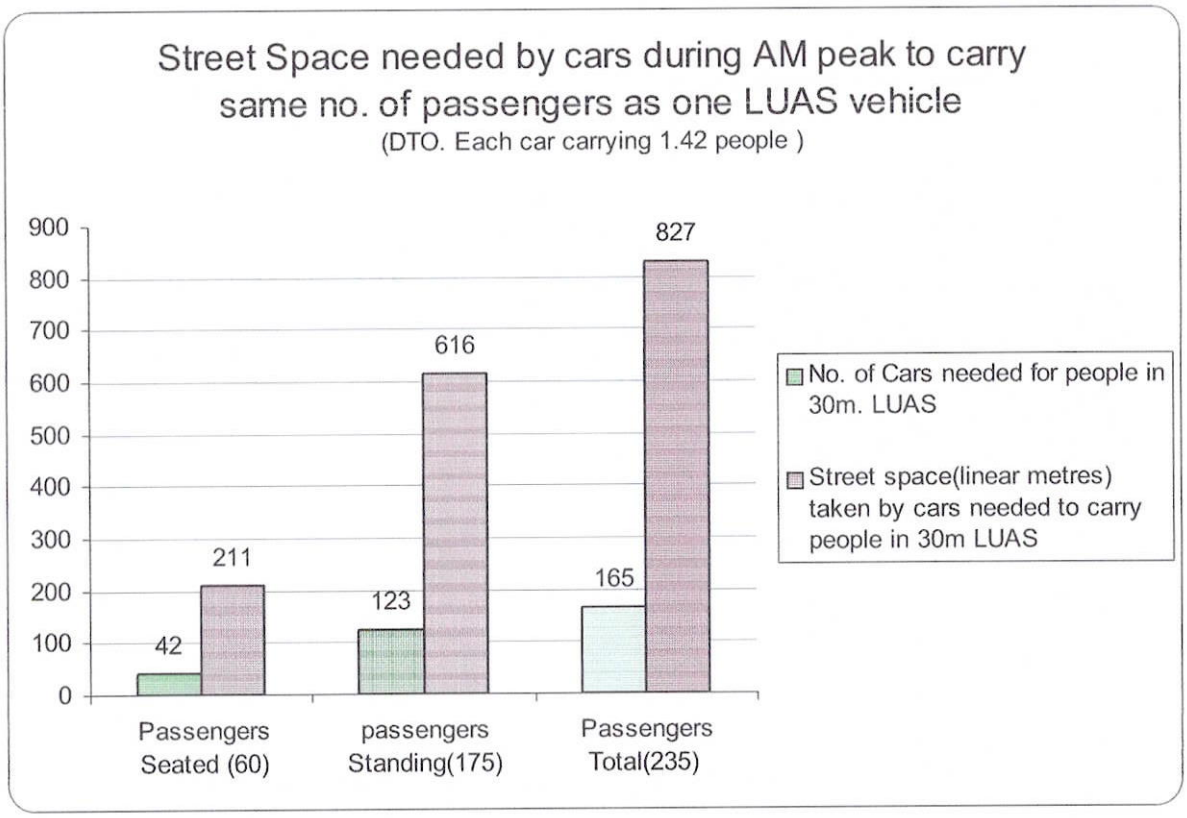
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1. Drawn from CIE/Aer Rianta. Dublin Airport Air-Rail Link Study. Final Report. April 1998. (Air-Rail Link Study)
2. Aer Rianta Press releases on 1999 Passengers though its Airports. 28th January 2000
3. Air-Rail Link Study. Table 3.4. p.12
4. Air-Rail Link Study. Figure 4.1 p.19
5. Air-Rail Link Study. Section 4.3. p.19
6. Air-Rail Link Study. Table 4.4. p.25

STREETWISE!



If 1,000 new cars are being bought every week in Dublin, then these occupy 5km (3 miles) of street space. It is cheaper to provide new street space underground, in road tunnels, than it is to put LUAS/Metro/Rail/CAT underground (see p. 5)



Appendix 3

Exchanges (email) with AECOM re Drumcondra CAT before and after meeting of 6Oct2104

Donal O'Brolchain

From: Donal O'Brolchain <donalobrol@clubi.ie>
Sent: 25 September 2014 14:19
To: 'Brick, Elaine'
Subject: RE: Fingal/North Dublin Transport Study
Attachments: CITY ACCESS TRANSIT Drumcondra 2005 Submission 2001.pdf

Elaine,

Being unaware of what you may know of the Drumcondra CAT, I attach the original submission made in 2001.
I will also have some more material. BTW, if I bring a very short presentation on a USB, I trust that you have facilities to show it.

It is not clear to me that the reasons we put forward to support CAT then have lost any of their force – despite the emphasis on grand gestures by some public authorities, as opposed to the persistent quiet competence which is the only way to build public transport infrastructure and to sustain services.

All for discussion on Monday 6th October next.

Regards

Donal

From: Brick, Elaine [mailto:elaine.brick@aecom.com]
Sent: 25 September 2014 12:45
To: Donal O'Brolchain
Subject: RE: Fingal/North Dublin Transport Study

Hi Donal,

The purpose of the meeting is really just for you to present the CAT option, to tell us more about it and its technical feasibility.

I think 1.5 hours should be enough?

I have no problem with you bringing additional people.

Regards,

Elaine Brick
Associate Director, Transportation
elaine.brick@aecom.com

AECOM
Ground Floor, Grand Canal House,
Grand Canal Street Upper, Dublin 4

Donal O'Brolchain

From: Donal O'Brolchain <donalobrol@clubi.ie>
Sent: 28 November 2014 07:08
To: 'joe.seymour@aecom.com'
Cc: 'Brick, Elaine'; 'mjhoward@eircom.net'; Tom Coffey; Brian MacEochaidhin; John Roden (john.roden@iol.ie)
Subject: FW: Drumcondra CAT a response to the long-term neglect of Dublin North City by the public authorities

Joe,

A few things about your final report on options for public transport serving North Dublin

1. **Population:** the existing Northern part of Dublin city has the highest number of people living in it
2. **A Platform for Change** Dublin Transport Office ; this should get detailed consideration document, given that so much else that followed during the 2000s claimed to be based on the work summarised in that document, including the distortion that is Metro North;
3. **Metro East**; this should get a complete chapter, given that it was developed to a very high standards by the Howards on their own initiative and using their own resources – an option which fits with A Platform for Change;
4. **Docklands LUAS link**: the need for to serve that business/residential district – set for further investment by NAMA - by linking the two existing LUAS lines
5. **LUAS CrossCity** – a comment showing how this rushed project closed off options set out in the 1998 Atkins report;
6. **Between the canals**: The need for another plane for transport within the canals eg.
    a. the overstreet heavy rail link between Pearse and Connolly stations;
    b. The Dublin Port Tunnel;
    c. The Phoenix Park heavy rail tunnel, due for reopening over the next two years.
7. **Buses:** the need for complete recasting of the routes – way beyond any policy-driven evidence making shown engaged in by the National Transport Authority advocacy of Bus Rapid Transit proposals
8. **CAT Proposal**: I would appreciate it if you included the original the 2001 CAT proposal as an appendix in your report.

Your sincerely

Donal O'Brolchain

From: Seymour, Joseph [mailto:Joseph.Seymour@aecom.com]
Sent: 10 November 2014 08:16
To: Donal O'Brolchain
Subject: RE: Drumcondra CAT a response to the long-term neglect of Dublin North City by the public authorities

Donal

Thanks for reply.

Regards
Joe

From: Donal O'Brolchain [mailto:donalobrol@clubi.ie]
Sent: 10 November 2014 00:17
To: Seymour, Joseph
Subject: RE: Drumcondra CAT a response to the long-term neglect of Dublin North City by the public authorities

Joe,
Thanks for forwarding your map showing the Drumcondra CAT.

A couple of comments.

1. The Drumcondra CAT was drawn up to show that the Dublin area needs an integrated Light Rail based core City Access Transit;
2. This called for a Northside LRT loop, consisting of two linked lines, linked to the existing Red and Green lines, but also to other loops and some spurs.
3. Your map does show this basic idea
4. But omits some critical elements ie
    a. There is no Docklands Loop, as was presented in the DTO *Platform for Change* ;
    b. The spur to link with the DART was to Howth Junction, along Coolock Lane, the Oscar Traynor, Tonlegee and Kilbarrack Roads
    Reason: Howth Junction is a stop for commuter heavy rail services (eg. from Dundalk, Drogheda) as well as being the point at which the Howth and Malahide DART services separate in contrast to Raheny shown in your map. In short, Howth Junction would serve as the functional equivalent to say Broombridge, with the possibility of passenger interchange between LUAS CrossCity - as extended in the CAT thinking and heavy rail based commuter services on that Western Line;
    c. Your map only provides for an East-West transport plane in the central area ie. DART Underground;
    d. I suggest that there are still major commuter North – South flows particularly towards the East of the Greater Dublin Area.
5. Showing BRT routes on this map lacks merit, as does the whole BRT concept (see attached submission)
    BRT is far from the kind of radical overhaul of Dublin bus routes that we advocated in 2001 and which is still needed.

Yours sincerely

Donal O'Brolchain

From: Seymour, Joseph [mailto:Joseph.Seymour@aecom.com]
Sent: 04 November 2014 09:16
To: Donal O'Brolchain
Cc: Brick, Elaine
Subject: RE: Durmcondra CAT a response to the long-term neglect of Dublin North City by the public authorities

Donal

As part of our report development we are preparing images that are consistent with each other. Could I ask you to review the attached and indicate if it is a reasonable interpretation of your CAT Proposal (north side study area only). Your help would be much appreciated.

Regards

Joe

Joe Seymour, BEng MEngSc CEng FIEI FCIHT
Regional Director, Transportation



Irish Journal of Social, Economic and Environmental Sustainability

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10 May 2018

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Dr. Edmond Byrne, Dr. Gerard Mullaly and Dr. Colin Sage

Designer: Cleona McCann
Email: cleonamccann@gmail.com

Academic Approaches

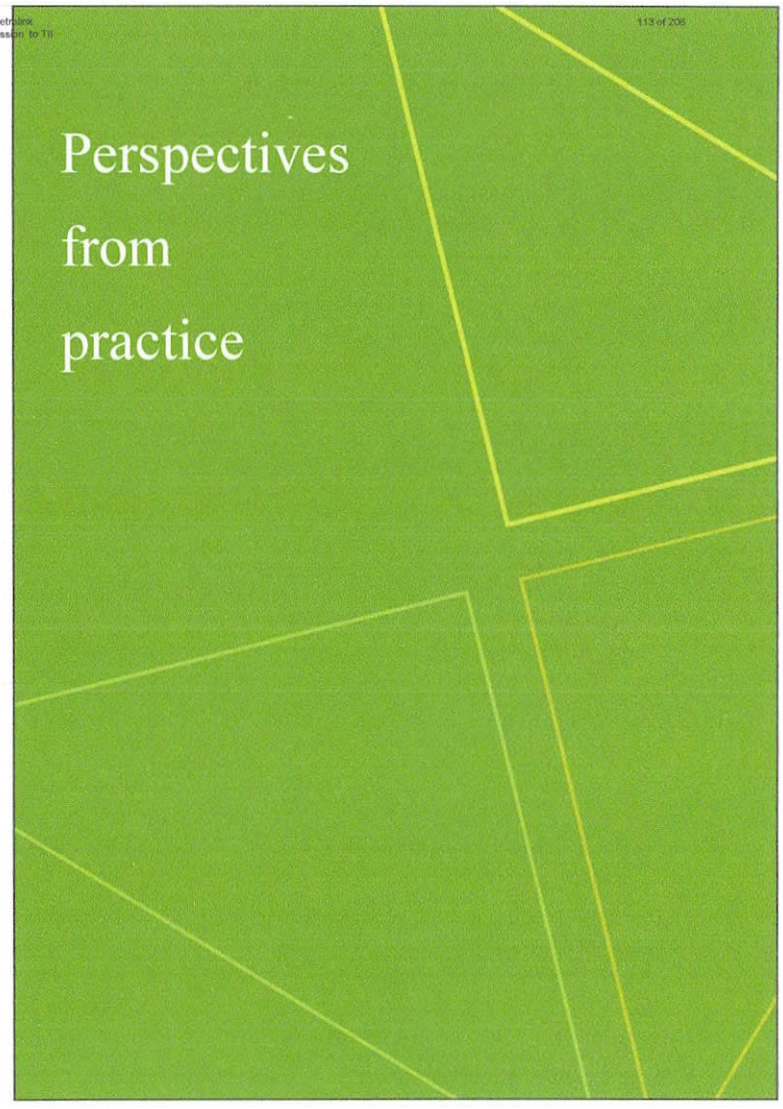
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A LUAS loop for North Dublin's Economic Core instead of Metro North

By Donal O Brolcháin

Abstract

Metro North is the largest single project in the Government's capital investment programme. This project emerged from a National Transport Authority Fingal/North Dublin Transport study in which options were assessed with the fundamental aim of serving the City Centre, Dublin Airport and Swords, while being technically feasible. This gave no weight to the travel patterns and transport needs of those living in the north part of Dublin City. Investing in Dublin's transport should be founded on a clear sense of priorities, based on (i) travel patterns and population, (ii) the optimum use of resources available eg.streetspace, land use, finance, (iii) sustainability, particularly air quality. This paper proposes an alternative LUAS loop in North Dublin. This is based on (a) maps of Dublin's Core Economic Area and population density (b) travel patterns revealed in reports/studies (c) a review of the relative importance fast access public transport access to Dublin Airport and Swords.

The Government has committed to building Optimised Metro North to serve the transport needs of the Swords/Airport/City-Centre Corridor. (DeptPER 2015 p. 22-24). The largest single project in the infrastructure and capital investment programme is based on the outcome of a Fingal/North Dublin Transport study (NTA/AECOM Fingal/North Dublin 2014 2015). It is estimated to cost €2.4bn.

To understand how Metro North fits with employment and population in the Greater Dublin Area, in late 2014 I commissioned two maps from the All-Island Regional Observatory (AIRO). Maynooth University based on the 2011 Census. I asked AIRO to superimpose the existing and proposed rail-based transport on maps showing (a) Dublin's Core Economic Area (Figure 1 Dublin's Core Economic Area with existing/ proposed rail lines superimposed) and (b) Population Density (Figure 2 Greater Dublin Area Population Density (2011 Census with existing/proposed rail lines superimposed).

These rail lines include

- the heavy rail commuter lines including DART shown as broken dotted lines;
- LUAS (Green and Red lines) including LUAS CrossCity (purple line) under construction and du be operational by the end of 2017;
- the Phoenix Park Tunnel (light orange line) which links the heavy rail lines between Inchicore and Connolly. This opened for passenger services in 2016;
- Metro North – (blue line);
- DART Underground (yellow line) which is planned over the longer term.

Dublin's core economic area is defined as those areas having more than 700 jobs per square kilometre. (see Appendix 1) It is clear that the routing of Metro North is to the west of the main part of the Core Economic Area in the north city. It does not serve some major trip attractors/generators in the North City eg. Beaumont or Cappagh Hospitals. Metro North provides an underground service on the same route as LUAS CrossCity from Stephen's Green to Parnell Square.

Figure 1 Dublin's Core Economic Area with existing/proposed rail lines superimposed

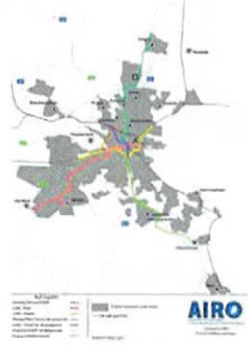


Figure 2 Greater Dublin Area Population Density (2011 Census with existing/proposed rail lines superimposed)



Figure 3 Dublin Light Rail Network 1995



Source: Dublin Transportation Initiative. 1995.

Background to Light Rail/LUAS and Metro in Dublin (now LUAS)

The Dublin Transportation Initiative (DTI) proposed a light rail system for Dublin as one of a series of mutually reinforcing measures to make it easier for people to move around the Greater Dublin area. (DTI 1995). This was to be an integrated 3-line system from the City Centre to Ballymun, Cabinteely, Tallaght with extensions to Finglas and Airport/Swords.(see Figure 3 Dublin Light Rail Network 1995) The EU funded DTI was major review of Dublin transport under the Technical Assistance Programme of the onal Programme on Peripherality 1989-1993.

In 1996, an EU prompted study found that a Light Rail line along a route from the City Centre through Drumcondra to Ballymun had a higher density of trip attractors/generators per route kilometre than either of the Dundrum or Tallaght lines. (see Table 1 Intensity of use indicators for the original three LUAS lines from City Centre to Ballymun, Dundrum, Tallaght). However, the Government ignored that finding and in 1998, the Government decided to build two non-interlinked lines (Red, Green) which primarily serve the south city. Both these lines have been extended since starting operations in 2004. Luas CrossCity extends the Green line to Broombridge to the west of North Dublin's Core Economic Area (see Figure 1) and is due to open in late 2017.

Table 1 Intensity of use indicators for the original three LUAS lines from City Centre to Ballymun, Dundrum, Tallaght

Section	Density of Major Attractors/Generators number per route km	Frontage Density metres per route metre
Tallaght Sq. - Treepark	1.44	0.09
Treepark - Fox & Geese	.44	0.01
Fox & Geese - Davitt	7.96	1.26
Davitt - Inchicore	2.60	1.72
Inchicore - Kilmainham	3.31	2.09
Kilmainham - Heuston	20.00	1.88
Heuston - Chancery St.	18.32	1.42
Chancery St. - O'Connell St.	21.56	2.73
Tallaght Route	7.79	1.91
O'Connell St. - Trinity College	3.33	2.02
Trinity College - Harcourt	21.33	1.96
Harcourt - Charlemont	20.00	1.85
Charlemont - Dundrum	0.00	0.00
Dundrum Route	7.81	0.68
O'Connell St. - Parnell	30.36	1.42
Parnell - Gardiner	15.7	1.91
Gardiner - St. Alphonsus	7.27	1.81
St. Alphonsus - St. Patrick's	3.90	2.46
St. Patrick's - Griffith	4.92	2.16
Griffith - Collins	15.12	1.55
Collins - DCU	2.86	1.86
DCU - Glasnevin	1.59	2.22
Glasnevin - Ballymun	9.68	2.25
Ballymun Route	9.61	2.00

Source: Department of Transport, Energy & Communications.1996

In 1998, the Environmental Impact Statement for the Dublin Port Tunnel assumed that the maximum benefits would accrue to the north city when on-street light rail line was built to link the City Centre to Drumcondra, Ballymun and the Airport. This LRT was to be an integrated three lines serving Tallaght and Cabinteely. (DC/GA 1998 Table 4.1 p.52)

Dublin Transportation Initiative

In 1995, the Dublin Transportation Office (DTO) was set up to implement the integrated transportation strategy recommended in the Final Report of the Dublin Transportation Initiative (DTI). Late in 2001, DTO set out an integrated strategy covering the Greater Dublin Area for the period 2000-2016. (DTO 2001). This included two new rail-based projects for North Dublin, as part of an integrated rail-based network for the Greater Dublin Area. (see Figure 4 Greater Dublin Area Rail Network Schematic. A Platform for Change). This rail network was part of a public transport system, with redesigned bus services including many Quality Bus Corridors.

There was to be an on-street LUAS line through Drumcondra which then split into two lines one goi the Airport via Ballymun and the other to Howth Junction. There was also to be a Metro Network. This included an southwestern LUAS line starting at Tallaght, going underground in the Kimmage area to the city centre (including under Tara Street Station) to a disused rail line at Broadstone, onto Finglas and onto the Airport and Swords. LUAS CrossCity is now being built on that railway line at Broadstone and on to Broombridge where it terminates.

Figure 4 Greater Dublin Area Rail Network Schematic. A Platform for Change



Source: Dublin Transportation Office. 2001.

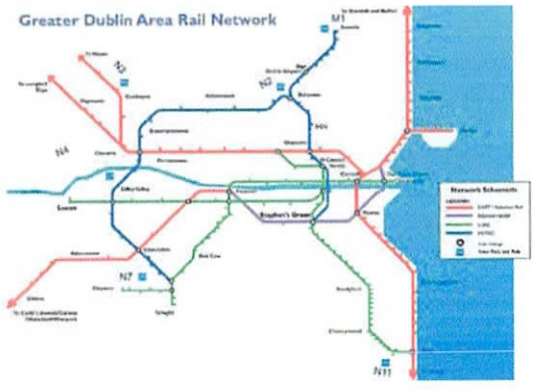
National Transport Authority

In December 2009, the National Transport Authority (NTA) was established and took over the responsibilities of the Dublin Transportation Office, in addition to certain functions of the then Department of Transport.

Metro North

Metro North was one of the projects in Transport 21, an infrastructure investment programme announced in November 2005 and abandoned in May 2011.1 Comparing the DTO Rail Network Schematic in Figure 4 with the Transport 21 Greater Dublin Area Rail Network in Figure 5 shows clearly that Metro North did not correspond in any way whatsoever with DTO strategy.

Figure 5 Transport 21 Greater Dublin Area Rail Network



Source: Transport 21. 2005

1 Martin Cullen TD, then Minister for Transport, announced Transport 21 on 1 November 2005 at a Press Conference. Apart from the texts of the Ministerial speeches, documentation on Transport 21 consisted of one page of statistics, three maps and one page of project completion dates for various projects.

Given that Transport 21 was decided before the economic crisis, it is difficult to find any justification for the change in strategy set out only four years previously. This is particularly true of investment aimed at enhancing public transport in the Greater Dublin area and thereby making more intensive use of existing streetspace.

Apart from the schematic in Figure 5, there was no other documentation or evidence of any analysis to support this change. No explanation was offered for setting aside of the extensive work done during the Dublin Transportation Initiative summarised in A Platform for Change (DTO 2001). It was bizarre that the following statement appeared in a 2011 National Transport Authority document "*Transport 21 included major investment in greater Dublin area public transport (largely based on the proposals contained in 'A Platform for Change)'.* (NTA February 2011 Vison2030 par. 2.3 Chap 2. p.1)

In 2008, the Railway Procurement Agency (RPA) (functions now in Transport Infrastructure Ireland) applied for Planning Permission and a Railway Order for Metro North. In October 2010, An Bord Pleanála(ABP) gave permission for a cut back Metro North. This meant that RPA had to make a new application for the depot for Metro North. In Table 2, these two projects are compared with what the National Transport Authority calls new Metro North.

ABP's reasons for cutting back RPA's proposed 2008 Metro North are worth noting;

1. the absence of a statutory framework for unserviced lands north of Swords which were remote from development lands or populations centres. This would lead to an unsustainable use of land unlikely to be supported by future travel demand in the short or medium term. (ABP 2010 p.3)
2. the proposed depot lands at Belinstown were prone to flooding which the RPA had not clearly identified. Nor had RPA justified the extensive land filling need in terms of sustainable development. ABP was not satisfied that the depot works would not exacerbate local flooding. (ABP p.3). ABP refused permission for the depot. RPA had to reapply for permission, which ABP granted in 2011.
3. as regards Swords Metro stops, ABP "..considered there was overlap between stations

and the number of stops proposed was not justified by current or foreseeable population catchments, bearing in mind the need to preserve the operational efficiency of the overall metro service."(ABP 2010 par 19. p. 13)

Table 2 Metro North projects compared RPA (2008), RPA(2010-11), NTA(2015)

	RPA Proposal 2008	An Bord Pleanala Decision on RPA proposal 2010-11	NTA New Metro North 2015
Route			
Between	Stephen's Green	Stephen's Green	Stephen's Green
and	Belinstown	Estuary	Estuary
Distance	18km	15.7	16.5km
Tunnel	10km		8.5km
Surface(At Grade)	8km		8km
Stations	17	14	14
Underground	9	9	6
On surface	8	5	8
Platform Length	94m	No change	60m
Vehicles	45-90m	No change	60m
Frequency of service	4 minutes	No change	2 minutes 30 trams per hour in each direction
Passengers			
On opening	80,000 per day	No change	
Over time	40,000 per hour	No change	
	20,000 in each direction	No change	9,900ppdph
Opening Year			2033

Given the work done for RPA 2008 Proposal and ABP's extensive involvement in considering that application, a lot of preparatory work has been done for NTA's new Metro North.

Travel Patterns in Greater Dublin Area

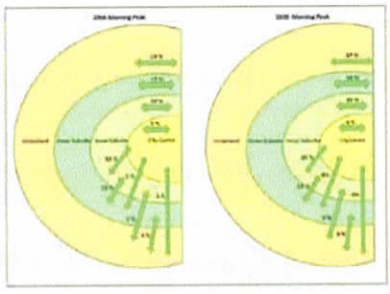
Early in 2015, NTA published Greater Dublin Area Transport Strategy 2011-2030 2030 Vision, dated April 2012. This included figures showing travel patterns in the Greater Dublin Area (see Figures 6 a 7) To try to understand these patterns, this data is summarised in Table 3 Travel Patterns in the Greater Dublin Area 2006 and 2030. This suggests that travel demand is greatest inside the M50. These areas are the destinations for over two-thirds of people in both 2006 and 2030. These areas were also the origins of 45% of trips in 2006 and will reduce to 39% in 2030.

Table 3 Travel Patterns in the Greater Dublin Area 2006 and 2030

	Destination	City Centre *(inside Canals)*	Inner suburbs *(within M50)*	Inside M50	Outer Suburbs *(outside M50)*	Hinterland	**All Destinations**
Origin							
City Centre *(inside canals)*	2006	5%	13%	18%	5%	2%	**25%**
	2030	6%	15%	21%	8%	4%	**33%**
Inner suburbs *(within M50)*	2006		27%	27%	12%	3%	**42%**
	2030		18%	18%	12%	3%	**33%**
Inside M50	2006			45%	17%	5%	**67%**
	2030			39%	20%	7%	**66%**
Outer Suburbs *(outside M50)*	2006				15%	4%	**19%**
	2030				14%	6%	**20%**
Hinterland	2006					14%	**14%**
	2030					14%	**14%**
All Origins	2006	5%	40%	45%	32%	23%	**100%**
	2030	6%	33%	39%	34%	27%	**100%**

Source: from National Transport Authority. 2012. (NTA April 2012 Vision). Fig 4.6 Chap 4 p.9

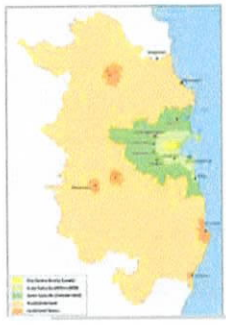
Figure 6 Travel patterns (morning peak period 07.00-10.00) Greater Dublin Area 2006 and 2030



Source: National Transport Authority. 2012. (NTA April 2012 Vision) Figure 4.6 Chap 4. p.9

The spatial extent of these areas is shown in Figure 7 Greater Dublin Travel Area

Figure 7 Greater Dublin Travel Area

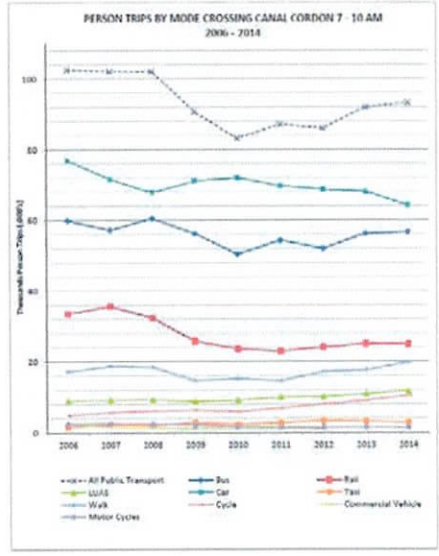


Source: National Transport Authority. 2012. (NTA April 2012 Vision) Figure 4.1 Chap 4. p.3

How do people travel?

Most people travel by car, but this has decreased by 16% since 2006. The next largest group travel by bus. Walking has increased such that in 2014 it was at the highest level since 1997 when canal cordon counts started. Both the number of cyclists and the number of people using taxis have more than doubled, even if the share of taxis is small in overall terms. see Figure 8 People crossing the canal cordon during the morning peak by travel mode 2006-2014

Figure 8 People crossing the canal cordon during the morning peak by travel mode 2006-2014

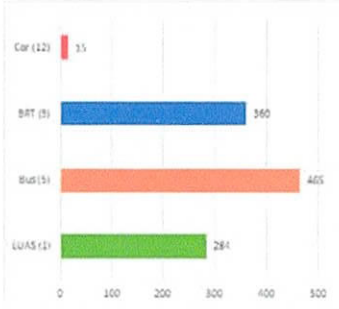


Source: Dublin City Council National Transport Authority. 2014 p.16

Increasing the use of cars as the main mode of travel to work in urban areas is not sustainable given the fixed nature of most streets and roads coupled with the human health and climate effects from emissions of fossil fuelled engines. To indicate these spatial constraints, it is useful to compare the streetspace occupied by cars, buses, the proposed Bus Rapid Transit (BRT) and LUAS. The street space taken by a 53m tram (to be used on the Green Line/LUAS CrossCity) carrying 75% of maximum passenger capacity (ie. 379), accommodates, at most

- 12 cars (assuming each car is 4.36m long), each of which carries 1.21 people during the morning peak 07.00-10.00 (see Appendix 2)
- 5 of the latest Dublin buses (each 10m long) each of which has a maximum passenger capacity of 93 people;
- 3 BRT vehicles (18m long) of the type proposed for Bus Rapid Transit (BRT), each of which has a maximum passenger capacity of 120 people;

Figure 9 Passengers on one 53m LUAS tram compared with capacity of buses, BRT vehicles and cars using the same streetspace.



In practice, cars/buses/BRT vehicles take more street space as they cannot travel without some assured clear distance ahead between them for accident prevention... Thus this figure overstates the passenger capacity of these vehicles. Those analysing urban rail capacity only allow 75% of maximum vehicle capacity in assessing how many passengers can be carried per direction per hour (ppdph). (NTA /AECOM Fingal/North Dublin 2015 p.61). However driverless technology may it possible for non-rail based vehicles to travel very close together. If so, they would resemble a long rail-based vehicle.

In considering the allocation of streetspace, air quality is important for pedestrian, cyclists and those who live/work on those streets. The current government consultation paper on clean air points out that "Vehicle emissions are a key source of health impacts from a range of air pollutant including NOx, particulate matter, black carbon and VOCs particularly in urban areas. (DeptCCAE 2017 p.34) Electrically powered transport pollutes less at point of use. Electricity can be generated in many different ways. It is easier to monitor, control and mitigate the emissions from generation sources than it from the 2.5m vehicles registered here, 80% of which are private cars.

Enhancing Public Transport in North Dublin, without/pending Metro North

In 2011, it seemed that Metro North was deferred indefinitely. NTA started to work on enhancing transport the Northern Corridor ie. Swords –Airport-City Centre by commissioning a series of studies.

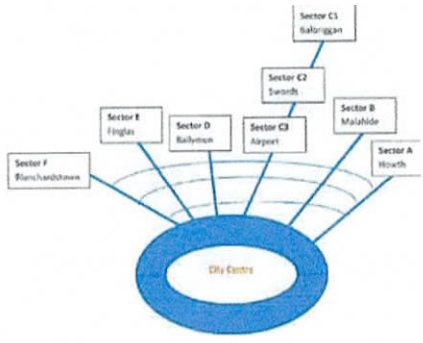
Fingal Corridors Study

NTA has not published this study which was completed in April 2012 (NTA Fingal Corridors 2012) which was obtained it using Access to Information on the Environment regulations. A senior NTA official has assured the author that the April 2012 Draft is the final version of the report of that work. (for further details, see Appendix 3)

This study focused on patterns of travel from each of eight sectors to the other seven sectors and of particular importance, the relationship to the City Centre. (NTA Fingal Corridors 2012). Footnote, Appendix) (see Figure 10 Main Fingal corridors in advance of Metro North). Two of sectors chosen (Ballymun, Finglas) are within the Dublin City Council area. Note that other sectors within the Dublin City area (Coolock, Santry, Drumcondra) on these corridors were not chosen for analysis. For each sector chosen, this study looked at travel demand during the morning peak, based on 2006 Census data

supplemented by the preliminary results of the 2011 Census.

Figure 10 Main Fingal corridors in advance of Metro North



Source: National Transport Authority. April 2012 par. 2.1 p.6 (NTA Fingal Corridors 2012)

The data in this study is presented in Table 4 Trip destinations from each Fingal sector to the other sectors studied during the morning peak (07.00-10.00. The column Other refers to trips from the sectors named to other parts of the Greater Dublin Area which are not included in those shown in Figure 8.

It is striking that Swords and Balbriggan have the lowest percentage of trips to the City Centre. Both also have a very high level of internal trips, as do Blanchardstown and the City Centre. Only 22% of the trips (about 1,600 people) from the Airport during the morning peak were to the City Centre while [redacted]vere about 2,500 trips in the opposite direction. More than two-thirds of trips from the Airport are [redacted]s outside the sectors studied. During the morning peak, Blanchardstown has over twice as many trips (55,719) as Swords (26,039). Of these trips, almost three times more people from Blanchardstown has City Centre destinations (10,586) than those going from Swords to the City Centre (3,645). It is also striking that there are more trips from Swords to Malahide (2,083) than there are to the Airport (1,562).

The report focuses on Swords, but notes that Blanchardstown will be the subject of a separate study later.

Table 4 Trip destinations from each Fingal sector to the other sectors studied during the morning peak (07.00-10.00

Origins	Howth	Mala-hide	Balbrig-gan	Swords	Airport	Ballymun	Finglas	Blanchards-town	City Centre
No of Trips	10,633	25,594	25,232	26,039	7,218	12,937	14,419	55,719	81,824
Destinations									
Internal	36%	34%	48%	44%	1%	35%	31%	46%	61%
City Centre	26%	20%	15%	14%	22%	19%	20%	19%	
Howth		9%	1%	1%	1%	1%	1%	0%	0%
Malahide	2%		3%	8%	2%	1%	0%	0%	0%
Balbriggan	0%	1%		1%	1%	0%	0%	0%	0%
Swords	1%	6%	5%		2%	1%	1%	1%	1%
Airport	2%	3%	3%	6%		3%	2%	1%	3%
Ballymun	1%	1%	1%	1%	1%		7%	1%	1%
Finglas	1%	1%	1%	1%	1%	5%		2%	0%
Blanchards-town	1%	1%	1%	2%	2%	2%	4%		1%
Other	30%	24%	22%	22%	67%	33%	34%	30%	33%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

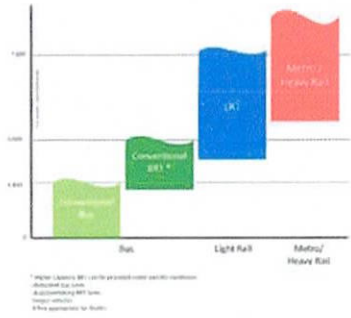
Source: National Transport Authority. April 2012 (NTA Fingal Corridors 2012)

Note This Table was compiled from the data given in each pie-chart for the different sectors. In five sectors (Malahide, Swords, Finglas, Blanchardstown, City Centre) there was a discrepancy between data in the table and the data in pie chart printed with the table. In all sectors, the pie-chart numbers added to 100%. The differences between the data in the tables and pie-charts do not appear to be significant.

Bus Rapid Transit

In October 2012, NTA published a study on a Core Dublin Network for Bus Rapid Transit(BRT).(NTA BRT 2012) This compared Bus Rapid Transit systems with LUAS type system and Metro/Heavy Rail see Figure 11 Public Transport Passenger Capacities per mode passengers per direction per hour (ppdph). The report pointed out that higher capacity Bus Rapid Transit was not appropriate for Dublin. The report looked at three cross city corridors routes ie Blanchardstown to UCD, Clongriffin to Tallaght, Swords to Tallaght through Santry and Drumcondra. The analysis found that there was a peak line flow demand at St. Patrick's College of 5,900 ppdph. This greatly exceeds the 3,600 ppdph capacity for BRT. The report noted that "The Swords to City BRT section has not been brought forward to the later costing and appraisal sections of this feasibility study report" NTA BRT 2012 par 4.7 p54

Figure 11 Public Transport Passenger Capacities per mode passengers per direction per hour (ppdph)



Source: National Transport Authority. 2012. (NTA BRT 2012 Figure 3 p.4).

Swiftway Bus Rapid Transit

Despite the earlier statement about the lack of capacity using BRT to meet passenger demand on the Swords -City Centre corridor, NTA published a major study in October 2014 on this corridor. (NTA Swiftway) No equivalent work appears to have been done on the two BRT routes which the NTA BR report of 2012 recommended for further study.

This NTA Swiftway report confirmed the findings of the NTA BRT 2012 report on the lack of capacity of BRT to cater for the passengers forecast on the Swords-Dublin Airport-Drumcondra-City Centre corridor. The report notes "It is anticipated that demand will increase following a reorganisation of Dublin Bus Routes"

With one exception, passengers forecast exceed the proposed BRT capacity even with the existing bus network still in place. These forecasts assumed that the existing Dublin Bus network remained place, not just on the North Dublin roads, but also in the City Centre.2

In 2015, BRT was not brought forward for economic appraisal on the grounds that it did not provide sufficient capacity to meet the long terms needs of an area studied for Metro North. (NTA /AECOM Fingal/North Dublin 2015 par. 9.7 p.147). It is not clear that this assessment spells the end of BRT on the Swords-Airport-Drumcondra-City Centre Corridor, as the Greater Dublin Area Transport Strategy maintains the necessity for greater public transport capacity in advance of Metro North. (NTA 2016 par 4.2.1 p.53).

Does Fingal deserve so much attention?

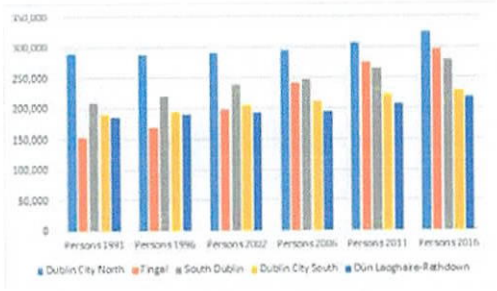
The resources which NTA committed to Fingal and Swords deserves scrutiny, when compared to those committed to the north part of Dublin City or Blanchardstown both of which have much bigger populations.

2 This report assumed two separate BRT services south of the Airport, with maximum capacity of 2,700 ppdph. This implied 22.5 BRT vehicles/hour on the existing roads from Dublin Airport through Drumcondra to the City Centre ie. one BRT vehicle every 2.7 minutes. This is 50% higher than the 15 vehicles/hour cited for BRT. With one exception, these options lack adequate capacity for the passengers forecast ie.
1,800 ppdph (4 minute frequency) is exceeded by (a) 40% in 2018 - the opening year for this proposed BRT; (b) 80% in 2033 - the forecast year;
2,700 ppdph (2.7 minute frequency) exceeded by 22% in 2033, the forecast year
while being at 95% capacity in 2018, the opening year for the proposed BRT.
NTA Swiftway Volume 1.Summary tables 10.5 and 10.6 p. 187

North City has a bigger population than Fingal

More people live in the north part of Dublin City (325,002 in Census 2016) than in either the South City (228,163), Dun Laoghaire/Rathdown (217,274), South Dublin (278,749) or Fingal (296,214). This has been so for the last 25 years, as is clear from Figure 12 Population in the major areas the Greater Dublin
996-2016(preliminary results)

Figure 12 Population in the major areas the Greater Dublin Area 1996-2016(preliminary results)

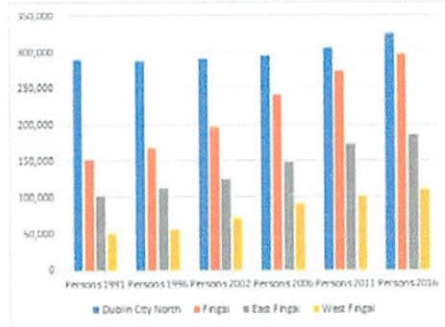


Fingal – two distinct areas

Fingal is the fastest growing county in Ireland. Asserting that alone hides the fact that Fingal is actually two distinct areas, ie Fingal West and Fingal East, using the Ashbourne Road (M2/N2) as the border. (see Appendix 4) This division is clear in the very few trips between Blanchardstown and the other sectors studied in (NTA Fingal Corridors 2012) .see Table 3 above. The NTA report which recommended new
North was focused on some of the eastern part of Fingal, with a cut-off just north of the Malahide
y. As in the Fingal Corridors report, North Dublin included that part of the Centre City inside the canals and other parts east of Finglas. (North Dublin 2014. par 1.1 p.1)

West Fingal (around Blanchardstown) has doubled in population in the last 20 years. In contrast, East Fingal (Balbriggan, Skerries, Malahide, Portmarnock, Swords) has increased by less than 70% see Figure 13 Population of Dublin City North, East Fingal and West Fingal 1991-2016. Both Blanchardstown and Swords are designated Metropolitan Consolidation Towns in the Regional Planning Guidelines for the Greater Dublin Area 2010-2022.(RPG 2010 par. 4.6 p.93) .3.In 2016, Blanchardstown had about 75,000 people whereas Swords had about 43, 000 people. Both have doubled in population over the past 25 years.

Figure 13 Population of Dublin City North, East Fingal and West Fingal 1991-2016



Based on population and travel patterns during the morning peak, It is clear that Blanchardstown merits more attention from those responsible for transport planning and investment in the Greater Dublin Area than does Swords.

3 These are to be strong active urban places within metropolitan areas with strong transport links. In addition to Blanchardstown and Swords, Lucan, Clondalkin, Tallaght, Dundrum, Dun Laoghaire and Bray are also in this category.

Why does Swords get so much attention?

Most people making trips during the morning peak stay in Swords (44% of 26,039).

It is also clear from the data in Table 3 that there are about 3,700 people (14% of the 26,039 trips) going from Swords to the City Centre during the morning peak, with another 1,600 going to the Airport from Swords. This compares with 10,500 travelling to the City Centre from Blanchardstown, the population of which is over 70% bigger than Swords.

Swords may get what seems like undue attention from transport planners because it is near the Airport.

Dublin Airport

Dublin Airport is a major employment centre with about 15,000 servicing the 28m passengers who travelled through the Airport in 2016. An NTA survey of Dublin Airport passengers revealed data that is critical in assessing transport links to/from the Airport. (NTA Airport Survey 2011).

This survey found that

1.

a) Less than one seventh of trips (14%) were business related (see Figure 14 Dublin Airport Why did people travel?);

b) Three quarters of all trips were either for holiday/leisure (nearly half) or visiting friends/ relatives (over one-quarter). This has scarcely changed since a similar study was done during the late 1990s (CIE/Aer Rianta 1998). Figure 14 Dublin Airport Why did people travel?

Figure 14 Dublin Airport Why did people travel?



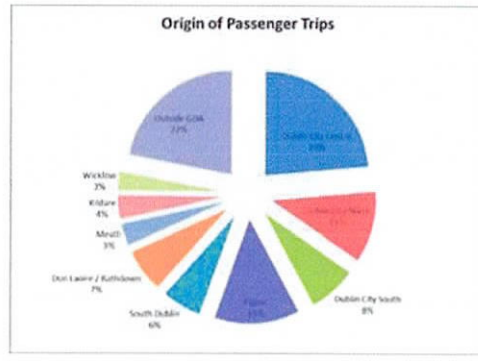
Source: National Transport Authority. 2012. (NTA Airport Survey 2011).Fig.3.11 p.22

2.

Less than one third of the trips originated in City Centre/South part of Dublin City see Figure 15 Dublin Airport Where is Ireland do the passengers come from?

3.

Three quarters (75%) had a journey time of less than one hour to the Airport, with almost half (46%) having a journey time of less than 30 minutes (see Figure 16 Dublin Airport. How long did passengers originating in Ireland take to get there?)



Source: National Transport Authority. 2012. (NTA Airport Survey 2011) Figure 3.6 p.15

Figure 16 Dublin Airport. How long did passengers originating in Ireland take to get there?



Source: National Transport Authority. 2012. (NTA Airport Survey 2011) Figure 3.5 p.13

Data from this suggests that the vast majority of passengers using Dublin Airport are not very time-constrained in how they access the Airport, given the purpose of their trips. Most passengers do not come from Dublin's Central Business District (CBD), as 42% start their trips in Dublin City Centre/North/South. Those passengers who are time-constrained have the option of taxis (which can use bus lanes) and/or using the Dublin Port Tunnel to access Dublin Airport from Dublin's CBD. The Dublin Port Tunnel is currently operating below its unconstrained capacity, although there are capacity issues with the current road layout at the interface between the Port and the City. The data in Table 3 shows that there were just under 2,500 going from the City Centre to the Airport during the morning peak, with just under 1,600 travelling the opposite direction.

The NTA survey found that 20% of passenger arrive at the Airport before 08.00. (NTA Airport Survey 2011 p.13). This percentage is very similar to the 22% who make trips from the Airport to the City Centre [illegible] the morning peak as shown in Table 4 Trip destinations from each Fingal sector to the other sectors [illegible]d during the morning peak (07.00-10.00). Two thirds of departing passengers leave after midday. The busiest time for arrivals is between 08.00 and midday.

The National Transport Authority/AECOM Fingal North Dublin Transport Study

The Capital Investment Programme cites this study as the basis on which NTA recommended that a revised metro be selected as the appropriate public transport project to address the transport needs of the Swords/Airport/City-Centre Corridor (NTA/ AECOM Fingal/North Dublin 2014, 2015)

In assessing options, the key criteria were City Centre-Airport journey times and capacity in terms of people per hour per direction (pphpd). No basis is set out for this assumption by reference to other studies that the NTA has done eg the NTA survey of Airport passengers or the Fingal Corridors study. Little or no account was taken of the travel patterns revealed in Table 3 Travel Patterns in the Greater Dublin Area 2006 and 2030 or Table 4 Trip destinations from each Fingal sector to the other sectors studied during the morning peak (07.00-10.00)

There was relatively no emphasis on integrating with the existing LUAS services (eg. LUAS CrossCity at Broombridge) or developing options which linked to Howth Junction, served by both DART and north-bound commuter services.

The public transport needs of those living and working in the north city part of Dublin's Core Economic area have not been studied

Why Swords?

Why should Swords which is outside the M50 have a much higher priority than any other area in the North City given that

1. data from National Transport Authority report suggests that the largest increases in travel will take place inside the M50 see Table 2 above;
2. Swords has the lowest percentage (14% 3,645) city-centered oriented trips of any the sectors studied in the Fingal Corridors study see Table 4 Trip destinations from each Fingal sector to the other sectors studied during the morning peak (07.00-10.00)
3. The north city has more people than Fingal see Figure 13 Population of Dublin City North, East Fingal and West Fingal 1991-2016;

4. In the 10 years from 2006, the population of the North City grew by just over 30,000 people, compared with an increase in Swords population of just over 5,000 people;
5. The north city forms an organic whole with Dublin's Economic Core Area, while the Airport means that Swords is at some distance from the economic core. Figure 1 Dublin's Core Economic Area with existing/proposed rail lines superimposed.

In 2006, Swords had a population of 37,762 while Blanchardstown had a population of 63,120. In the last 10 years, Swords has increased by 13% (to 42,776 in 2016) while Blanchardstown has increased by 18% (to 74,478 in 2016). As has already been pointed out, in 2010, ABP rejected the number of stations proposed for Metro North in Swords on the basis that these were not justified by population trends. (ABP 2010 par 19. p.13)

How critical is journey time between the City Centre and the Airport?

Is it really worth spending €2.4 bn (excluding VAT) to get a 19 minute journey time from O'Connell Street to the Airport, given that

i. the journey time to the Airport
   - is less than 30 minutes for nearly half the passengers;
   - is less than an hour for 75% of passengers;

ii. less than half the Airport passengers start their trips in areas (ie. Dublin City Centre/North/South) directly served by the route of this project;

iii. 75% of all Airport passengers are travelling for leisure or visiting family/friends;

iv. Metro North
   - will not be integrated with the existing LUAS system until another tunnelled link is built from Stephen's Green to link with the Green LUAS line ;
   - has very limited connectivity to other rail-based services in the Greater Dublin Area, thus limiting options for promoting modal shift throughout the Great Dublin Area.

North City LUAS loop instead of Metro North

Instead of one single channel to the Airport, extending LUAS CrossCity to create a north Dublin LUAS loop would be more in keeping the data emerging from NTA studies on population and travel patterns.

Figure 17 A LUAS loop serving the North City part of Dublin's Core Economic Area with spurs to the Airport, Howth Junction and Swords



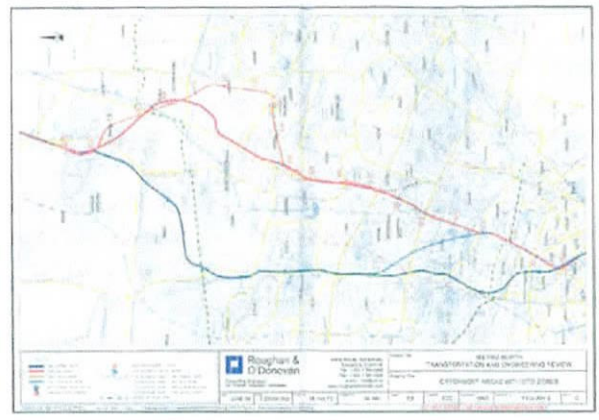
This loop

- serves the northern part of Dublin's Core Economic Area and the populated areas comprehensively, taking in
  - Northwood, Santry, Drumcondra, North East Inner City;
    Kilmore, Beaumont Hospital, Coolock, Edenmore, Donaghmede, Kilbarrack;
  - Ballymun, Poppintree, Charlestown, Finglas, Cappagh Hospital
- is Integrated with Dublin 's existing light rail system LUAS, as it extends LUAS CrossCity and could link with LUAS in the Docklands (North and South) using the Samuel Becket Bridge (which is designed to carry LUAS);
- offers two rail-based links between the Central Business District and Dublin Airport
  - directly on LUAS via either Drumcondra or LUAS CrossCity;
  - indirectly using LUAS to get to Howth Junction to connect with
    - DART services to Connolly, Tara and Pearse Stations;
- links with heavy rail services
  - at Howth Junction; which has DART and Commuter services;
  - he Maynooth line at both Drumcondra and Broombridge;

Two parts of the proposed the LUAS loop have already been studied. These are

1. a route from the City Centre through Drumcondra, Whitehall. Beaumont, Kilmore, Clonshaugh to the Airport (Roughan & O'Donovan 2006) see Figure 18.
   This report was presented to the NTA/AECOM study team. However, the NTA/AECOM reports do not refer to the study explicitly or mention the authors. The NTA/AECOM study misrepresented this report by including it as part of another proposal. This other proposal was dismissed on the grounds that "Very little information is available on this proposal. Its primary purpose is to improve transport links in north Dublin City, rather than to provide a link to the Airport or Swords. As a result, journey times from the City Centre to Dublin Airport and Swords are relatively high." (NTA AECOM 2014 par 74. p.90)

Figure 18 LUAS route option through Drumcondra, Whitehall, Beaumont, Kilmore, Clonshaugh



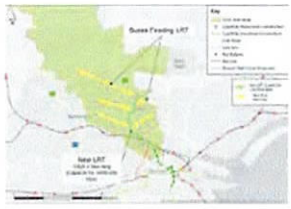
Source: Roughan & O'Donovan 2006

2. a 4.5km extension of LUAS CrossCity from Broombridge through Finglas to a terminus close to the N2/M50 near Charlestown. see In addition to these two studies, some of the more recent work done on SwiftwayBRT may be very useful in considering an on-street LUAS line from the City Centre to Drumcondra and northwards. ((NTA Swiftway)

3. Figure 19 LUAS CrossCity extension to Finglas and Charlestown.

In addition to these two studies, some of the more recent work done on SwiftwayBRT may be very useful in considering an on-street LUAS line from the City Centre to Drumcondra and northwards. ((NTA Swiftway)

Figure 19 LUAS CrossCity extension to Finglas and Charlestown.



Source: National Transport Authority Jacobs Systra. 2015.

Cost

The indicative costs for this 35km North City LUAS Loop ranges from €1.575bn to €2.2bn to using costings given in an NTA study on extending LUAS CrossCity to Finglas((NTA/Jacobs Systra 2015) and those of LUAS CrossCity

1. Luas CrossCity extension to Finglas.

This was estimated to cost €201m for a 4.5km route. (NTA/Jacobs Systra 2015 par 7.3 p.41). This includes€5m for feeder buses. This works out at just under €45m per killometer. On this basis, the 35km North City LUAS Loop would cost €1.575bn – This is nearly one-third cheaper than the estimated cost of new Metro North

2. LUAS CrossCity

LUAS CrossCity is estimated to cost of €61m per kilometre including vehicles and stations.

On this basis the 35km LUAS loop would cost just under €2.2bn. This is about the same as the estimated cost of new Metro North (see below). However, building the LUAS North City loop in unlikely to be as costly as LUAS CrossCity which was incurred considerable costs of diver utilities and securing existing buildings particularly in the City Centre.

Metro North

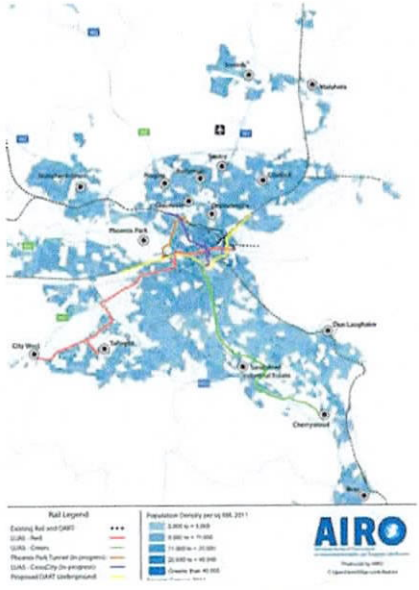
This is estimated to cost €2.3bn (including VAT at 13.5% with a degree of estimating uncertainty set at +/- 30% of our estimate value (NTA/AECOM 2015 par 8.4.5 p. 134).

Conclusion

new Metro North emerged from an assessment process that had one fundamental project objective of serving the City Centre, Dublin airport and Swords (NTA/AECOM 2015 par 4.2.4 p. 37). In doing so, the public authorities gave far less weight to the patterns of travel that emerged from their own studies, the existing population and where Dublin's Economic Core actually is. The LUAS Loop proposed here can be phased in, with sections opening as they are completed. In this way, the long overdue enhancement of public transport in the north city part of Dublin's Economic Core Area will not be subject to an all or nothing approach needed for new Metro North.

To promote competitiveness and social cohesion, Dublin needs integrated and sustainable public transport. Achieving this needs quiet, consistent competence to bring working and living conditions to the levels of well-run European cities. It would be a start if our public authorities drew the appropriate conclusions from their own reports and invested accordingly.

Figure 20 A LUAS loop serving the north city population



Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Appendix 1

Dublin's Economic Core Area

The map showing Dublin's Economic Core is based on the 2011 Census using the same methodology described in Cormac Walsh, Brendan Williams and Ian Boyle Mapping the true extent of Dublin's functional urban region – What the best available evidence tells us. Posted 21 December 2010 on irelandafternama

https://irelandafternama.wordpress.com/2010/12/21/mapping-the-true-extent-of-dublins-functional-urban-region-what-the-best-available-evidence-tells-us/

Appendix 2

Car lengths

I have taken 4.36m as the average length of the top 10 selling passenger car models in Ireland during 2016.The top selling 10 cars account for 76% of total new registrations including imports.

Hyundai TUCSON 4.475m, Volkswagen GOLF 4.255m, Ford FOCUS 4.36m,

Skoda OCTAVIA 4.659m , Nissan QASHQAI 4.379m, Ford FIESTA 3.969m,

Toyota COROLLA4.385m, Toyota YARIS 3.95m, Volkswagen PASSAT SALOON 4.767m

Kia SPORTAGE 4.44 m

Sources:

1) Society of the Irish Motor Industry (SIMI) Motorstats

http:www.beepbeep.ie/stats?sYear%5B%5D=2016&sYear%5B%5D=&RegType+1&sMonth%5B%5D+12&x+48&y=10

2) Data on each model – from motor manufacturer's websites.

3) DCC/NTA 2014 p.16

Appendix 3

Fingal corridors

National Transport Authority. April 2012 Study of Transport Options for Fingal Corridors in advance of Metro North. April 2012. (NTA Fingal Corridors 2012) Unpublished. Obtained using Access to Information on the Environment Regulations

This study aimed to undertake an analysis of three key transport indicators as follows

- overall travel demand and the patterns of travel;
- Public transport versus car mode shares (for trips to the city centre)
- Public transport versus car mode times (for trips to the city centre)

The City Centre is defined as the area inside the canals, the docklands and two Ballsbridge zones (just south of the canals) that include significant office based employment.

Balbriggan includes Skerries. Malahide includes Clongriffin, Portmarnock and Donabate.

Swords includes the town centre, the residential and industrial parts. Ballymun includes Sillogue Park and Santry Demesne, both of which are in Fingal.

Using preliminary data from the 2011 Census and the latest CSO data on employment levels in the Greater Dublin Area, an estimate was made of the changes n travel demand for each of identified sectors.

Appendix 4

Fingal East and West

Using an Ordnance Survey map of Dublin Administrative Counties, District Electoral Divisions (DED) were allocated as follows (Number preceding each DED is that given the Census tables)

East Fingal

001 Airport, 002 Balbriggan Rural, 3 Balbriggan Urban, 004 Baldoyle, 005 Balgriffin, 006 Ballyboghil, 007 Balscadden, 018 Clonmethan, 019 Donabate, 020 Dubber, 021 Garristown, 022 Hollywood, 023 Holmpatrick, 024 Howth, 025 Kilsallaghan, 026 Kinsaley, 028 Lusk, 029 Malahide East, East Fingal (continued), 030 Malahide West, 031 Portmarnock North, 032 Portmarnock South, 033 Rush, 034 Skerries, 035 Sutton, 036 Swords-Forrest, 037 Swords-Glasmore, 038 Swords-Lissenhall, 039 Swords-Seatown, 040 Swords Village, 042 Turnapin

West Fingal

008 Blanchardstown-Abbotstown, 009 Blanchardstown-Blakestown, 010 Blanchardstown-Coolmine, 011 Blanchardstown-Corduff, 012 Blanchardstown-Delwood 013 Blanchardstown-Mulhuddart, 014 Blanchardstown-Roselawn, 015 Blanchardstown-Tyrrelstown, 016 Castleknock-Knockmaroon, 017 Castleknock-Park 027 Lucan North, 041 The Ward

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Transport 21. 2005 The then Minister for Transport, Martin Cullen TD announced Transport 21 on 1 November 2005 at a Press Conference.

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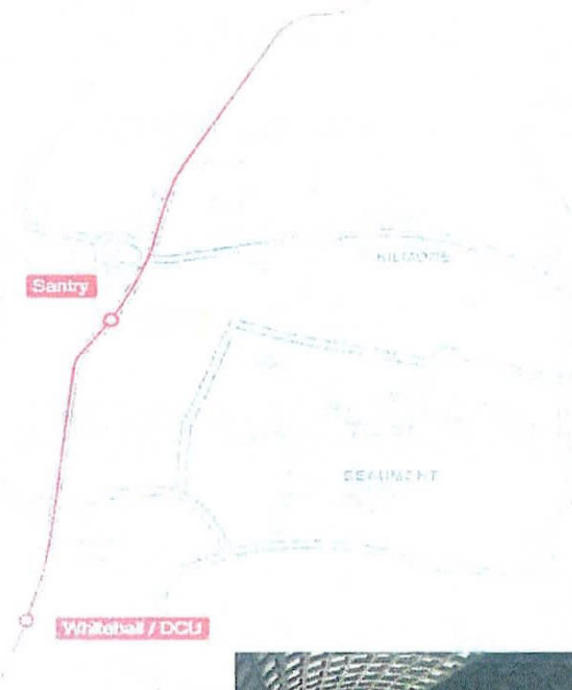
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Roughan & O'Donovan
CONSULTING ENGINEERS

METRO NORTH

TRANSPORTATION AND ENGINEERING REVIEW

FINAL REVISION





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Metro North

Transportation and Engineering Review

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Metro North

Transportation and Engineering Review

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SECTION 1

METRO ROUTE OPTIONS

1.1 Introduction

Roughan & O'Donovan were engaged by Willie Murray Planning Consultants to assess the transportation and engineering aspects of alignment options for the proposed Metro North from Dublin City Centre to Swords via Dublin Airport. The Railway Procurement Agency (RPA) has identified three possible corridors for the new service, namely the West Route, Central Route and East Route. The three options put forward by the RPA are shown on **Figure 1** in Appendix A.

During the public consultation process, the RPA issued an additional proposal to address some of the concerns raised in the initial stages. This route is in effect a combination of the previous Central and East Route proposals, following the East Route alignment to Drumcondra before diverting westward to follow the Central Route alignment from DCU. This additional proposal has been included on **Figure 1** and will be referred to herein as the RPA Alternative Route.

The RPA has issued the following information in relation to the route selection process:

- At approximately 17km each, the East and Central Routes are preferred over the West route, which is about 5km longer.
- Indicative passenger projections by the RPA suggest a potentially greater demand on the Central Route of 4 million more passengers a year than on the East Route.
- The Central Route would be easier to construct than the East Route.
- The construction cost of the Central Route would be lower than the East Route.

Based on the above, the RPA has a stated preference for the Central Route corridor. The recent additional proposal by the RPA has been put forward as a compromise proposal and as such, it can be assumed that there is also strong support for this alignment option.

The aim of this report is to review the above conclusions and to confirm which of the Central and East Route (or the Alternative Route proposed during the public consultation process) would be the most suitable for Metro North. During this study the potential for a variation to the East Route that would improve the performance and economic viability of the metro was also assessed.

This report has been prepared with regard to the Dublin Transportation Office (DTO) Dublin model, which is an extensive database of travel patterns in the Dublin area based on 2002 census data from the Central Statistics Office (CSO). The following references have also been used:

- Fingal County Council (FCC) Development Plan 2005 – 2011;
- Dublin City Council (DCC) Development Plan 2005 – 2011;
- The National Spatial Strategy 2002 - 2020;
- Transport 21, Department of Transport (DoT), 2006;
- 'A Platform for Change', DTO 2000;
- Dublin Airport Draft Masterplan, FCC, 2006;
- Census 2002 Report, CSO, 2002;
- Metro North – A Link to the Future, FCC, 2005;

- www.besttransport.org, EU Sustainable Transport Research Group website;
- Dublin Airport Car Parking Strategy 2003 – 2020, Aer Rianta Technical, 2003.

KHSK Economic Consultants and McGill Planning have also been engaged by the client to undertake assessments of the relative merits of each route in terms of socio-economic breakdown of the catchment populations and development potential respectively. This study also makes reference to reports prepared by these other consultants.

The work in support of this report took place over a period of just 2 months in response to the public consultation process undertaken by the RPA for the Route Selection stage of the project. It is recognised that planning work for the Metro has been underway for several years, and that the RPA design team will have had much more detailed information available to them than the team working on this report. Nonetheless, our objective in this review was to investigate independently whether the stated preference of the RPA for the Metro Central Route is robustly based and generally supported by the publicly available information for transportation demand and engineering challenges involved with the project. Our findings are therefore intended to assist the RPA in ensuring that the outcome of the Route Selection Process reaches the best conclusion in relation to a Metro scheme that best serves the needs of Dublin.

1.2 Background

Ireland's infrastructure is insufficient in its current state to cater for the additional travel demands generated by the economic growth of the past 10 years. In order to remedy this, several key policy documents have been published over the past decade outlining transport network proposals for both the Greater Dublin Area and the country as a whole. The most notable of these policy documents are "The National Development Plan, 2000-2006", Department of the Taoiseach, 2000, "A Platform for Change", Dublin Transportation Office (DTO), 2000 and "Transport 21", Department of Transport, 2005.

Each of the documents above recognises the existing poor public transport network in Dublin, and in particular the shortage of light rail and / or Metro links. The two recently opened Luas LRT lines, as well as widespread development of Quality Bus Corridors in Dublin represent the first steps to remedying the capital's deficiency in transportation infrastructure. However, the rail links constructed to date serve predominantly southside Dublin areas and as such, there is an absence of such high quality transit links on the northside of the city.

The policy documents mentioned above recognise the lack of high quality public transport links on the northside of Dublin and highlight this as an area where improvements are badly needed. In addition, the lack of a rail link from Dublin City Centre to Dublin Airport is recognised as a major weakness in the national context. The Dublin Metro North concept addresses both of these existing deficiencies. It is important therefore that the concept is developed fully to ensure maximum return on the significant level of investment required to develop such a scheme.

1.3 Existing Public Transport Facilities

The DART suburban rail service also serves the east coast area and there are 4 radial Quality Bus Corridors (QBCs) currently serving the remainder of the north Dublin suburbs, as follows:

1. Finglas QBC along the N2 through Glasnevin west;
2. Ballymun QBC through Glasnevin east;
3. Swords Road QBC through Whitehall and Drumcondra,
4. Malahide Road QBC through Artane and Marino.

The biggest gap in the public transport on the northside of Dublin is between the Swords Road and Malahide Road QBCs, which are separated by a distance of 3.5km between Santry and Coolock. Even allowing for a generous 1km catchment zone either side of the QBC (rather than the optimal distance of 500m), a 1.5 - 2km wide zone exists between the two corridors with no high quality radial public transport facilities in an area of high population.

The RPA Central Route generally follows the line of the Ballymun Road QBC while the East Route proposed generally runs along or parallel to the line of the existing Swords QBC. The RPA Alternative Route follows the Swords QBC to Drumcondra and follows the Ballymun QBC from DCU. It is generally accepted that the catchment area for a railway system is approximately 1km. This is greater than that of a Quality Bus Corridor as people are more inclined to walk a greater distance to a Metro service, given the higher capacity, frequency and reliability of such services. All catchment calculations have therefore been undertaken on the basis of a 1km catchment corridor along the route of the metro.

1.4 Alignment Options for Metro North

Roughan & O'Donovan previously contributed to a study for Fingal County Council which led to a submission to the Department of Transport and the RPA to extend the Dublin Airport Metro to Swords. This submission was successful and the scheme proposed has been included in the conceptual design of the Metro North.

The aim of this study is to find the optimal route alignment between the City Centre and Dublin Airport. This section of the line is critical in terms of developing a high quality public transport network for the citizens of Dublin. Any of the options proposed will deliver a much-improved link to Dublin Airport but analysis has indicated that not all route options would perform equally well in terms of serving the residents of Dublin's northside.

The following discussions relate to the section of the Metro route between the Mater Hospital and Dublin Airport only. To the north and south of these points the routes are common, and are outside the focus of this study.

1.4.1 RPA Central Route Proposal

The following text is taken from the RPA's Metro North Information Leaflet:

*"The **CENTRAL ROUTE** starts at an underground station in the vicinity of the existing Luas Green Line terminus at St. Stephen's Green and continues underground northwards to possible stations at D'Olier Street, O'Connell Street, Mater Hospital and Botanic Road and emerges from tunnel on the Ballymun Road at a station immediately south of Dublin City University. From there the route continues on an elevated structure through the centre of Ballymun with possible stops at Ballymun town centre and Ballymun north and over the M50 to a possible park-and-ride and station close to the Ballymun Road / M50 interchange. The line turns east at this point and runs on surface before rising up to arrive at an elevated station at Dublin Airport in the vicinity of the Great Southern Hotel."*

There is a proposal to construct a significant new development, "Metropark", around a station located just northeast of the M50 / Ballymun Road interchange. This site would generate significant additional transport demand that would avail of the Metro service.

A summary of the civil engineering infrastructure requirements along the Central Route, *as indicated in the RPA documentation,* is as follows:

- Bored Tunnel from Mater to DCU: 3.4km
- Elevated Railway through Ballymun: 3.3km
- At-grade railway between M50 and Airport: 2.0km
- Elevated Railway through Airport: 0.9km

Total Route Length: 9.6km

It is considered a weak point of the Central Route proposal that the proposed Dublin Airport Station would be constructed at the Great Southern Hotel at the eastern end of the airport campus, approximately 10 minutes walk from the existing terminal building. This would necessitate the introduction of a shuttle bus service from the station to the terminal. To address this weakness, an alternative alignment option has been mooted deviating from the main Central Route proposal at the Metropark station and descending into a tunnel under the airport apron to serve the terminal directly at an underground station. This option will be referred to in this report as **RPA Central Route - Airport Tunnel Option**. Considerable additional capital cost would be involved with this option because of the need for a bored tunnel under the South and North Aprons at the Airport so as to avoid major disruption to the airport operations and existing buildings, including Pier C.

A summary of the civil engineering infrastructure requirements along the Central Route – Airport Tunnel Option is as follows:

- Bored Tunnel from Mater to DCU: 3.4km
- Elevated Railway through Ballymun: 3.3km
- At-grade railway between M50 and Airport: 1.2km
- Bored Tunnel through Airport: 1.5km

Total Route Length: 9.4km

There is also a concern that the proposed elevated structure through Ballymun will meet significant political and public opposition, as it would entail years of further disruption for the area. It is considered likely that much pressure will be brought to bear to have this section of the route constructed underground. As cut and cover tunnelling techniques would involve the same level of disruption, this section would therefore have to be bored. In practical terms, this would entail boring all the way from the city centre to beyond Ballymun, which would add significantly to the construction cost. This is discussed in more detail in **Section 3**.

1.4.2 RPA East Route Proposal

The following text is taken from the RPA's Metro North Information Leaflet:

"From St. Stephen's Green, the **EAST ROUTE** continues north underground via possible stations in the vicinity of Hawkins Street, O'Connell Street, Mater Hospital, Drumcondra and Griffith Avenue to emerge from tunnel on the Swords Road

between Griffith Avenue and Collins Avenue. From there the route continues on an elevated structure and at grade along the M1 motorway to a park-and-ride near the M1/M50 interchange, and then on to an elevated structure at Dublin Airport in the vicinity of the Great Southern Hotel. Possible station locations on this section of the route include Whitehall, Santry and Clonshaugh Road."

The RPA East Route option generally follows the line of the Swords QBC from the City Centre to Whitehall. This serves the densely populated areas of Drumcondra, Griffith Avenue, Whitehall (and DCU to Beaumont) and Santry. However, beyond this point, the proposed route would then follow the line of the M1 motorway and as such, does not serve as large an area as it potentially might.

A summary of the civil engineering infrastructure requirements along the RPA East Route, as indicated in the RPA documentation, is as follows:

- Bored Tunnel from Mater to Whitehall: 3.1km
- Elevated Railway through Santry: 2.4km
- At-grade railway along M1: 1.0km
- Elevated Railway through Clonshaugh: 1.5km
- At-grade railway between M1 and Airport: 0.5km
- Elevated Railway through Airport: 1.0km

Total Route Length: 9.3km

The total route length of the RPA East Route is comparable to that of the Central Route, and the length of bored tunnel leading out from the City Centre is similar in both cases.

As shown on the RPA map, the length of elevated structure required on the East Route is at 4.8km slightly longer than the 4.1km on the Central Route. This item is open to question, as the sections shown elevated on the East Route appear to be unnecessary in several locations. Most of the viaduct on this route could be eliminated through a rationalised approach. For example, at Whitehall it would be better for the Metro to run in a shallow cut and cover tunnel or retained cutting for about 0.5km beneath Collins Avenue and along the front of Whitehall Church and car park. The route could then pass beneath Shantallagh Bridge and run at grade along the former M1 motorway reservation Santry Bypass section where there is space available following the diversion of most traffic into the Dublin Port Tunnel beneath. This arrangement would replace 2.4km of elevated structure with 1.4km of retained cutting, 3 or 4 bridges under roads and accesses and the rest at grade.

It is understood that the RPA have concerns about crossing the Port Tunnel at Whitehall. This is directly adjacent to the launching shaft at Collin's Avenue. Available literature indicates that this shaft is 33m deep, and it can therefore be concluded that the tunnel is located at considerable depth at this location. It would therefore make more sense to cross over the Port Tunnel and under Collin's Avenue. An initial assessment has concluded that the minimum depth of the tunnel roof under Collin's Avenue required would be ~12m. The evidence suggests that the tunnel roof is more than 20m below ground level and that crossing over would therefore be feasible.

Similarly, the 1.5km long section of elevated structure at Clonshaugh could be mostly replaced by at-grade railway with a bridge under the N32 with open cutting

approaches, and another longer bridge over the M1 motorway with embankment approaches.

The effect of the above changes would be to substantially reduce the construction cost of the East Route. The structural cost of an elevated railway is about €20m/km, as compared to €4m/km for at-grade railway (including earthworks for cut and fill sections up to 6m deep). The marginal cost of elevated railway is therefore €16m/km. Retained cutting with short roof sections at intervals would cost about the same as an elevated structure per kilometre. The rationalised approach to the East Route enhances the attractiveness of this route option. Further detail is included in **Section 3**.

1.4.3 RPA Alternative Alignment

The RPA's compromise proposal, deviating from the East Route alignment at Drumcondra and joining the Central Route alignment at DCU, has been assessed in the same terms as the other alignment options proposed. The revised alignment between Drumcondra and DCU is indicated as a tunnel on the RPA documentation. It is assumed that this would have to be bored, as it passes through residential areas, and that the route therefore would be constructed in bored tunnel, at least as far as DCU. This alignment is very similar to the RPA Central Route in terms of length from the Mater Hospital to DCU.

A summary of the civil engineering infrastructure requirements along the RPA Alternative Route is as follows:

- Bored Tunnel from Mater to DCU: 3.5km
- Elevated Railway through Ballymun: 3.3km
- At-grade railway between M50 and Airport: 2.0km
- Elevated Railway through Airport: 0.9km

Total Route Length: 9.7km

The same caveats as the Central Route apply in terms of traversing Ballymun. It is considered likely that this section also may have to be constructed as bored tunnel. The cost implications associated with this additional tunnelling are considered in detail in **Section 3**.

1.4.4 East Route Variant at Kilmore / Clonshaugh

The RPA's East Route proposal has a significant weakness in that the potential catchment population is constrained by following closely the line of the M1 motorway beyond Santry. This report proposes that diverting the route to the east of the M1 towards Kilmore and Clonshaugh would serve a much larger catchment area. The variant route would be approximately 0.7km longer than the RPA East Route proposal and is shown as an orange line on **Figure 1**, with larger scale maps on aerial photography in **Figures 1-A**, **1-B** and **1-C**. The marginal construction cost of lengthening the route at grade is approximately €16m per km (for civil engineering works, tracks, signal systems and power), which is a small sum in the context of the overall project. The additional journey time for the Metro would be less than 1 minute per kilometre, and the slightly longer East Route Variant would add less than 5% to the overall journey time from the Airport to the City Centre. The small additional cost and journey time would be worthwhile if a larger population could be served along the route, and particularly if increased development potential could be harnessed, which would significantly increase the development levies contribution to the capital cost of the new transport facility.

The East Route Variant departs from the RPA East Route along the M1 motorway corridor at the Santry Interchange and heads east along the southern side of Coolock Lane and Oscar Traynor Road. There is a pinch point midway along this section that will require a 500m long viaduct over the road verge beside a soccer training facility. This viaduct would then swing across Oscar Traynor Road to reach more open space south of the Santry River at the entrance to the Clonshaugh Industrial Estate, where the Kilmore station would be located. The route then turns north over the Santry River and then passes through the Clonshaugh industrial estate in a cutting. There would be 3 road bridges to carry the industrial estate distributor roads over the railway.

At this location there is a major passenger demand arising from the significant local employment at Clonshaugh. A metro station at Kilmore just south of the industrial estate would be within 0.7km of Beaumont Hospital and 0.5km of Northside Shopping Centre at Cromcastle. A large residential population in the surrounding area would avail of the Metro at this station. Dublin City Council has proposals for major redevelopment in this area, which will increase the local population and commercial facilities.

North of the Clonshaugh Industrial Estate the route crosses open ground to pass under the N32 near the new Bewley's Hotel. At this point the variation rejoins the RPA East Route to cross over the M1 motorway on the approach to Dublin Airport. The lands in this area are zoned for development, and there is scope for the equivalent range of activity as at the MetroPark site on the Central Route. It is considered therefore that the Central and East Routes would be similar in terms of potential development and associated transport demand in the area immediately north of the present edge of the city.

1.4.5 Route Options at Dublin Airport

The RPA East Route proposal includes the same weakness identified in the case of the RPA Central Route in that the proposed Dublin Airport Station is located remote from the terminal building. It is recognised generally that the Metro should ideally serve the airport terminal directly. However, with the rapid expansion of the airport, the centre of gravity of the operations is moving eastward. Already the planned Terminal 2 will be to the southeast of Terminal 1, and therefore the optimal location for the Metro station will be to the east of the existing short-term car park at the entrance to Terminal 1. Long-term planning for the airport expansion could involve a Terminal 3 at the northern side of the terminal complex in association with the second runway on that side. Until the final plans for the airport are confirmed by the Dublin Airport Authority, it will not be possible to determine precisely where the metro station should go. This subject is we believe the focus of urgent consideration by the various agencies involved so that the metro planning process can proceed without delay.

For the purpose of this report it is sufficient to consider the feasibility of each route option in terms of reaching the station at the airport in a range of possible locations, and to determine the implications in terms of need for tunnel or viaduct and the associated construction costs.

There are two basic alternatives for bringing the Metro through the Airport and on to Swords:

a) **Bored Tunnel**: *Any of the routes considered* could pass under the airport and reach any location for an airport station through a 1.6km long bored tunnel for which the civil engineering cost would be about €130 million. There is no difference between the route options in this respect.

b) **Viaduct**: Potentially it would be up to €80 million cheaper to construct a viaduct through the airport instead of a tunnel. However, the route for an elevated railway would be constrained by existing buildings at the airport and by the geometrical requirements for the horizontal alignment of the metro. There are 3 elevated route options at the Airport as follows:

- **Airport Viaduct Option 1:** The most direct route through the Airport towards Swords would be for the Airport Station to be located just west of the Great Southern Hotel as shown in **Figure 3**. However, this location would leave airport passengers at a distance of about 900m away from the existing terminal, which is undesirable, and would require some means of shuttle conveyance to avoid a long walk for people with luggage.
- **Airport Viaduct Option 2:** It would be desirable for the Airport Station to be located about 300m west of the Great Southern Hotel so as to be centrally located for the 2 (or possibly 3) future air terminals. We have established that within the limits of permissible geometry for the railway horizontal alignment it would be possible to loop through the terminal complex from the southeast to the northeast so as to reach a potential centrally located station in the vicinity of the exit from the existing short-term car park. This layout is shown in **Figure 4**.
- **Airport Viaduct Option 3:** To reach a station at the existing terminal, a loop layout might not work because of the limited space between existing buildings towards the western end of the terminal complex. A possible arrangement therefore would be for the metro to drive in and reverse out along a short spur alignment as shown in Figure 5. This is similar to the arrangement proposed for the LUAS Line C1 extension from Connolly Station to the North Docklands, and is a practical method that would allow the metro to follow the existing airport road system with minimal impact on the rest of the complex.

For the Central Route *or Alternative Route* to reach the elevated airport station at a central location would require a long loop to the east around the ALSAA (Aer Lingus Sports and Athletics Association) site east of the Swords Road. The Central Route elevated through the Airport would therefore be considerably longer than the East Route.

In conclusion, the East Route offers more flexibility for either a tunnel or viaduct section through the Airport, which would provide a significant saving on the capital cost of the Metro project.

In discussions with the Dublin Airport Authority, they expressed concern about potential difficulties in coordinating an elevated metro route through the complex with the planned changes for the access road network to cater for Terminal 2, which might include a two-level road system. This issue could be resolved through coordinated design and should not force the adoption of the much more costly tunnel for the Metro at the airport.

SECTION 2

RIDERSHIP ASSESSMENT

2.1 Introduction

In this section, the potential catchment population of each of the route alignments proposed is discussed. A design year of 2020 has been assumed for the Metro North, which would be 8 years after opening in 2012. It is assumed for the purposes of this study that the route alignments outside Dublin Airport are interchangeable and as such, that trip generation at and beyond Dublin Airport will be the same for any of the routes proposed.

Trip generation for the various alignment options has been calculated primarily on the basis of the 2002 DTO model. This model is a comprehensive database of information about the travel patterns of the population of Dublin, categorised on the basis of zones, each denoted by a 5 digit enumerator and equivalent to the District Electoral Divisions (DEDs) used in the categorisation of Census data.

A separate report by McGill Planning[1] has identified development potential along each of the possible route corridors between the city centre and the airport. Additional trip generation has been estimated along each of the route corridors based on this information. Through trips between the City Centre and airport and Swords, which will be common to all of the route corridors discussed have been calculated on the basis of available literature outlining future development potential.

2.2 Methodology Used in Calculations

In general, trip generation statistics are available for morning peak period trips only. The Metro North Ridership Assessment has been undertaken on the basis of annual ridership projections and as such, correlation factors had to be adopted. The following assumptions have been made in the analysis:

- Trips made during the morning peak hour (available data) comprise 20% of the total number of two-way daily trips made on public transport services;
- These trips will be made on all five weekdays;
- Trips made on Saturdays and Sundays will total 20% of those made during weekdays;
- Annual trips will total the equivalent of 50 working weeks2, based on the above.

The formula used to calculate annual trip generation for Metro per head of population is therefore:

$$X \times Y \times 5 \times 5 \times 1.2 \times 50 = 1{,}500XY$$

where:

X is the proportion of the population making radial trips during the morning peak hour (from DTO model data).

Y is the predicted modal share for metro.

Much of the analysis was conducted using data from the DTO model for AM peak trips by number rather than as a proportion of the population and the **X** variable is therefore not always relevant.

[1] Metro Link Assessment – Land Budget & Services/Facilities Survey, Draft, May 2006

[2] 50 weeks has been used to allow for seasonal reductions during holiday periods.

Future Metro Trips have generally been calculated on the basis of a **Z** variable which is a combination of **X** and **Y**, that is to say the proportion of total population making trips by Metro during the morning peak hour.

Trip generation by household has also been calculated, assuming an average population of 2.5 persons per dwelling (typical). Thus, future trip generation per dwelling has been calculated using the following formula:

$$(Z \times 5 \times 5 \times 1.2 \times 50) / 2.5 = 600Z$$

2.3 Trip Generation Common to All Route Options

2.3.1 Dublin Airport

Future passenger and modal split projections for Dublin Airport have been obtained from the Draft Dublin Airport Masterplan, from www.besttransport.org, homepage of the Benchmarking European Sustainable Transport (BEST) body and also from Metro North – A Link to the Future, a document prepared for Fingal County Council (FCC) in association with Dublin City Council (DCC), the Dublin Airport Authority (DAA) and the RPA to promote the Metro North extension to Swords. The following is a brief summary of the key points:

- Dublin Airport annual passenger volumes to increase from 17m in 2004 to 34 million by 2020 (Metro North – A Link to the Future).
- Existing public transport modal share at Dublin Airport: 22.4% for passengers and 16.2% for employees (www.besttransport.org - figures sourced from DAA).
- Target public transport modal share for Dublin Airport: 42% for passengers and 30% for employees. (www.besttransport.org - figures sourced from DAA).

Employment growth at Dublin Airport was estimated in the Metro North – A Link to the Future document. That report concluded that employment at the airport will increase from the current level of approximately 13,000 to approximately 30,000 by 2020. A lower estimate of 23,000 has been used in the calculations, based on projections from the Dublin Airport Car Parking Strategy Document 2003 – 2020. The lower figure has been used to allow for a more thorough assessment of the variation of passenger numbers between the competing Metro routes where they run separately further south. The figures are consequently conservatively low.

The existing modal share for public transport relates mainly to bus services but a small amount also uses the DART suburban rail service, accessed by shuttle buses from the airport. It is assumed that the increased frequency and reliability of Metro over bus will reduce the bus share slightly and it is estimated that the 2020 modal share will be 25% metro and 17% buses for passengers and 15% metro and 15% buses for employees. Based on the above, the following passenger volumes have been calculated for Metro North from Dublin Airport in 2020:

Table 2.1: Dublin Airport Passenger Trip Projections for Metro North

Year	2004	2020
No. Passengers	17,000,000	34,000,000
Bus Modal Share	22.4%	17.0%
Metro Modal Share	0.0%	25.0%
Bus Passengers	3,808,000	5,780,000
Metro Passengers	0	8,500,000

Table 2.2: Dublin Airport Employee Trip Projections for Metro North

Year	2004	2020
No Employees	13,000	23,000
Bus Modal Share	16.2%	15.0%
Metro Modal Share	0.0%	15.0%
Bus Passengers	1,533,168	2,511,600
Metro Passengers	0	2,511,600

Therefore, in total, approximately 11 million trips will be generated per annum on Metro North by Dublin Airport by 2020.

2.3.2 Swords

Swords and its hinterland has been identified as an area for significant development over the next two decades. This development potential has been identified in the context of the proposed Metro North, and would not be considered sustainable without the proposed service in place. Swords will be promoted as a commuter town with rapid rail connections to the city centre and beyond.

The Metro North project, in conjunction with the other infrastructural projects for the Greater Dublin Area (GDA) envisioned in Transport 21, will greatly improve the accessibility of Swords relative to much of the city. The new developments in the area will be targeted at the commuting classes and it is anticipated that there will be significant passenger demand for the proposed Metro North arising in the area.

A rough appraisal of potential metro ridership based on population forecasting for the Swords area indicates a minimum potential demand of approximately 7,500 trips towards the City Centre in the morning peak hour. To put this figure in perspective, the capacity of the LUAS Green Line serving Sandyford is currently at 4,500 passengers per hour in one direction based on a high frequency service with 40m trams at 4-minute intervals. The potential demand arising from Swords and surrounding area could therefore be over 1.5 times that of the LUAS Green Line.

The 7,500 trips during the morning peak hour would be mirrored during the evening peak period. Assuming that these morning peak hour trips represent 20% of the weekday two-direction total, 37,500 trips will be generated to and from Swords on the average weekday, or 225,000 over an average 5-day working week. Over the course of a year, it is therefore anticipated that in excess of 11 million trips will be generated by the Swords area on any route option chosen for Metro North.

2.4 Comparison of Route Catchments (2002 Census Data)

The catchment areas of the RPA East and Central Routes, *the RPA Alternative Route,* as well as the East Route Variant proposed in this study have been assessed based on 2002 census data from the DTO model. The following tables contain a breakdown of the potential catchment populations of each route in terms of residential population, employment population and educational population. Note that it is assumed that the city centre area will generate a similar number of trips on either route and as such, a detailed assessment of this area has been omitted and a nominal allowance made for trip generation. **Figure 2** in Appendix A shows each route corridor catchment with the DTO model zones.

The catchment factors used in the following tables represent the approximate inhabited area of each DTO model zone that falls within the 2km catchment corridor around each alignment option.

Table 2.3: 2002 RPA Central Route Catchment (based on DTO Model Data)

DTO Model Zone	Zone Total			Catchment Factor	Catchment Total		
	Pop.	Emp.	Edu.		Pop.	Emp.	Edu.
16147	3,885	2,534	864	5%	194	127	43
16148	1,392	550	0	40%	557	220	0
17127	2,925	1,363	2,474	70%	2,048	954	1,732
17128	3,357	628	0	100%	3,357	628	0
17149	3,413	203	1,608	100%	3,413	203	1,608
17312	1,746	254	690	5%	87	13	35
17314	2,407	73	456	30%	722	22	137
17413	3,806	313	304	100%	3,806	313	304
17490	3,336	888	7,678	80%	2,669	710	6,142
17491	3,934	943	860	75%	2,951	707	645
17492	2,227	4,702	783	20%	445	940	157
17515	1,571	966	0	5%	79	48	0
17516	4,087	577	515	95%	3,883	548	489
17517	5,836	713	272	100%	5,836	713	272
17518	3,735	144	1,976	100%	3,735	144	1,976
17519	1,633	111	0	100%	1,633	111	0
17520	2,630	1,581	0	0%	0	0	0
35442	1,714	2,519	0	10%	171	252	0
35629	0	31	0	65%	0	20	0
36603	135	615	0	100%	135	615	0
36604	135	2,151	0	80%	108	1721	0
TOTAL	**5,3903**	**2,1859**	**18,480**		**35,827**	**9,009**	**13,540**
Overall Total:			**94,242**	**Catchment Total:**			**58,376**

Table 2.4: 2002 RPA East Route Catchment (based on DTO Model Data)

Zone	Zone Total			Catchment Factor	Catchment Total		
	Pop.	Emp.	Edu.		Pop.	Emp.	Edu.
16146	2,406	95	0	5%	120	5	0
16147	3,885	2,534	864	100%	3,885	2,534	864
16148	1,392	550	0	100%	1,392	550	0
16226	3,761	89	0	60%	2,257	53	0
16258	6,107	836	3,130	35%	2,137	293	1,096
16293	2,360	917	237	100%	2,360	917	237
16580	1,566	2,443	43	90%	1,409	2,199	39
16584	2,881	28	0	10%	288	3	0
16621	2,672	263	0	100%	2,672	263	0
16622	5,156	3,140	2,441	30%	1,547	942	732
16669	2,954	277	0	100%	2,954	277	0
16670	3,003	268	0	20%	601	54	0
17127	3357	627	0	5%	168	31	0
17128	3,357	627	0	100%	3,357	627	0
17149	3,413	203	1,608	100%	3,413	203	1,608
17490	3,336	888	7,678	70%	2,335	621	5,375
17491	3,934	943	860	70%	2,754	660	602
17492	2,227	4,702	783	100%	2,227	4,702	783
17517	5,836	713	272	15%	875	107	41
35414	0	0	0	100%	0	0	0
35415	0	0	0	40%	0	0	0
35442	1,714	2,519	0	100%	1,714	2,519	0
36604	135	2,151	0	50%	67	1,076	0
TOTAL	**65,452**	**24,813**	**17,916**		**38,533**	**18,635**	**11,376**
Overall Total:			**108,180**	**Catchment Total:**			**68,544**

Table 2.5: 2002 RPA Alternative Route Catchment (based on DTO Model Data)

Zone	Zone Total			Catchment Factor	Catchment Total		
	Pop.	Emp.	Edu.		Pop.	Emp.	Edu.
16147	3885	2534	864	85%	3302	2154	734
16148	1392	550	0	100%	1392	550	0
16293	1566	2443	43	50%	783	1221	22
17127	2925	1363	2474	50%	1463	682	1237
17128	3357	628	0	100%	3357	628	0
17149	3413	203	1608	100%	3413	203	1608
17312	1746	254	690	5%	87	13	35
17314	2407	73	456	25%	602	18	114
17413	3806	313	304	100%	3806	313	304
17490	3336	888	7678	95%	3169	843	7294
17491	3934	943	860	75%	2951	707	645
17492	2227	4702	783	20%	445	940	157
17515	1571	966	0	5%	79	48	0
17516	4087	577	515	95%	3883	548	489
17517	5836	713	272	100%	5836	713	272
17518	3735	144	1976	100%	3735	144	1976
17519	1633	111	0	100%	1633	111	0
17520	2630	1581	0	0%	0	0	0
35442	1714	2519	0	10%	171	252	0
35629	0	31	0	65%	0	20	0
36603	135	615	0	100%	135	615	0
36604	135	2151	0	80%	108	1721	0
TOTAL	**55469**	**24302**	**18523**		**40349**	**12445**	**14886**
Overall Total:			**98,294**	**Catchment Total:**			**67,679**

Table 2.6: 2002 East Route Variant Catchment (based on DTO Model Data)

Zone	Zone Total			Catchment Factor	Catchment Total		
	Pop.	Emp.	Edu.		Pop.	Emp.	Edu.
16146	2,406	95	0	5%	120	5	0
16147	3,885	2,534	864	100%	3,885	2,534	864
16148	1,392	550	0	100%	1,392	550	0
16226	3,761	89	0	70%	2,633	62	0
16258	6,107	836	3,130	45%	2,748	376	1,409
16293	2,360	917	237	100%	2,360	917	237
16571	1,684	4,315	1,661	40%	674	1,726	664
16580	1,566	2,443	43	100%	1,566	2,443	43
16581	3,321	25	0	5%	166	1	0
16583	2,848	2,792	782	5%	142	140	39
16584	2,881	28	0	100%	2,881	28	0
16621	2,672	263	0	100%	2,672	263	0
16622	5,156	3,140	2,441	55%	2,836	1,727	1,343
16669	2,954	277	0	100%	2,954	277	0
16670	3,003	268	0	100%	3,003	268	0
16672	2,338	653	1,337	15%	351	98	201
17127	2,925	1,363	2,474	5%	146	68	124
17128	3,357	627	0	100%	3,357	627	0
17149	3,413	203	1,608	100%	3,413	203	1,608
17490	3,336	888	7,678	75%	2,502	666	5,759
17491	3,934	943	860	75%	2,951	707	645
17492	2,227	4,702	783	100%	2,227	4,702	783
17517	5,836	713	272	15%	875	107	41
35414	0	0	0	100%	0	0	0
35415	0	0	0	50%	0	0	0
35442	1,714	2,519	0	85%	1,457	2,141	0
36604	135	2,151	0	5%	7	108	0
TOTAL	**75,211**	**33,334**	**24,170**		**47,317**	**20,744**	**13,758**
Overall Total:			**132,714**	**Catchment Total:**			**81,819**

As can be seen from the tables above, the overall population along the RPA East Route corridor is higher than that along the RPA Central Route and hence, more trips would be generated along that route. The RPA's Alternative proposal, combining the East and Central Route alignments, has a higher existing population the RPA Central Route but the East Route is still superior in this regard. Furthermore, there is clearly a marked increase (~20%) in the potential catchment of the East Route, should the slightly longer route variation proposed be adopted. The catchment populations are summarised in **Table 2.7** below.

Table 2.7: Comparison of 2002 Catchment Populations

Route	2002 Catchment Population	% Difference from Central Route
Central Route	58,376	-
East Route	68,544	+17.42%
Alternative Route	67,679	+15.94%
East Route Variant	81,819	+40.16%

2.5 Comparison of Growth Potential of Route Catchments

The accompanying report by McGill Planning Consultants outlines development potential along each of the route corridors under consideration and this is summarised briefly in **Table 2.8** below. Information describing the growth potential of the RPA Alternative Route is unavailable at the time of writing, as a growth assessment has not yet been carried out for this alignment. In order to account for potential future growth along this corridor, the growth projections for the RPA Central Route have been adopted along this alignment. This is a reasonable approximation, as the vast majority of the growth potential will be concentrated in the outer suburban areas, i.e. beyond DCU. Any inaccuracies will be negligible in the context of the uncertainties inherent in the process of growth assessment.

Table 2.8: Development Potential along Route Corridors for each Alignment Option

	RPA Central Route / Alternative Route	RPA East Route	East Route Variant
Available Development Land Area (ha)	286	308	338
Residential Development Potential (No. Units)	6,724	9,098	9,118
Commercial Development Potential (m^2)	1,931,670	1,781,350	1,838,150

Typically, commercial development for office-based operations generates employment at a rate of 1 employee per 17.5m^2. For the purposes of a robust assessment, several employment scenarios have been analysed using this typical rate as an upper bound estimate. The resulting employment figures for each of the route options are shown in **Table 2.9** below.

Table 2.9: Employment Potential along Each Route Corridor

	RPA Central Route / *Alternative Route*	RPA East Route	East Route Variant
1 employee / 17.5m^2	110,381	101,791	105,037
1 employee / 22.5m^2	85,852	79,171	81,696
1 employee / 27.5m^2	70,243	64,776	66,842

Typical populations for new dwellings in Dublin are in the order of 2.5 persons per unit. This reflects a decrease on historic trends, due to the reduction in the average family size and the increasing numbers of apartments being constructed. It is anticipated that a significant proportion of the new dwellings would be apartments. **Table 2.10** below has been prepared on the basis of this assumption.

Table 2.10: Potential Residential Population Increase along each Route Option

Route Corridor	Additional Housing	Additional Residential Population	% Difference from Central Route
Central Route	6,724	16,810	-
East Route	9,098	22,745	+35.31%
East Route Variant	9,118	22,795	+35.60%

Table 2.11 below summarises the 2020 population estimates calculated above. It is assumed that future commercial development will have 1 employee per 22.5m^2 of usable floor area. Educational and Commercial figures are derived from adding the 2002 census data (from **Tables 2.3 – 2.6**) to the future commercial development potential outlined above.

Table 2.11: Estimated 2020 Population along each Route Option

Route Catchment	2020 Residential Population	2020 Educational & Commercial	2020 Total Population	% Difference from Central Route
Central Route	52,637	108,401	161,038	-
East Route	61,278	109,182	170,460	+5.85%
Alternative Route	57,159	113,183	170,341	+5.78%
East Route Variant	70,112	116,197	186,310	+15.69%

As can be seen from the tables above, the Central Route */ Alternative Route* has the greatest potential for additional commercial development (**Table 2.9**). However, both of the East Route options have significantly higher scope for additional residential development (**Table 2.10**). Overall, the East Route Variant has the greatest scope for additional development and hence developer contributions towards the cost of the Metro North project would be greater with the East Route. The reports prepared by KHSK Economic Consultants and McGill Planning discuss in detail the possibilities for developer contribution schemes and other economic factors that are beyond the scope of this report.

Table 2.11 shows the combined existing and future populations along each route corridor. The East Route Variant proposed has both a higher existing population and greater development potential than the alternatives. **Section 2.6** below investigates the corresponding ridership figures along each route corridor.

2.6 Passenger Number Projections

It is assumed that the same overall proportion of population would be attracted to Metro within each route catchment and that the percentage of passenger trips attracted to each route would therefore be broadly similar. The table below shows passenger numbers for different modal shares for each route. It is estimated that 53% of the total population will make trips during the morning peak hour (based on existing travel patterns). The modal share calculated for future Metro usage during the morning peak hour in Swords is approximately 27%. Different values lesser and greater than this value have been used in the preparation of **Table 2.12** below.

Table 2.12: Potential Metro Ridership between City Centre and Airport by Route Corridor and Modal Share (2002 Census Data)

Route Corridor	Existing Catchment Population	AM Peak Hour Trips	Modal Share for Metro			
			15%	20%	25%	30%
Central Route	58,376	30,939	6,961,337	9,281,783	11,602,229	13,922,675
East Route	68,544	36,328	8,173,851	10,898,468	13,623,085	16,347,702
Alternative Route	67,679	35,870	8,070,779	10,761,039	13,451,299	16,141,559
East Route Variant	81,819	43,364	9,756,938	13,009,250	16,261,563	19,513,875

Additional future trips have been estimated based on the information in the report prepared by McGill planning (discussed above). For the purposes of a robust assessment, low usage rates have been used for Metro North. It is assumed that 53% of residents will make a trip during the morning peak hour. However, it is conservatively estimated that only 20% of these will use the Metro. In the case of the commercial development, it is assumed that there will be 1 worker per 22.5m^2 of development and that only 10% of these will use the Metro North during the AM peak hour. **Table 2.13** below summarises the additional passenger trips to be generated on Metro North by the predicted additional development along each route corridor.

Table 2.13: Potential Additional Metro Ridership between City Centre and Airport by Route Corridor

Route Corridor	Additional Population	Additional Workers	AM Peak Hour Metro Trips (daily)	Annual Metro Trips
Central Route / *Alternative Route*	16,810	85,852	10,367	15,550,590
East Route	22,745	79,171	10,328	15,492,122
East Route Variant	22,795	81,696	10,586	15,878,738

It is assumed that the proportion of new residents and workers along each route corridor availing of the Metro service will be higher than the proportion of the existing populations on each route diverting trips to the new service. For the purposes of a robust overall assessment, it is assumed therefore that only 15% of the existing catchment populations will use the proposed service during the morning peak hour. **Table 2.14** below summarises the passenger number projections along each route corridor between the city centre and the airport. A nominal allowance of 10% has been added for trips to be generated from the city centre in each case. This is a conservative value but a detailed assessment of this area is beyond the scope of this report and in any event would be unlikely to yield an accurate projection due to the complex variables involved.

Table 2.14: Trip Generation for Each Route Option between the City Centre and the Airport (2020)

Route Corridor	Existing Demand (City Centre to Airport)	Additional Future Demand (City Centre to Airport)	City Centre	Total Trips (City Centre to Airport)	% Difference
RPA Central Route	6,961,337	15,550,590	2,251,193	24,763,120	-
RPA East Route	8,173,851	15,492,122	2,366,597	26,032,570	+5.13%
RPA Alternative Route	*8,070,779*	*15,550,590*	*2,362,137*	*25,983,506*	*+4.93%*
East Route Variant	9,756,938	15,878,738	2,563,568	28,199,244	+8.32%

Table 2.14 indicates that travel demand for the proposed Metro North Service is likely to be significantly higher along either of the East Route options *or the Alternative Route* than along the Central Route corridor. The additional existing population along the East Route Variant, along with the marginally higher development potential along this route result in the highest overall potential demand along this corridor, at over 8% higher than the RPA Central Route.

In order to calculate overall passenger numbers along each route option, it is necessary to include the trip projections for Dublin Airport and Swords, as discussed in **Section 2.3** above. As mentioned previously, route alignment options beyond the airport are interchangeable and as such, the projected additional trips along each route corridor will be the same in each case.

Table 2.15: Total Trip Generation for Each Route Option (2020)

Route Corridor	City Centre to Airport	Airport	Swords	Total Trips	% Difference
RPA Central Route	24,763,120	11,011,600	11,367,532	47,142,252	-
RPA East Route	26,032,570	11,011,600	11,367,532	48,411,702	+2.69%
RPA Alternative Route	*25,983,506*	*11,011,600*	*11,367,532*	*48,362,638*	*+2.59%*
East Route Variant	28,199,244	11,011,600	11,367,532	50,578,375	+4.48%

2.7 Conclusion for Transport Demand

The assessment of potential passenger demand along the Central, *Alternative* and East route options has shown that overall passenger volumes for the Metro will probably be about double the number indicated by the RPA in the information released for the route selection process.

Contrary to the assertion of the RPA, the East Route has greater existing and future potential demand than the Central Route within the corridor between the City Centre and the Airport. The existing population along the East Route is about 17% higher than along the Central Route. For the East Route Variant the difference is considerably greater at 40%. These figures translate to additional annual passenger demand of up to 3.5 million journeys along the East Route Variant.

An assessment of development potential along the competing route corridors has shown that the additional potential demand is roughly equivalent along the Central, *Alternative* and East Route options. However, a large proportion of the development along the Central / *Alternative* Routes is within the Ballymun Regeneration Area and is already committed. Development levies could not therefore be raised from a large proportion of the Central Route. In contrast along the East Route a very considerable amount of funding for the Metro project could be raised from large-scale development that has not previously been envisaged. In this sense the Metro East Route would unlock very considerable additional potential development that would otherwise not be possible without supporting high capacity transportation infrastructure.

SECTION 3

COMPARATIVE COST ASSESSMENT

3.1 Comparative Construction Costs for Metro Route Options

This section has been extensively revised to provide more clarity as regards the cost estimates used for the various alignment options. Cost estimates have been prepared for both the infrastructure works required for each route option and also the total project costs entailed in each case. These estimates have been prepared on the basis of available literature and are therefore considered to be indicative only.

The following assumptions and allowances have been made in the preparation of the cost estimates for the various alignment options:

- All bored tunnel sections will have cut & cover approaches;
- Operational systems will amount to €75m in each case;
- A 15% contingency has been included;
- Planning & Design Costs will total 14% of the total operational and construction costs.

Land costs have not been accounted for in these calculations. These are expected to be broadly similar for the various route options. While land costs along the route corridors would be minimal for bored tunnel sections, increased insurance costs and the requirement for a large launching basin for the Tunnel Boring Machine (TBM) negates the potential savings to be made by eliminating these costs.

The following rates have been assumed in the calculations:

• At-grade railway with minor cut and fill earthworks:	€ 4m/km
• Viaduct or retained cutting	€ 20m/km
• Cut and Cover Tunnel	€ 35m/km
• Bored Tunnel	€ 70m/km
• Over / Underbridges	€ 15m/km
• Sections in medium depth cuttings	€ 5m/km
• Stations in Tunnel	€ 20m each
• Stations at-grade	€ 2m each
• Stations on elevated structures	€ 6m each
• Railway Infrastructure	~ € 12m/km

Tables 3.1 and **3.2** below outline the comparative costs of each of the various alignment options. In each instance the costs are compared to the RPA Central Route cost, based on the alignment indicated on the RPA documentation. This is used as a baseline, given that this was the stated preference of the RPA in the initial stages of the public consultation process.

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Table 3.1: Summary of Estimated Infrastructure Cost for Each Route Option

Infrastructure Costs	RPA Central Route			RPA East Route			RPA East Route Rationalised			RPA Alternative Route			East Route Variant		
Variant	€m	+ / -	%	€m	+ / -	%	€m	+ / -	%	€m	+ / -	%	€m	+ / -	%
	504	0	0.0%												
(Airport Viaduct Option 1)				**508**	4	0.8%	**445**	-59	-11.7%	**512**	8	1.6%	**470**	-34	-6.8%
Airport Tunnel	**582**	78	15.5%	**n/a**	-	-	**519**	15	3.0%	**590**	86	17.1%	**550**	47	9.3%
Ballymun Tunnel	**647**	143	28.4%	**n/a**	-	-	**n/a**	-	-	**655**	151	30.0%	**n/a**	-	-
Airport & Ballymun Tunnels	**843**	340	67.4%	**n/a**	-	-	**n/a**	-	-	**851**	348	69.0%	**n/a**	-	-
Airport Viaduct Option 2	**n/a**	-	-	**n/a**	-	-	**463**	-41	-8.2%	**n/a**	-	-	**483**	-16	-3.2%
Airport Viaduct Option 3	**n/a**	-	-	**n/a**	-	-	**485**	-19	-3.8%	**n/a**	-	-	**511**	8	1.5%

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Table 3.2: Summary of Estimated Project Costs for Each Route Option

Total Costs	RPA Central Route			RPA East Route			RPA East Route Rationalised			RPA Alternative Route			East Route Variant		
Variant	€m	+ / -	%	€m	+ / -	%	€m	+ / -	%	€m	+ / -	%	€m	+ / -	%
	759	0	0.0%												
(Airport Viaduct Option 1)				**764**	5	0.7%	**681**	-77	-10.2%	**769**	11	1.4%	**714**	-45	-5.9%
Airport Tunnel	**861**	102	13.5%	**n/a**	-	-	**779**	20	2.6%	**872**	113	14.9%	**820**	61	8.1%
Ballymun Tunnel	**946**	188	24.7%	**n/a**	-	-	**n/a**	-	-	**957**	198	26.1%	**n/a**	-	-
Airport & Ballymun Tunnels	**1,204**	445	58.7%	**n/a**	-	-	**n/a**	-	-	**1,215**	456	60.1%	**n/a**	-	-
Airport Viaduct Option 2	**n/a**	-	-	**n/a**	-	-	**705**	-54	-7.1%	**n/a**	-	-	**737**	-21	-2.8%
Airport Viaduct Option 3	**n/a**	-	-	**n/a**	-	-	**734**	-25	-3.3%	**n/a**	-	-	**769**	10	1.3%

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As outlined previously, it is considered quite possible that any Metro system through Ballymun would have to be constructed as a bored tunnel. In the case that both the sections through Ballymun and Dublin Airport be constructed in this manner, it would leave that constructing the M50 crossing in tunnel also would be most efficient. This would escalate the overall project cost of either the RPA Central or Alternative Routes to approximately €1.2 billion – ~€450m more than the East Route Variant with Airport Viaduct Option 3. Note that the East Route Variant with Airport Viaduct Option 3 would be ~€100m cheaper to construct than the Central Route Airport Tunnel Option to serve the existing terminal directly.

The East Route, as proposed by the RPA, is not considered to be optimal in terms of vertical alignment. This route has therefore been rationalised to reduce the requirement for extensive viaducts. A saving of over €80m would be made, should this approach be adopted.

In the case of the various alignment options for Dublin Airport, clearly a trade-off will have to be made by the relevant authorities, taking construction costs, construction disruption and convenience of location into account. Such issues are beyond the scope of this review but the various options have been discussed and cost estimates prepared. Locating the airport station on an elevated structure at the Great Southern Hotel, at the eastern end of the airport campus, would entail the lowest construction cost and the least disruption during the construction phase. However, the level of service provided would be considerably lower due to the distance between the terminal buildings and the proposed station location.

The marginal cost of constructing the slightly longer East Route Variant would not be significant at approximately €30-40m more than the Rationalised East Route. This difference is insignificant when the greater passenger numbers predicted along this route corridor are taken into account.

SECTION 4

CONCLUSIONS

4.1 Conclusions

From the brief technical review undertaken for this report it appears that the Drumcondra – Beaumont Metro (East Route Variant) is superior to the RPA Central Route for the following reasons relevant to Passenger Volumes, Capital Cost and Ease of Construction:

a) There is higher passenger demand of up to 3.5 million per annum more along the route corridor because of the greater existing and potential future population in the East Route Catchment;

b) The East Routes fill a major gap in the Dublin Transport Network, while the Central Route duplicates the Ballymun QBC. The Metro project provides an ideal opportunity to bring a high quality public transport service to the Beaumont/Kilmore/Clonshaugh areas of north Dublin that would otherwise be difficult to serve appropriately.

c) The East Routes provide access to key facilities including Croke Park, St.Patrick's College, Dublin City University, Beaumont Hospital and 4 major hotels;

d) Either the RPA East Route or the East Route Variant would be integrated with other public transport routes, such as the Maynooth Rail Line, leading to a wider network for flexible journey planning. There is also scope to provide a connection to the proposed Orbital Metro to Blanchardstown;

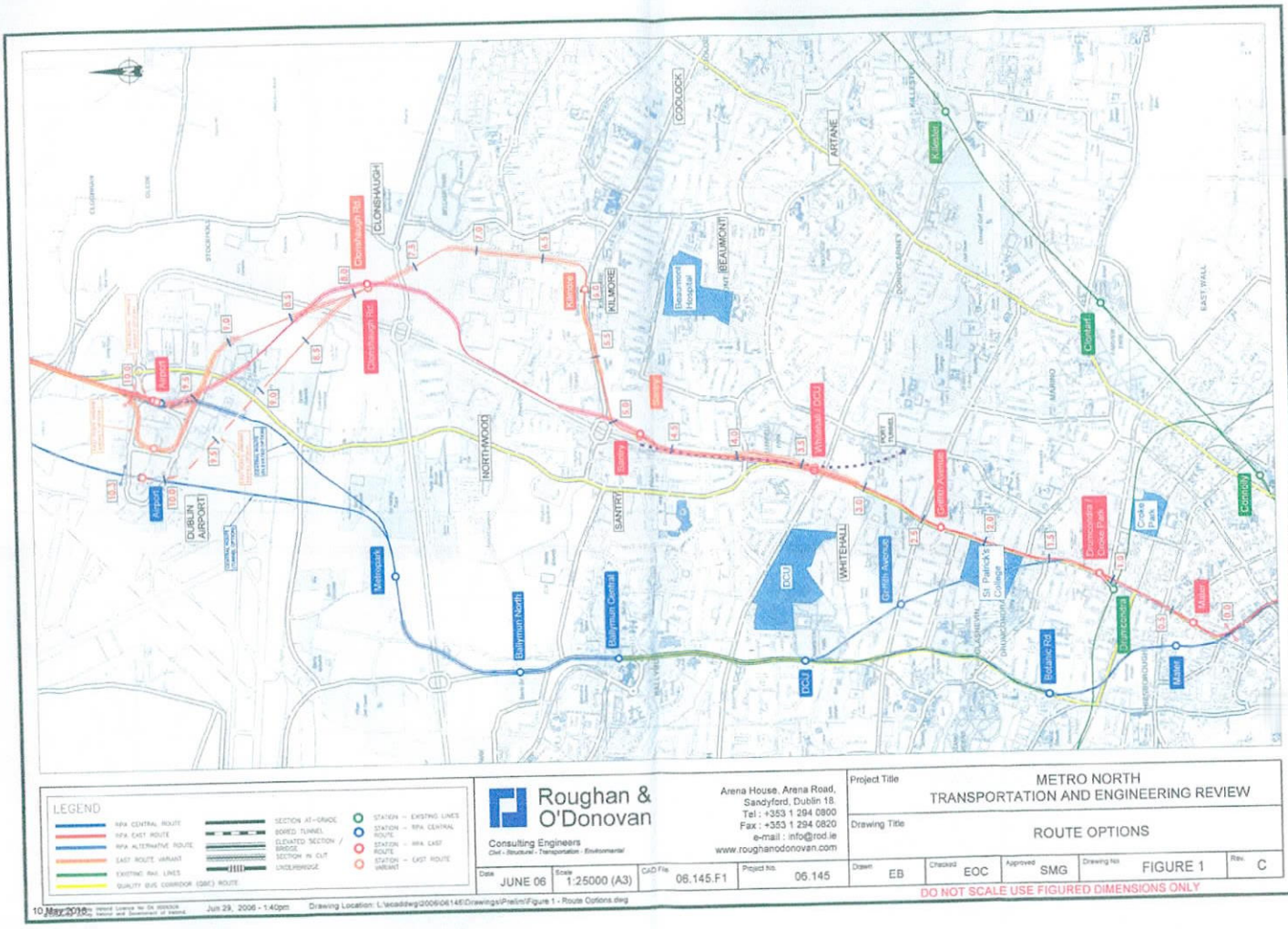
e) The cost of serving the existing terminal at Dublin airport directly would be in the order of €100m cheaper along the proposed East Route Variant, than along the Central Route. This figure would rise to €450m should the section through Ballymun be required to be constructed in tunnel.

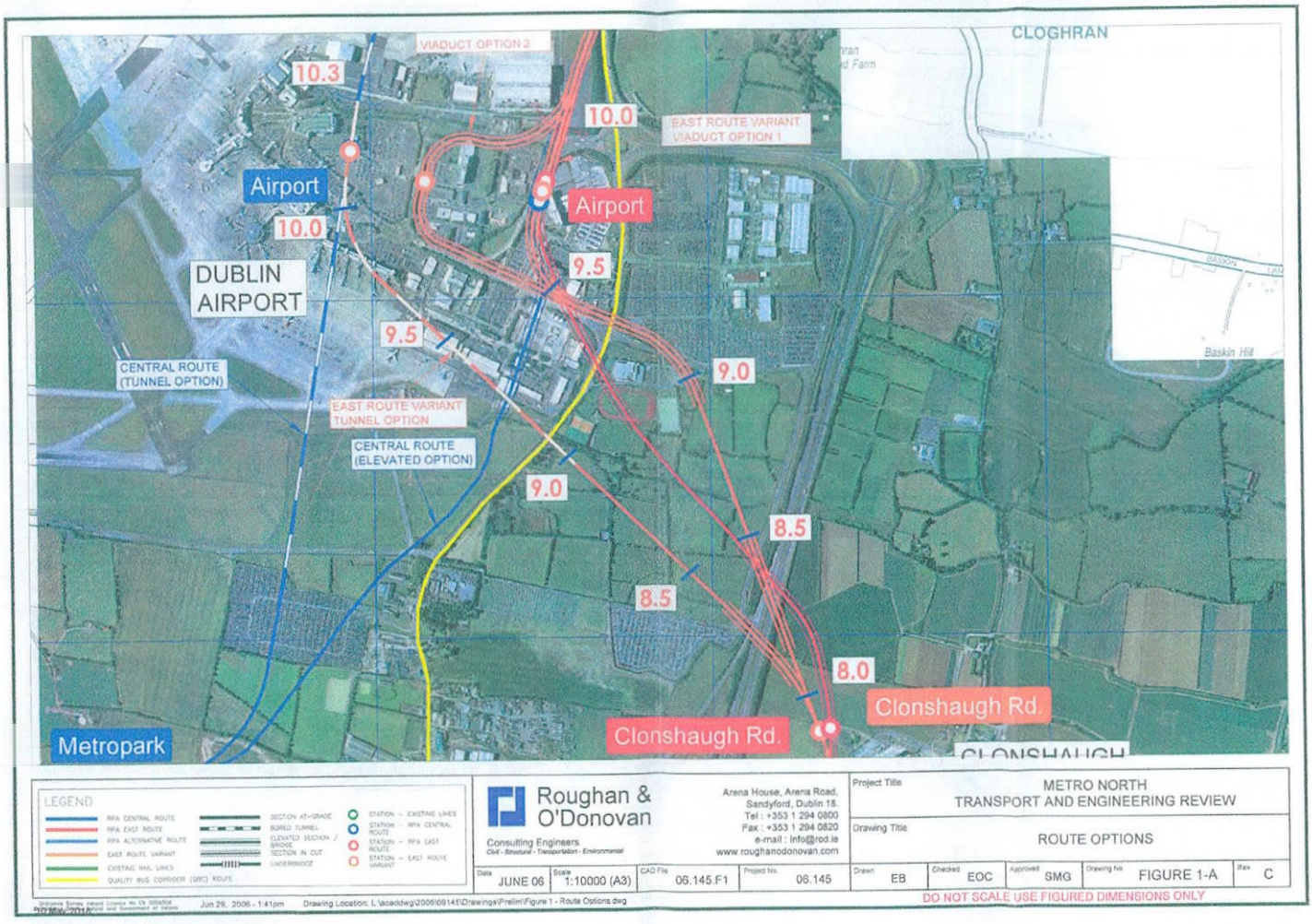
f) It would be easier to construct the East Route or East Route Variant with less disruption for the local population as the route follows the M1 motorway and passes through industrial lands or open spaces, rather than the Central Route which would bring several more years of construction disruption through the middle of Ballymun Town Centre.

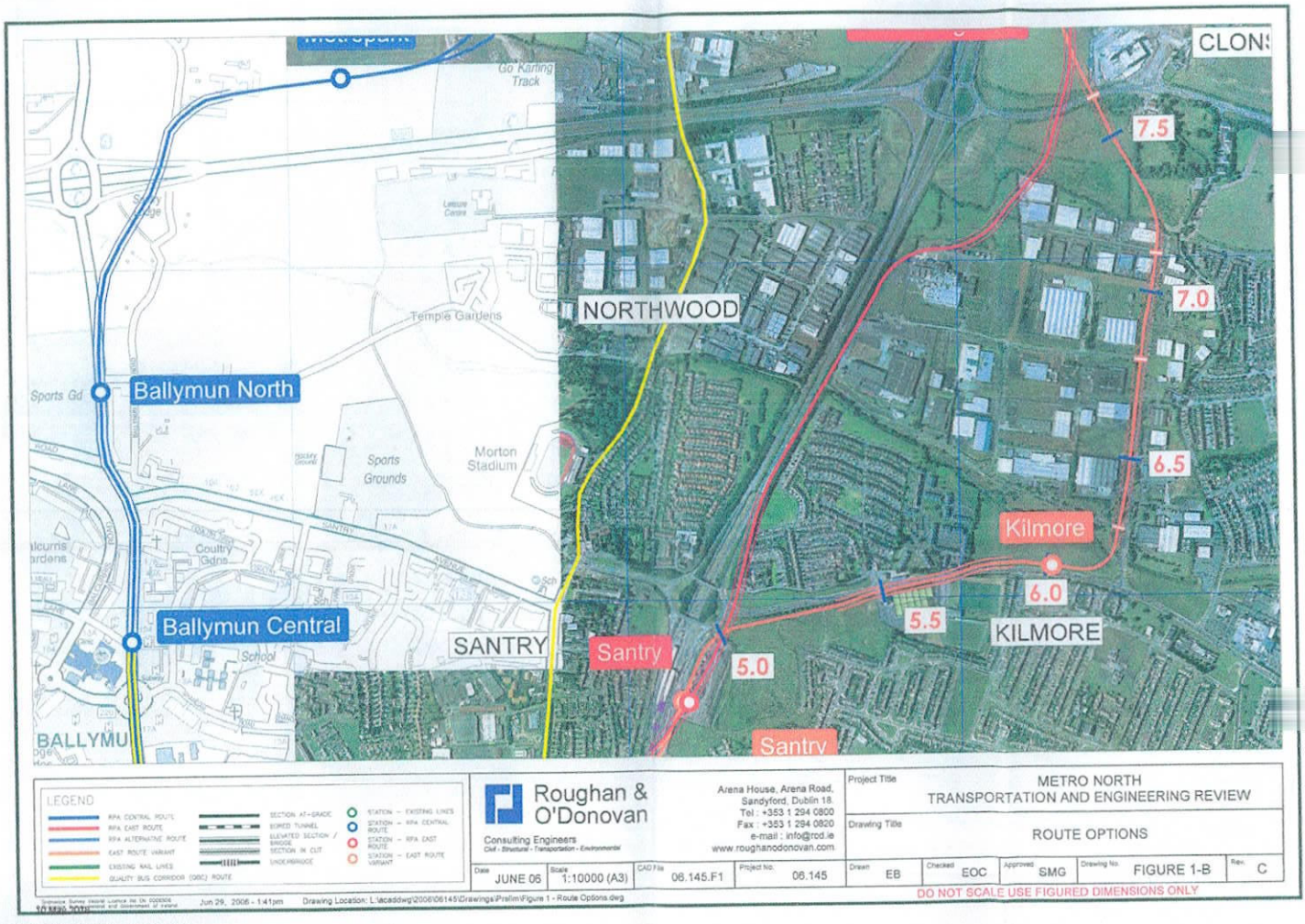
g) Following on from the above, 24 hour tunnelling would be more acceptable along the East Route or East Route Variant, as the route does not pass under any properties. This would lead to significant time and cost savings. These cost savings have not been assumed in the analysis contained herein.

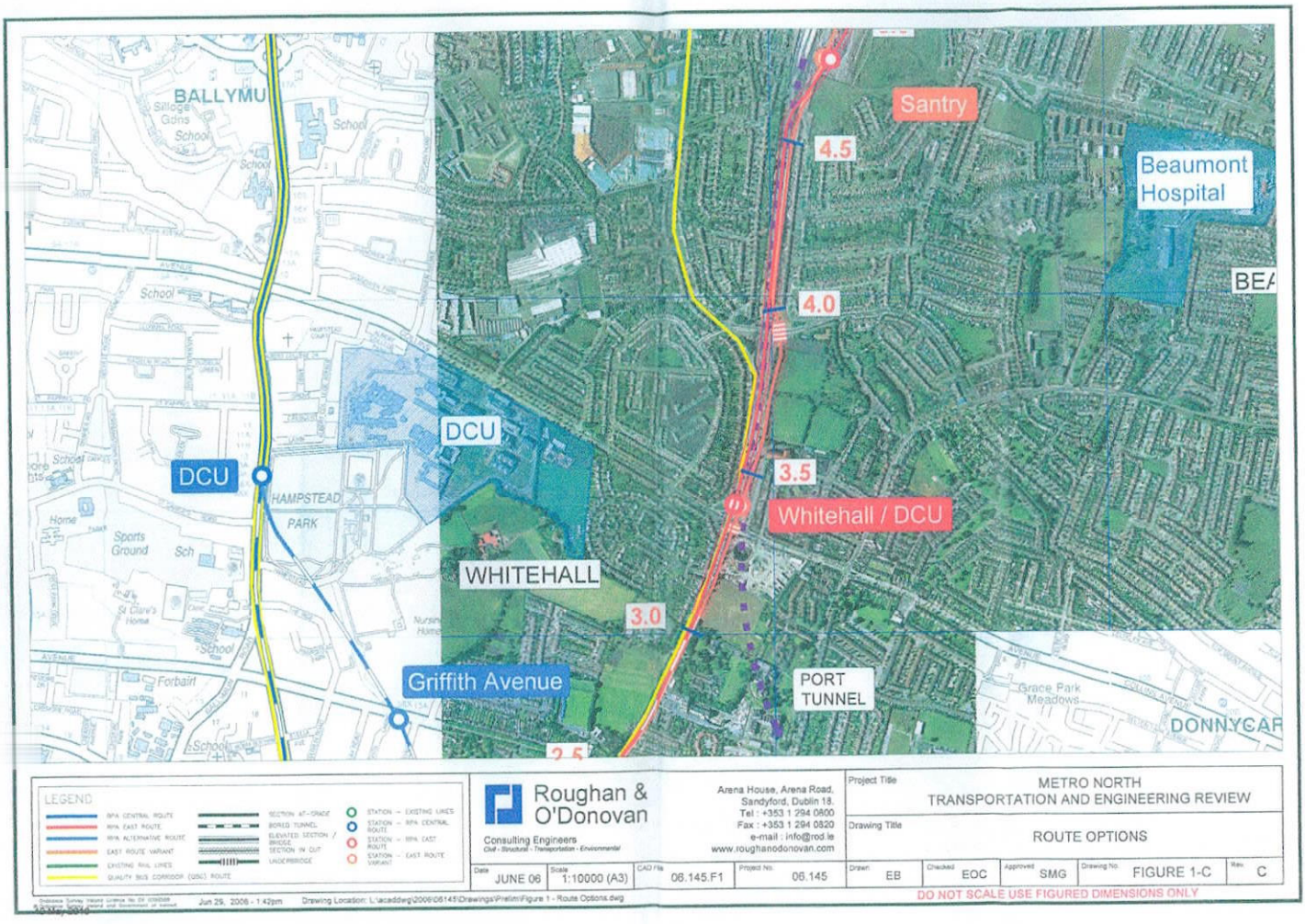
The outcome of this review suggests that the case for the East Route, and in particular the East Route Variant, known as the Drumcondra – Beaumont Route, should be re-examined to ensure that the best route is chosen for the Metro North project.

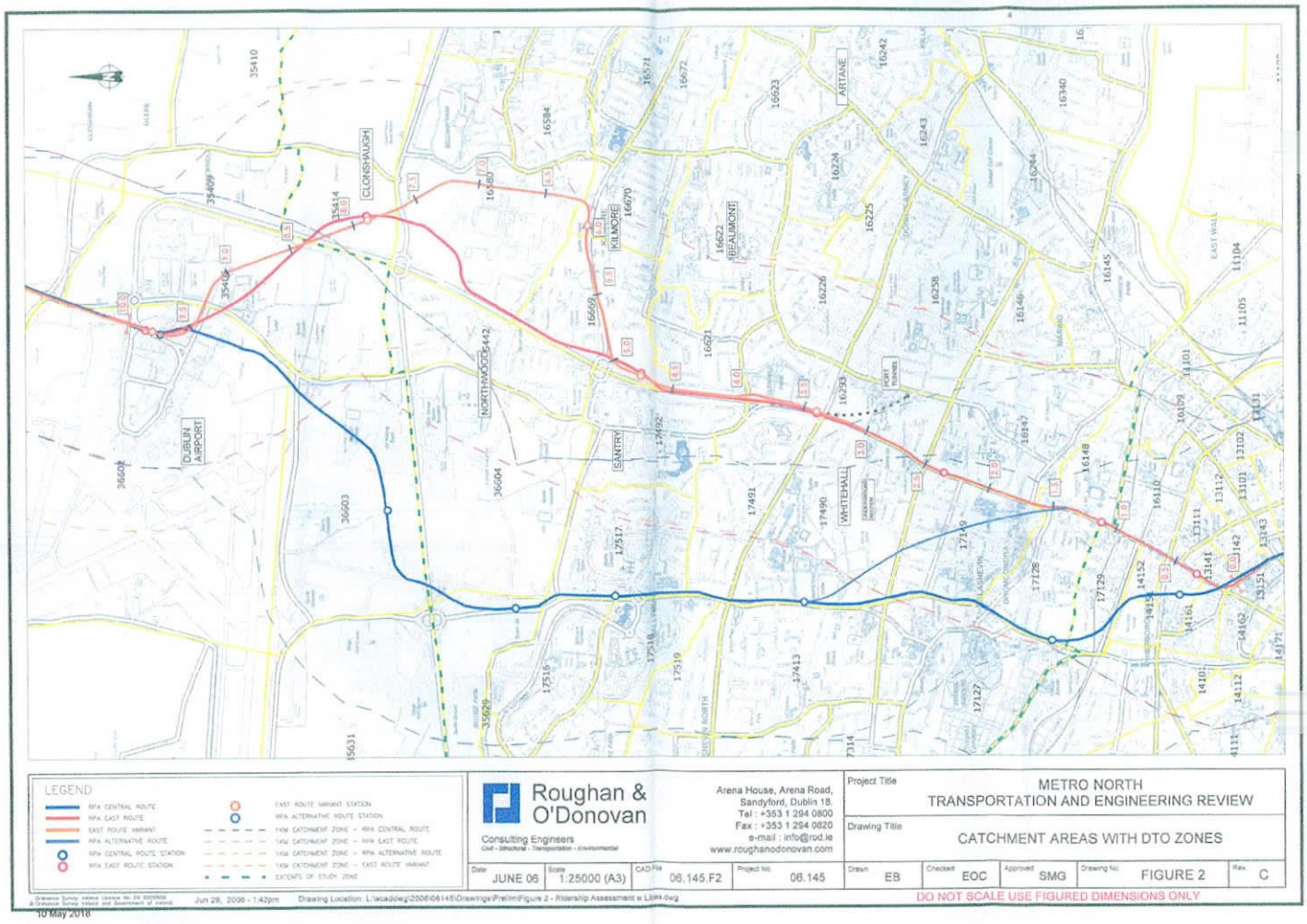
Appendix A – Route Maps


LEGEND
RPA CENTRAL ROUTE
RPA EAST ROUTE
RPA ALTERNATIVE ROUTE
EAST ROUTE VARIANT
EXISTING RAIL LINES
QUALITY BUS CORRIDOR (QBC) ROUTE
SECTION AT-GRADE
BORED TUNNEL
ELEVATED SECTION / BRIDGE
SECTION IN CUT
UNDERBRIDGE
STATION – EXISTING LINES
STATION – RPA CENTRAL ROUTE
STATION – RPA EAST ROUTE
STATION – EAST ROUTE VARIANT
Clonshaugh Rd
CLONSHAUGH
CLOGHRAN
CLEAR
STOCKHAZ
COOLOCK
ARTANE
BEAUMONT
Beaumont Hospital
KILMORE
Kilmore
Killester
Clontarf
EAST WALL
MARINO
Clontarf Rd
Airport
DUBLIN AIRPORT
NORTHWOOD
Santry
SANTRY
Whitehall Dcu
PORT TUNNEL
Griffith Avenue
Croke Park
Drumcondra
Connolly
Mater
Melnpark
Ballymun North
Ballymun Central
DCU
WHITEHALL
Griffith Avenue
St Patrick's College
Botanic Rd
Drumcondra
Mater
Roughan & O'Donovan
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Project Title
METRO NORTH
TRANSPORTATION AND ENGINEERING REVIEW
Drawing Title
ROUTE OPTIONS
Date JUNE 06
Scale 1:25000 (A3)
CAD File 06.145.F1
Project No. 06.145
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VIADUCT OPTION 2
10.3
10.0
EAST ROUTE VARIANT
VIADUCT OPTION 1
CLOGHRAN
Airport
Airport
10.0
9.5
DUBLIN
AIRPORT
9.5
9.0
CENTRAL ROUTE
(TUNNEL OPTION)
EAST ROUTE VARIANT
TUNNEL OPTION
CENTRAL ROUTE
(ELEVATED OPTION)
9.0
8.5
8.5
8.0
Clonshaugh Rd.
Clonshaugh Rd.
Metropark
Baskin Hill
LEGEND
RPA CENTRAL ROUTE
RPA EAST ROUTE
RPA ALTERNATIVE ROUTE
EAST ROUTE VARIANT
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Scale 1:10000 (A3)
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Go Karting Track
Leisure Centre
Temple Gardens
NORTHWOOD
Ballymun North
Sports Gd
Sports Grounds
Morton Stadium
Country Gdns
Ballymun Central
School
SANTRY
BALLYMU
Santry
5.0
5.5
6.0
6.5
7.0
7.5
Kilmore
KILMORE
CLONS
Santry
LEGEND
RPA CENTRAL ROUTE
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Project No. 06.145
Drawn EB
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Approved SMG
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Rev. C
Jun 29, 2006 - 1:41pm
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BALLYMUN
Sillogue Gdns
School
School
School
School
DCU
DCU
HAMPSTEAD
PARK
Home
Sports Ground
Sch
St Clare's Home
School
Forbairt
School
Griffith Avenue
Santry
4.5
Beaumont Hospital
BEA
4.0
3.5
Whitehall / DCU
WHITEHALL
3.0
PORT TUNNEL
Grace Park Meadows
DONNYCAR
2.5
LEGEND
RPA CENTRAL ROUTE
RPA EAST ROUTE
RPA ALTERNATIVE ROUTE
EAST ROUTE VARIANT
EXISTING RAIL LINES
QUALITY BUS CORRIDOR (QBC) ROUTE
SECTION AT-GRADE
BORED TUNNEL
ELEVATED SECTION / BRIDGE
SECTION IN CUT
UNDERBRIDGE
STATION - EXISTING LINES
STATION - RPA CENTRAL ROUTE
STATION - RPA EAST ROUTE
STATION - EAST ROUTE VARIANT
Roughan & O'Donovan
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www.roughanodonovan.com
Project Title
METRO NORTH
TRANSPORTATION AND ENGINEERING REVIEW
Drawing Title
ROUTE OPTIONS
Date JUNE 06
Scale 1:10000 (A3)
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Approved SMG
Drawing No. FIGURE 1-C
Rev. C
Jun 29, 2006 - 1:42pm
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CLONSHAUGH
KILMORE
BEAUMONT
ARTANE
NORTHWOOD
SANTRY
WHITEHALL
DUBLIN AIRPORT
LEGEND
RPA CENTRAL ROUTE
RPA EAST ROUTE
EAST ROUTE VARIANT
RPA ALTERNATIVE ROUTE
RPA CENTRAL ROUTE STATION
RPA EAST ROUTE STATION
EAST ROUTE VARIANT STATION
RPA ALTERNATIVE ROUTE STATION
1KM CATCHMENT ZONE - RPA CENTRAL ROUTE
1KM CATCHMENT ZONE - RPA EAST ROUTE
1KM CATCHMENT ZONE - RPA ALTERNATIVE ROUTE
1KM CATCHMENT ZONE - EAST ROUTE VARIANT
EXTENTS OF STUDY ZONE
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Drawing Title
CATCHMENT AREAS WITH DTO ZONES
Date JUNE 06
Scale 1:25000 (A3)
CAD File 06.145.F2
Project No. 06.145
Drawn EB
Checked EOC
Approved SMG
Drawing No. FIGURE 2
Rev. C
Jun 29, 2006 - 1:42pm
Drawing Location: L:\eadowg\2006\06145\Drawings\Prelim\Figure 2 - Ridership Assessment w Lines.dwg
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Drawing Title: EAST ROUTE VARIANT
VIADUCT OPTION 1

Date	Scale	CAD File	Project No.	Drawn	Checked	Approved	Drawing No.	Rev.
JUNE 06	1:5000 (A3)	06.145.F3	06.145	EB	EOC	SMG	FIGURE 3	C

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Drawing Title: EAST ROUTE VARIANT
VIADUCT OPTION 2

Date	Scale	CAD File	Project No.	Drawn	Checked	Approved	Drawing No.	Rev
JUNE 08	1:5000 (A3)	06.145.F4	06.145	EB	EOC	SMG	FIGURE 4	C

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Jun 26, 2008 - 1:43pm
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10 May 2011



LEGEND
NORTHBOUND LINE
SOUTHBOUND LINE
ELEVATED SECTION
DOUBLE ELEVATED SECTION
STATION

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Project Title: METRO NORTH
TRANSPORTATION AND ENGINEERING REVIEW

Drawing Title: EAST ROUTE VARIANT
VIADUCT OPTION 3

Date	Scale	CAD File	Project No.	Drawn	Checked	Approved	Drawing No.	Rev.
JUNE 06	1:5000 (A3)	06.145.F5	06.145	EB	EOC	SMG	FIGURE 5	C

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Jun 29, 2006 - 1:44pm Drawing Location: L:\elcaddwg\2006\06145\Drawings\Prelim\Figure 5 - Airport Closeup - In and Out.dwg

10 May 2018



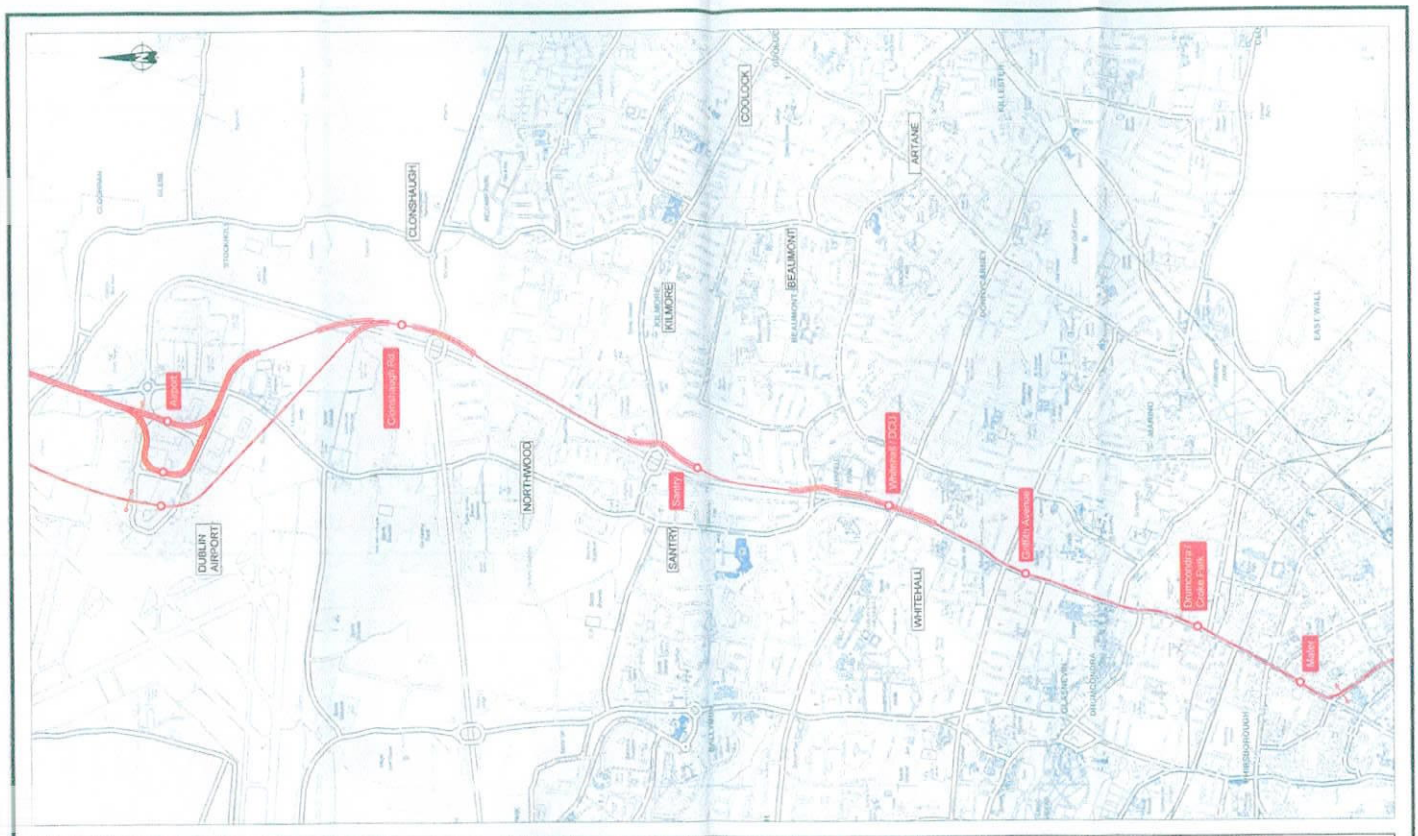
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Project Title	METRO NORTH TRANSPORTATION AND ENGINEERING REVIEW
Drawing Title	EAST ROUTE VARIANT AIRPORT TUNNEL OPTION

Date	Scale	CAD File	Project No.	Drawn	Checked	Approved	Drawing No.	Rev.
JUNE 06	1:10000 (A3)	06.145.F6	06.145	EB	EOC	SMG	FIGURE 6	C

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LEGEND

- SECTION AT - GRADE
- BORED TUNNEL
- ELEVATED SECTION / BRIDGE
- SECTION IN CUT
- LADEBRIDGE

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Project Title: METRO NORTH
TRANSPORTATION AND ENGINEERING REVIEW

Drawing Title: RPA EAST ROUTE RATIONALISED

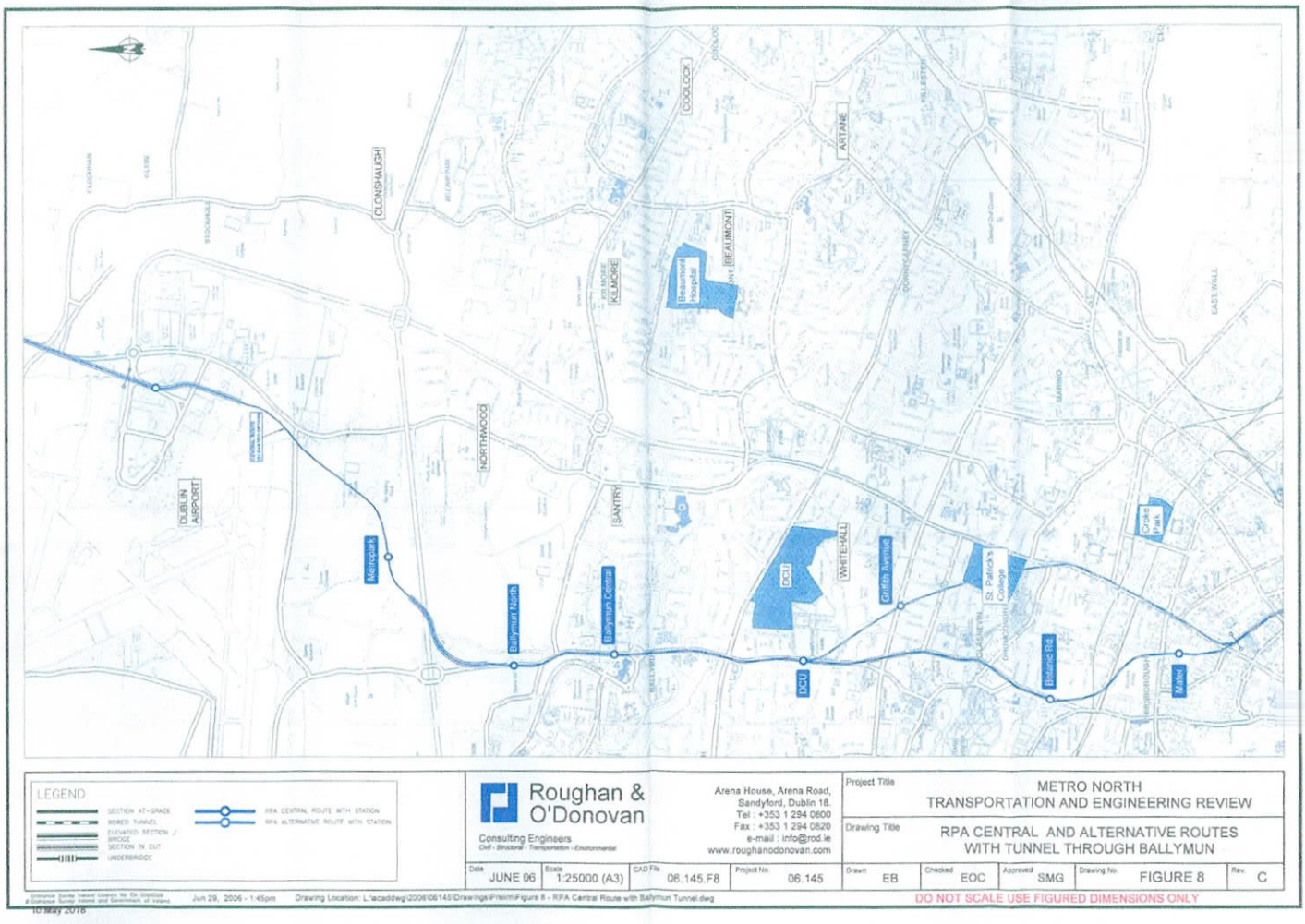
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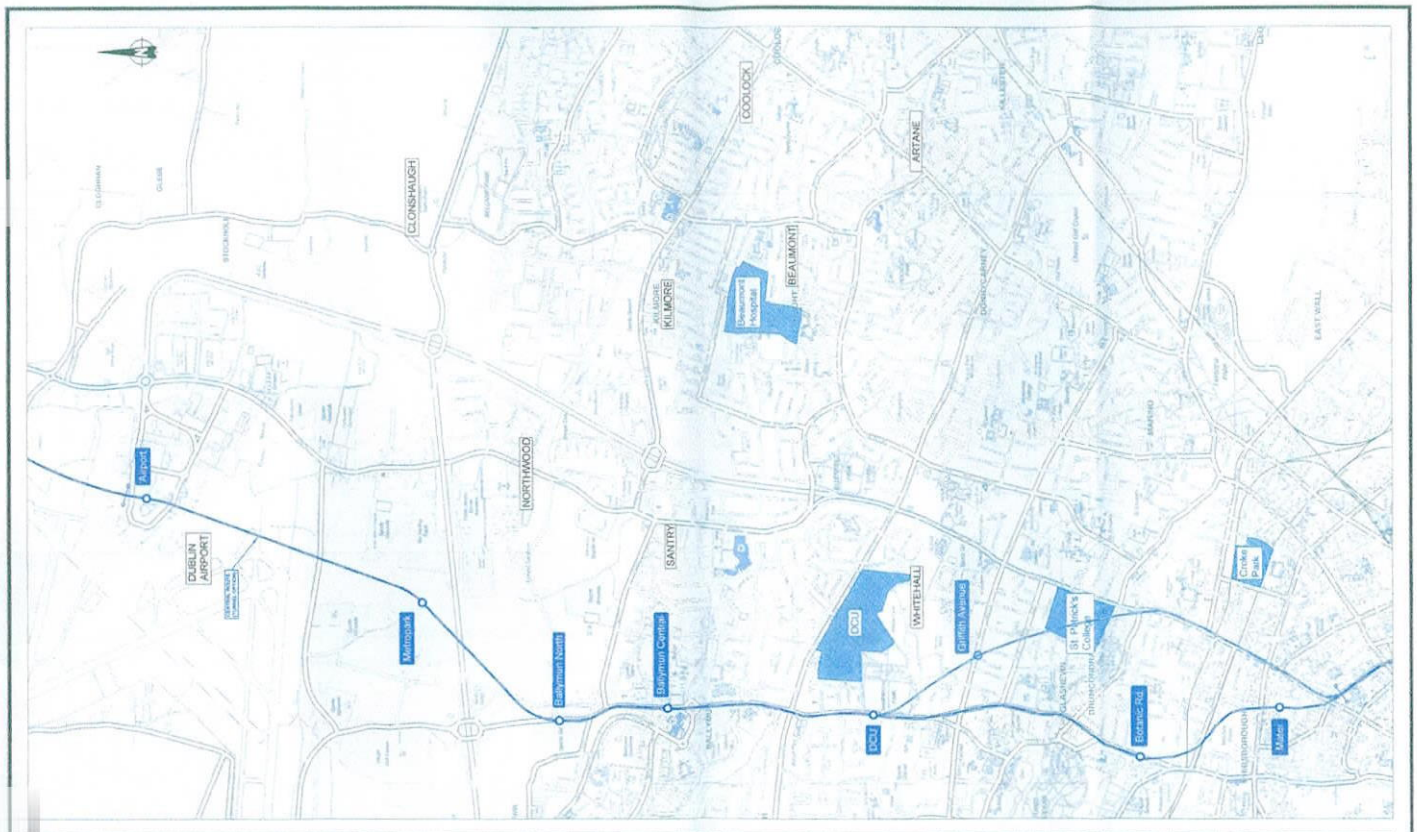
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Project Title	METRO NORTH TRANSPORTATION AND ENGINEERING REVIEW
Drawing Title	RPA CENTRAL AND ALTERNATIVE ROUTES WITH TUNNELS THROUGH BALLYMUN AND AIRPORT

Date	Scale	CAD File	Project No	Drawn	Checked	Approved	Drawing No	Rev
JUNE 06	1:25000 (A3)	06.145.F9	06.145	EB	EOC	SMG	FIGURE 9	C

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Appendix B – Cost Analysis

10 May 2018

Donal O'Brolchain

Metrolink
Submission to TII

Metro North - Transportation and Engineering Review

Summary of Indicative Cost Estimates

22-Jun-06

RPA Central Route

Category	RPA Central Route	RPA Central Route with Airport Tunnel	RPA Central Route with Ballymun Tunnel	RPA Central Route with Airport Tunnel and Ballymun Tunnel
	€m	€m	€m	€m
Civil Engineering Works	315	384	436	633
Railway Infrastructure	113	111	113	107
Stations	62	76	90	104
Enabling Works	13	11	8	0
Infrastructure Total	**504**	**582**	**647**	**843**
Operational Systems	75	75	75	75
Contingency (15%)	87	98	108	138
Subtotal	**666**	**755**	**830**	**1,056**
Planning and Design (14%)	93	106	116	148
Total	**759**	**861**	**946**	**1,204**

RPA Alternative Route

Category	RPA Alternative Route	RPA Alternative Route with Airport Tunnel	RPA Alternative Route with Ballymun Tunnel	RPA Alternative Route with Airport Tunnel and Ballymun Tunnel
	€m	€m	€m	€m
Civil Engineering Works	322	391	443	640
Railway Infrastructure	114	112	114	108
Stations	62	76	90	104
Enabling Works	13	11	8	0
Infrastructure Total	**512**	**590**	**655**	**851**
Operational Systems	75	75	75	75
Contingency (15%)	88	100	109	139
Subtotal	**675**	**764**	**839**	**1,065**
Planning and Design (14%)	94	107	118	149
Total	**769**	**872**	**957**	**1,215**

10 May 2018

Donal O'Broichain

Metrolink
Submission to TII

RPA East Route

Category	RPA East Route	RPA East Route Rationalised Viaduct Option 1	RPA East Route Rationalised Viaduct Option 2	RPA East Route Rationalised Viaduct Option 3	RPA East Route Rationalised Airport Tunnel Option
	€m	€m	€m	€m	€m
Civil Engineering Works	301	252	263	278	310
Railway Infrastructure	110	108	114	119	111
Stations	84	72	72	72	86
Enabling Works	13	13	14	15	12
Infrastructure Total	**508**	**445**	**463**	**485**	**519**
Operational Systems	75	75	75	75	75
Contingency (15%)	87	78	81	84	89
Subtotal	**670**	**598**	**618**	**644**	**683**
Planning and Design (14%)	94	84	87	90	96
Total	**764**	**681**	**705**	**734**	**779**

East Route Variant

Category	East Route Variant Viaduct Option 1	East Route Variant Viaduct Option 2	East Route Variant Viaduct Option 3	East Route Variant Airport Tunnel Option
	€m	€m	€m	€m
Civil Engineering Works	263	274	291	327
Railway Infrastructure	118	124	130	122
Stations	74	74	74	88
Enabling Works	15	16	17	13
Infrastructure Total	**470**	**488**	**511**	**550**
Operational Systems	75	75	75	75
Contingency (15%)	82	84	88	94
Subtotal	**626**	**647**	**674**	**719**
Planning and Design (14%)	88	91	94	101
Total	**714**	**737**	**769**	**820**

Metro North - Transportation and Engineering Review

22-Jun-06

Summary of Indicative Cost Estimates

RPA Central Route

From Mater to
Great Southern Hotel
at Airport (Figure 1)

		Length (km)	Rate (m€/km)	Cost €m	
Part 1	Civil Engineering Works				
	Bored Tunnel Railway structure	3.0	70	€210	
	Cut & Cover Tunnel Railway structure	0.4	35	€14	
	At-grade Railway	2.1	4	€8	
	Elevated Railway Structure	4.1	20	€83	
	Under/Over-Bridge	0.0	15	€0	
	Section in Cut	0.0	5	€0	
	Total	9.6		€315	
Part 2	Railway Infrastructure				
	Trackworks	9.6	3	€29	
	Overhead power	9.6	1.8	€17	
	Signalling	9.6	5	€48	
	Telecoms	9.6	1.5	€14	
	Ducting	9.6	0.5	€5	
				€113	
		No.			
	Stations				
Part 3	Stations in Tunnel	2	20	€40	
	Stations Elevated	3	6	€18	
	Stations at Grade	2	2	€4	
				€62	
		Acres			
Part 4	Land	-	-	€0	
Part 5	Miscellaneous				
	Enabling works	6.6	2	€13	
	Railway Route Works Total			€504	
Part 6	Operational Systems				
	Rolling Stock		€50		?
	Depot Costs		€10		?
	Ticketing		€15		?
	Operational Systems Total			€75	
	Sub-Total			€579	
	Contingency	15%		€87	
	Sub-Total			**€666**	**million**
Part 7	Planning and Design Costs				
	Project Management	3%		€20	
	Engineering Design - Employer	2%		€13	
	Engineering Design - Contractor	4%		€27	
	Environmental Impact Statement and Planning	1%		€7	
	Construction Supervision	4%		€27	
		14%		€93	
	Overall Total			**€759**	**million**

Metro North - Transportation and Engineering Review

22-Jun-06

Summary of Indicative Cost Estimates

RPA Central Route with Airport Tunnel

From Mater to
Airport Terminal (Figure 1)

		Length (km)	Rate (m€/km)	Cost €m	
Part 1	Civil Engineering Works				
	Bored Tunnel Railway structure	4.1	70	€286	
	Cut & Cover Tunnel Railway structure	0.8	35	€28	
	At-grade Railway	1.2	4	€5	
	Elevated Railway Structure	3.3	20	€65	
	Under/Over-Bridge	0.0	15	€0	
	Section in Cut	0.0	5	€0	
	Total	9.4		€384	
Part 2	Railway Infrastructure				
	Trackworks	9.4	3	€28	
	Overhead power	9.4	1.8	€17	
	Signalling	9.4	5	€47	
	Telecoms	9.4	1.5	€14	
	Ducting	9.4	0.5	€5	
				€111	
		No.			
	Stations				
Part 3	Stations in Tunnel	3	20	€60	
	Stations Elevated	2	6	€12	
	Stations at Grade	2	2	€4	
				€76	
		Acres			
Part 4	Land		1	€0	
Part 5	Miscellaneous				
	Enabling works	5.3	2	€11	
	Railway Route Works Total			€582	
Part 6	Operational Systems				
	Rolling Stock		€50		?
	Depot Costs		€10		?
	Ticketing		€15		?
	Operational Systems Total			€75	
	Subtotal			€657	
	Contingency	15%		€98	
	Sub-Total			**€755**	**million**
Part 7	Planning and Design Costs				
	Project Management	3%		€23	
	Engineering Design - Employer	2%		€15	
	Engineering Design - Contractor	4%		€30	
	Environmental Impact Statement and Planning	1%		€8	
	Construction Supervision	4%		€30	
		14%		€106	
	Overall Total			**€861**	**million**

Metro North - Transportation and Engineering Review

22-Jun-06

Summary of Indicative Cost Estimates

RPA Central Route with Ballymun Tunnel

From Mater to
Great Southern Hotel
at Airport (Figure 8)

			Length (km)	Rate (m€/km)	Cost €m	
Part 1	Civil Engineering Works					
	Bored Tunnel Railway structure		5.4	70	€380	
	Cut & Cover Tunnel Railway structure		0.4	35	€14	
	At-grade Railway		2.0	4	€8	
	Elevated Railway Structure		1.7	20	€34	
	Under/Over-Bridge		0.0	15	€0	
	Section in Cut		0.0	5	€0	
		Total	9.5		€436	
Part 2	Railway Infrastructure					
	Trackworks		9.5	3	€29	
	Overhead power		9.5	1.8	€17	
	Signalling		9.5	5	€48	
	Telecoms		9.5	1.5	€14	
	Ducting		9.5	0.5	€5	
					€113	
			No.			
	Stations					
Part 3	Stations in Tunnel		4	20	€80	
	Stations Elevated		1	6	€6	
	Stations at Grade		2	2	€4	
					€90	
			Acres			
Part 4	Land			1	€0	
Part 5	Miscellaneous					
	Enabling works		4.1	2	€8	
	Railway Route Works Total				€647	
Part 6	Operational Systems					
	Rolling Stock			€50		?
	Depot Costs			€10		?
	Ticketing			€15		?
	Operational Systems Total				€75	
	Subtotal				€722	
		Contingency	15%		€108	
		Sub-Total			**€830**	**million**
Part 7	Planning and Design Costs					
	Project Management		3%		€25	
	Engineering Design - Employer		2%		€17	
	Engineering Design - Contractor		4%		€33	
	Environmental Impact Statement and Planning		1%		€8	
	Construction Supervision		4%		€33	
			14%		€116	
		Overall Total			**€946**	**million**

Metro North - Transportation and Engineering Review

22-Jun-06

Summary of Indicative Cost Estimates

RPA Central Route with Airport Tunnel and Ballymun Tunnel

From Mater to Existing Airport Terminal (Figure 8)

		Length (km)	Rate (m€/km)	Cost €m	
Part 1	Civil Engineering Works				
	Bored Tunnel Railway structure	9.0	70	€633	
	Cut & Cover Tunnel Railway structure	0.0	35	€0	
	At-grade Railway	0.0	4	€0	
	Elevated Railway Structure	0.0	20	€0	
	Under/Over-Bridge	0.0	15	€0	
	Section in Cut	0.0	5	€0	
	Total	9.0		€633	
Part 2	Railway Infrastructure				
	Trackworks	9.0	3	€27	
	Overhead power	9.0	1.8	€16	
	Signalling	9.0	5	€45	
	Telecoms	9.0	1.5	€14	
	Ducting	9.0	0.5	€5	
				€107	
		No.			
	Stations				
Part 3	Stations in Tunnel	5	20	€100	
	Stations Elevated	0	6	€0	
	Stations at Grade	2	2	€4	
				€104	
		Acres			
Part 4	Land		1	€0	
Part 5	Miscellaneous				
	Enabling works	0.0	2	€0	
	Railway Route Works Total			€843	
Part 6	Operational Systems				
	Rolling Stock		€50		?
	Depot Costs		€10		?
	Ticketing		€15		?
	Operational Systems Total			€75	
	Subtotal			€918	
	Contingency	15%		€138	
	Sub-Total			**€1,056**	**million**
Part 7	Planning and Design Costs				
	Project Management	3%		€32	
	Engineering Design - Employer	2%		€21	
	Engineering Design - Contractor	4%		€42	
	Environmental Impact Statement and Planning	1%		€11	
	Construction Supervision	4%		€42	
		14%		€148	
	Overall Total			**€1,204**	**million**

Metro North - Transportation and Engineering Review

22-Jun-06

Summary of Indicative Cost Estimates

RPA Alternative Route

From Mater to
Great Southern Hotel
at Airport (Figure 1)

			Length (km)	Rate (m€/km)	Cost €m	
Part 1	Civil Engineering Works					
	Bored Tunnel Railway structure		3.1	70	€217	
	Cut & Cover Tunnel Railway structure		0.4	35	€14	
	At-grade Railway		2.1	4	€8	
	Elevated Railway Structure		4.1	20	€83	
	Under/Over-Bridge		0.0	15	€0	
	Section in Cut		0.0	5	€0	
		Total	9.7		€322	
Part 2	Railway Infrastructure					
	Trackworks		9.7	3	€29	
	Overhead power		9.7	1.8	€17	
	Signalling		9.7	5	€49	
	Telecoms		9.7	1.5	€15	
	Ducting		9.7	0.5	€5	
					€114	
			No.			
	Stations					
Part 3	Stations in Tunnel		2	20	€40	
	Stations Elevated		3	6	€18	
	Stations at Grade		2	2	€4	
					€62	
			Acres			
Part 4	Land			1	€0	
Part 5	Miscellaneous					
	Enabling works		6.6	2	€13	
	Railway Route Works Total				€512	
Part 6	Operational Systems					
	Rolling Stock			€50		?
	Depot Costs			€10		?
	Ticketing			€15		?
	Operational Systems Total				€75	
	Subtotal				€587	
		Contingency	15%		€88	
		Sub-Total			**€675**	**million**
Part 7	Planning and Design Costs					
	Project Management		3%		€20	
	Engineering Design - Employer		2%		€13	
	Engineering Design - Contractor		4%		€27	
	Environmental Impact Statement and Planning		1%		€7	
	Construction Supervision		4%		€27	
			14%		€94	
		Overall Total			**€769**	**million**

Metro North - Transportation and Engineering Review

22-Jun-06

Summary of Indicative Cost Estimates

	RPA East Route Rationalised Viaduct Option 1		Mater to Clonshaugh Road Stn.	Clonshaugh Road to N. Edge of Airport			From Mater to Great Southern Hotel at Airport (Figures 3,7)
Part 1	Civil Engineering Works		Length (km)		Rate (m€/km)	Cost €m	
	Bored Tunnel Railway structure		2.7	0.0	70	€186	
	Cut & Cover Tunnel Railway structure		0.4	0.0	35	€14	
	At-grade Railway		1.9	0.7	4	€10	
	Elevated Railway Structure		0.0	1.5	20	€30	
	Under/Over-Bridge		0.3	0.0	15	€4	
	Section in Cut		1.8	0.0	5	€9	
		Total	7.0	2.2		€252	
Part 2	Railway Infrastructure						
	Trackworks		7.0	2.2	3	€27	
	Overhead power		7.0	2.2	1.8	€16	
	Signalling		7.0	2.2	5	€46	
	Telecoms		7.0	2.2	1.5	€14	
	Ducting		7.0	2.2	0.5	€5	
						€108	
			No.				
	Stations						
Part 3	Stations in Tunnel		3	0	20	€60	
	Stations Elevated		0	1	6	€6	
	Stations at Grade		3	0	2	€6	
						€72	
			Acres				
Part 4	Land				1	€0	
Part 5	Miscellaneous						
	Enabling works		6.5		2	€13	
	Railway Route Works Total					€445	
Part 6	Operational Systems						
	Rolling Stock				€50		?
	Depot Costs				€10		?
	Ticketing				€15		?
	Operational Systems Total					€75	
	Subtotal					€520	
		Contingency	15%			€78	
		Sub-Total				**€598**	**million**
Part 7	Planning and Design Costs						
	Project Management		3%			€18	
	Engineering Design - Employer		2%			€12	
	Engineering Design - Contractor		4%			€24	
	Environmental Impact Statement and Planning		1%			€6	
	Construction Supervision		4%			€24	
			14%			€84	
		Overall Total				**€681**	**million**

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Summary of Indicative Cost Estimates

	RPA East Route Rationalised Viaduct Option 2	Mater to Clonshaugh Road Stn.	Clonshaugh Road to N. Edge of Airport	Rate (m€/km)	Cost €m	From Mater to Centre of Airport (Figures 4,7)
		Length (km)				
Part 1	Civil Engineering Works					
	Bored Tunnel Railway structure	2.7	0.0	70	€186	
	Cut & Cover Tunnel Railway structure	0.4	0.0	35	€14	
	At-grade Railway	1.9	0.7	4	€10	
	Elevated Railway Structure	0.0	2.0	20	€40	
	Under/Over-Bridge	0.3	0.0	15	€4	
	Section in Cut	1.8	0.0	5	€9	
	Total	7.0	2.7		€263	
Part 2	Railway Infrastructure					
	Trackworks	7.0	2.7	3	€29	
	Overhead power	7.0	2.7	1.8	€17	
	Signalling	7.0	2.7	5	€48	
	Telecoms	7.0	2.7	1.5	€14	
	Ducting	7.0	2.7	0.5	€5	
					€114	
		No.				
	Stations					
Part 3	Stations in Tunnel	3	0	20	€60	
	Stations Elevated	0	1	6	€6	
	Stations at Grade	3	0	2	€6	
					€72	
		Acres				
Part 4	Land			1	€0	
Part 5	Miscellaneous					
	Enabling works	7.0		2	€14	
	Railway Route Works Total				€463	
Part 6	Operational Systems					
	Rolling Stock			€50		?
	Depot Costs			€10		?
	Ticketing			€15		?
	Operational Systems Total				€75	
	Subtotal				€538	
	Contingency	15%			€81	
	Sub-Total				**€618**	**million**
Part 7	Planning and Design Costs					
	Project Management	3%			€19	
	Engineering Design - Employer	2%			€12	
	Engineering Design - Contractor	4%			€25	
	Environmental Impact Statement and Planning	1%			€6	
	Construction Supervision	4%			€25	
		14%			€87	
	Overall Total				**€705**	**million**

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Summary of Indicative Cost Estimates

	RPA East Route Rationalised Viaduct Option 3		Mater to Clonshaugh Road Stn.	Clonshaugh Road to N. Edge of Airport			From Mater to Existing Airport Terminal (Figures 5,7)
Part 1	Civil Engineering Works		Length (km)		Rate (m€/km)	Cost €m	
	Bored Tunnel Railway structure		2.7	0.0	70	€186	
	Cut & Cover Tunnel Railway structure		0.4	0.0	35	€14	
	At-grade Railway		1.9	0.7	4	€10	
	Elevated Railway Structure		0.0	1.3	20	€25	
	Under/Over-Bridge		0.3	0.4	15	€10	
	Section in Cut		1.8	0.0	5	€9	
	Double-Elevated Section		0.0	0.8	30	€24	
		Total	7.0	3.2		€278	
Part 2	Railway Infrastructure						
	Trackworks		7.0	3.2	3	€30	
	Overhead power		7.0	3.2	1.8	€18	
	Signalling		7.0	3.2	5	€51	
	Telecoms		7.0	3.2	1.5	€15	
	Ducting		7.0	3.2	0.5	€5	
						€119	
			No.				
	Stations						
Part 3	Stations in Tunnel		3	0	20	€60	
	Stations Elevated		0	1	6	€6	
	Stations at Grade		3	0	2	€6	
						€72	
			Acres				
Part 4	Land				1	€0	
Part 5	Miscellaneous						
	Enabling works		7.5		2	€15	
	Railway Route Works Total					€485	
Part 6	Operational Systems						
	Rolling Stock				€50		?
	Depot Costs				€10		?
	Ticketing				€15		?
	Operational Systems Total					€75	
	Subtotal					€560	
		Contingency	15%			€84	
		Sub-Total				**€644**	**million**
Part 7	Planning and Design Costs						
	Project Management		3%			€19	
	Engineering Design - Employer		2%			€13	
	Engineering Design - Contractor		4%			€26	
	Environmental Impact Statement and Planning		1%			€6	
	Construction Supervision		4%			€26	
			14%			€90	
		Overall Total				**€734**	**million**

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Summary of Indicative Cost Estimates

	RPA East Route Rationalised Airport Tunnel Option	Mater to Clonshaugh Road Stn.	Clonshaugh Road to N. Edge of Airport	Rate (m€/km)	Cost €m	From Mater to Existing Airport Terminal (Figure 6,7)
		Length (km)				
Part 1	Civil Engineering Works					
	Bored Tunnel Railway structure	2.7	1.0	70	€252	
	Cut & Cover Tunnel Railway structure	0.4	0.4	35	€28	
	At-grade Railway	1.9	0.8	4	€11	
	Elevated Railway Structure	0.0	0.3	20	€7	
	Under/Over-Bridge	0.3	0.0	15	€4	
	Section in Cut	1.8	0.0	5	€9	
	Total	7.0	2.5		€310	
Part 2	Railway Infrastructure					
	Trackworks	7.0	2.5	3	€28	
	Overhead power	7.0	2.5	1.8	€17	
	Signalling	7.0	2.5	5	€47	
	Telecoms	7.0	2.5	1.5	€14	
	Ducting	7.0	2.5	0.5	€5	
					€111	
		No.				
	Stations					
Part 3	Stations in Tunnel	3	1	20	€80	
	Stations Elevated	0	0	6	€0	
	Stations at Grade	3	0	2	€6	
					€86	
		Acres				
Part 4	Land			1	€0	
Part 5	Miscellaneous					
	Enabling works	5.8		2	€12	
	Railway Route Works Total				€519	
Part 6	Operational Systems					
	Rolling Stock			€50		?
	Depot Costs			€10		?
	Ticketing			€15		?
	Operational Systems Total				€75	
	Subtotal				€594	
	Contingency	15%			€89	
	Sub-Total				**€683**	**million**
Part 7	Planning and Design Costs					
	Project Management	3%			€20	
	Engineering Design - Employer	2%			€14	
	Engineering Design - Contractor	4%			€27	
	Environmental Impact Statement and Planning	1%			€7	
	Construction Supervision	4%			€27	
		14%			€96	
	Overall Total				**€779**	**million**

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Summary of Indicative Cost Estimates

	East Route Variant Viaduct Option 1	Mater to Clonshaugh Road Stn. Length (km)	Clonshaugh Road to N. Edge of Airport Length (km)	Rate (m€/km)	Cost €m	From Mater to Great Southern Hotel at Airport (Figures 1,3)
Part 1	Civil Engineering Works					
	Bored Tunnel Railway structure	2.7	0.0	70	€186	
	Cut & Cover Tunnel Railway structure	0.4	0.0	35	€14	
	At-grade Railway	2.0	0.7	4	€11	
	Elevated Railway Structure	0.5	1.4	20	€40	
	Under/Over-Bridge	0.2	0.0	15	€2	
	Section in Cut	2.1	0.0	5	€11	
	Total	7.9	2.1		€263	
Part 2	Railway Infrastructure					
	Trackworks	7.9	2.1	3	€30	
	Overhead power	7.9	2.1	1.8	€18	
	Signalling	7.9	2.1	5	€50	
	Telecoms	7.9	2.1	1.5	€15	
	Ducting	7.9	2.1	0.5	€5	
					€118	
		No.	No.			
	Stations					
Part 3	Stations in Tunnel	3	0	20	€60	
	Stations Elevated	0	1	6	€6	
	Stations at Grade	4	0	2	€8	
					€74	
		Acres				
Part 4	Land			1	€0	
Part 5	Miscellaneous					
	Enabling works	7.3		2	€15	
	Railway Route Works Total				€470	
Part 6	Operational Systems					
	Rolling Stock			€50		?
	Depot Costs			€10		?
	Ticketing			€15		?
	Operational Systems Total				€75	
	Subtotal				€545	
	Contingency	15%			€82	
	Sub-Total				**€626**	**million**
Part 7	Planning and Design Costs					
	Project Management	3%			€19	
	Engineering Design - Employer	2%			€13	
	Engineering Design - Contractor	4%			€25	
	Environmental Impact Statement and Planning	1%			€6	
	Construction Supervision	4%			€25	
		14%			€88	
	Overall Total				**€714**	**million**

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Summary of Indicative Cost Estimates

	East Route Variant Viaduct Option 2	Mater to Clonshaugh Road Stn. Length (km)	Clonshaugh Road to N. Edge of Airport Length (km)	Rate (m€/km)	Cost €m	From Mater to Centre of Airport (Figures 1,4)
Part 1	Civil Engineering Works					
	Bored Tunnel Railway structure	2.7	0.0	70	€186	
	Cut & Cover Tunnel Railway structure	0.4	0.0	35	€14	
	At-grade Railway	2.0	0.7	4	€11	
	Elevated Railway Structure	0.5	2.0	20	€50	
	Under/Over-Bridge	0.2	0.0	15	€2	
	Section in Cut	2.1	0.0	5	€11	
	Total	7.9	2.6		€274	
Part 2	Railway Infrastructure					
	Trackworks	7.9	2.6	3	€32	
	Overhead power	7.9	2.6	1.8	€19	
	Signalling	7.9	2.6	5	€53	
	Telecoms	7.9	2.6	1.5	€16	
	Ducting	7.9	2.6	0.5	€5	
					€124	
		No.				
	Stations					
Part 3	Stations in Tunnel	3	0	20	€60	
	Stations Elevated	0	1	6	€6	
	Stations at Grade	4	0	2	€8	
					€74	
		Acres				
Part 4	Land			1	€0	
Part 5	Miscellaneous					
	Enabling works	7.9		2	€16	
	Railway Route Works Total				€488	
Part 6	Operational Systems					
	Rolling Stock			€50		?
	Depot Costs			€10		?
	Ticketing			€15		?
	Operational Systems Total				€75	
	Subtotal				€563	
	Contingency	15%			€84	
	Sub-Total				**€647**	**million**
Part 7	Planning and Design Costs					
	Project Management	3%			€19	
	Engineering Design - Employer	2%			€13	
	Engineering Design - Contractor	4%			€26	
	Environmental Impact Statement and Planning	1%			€6	
	Construction Supervision	4%			€26	
		14%			€91	
	Overall Total				**€737**	**million**

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Summary of Indicative Cost Estimates

East Route Variant
Viaduct Option 3

From Mater to Existing Airport Terminal (Figures 1,5)

		Mater to Clonshaugh Road Stn. Length (km)	Clonshaugh Road to N. Edge of Airport Length (km)	Rate (m€/km)	Cost €m	
Part 1	Civil Engineering Works					
	Bored Tunnel Railway structure	2.7	0.0	70	€186	
	Cut & Cover Tunnel Railway structure	0.4	0.0	35	€14	
	At-grade Railway	2.0	0.7	4	€11	
	Elevated Railway Structure	0.5	1.6	20	€43	
	Under/Over-Bridge	0.2	0.0	15	€2	
	Section in Cut	2.1	0.0	5	€11	
	Double-Elevated Section	0.0	0.8	30	€24	
	Total	7.9	3.1		€291	
Part 2	Railway Infrastructure					
	Trackworks	7.9	3.1	3	€33	
	Overhead power	7.9	3.1	1.8	€20	
	Signalling	7.9	3.1	5	€55	
	Telecoms	7.9	3.1	1.5	€16	
	Ducting	7.9	3.1	0.5	€5	
					€130	
		No.				
	Stations					
Part 3	Stations in Tunnel	3	0	20	€60	
	Stations Elevated	0	1	6	€6	
	Stations at Grade	4	0	2	€8	
					€74	
		Acres				
Part 4	Land			1	€0	
Part 5	Miscellaneous					
	Enabling works	8.3		2	€17	
	Railway Route Works Total				€511	
Part 6	Operational Systems					
	Rolling Stock			€50		?
	Depot Costs			€10		?
	Ticketing			€15		?
	Operational Systems Total				€75	
	Subtotal				€586	
	Contingency	15%			€88	
	Sub-Total				**€674**	**million**
Part 7	Planning and Design Costs					
	Project Management	3%			€20	
	Engineering Design - Employer	2%			€13	
	Engineering Design - Contractor	4%			€27	
	Environmental Impact Statement and Planning	1%			€7	
	Construction Supervision	4%			€27	
		14%			€94	
	Overall Total				**€769**	**million**

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Summary of Indicative Cost Estimates

East Route Variant
(Airport Tunnel Option)

From Mater to Existing Airport Terminal (Figures 1,6)

		Mater to Clonshaugh Road Stn. Length (km)	Clonshaugh Road to N. Edge of Airport Length (km)	Rate (m€/km)	Cost €m	
Part 1	Civil Engineering Works					
	Bored Tunnel Railway structure	2.7	1.1	70	€264	
	Cut & Cover Tunnel Railway structure	0.4	0.2	35	€22	
	At-grade Railway	2.0	0.8	4	€11	
	Elevated Railway Structure	0.5	0.3	20	€17	
	Under/Over-Bridge	0.2	0.0	15	€2	
	Section in Cut	2.1	0.0	5	€11	
	Total	7.9	2.4		€327	
Part 2	Railway Infrastructure					
	Trackworks	7.9	2.4	3	€31	
	Overhead power	7.9	2.4	1.8	€19	
	Signalling	7.9	2.4	5	€52	
	Telecoms	7.9	2.4	1.5	€15	
	Ducting	7.9	2.4	0.5	€5	
					€122	
		No.				
	Stations					
Part 3	Stations in Tunnel	3	1	20	€80	
	Stations Elevated	0	0	6	€0	
	Stations at Grade	4	0	2	€8	
					€88	
		Acres				
Part 4	Land			1	€0	
Part 5	Miscellaneous					
	Enabling works	6.5		2	€13	
	Railway Route Works Total				€550	
Part 6	Operational Systems					
	Rolling Stock			€50		?
	Depot Costs			€10		?
	Ticketing			€15		?
	Operational Systems Total				€75	
	Subtotal				€625	
	Contingency	15%			€94	
	Sub-Total				**€719**	**million**
Part 7	Planning and Design Costs					
	Project Management	3%			€22	
	Engineering Design - Employer	2%			€14	
	Engineering Design - Contractor	4%			€29	
	Environmental Impact Statement and Planning	1%			€7	
	Construction Supervision	4%			€29	
		14%			€101	
	Overall Total				**€820**	**million**

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Summary of Indicative Cost Estimates

RPA Alternative Route
with Airport Tunnel

From Mater to
Existing Airport
Terminal (Figure 1)

			Length (km)	Rate (m€/km)	Cost €m	
Part 1	Civil Engineering Works					
	Bored Tunnel Railway structure		4.2	70	€293	
	Cut & Cover Tunnel Railway structure		0.8	35	€28	
	At-grade Railway		1.2	4	€5	
	Elevated Railway Structure		3.3	20	€65	
	Under/Over-Bridge		0.0	15	€0	
	Section in Cut		0.0	5	€0	
		Total	9.5		€391	
Part 2	Railway Infrastructure					
	Trackworks		9.5	3	€28	
	Overhead power		9.5	1.8	€17	
	Signalling		9.5	5	€47	
	Telecoms		9.5	1.5	€14	
	Ducting		9.5	0.5	€5	
					€112	
			No.			
	Stations					
Part 3	Stations in Tunnel		3	20	€60	
	Stations Elevated		2	6	€12	
	Stations at Grade		2	2	€4	
					€76	
			Acres			
Part 4	Land			1	€0	
Part 5	Miscellaneous					
	Enabling works		5.3	2	€11	
	Railway Route Works Total				€590	
Part 6	Operational Systems					
	Rolling Stock			€50		?
	Depot Costs			€10		?
	Ticketing			€15		?
	Operational Systems Total				€75	
	Subtotal				€665	
		Contingency	15%		€100	
		Sub-Total			**€764**	**million**
Part 7	Planning and Design Costs					
	Project Management		3%		€23	
	Engineering Design - Employer		2%		€15	
	Engineering Design - Contractor		4%		€31	
	Environmental Impact Statement and Planning		1%		€8	
	Construction Supervision		4%		€31	
			14%		€107	
		Overall Total			**€872**	**million**

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Summary of Indicative Cost Estimates

RPA Alternative Route with Ballymun Tunnel

From Mater to Great Southern Hotel at Airport (Figure 8)

			Length (km)	Rate (m€/km)	Cost €m	
Part 1	Civil Engineering Works					
	Bored Tunnel Railway structure		5.5	70	€387	
	Cut & Cover Tunnel Railway structure		0.4	35	€14	
	At-grade Railway		2.0	4	€8	
	Elevated Railway Structure		1.7	20	€34	
	Under/Over-Bridge		0.0	15	€0	
	Section in Cut		0.0	5	€0	
		Total	9.6		€443	
Part 2	Railway Infrastructure					
	Trackworks		9.6	3	€29	
	Overhead power		9.6	1.8	€17	
	Signalling		9.6	5	€48	
	Telecoms		9.6	1.5	€14	
	Ducting		9.6	0.5	€5	
					€114	
			No.			
	Stations					
Part 3	Stations in Tunnel		4	20	€80	
	Stations Elevated		1	6	€6	
	Stations at Grade		2	2	€4	
					€90	
			Acres			
Part 4	Land			1	€0	
Part 5	Miscellaneous					
	Enabling works		4.1	2	€8	
	Railway Route Works Total				€655	
Part 6	Operational Systems					
	Rolling Stock			€50		?
	Depot Costs			€10		?
	Ticketing			€15		?
	Operational Systems Total				€75	
	Subtotal				€730	
		Contingency	15%		€109	
		Sub-Total			**€839**	**million**
Part 7	Planning and Design Costs					
	Project Management		3%		€25	
	Engineering Design - Employer		2%		€17	
	Engineering Design - Contractor		4%		€34	
	Environmental Impact Statement and Planning		1%		€8	
	Construction Supervision		4%		€34	
			14%		€118	
		Overall Total			**€957**	**million**

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Summary of Indicative Cost Estimates

RPA Alternative Route
with Airport Tunnel and
Ballymun Tunnel

From Mater to
Existing Airport
Terminal (Figure 8)

			Length (km)	Rate (m€/km)	Cost €m	
Part 1	Civil Engineering Works					
	Bored Tunnel Railway structure		9.1	70	€640	
	Cut & Cover Tunnel Railway structure		0.0	35	€0	
	At-grade Railway		0.0	4	€0	
	Elevated Railway Structure		0.0	20	€0	
	Under/Over-Bridge		0.0	15	€0	
	Section in Cut		0.0	5	€0	
		Total	9.1		€640	
Part 2	Railway Infrastructure					
	Trackworks		9.1	3	€27	
	Overhead power		9.1	1.8	€16	
	Signalling		9.1	5	€46	
	Telecoms		9.1	1.5	€14	
	Ducting		9.1	0.5	€5	
					€108	
			No.			
	Stations					
Part 3	Stations in Tunnel		5	20	€100	
	Stations Elevated		0	6	€0	
	Stations at Grade		2	2	€4	
					€104	
			Acres			
Part 4	Land			1	€0	
Part 5	Miscellaneous					
	Enabling works		0.0	2	€0	
	Railway Route Works Total				€851	
Part 6	Operational Systems					
	Rolling Stock			€50		?
	Depot Costs			€10		?
	Ticketing			€15		?
	Operational Systems Total				€75	
	Subtotal				€926	
		Contingency	15%		€139	
		Sub-Total			**€1,065**	**million**
Part 7	Planning and Design Costs					
	Project Management		3%		€32	
	Engineering Design - Employer		2%		€21	
	Engineering Design - Contractor		4%		€43	
	Environmental Impact Statement and Planning		1%		€11	
	Construction Supervision		4%		€43	
			14%		€149	
		Overall Total			**€1,215**	**million**

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Summary of Indicative Cost Estimates

RPA East Route

From Mater to
Great Southern Hotel
at Airport (Figure 1)

		Length (km)	Rate (m€/km)	Cost €m	
Part 1	Civil Engineering Works				
	Bored Tunnel Railway structure	2.7	70	€186	
	Cut & Cover Tunnel Railway structure	0.4	35	€14	
	At-grade Railway	1.4	4	€6	
	Elevated Railway Structure	4.8	20	€96	
	Under/Over-Bridge	0.0	15	€0	
	Section in Cut	0.0	5	€0	
	Total	9.3		€301	
Part 2	Railway Infrastructure				
	Trackworks	9.3	3	€28	
	Overhead power	9.3	1.8	€17	
	Signalling	9.3	5	€46	
	Telecoms	9.3	1.5	€14	
	Ducting	9.3	0.5	€5	
				€110	
		No.			
	Stations				
Part 3	Stations in Tunnel	3	20	€60	
	Stations Elevated	4	6	€24	
	Stations at Grade	0	2	€0	
				€84	
		Acres			
Part 4	Land		1	€0	
Part 5	Miscellaneous				
	Enabling works	6.6	2	€13	
	Railway Route Works Total			€508	
Part 6	Operational Systems				
	Rolling Stock		€50		?
	Depot Costs		€10		?
	Ticketing		€15		?
	Operational Systems Total			€75	
	Subtotal			€583	
	Contingency	15%		€87	
	Sub-Total			**€670**	**million**
Part 7	Planning and Design Costs				
	Project Management	3%		€20	
	Engineering Design - Employer	2%		€13	
	Engineering Design - Contractor	4%		€27	
	Environmental Impact Statement and Planning	1%		€7	
	Construction Supervision	4%		€27	
		14%		€94	
	Overall Total			**€764**	**million**

Keeping the Luas on track

Thu, Dec 14, 2017, 01:16

Sir, – Allocating the limited space inside the M50 has to start by looking at how much streetspace each travel mode takes and how many people fit in vehicles taking that streetspace. ("Teething problems or a challenge too far?", December 11th)

During the morning peak, more people travel by car than by any other single mode. About 13 cars fit in the same street space as a 55m Luas tram with one driver. On average, each car takes no more than 1.25 people during that peak time, according to canal cordon counts.

These 16 people represent less than one-twentieth of the 380 passengers on a Luas tram.

Double-deck buses are 10m long and carry 93 passengers. Five buses (with five drivers) with 465 passengers take the same space as one Luas vehicle and 13 cars.

Given that all vehicles need some assured stopping space between them, Luas makes better use of the available streetspace on high traffic routes.

Operational costs are lower than buses. There are less emissions at point of use. It is far easier to monitor and mitigate emissions at electricity generating stations than it is for the 2.5m vehicles on our roads.

A recent IMF report assessed management of public investment here (*Irish Times*, November 10th). It found that there is a very big efficiency gap between us and other countries.

We in Dublin need to learn from well-run cities like Zurich. A good start would be to extend Luas Cross City to create a north city Luas loop together with Luas on Drumcondra Road as planned originally. A north city Luas loop would be faster and cheaper to build than Metro North. This €2bn relic of the Celtic tiger craziness is the same kind of solution to ease movement as is relying on private cars during peak commuting times in urban areas. – Yours, etc,

ADVERTISEMENT

DONAL O'BROLCÁIN,

Drumcondra,

Dublin 9.

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Regional Spatial and Economic Strategy
A LUAS Loop for the North City part of Dublin's Core Economic Area

A chara,

I attach my submission in which I propose extending LUAS CrossCity to create a North Dublin LUAS loop for Dublin's Core Economic Area, including Dublin Airport, as the first project to be implemented with immediate effect.

The LUAS loop is shown on two maps which I commissioned from AIRO (NUIMaynooth) early in 2015, which showed existing and proposed urban rail lines superimposed on

1. Dublin's Core Economic Area – as measured by employment (see Figure 1);
2. Population density (see Figure 2)

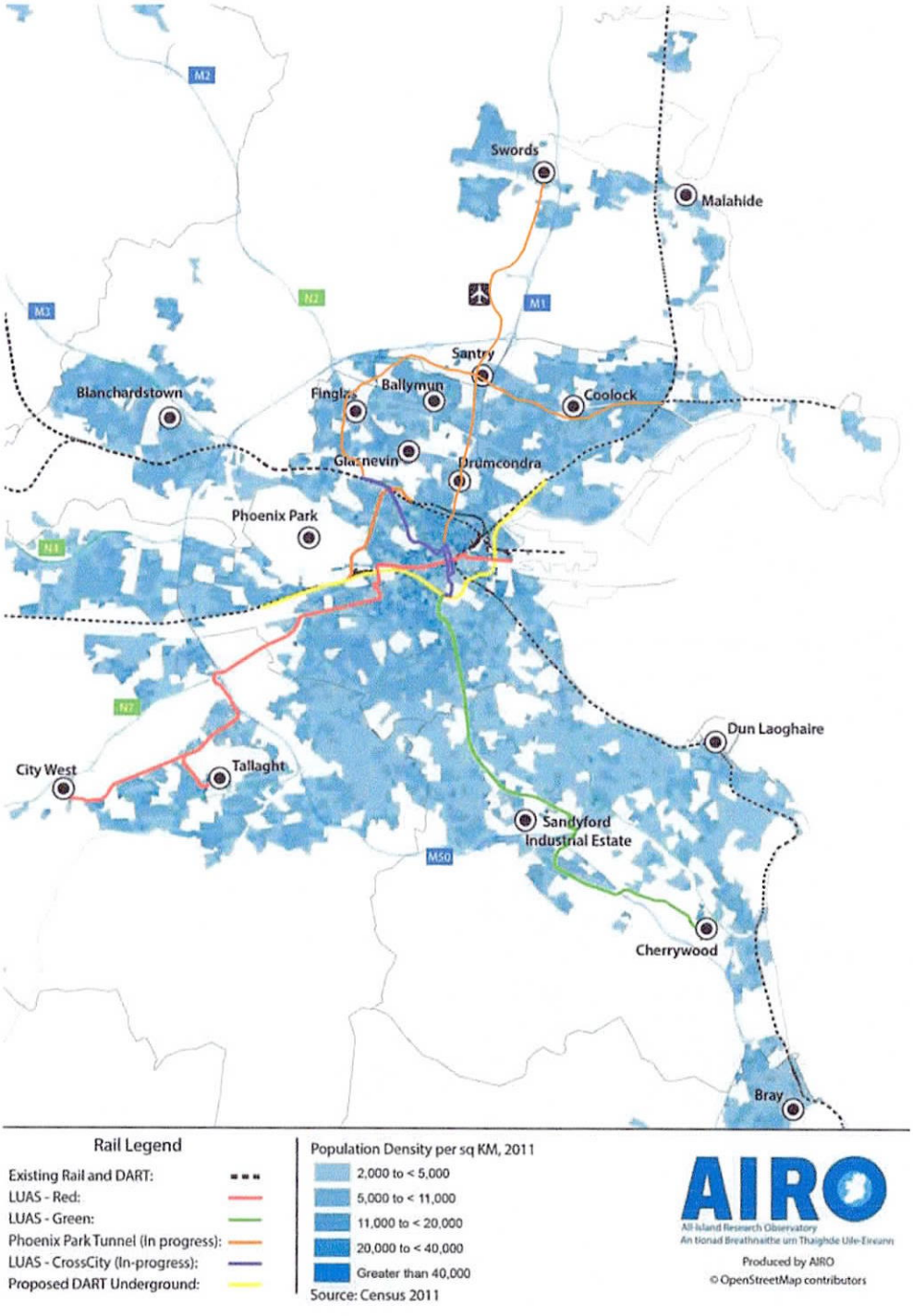
based on 2011 Census data.

Figure 1 North Dublin LUAS Loop for Core Economic Area



The north part of Dublin City has more people (325,000) than Fingal, the south part of Dublin City, Dun Laoghaire-Rathdown or South Dublin CC. In the 10 years to 2016, the population of the North City grew by just over 30,000 compared with an increase of just over 5,000 people in Swords to reach 43,000 people. In that period, Blanchardstown's population increased by over 11,000 people to reach just under 75,000 people.

Figure 2 North Dublin LUAS loop and Population Density



This loop

- serves the northern part of Dublin's Core Economic Area and the populated areas comprehensively, taking in
  - Northwood, Santry, Drumcondra, North East Inner City
  - Kilmore, Beaumont Hopsital, Coolock, Edenmore, Donaghmede, Kilbarrack;
  - Ballymun, Poppintree, Charlestown, Cappagh Hospital, Finglas.
- is Integrated with Dublin 's existing light rail system LUAS;
  as it extends LUAS CrossCity and
  could link with LUAS in the Docklands (North and South) using the Samuel Becket Bridge (which is designed to carry LUAS);
- offers two rail-based links between the Central Business District and Dublin Airport
  - Directly on LUAS via either Drumcondra or LUAS CrossCity;
  - Indirectly using LUAS to get to Howth Junction to connect with
    - DART services to Connolly, Tara and Pearse Stations;
- links with heavy rail services
  - at Howth Junction;, which has DART and Commuter rail services;
  - the Maynooth line at both Drumcondra and Broombridge.

Attached to this letter are papers and documents presenting a more detailed case for a North Dublin LUAS loop, based on

1. travel patterns and population;
2. optimum use of resources available eg. streetspace, land use, finance;
3. sustainability, particularly air quality;

This would be both faster and cheaper to build than Metro North – a relic of the Celtic craziness backed by group-think, policy driven evidence making and weak institutions.

The extent of this craziness is clear by comparing schematic maps from the Dublin Transportation Office(DTO) *A Platform for Change*[1] with another schematic map from Transport 21. The DTO document was a summary of years of analysis and joined up thinking. It showed were two LUAS lines in North Dublin, in addition to a north-south Metro. The Transport 21 schematic showed only Metro North.[2]

The public authorities did not give any justification for this change at a time when there seemed to be adequate resources to implement the DTO strategy.

As part of my submission, I attach my article setting out details supporting the case for a North Dublin LUAS loop [3] A summary of the case is set out in my letter published in the Irish Times on 14 December 2017, also attached.

---

[1] Dublin Transportation Office 2001. A Platform for Change. Summary of an integrated transportation strategy for the Greater Dublin Area 2001-2016.

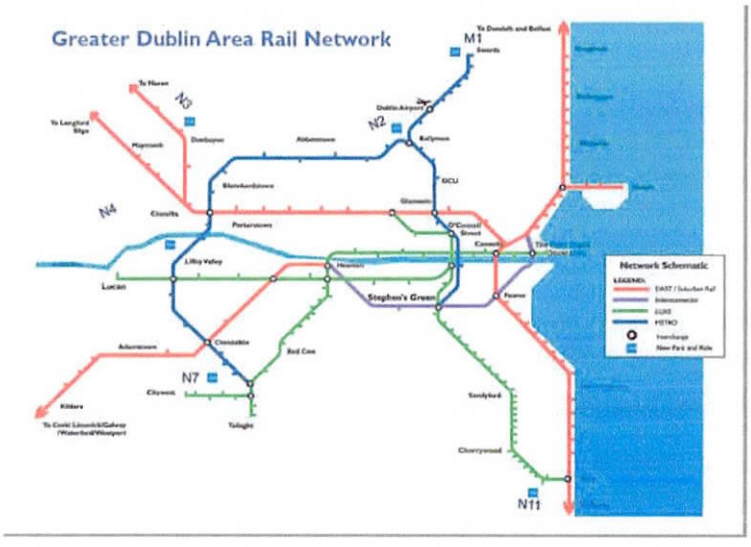
[2] Transport 21. The then Minister for Transport, Martin Cullen TD announced Transport 21 at a press conference on 1 November 2005

[3] Donal O'Brolchain *A LUAS Loop for North Dublin's Economic Core instead of Metro North*. Irish Journal of Social, Economic and Environmental Sustainability Vol. 1. Issue 2. January 2018 p.62-99. Submitted in March 2017.

Figure 3 LUAS lines and Metro DTO 2001



Figure 4 Transport 21 Greater Dublin Rail Network



As part of my submission, I attach a copy of an alternative route for Metro North, which consultant engineers Roughan & O'Donovan prepared in 2006. It would seem that the Director of the consultancy company who signed off on the National Transport Authority 2016 report recommending Metro North was not aware of this alternative option. This alternative to Metro North fits very well with the North Dublin LUAS loop I propose.

The Irish Times reported (Thurs 15 Feb 2018) a change in the justification for Metro North *"The Metro is not about the airport,' said one source. 'This is about increasing density around Dublin'*

https://www.irishtimes.com/news/ireland/irish-news/metro-north-plan-focuses-on-developing-areas-along-line-1.3392415

Curiouser and curiouser are the wondrous ways of our governing official thought processes about a National Plan/Investment programme that has been trumpeted as a means to build up city-based centres as a counter-balance to Dublin!

Yet it now seems the National Planning Framework/Ireland 2040 is to increase housing in Dublin. There is a housing shortage now. Yet a 10 year project (which is what Metro North would be) is now being justified by an increase in housing density in Dublin.

Where are the brownfield sites along the proposed Metro North route studied by the National Transport Authority consultants which is supposed to be the basis of this Government's commitment to Metro North? The sole criteria used by the consultants for that study was the journey time from the city centre to Dublin Airport. I could not find any mention of brownfield sites in the two reports

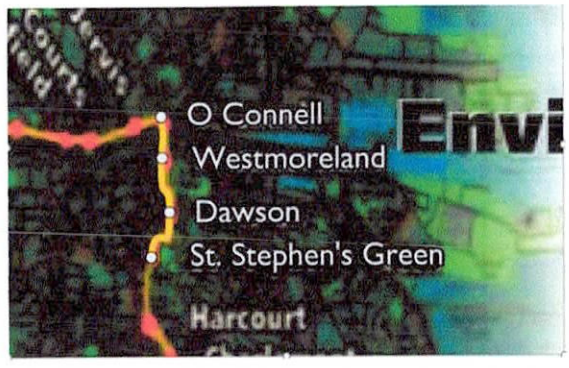
Do our governing authorities no longer believe their own study, which I consider to be deeply flawed in conception, exceptionally tendentious in execution and misleading in presentation?

In this context, note that the recent IMF Assessment of Public Investment Management (September 2017 released in November 2017) reported

It estimates an efficiency gap of 23 percent compared to the rest of the world, and a larger gap of 58 percent compared to advanced countries alone. Improving public investment management would enable Ireland to bring the efficiency of its infrastructure closer to the frontier of best practice in advanced countries, and deliver more "bangs for the buck" from infrastructure spending.

An example of this efficiency gap is the failure to link the two LUAS lines as was originally proposed. When launching LUAS CrossCity, Taoiseach Le Varadkar asked *"How many ministers for transport does it take to link* the *Luas*?" It still remains to be done (see Fig. 3)

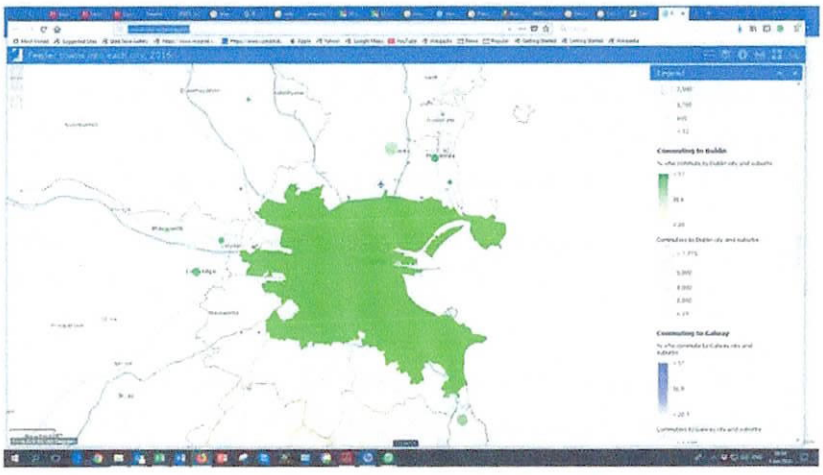
Figure 5 LUAS lines linked proposed in 1997



Humpty Dumpty sat on a wall;
Humpty Dumpty had a great fall;
All Leo's horses
And all Michael's mates
Couldn't put Humpty Dumpty together again

I call on the Eastern and Midland Regional Assembly to support this North Dublin LUAS loop as it serves the transport needs of the Greater Dublin Area comprehensively as shown in the Census 2016 (see Fig.4)

Figure 6 Feeder Towns into each City. Census 2016



Sources: Central Statistics Office
http://census.cso.ie/p6map42/
http://www.cso.ie/en/csolatestnews/presspages/2017/census2016profile6-commutinginireland/

Is mise

Donal O'Brolcáin

Papers with

Submission

to

Eastern & Midland Regional Assembly

on

Regional Spatial and Economic Strategy

Donal O'Brolcáin
16 February 2018

1. *Keeping LUAS on Track.* letter published in Irish Times on 14 December 2017

2. *A LUAS loop for North Dublin's Core Economic Area instead of Metro North* in the latest issue of the Irish Journal for Social, Economic and Environmental Sustainability (IJSEES) Vol. 1 Issue 2 January 2018 p.62-99.
   https://static1.squarespace.com/static/56a9f0a9e0327c33e479d003/t/5a54ae8771c10b117ef6c362/1515499181852/IJSEE_Volume_1_2.pdf

   This article was submitted in March 2017. I also used the same text as a basis for personal submissions to
   - Dept of Public Expenditure and Reform's *Mid-Term Review of the Capital Programme;*
   - Dept of Housing, Planning and Local Government *National Planning Framework.*

3. *Does Dublin's Core need more rail links?*
   Paper presented at Dublin Economic Workshop Athlone 17th October 2015.

4. Roughan & O'Donovan 2006. Metro North Transportation and Engineering Review. Final Revision. Dublin

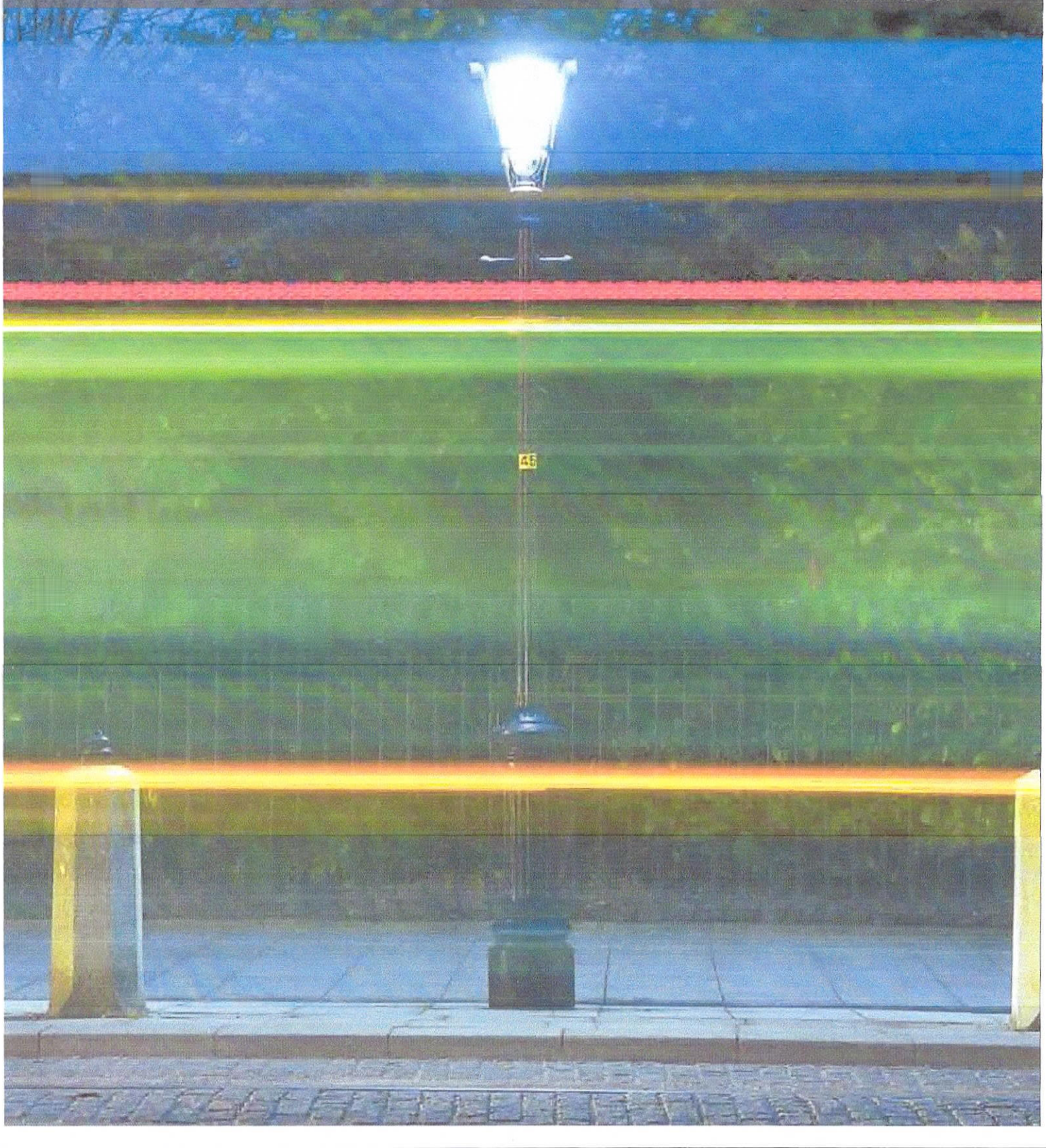
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FINGAL / NORTH DUBLIN TRANSPORT STUDY

STAGE ONE APPRAISAL REPORT

November 2014



FINGAL / NORTH DUBLIN TRANSPORT STUDY

STAGE ONE APPRAISAL REPORT

Document No:..... 04

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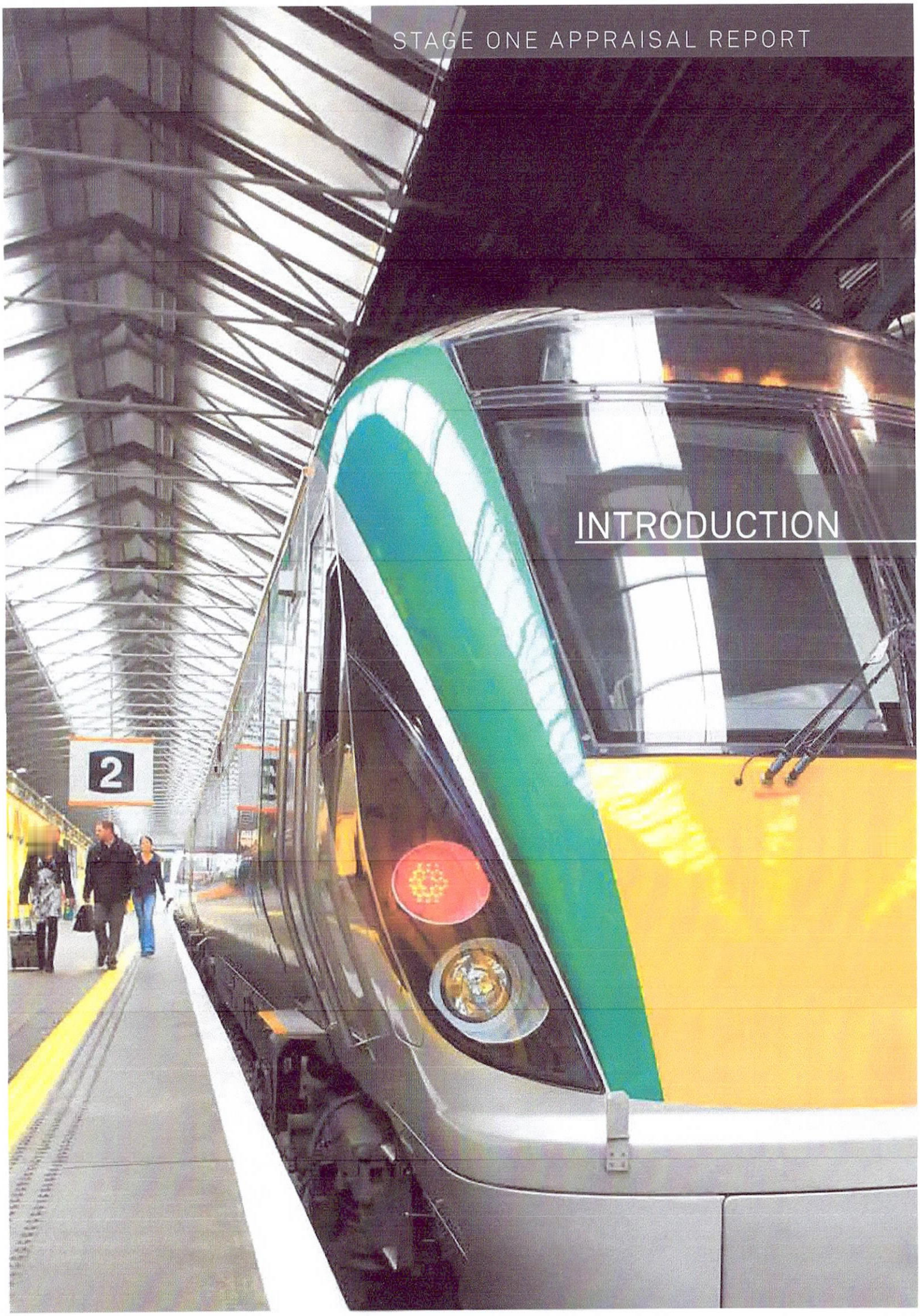
Revision	Description	Made	Checked	Approved	Date
02	Revised Draft	JF/SM	SD/JS	GM	11/11/14
03	Revised Draft	JF/SM	SD/JS	GM	18/11/14
04	Final report	JS	EB	GM	19/11/14

FINGAL / NORTH DUBLIN TRANSPORT STUDY

STAGE ONE APPRAISAL REPORT

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INTRODUCTION

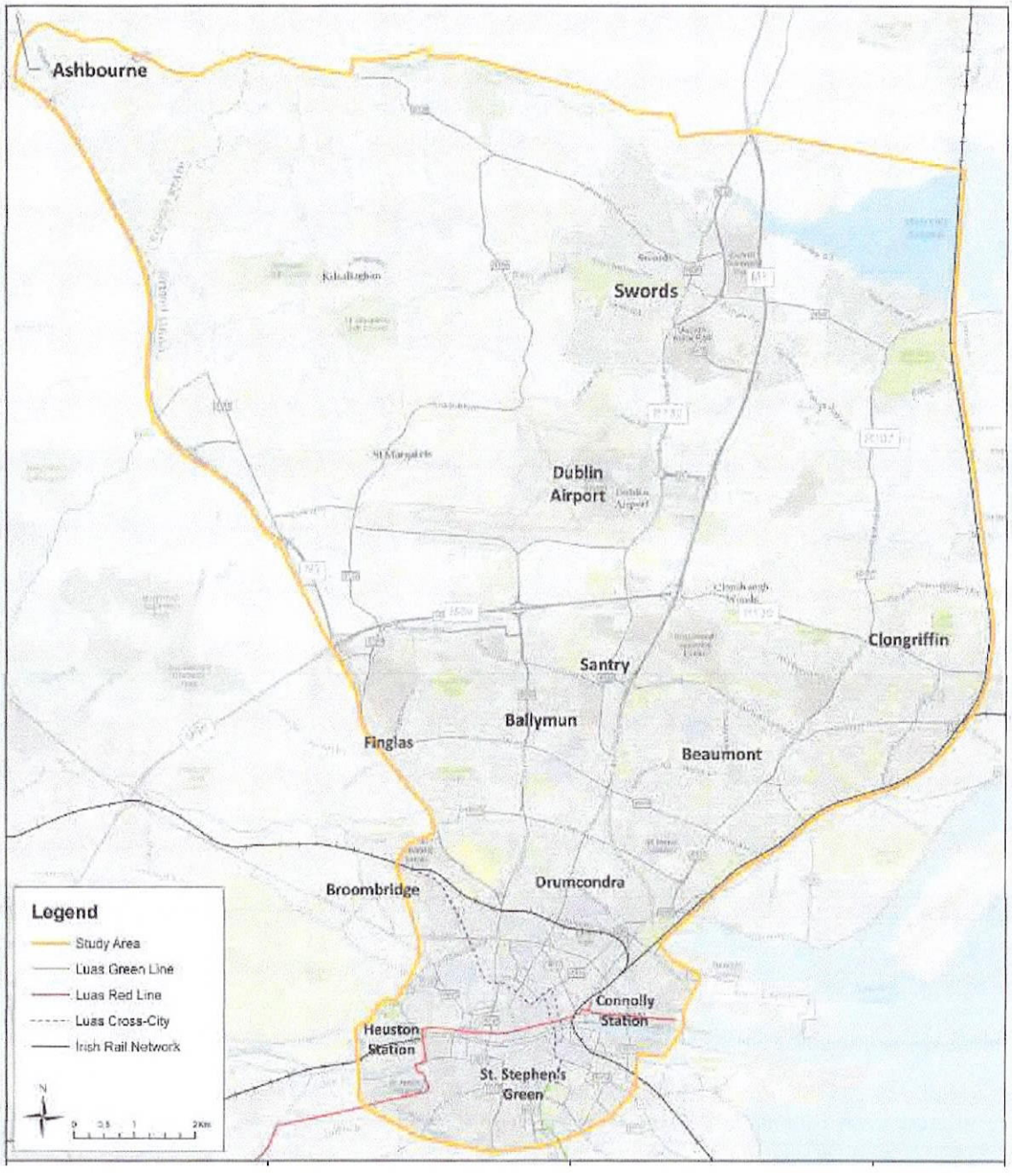
1.0 Introduction

1.1 Study Objectives

The overall objective of this Fingal/North Dublin Transport Study is to identify the optimum long term public transport solution to connect Dublin City Centre, Dublin Airport and Swords.

The study area for the project covers a large proportion of the Fingal and Dublin City local authority areas with the three core areas, or nodes, to be served running north/south within the area, as shown in Figure 1.1.

Figure 1.1: Study Area for the Fingal/North Dublin Transport Study



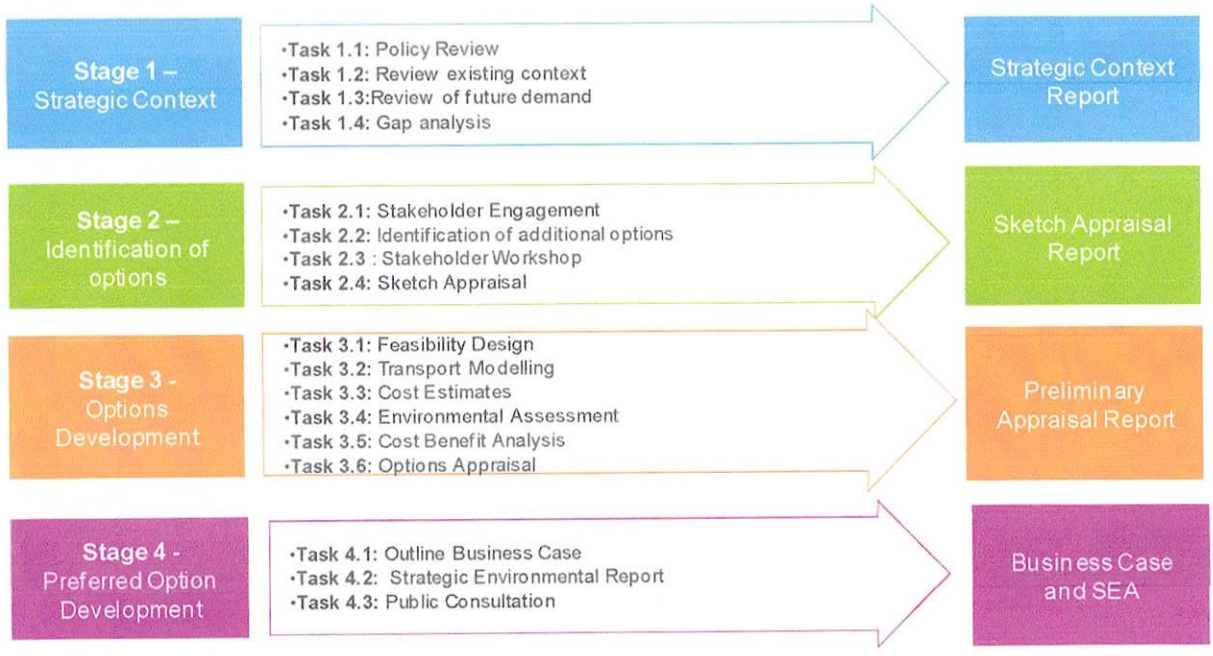
The study is being developed to ensure that the public transport needs of this Swords/Airport to City Centre corridor are adequately addressed in the study horizon year of 2035. In undertaking this study other proposals of relevance to the study area include:

- **DART Expansion Programme:** The DART Expansion Programme consists of the DART Underground Tunnel in the city centre. The scheme consists of a new underground DART line through the heart of Dublin City running some 8.6km from the Docklands to Inchicore. Further details on the scheme are set out in Section 2;
- **Luas Cross City:** The Luas Cross City project is currently under construction and when completed in 2017 will provide an extension of the Luas Green Line from St. Stephen's Green to Broombridge via Dublin City Centre, Broadstone and Cabra. Further details on the scheme are set out in Section 3; and
- **Swiftway Bus Rapid Transit (BRT):** The Swiftway BRT system for Dublin is a proposal for a Bus Rapid Transit network for Dublin, planning and design is progressing on this network which would consist of the following corridors: Swords to City Centre; Blanchardstown to UCD; and Clongriffin to Tallaght. Further details on the BRT BRT Proposals are set out in Section 4.

1.2 Methodology

To ensure development of the study was undertaken in logical, methodical manner and not biased towards any particular mode of transport or scheme, a four stage approach to delivery of the study was adopted, as summarised in Figure 1.2.

Figure 1.2: Study methodology



The following prinicples have guided the conduct of the study:

- Land use planning, employment and population forecasts form the basis of identifying a strategic need for an expanded public transport network in the area. As a result, AECOM has worked closely with the NTA, Dublin Airport Authority, Fingal County Council and Dublin City Council to understand future forecasts for the area and plans for spatial development;

- Ultimately, estimated travel demand will determine the most effective and efficient public transport solution for the area. As such transport modelling and economic analysis are critical components of our methodology;
- In addition to investigating schemes previously proposed for the study area, AECOM has been tasked to undertake a gap analysis to suggest any further schemes which might meet the study objectives;
- The appraisal of projects proposed should be on the basis of Government guidelines for appraisal as outlined in the The Public Spending Code[1] and the Common Appraisal Framework for Transport Projects and Programmes[2];
- The technical feasibility of schemes will be investigated further as the study progresses with shortlisted schemes being developed to a more advanced level to support economic analysis in Stage 3 of the study; and
- Stakeholder engagement is a critical component of overall delivery. Consultation undertaken to date is set out in Section 1.4.

At this stage of project delivery, Stages 1 and 2 of this methodology have been completed. AECOM has set out the strategic context for the study in a separate report and consulted with all key stakeholders. A long list of potential public transport schemes for the study area has been developed and are the subject of a preliminary appraisal as presented in this report. Pending approval of the proposed options for further delivery, Stage 3 of the project will commence an include more detailed development of each shortlisted option.

1.3 Strategic Context

A summary of the strategic context for the public transport infrastructure development within the study area has previously been developed and is summarised as follows:

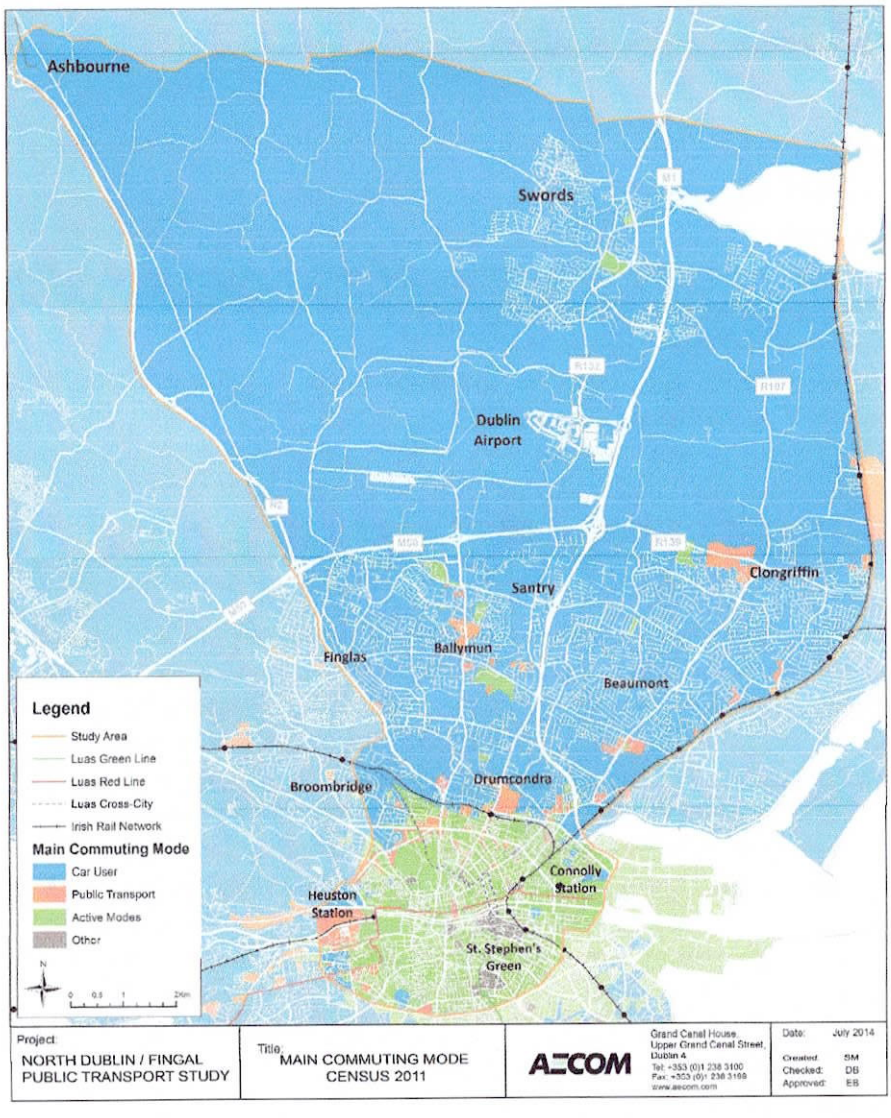
- The population of the Dublin region is anticipated to grow by approximately 23% by 2035. A more numerous and wealthier population will stimulate increased travel across the region over the medium term that requires a response in terms of the development of transport and other economic and social infrastructure;
- Car travel is currently the dominant mode of travel within the Study Area with car dependency in areas north of Drumcondra particularly high, see Figure 1.3. However, some urban centres such as Ballymun and Swords have a higher take-up of sustainable modes, principally the bus mode. Similarly, residential areas adjacent to the DART have higher use of public transport. This suggests a potential for public transport modes to capture a larger mode share, where settlement densities are high or high quality public transport services are provided;
- Government policy favours modal shift away from private car use and promotion of public transport, walking and cycling modes. Future demand for travel and the potential for the increased use of public transport and other sustainable modes within the study area are dependent, in part, on future settlement patterns. The Regional Planning Guidelines (RPGs) envisage a consolidation of land uses within the region via a settlement hierarchy;
- At the top of the hierarchy, a 'Gateway Core' of Dublin City Centre and its immediate suburbs is defined as the international business core with high density population, retail and cultural activities. Within Fingal, Swords is designated as a Metropolitan Consolidation Town to function as part of a wider Gateway for the Dublin region and is envisaged to grow to a relatively large scale as part of the consolidation of the metropolitan area. In addition to this

[1] Department of Public Expenditure and Reform "The Public Spending Code" available at publicspendingcode.per.gov.ie
[2] Department of Transport, Tourism and Sport "Common Appraisal Framework for Investment in Transport Projects and Programmes" October 2009.

hierarchy, Swords and the airport are identified as a combined cluster, with activity in aviation infrastructure and airport related services, and transport and logistics. The Guidelines envisage Dublin city and Fingal as the two administrative areas within the Greater Dublin Area that will experience the largest increase in housing provision;

- This broad approach to land use development is supported by the Fingal Development Plan and the Dublin City Development Plan and underpins the National Transport Authority's Draft Greater Dublin Area Transport Strategy 2011-2030. Development of the Draft Strategy considered two different development scenarios with varying density and distribution of population and employment. Scenario A was developed to reflect the minimum targets set out in the RPG settlement strategy for distribution of growth in the Dublin Metropolitan Area and designated hinterland towns up to 2022. Scenario B provides for a greater level of consolidation within the metropolitan area and in selected large growth towns close to rail and in particular the proposed Metro North. To further develop the strategic context for the study, the population distribution pattern of Scenario A will be applied with growth projections taken from the Central Statistics Office (CSO) M2 F2. This modelling work will be used to forecast demand for the options shortlisted as result of this sketch appraisal.

Figure 1.3: Main mode of commuting within the study area



1.4 Stakeholder Consultation

AECOM has consulted with a range of stakeholders to understand the various public transport schemes previously proposed for the Study Area. Seven schemes which were previously proposed for the area are set out in Table 1.1. Information on each of these schemes was collated and put forward for appraisal.

In addition to these proposed options by stakeholders, AECOM has developed a range of other schemes on the basis of:

- Outcomes of the Strategic Context Report in relation to existing/future travel demand;
- Additional schemes proposed historically for the study area;
- Serving three key destinations within the study area, namely: the city centre, Dublin Airport and Swords (which not all the schemes proposed by the interested stakeholders achieved); and
- Opportunities to optimise value of the existing public transport network.

Table 1.1: Public Transport schemes promoted by the stakeholders

Promoter	Scheme
Irish Rail	Northern line spur from Clongriffin to the airport
Railway Procurement Agency	Metro North Optimised Metro North Luas Line D1 from Broombridge to Finglas Luas Line D2 from Cabra to Swords
Metro Dublin	Metro Dublin Rail Network
"Drumcondra 2005"	City Access Transit (CAT)

The indicative alignment, technical feasibility, and environmental constraints of all options was investigated and presented to key stakeholders at a workshop, held on the 27th August 2014. The purpose of the workshop was threefold, as follows:

- To ensure AECOMs representation of stakeholder public transport schemes was accurate;
- To report on options developed by AECOM for consideration and appraisal; and
- To understand whether there were any other additional potential options that could be considered as part of the appraisal process.

Attendees at the workshop included representatives from: Fingal County Council, Dublin City Council, Irish Rail, Railway Procurement Agency, Dublin Airport Authority and the NTA. Feedback on the presented schemes was received from attendees and as a result, new scheme options / combinations of options were considered. Ultimately, each of the options outlined in this report have been reviewed by the stakeholders although it is acknowledged that the precise nature of infrastructure for each option is subject to more detailed development.

1.5 Schemes Presented for Appraisal

In total, 25 public transport scheme options have been included in this sketch appraisal, including:

- 10 Heavy Rail options;
- 8 Light Rail options;
- 5 BRT options; and
- 2 options combining different transport modes.

Some of these options, for example Metro North, have been the subject of extensive study and development by stakeholders. Others are at an earlier stage of development and investigation. In all cases, AECOM assembled sufficient information about schemes to ensure that they could be fairly subjected to the preliminary sketch appraisal described in this report.

A summary table of the proposed scheme options is presented below and presented in further detail in Sections 2 to 5 of this report.

Table 1.2: List of considered scheme options

HEAVY RAIL	
HR1	Clongriffin to Airport
HR2	Extension of HR1 to Swords
HR3	Malahide to Airport via Swords
HR4	North Malahide Estuary to Airport via Swords West
HR5	Combination HR1 + HR3
HR6	Combination HR1 + Spur Malahide to Swords
HR7	Maynooth Line (Broombridge) to Swords via Airport
HR8	Maynooth Line (Drumcondra) to Airport-Swords, under Glasnevin
HR9	Heuston to Swords via Phoenix Park Tunnel, under Glasnevin
HR10	Metro Dublin (scheme as proposed from St James's Hospital to Malahide)
LIGHT RAIL	
LR1	Broombridge to Finglas (Luas D1)
LR2	Broombridge to Swords via Airport and Finglas
LR3	LCC to Swords via Airport, under Glasnevin (Luas D2)
LR4	LCC to Swords via Airport, via Phibsborough (Luas D2)
LR5	LCC to Swords via Airport, via Drumcondra (Luas D2)
LR6	Metro North
LR7	Optimised Metro North
LR8	Dublin CAT
BUS RAPID TRANSIT	
BRT1	Clongriffin to Airport via Malahide
BRT2	Clongriffin to Airport
BRT3	City Centre to Airport via Ballymun
BRT4	Docklands to Swords via Tunnel
BRT5	Combination of BRT2, BRT3, BRT4.
MODE COMBINATION	
C1	Combination of HR1 and LR3
C2	Combination of HR1 and high-capacity BRT Swords-Airport

Each of the proposed schemes is presented in a similar format in the report as follows:

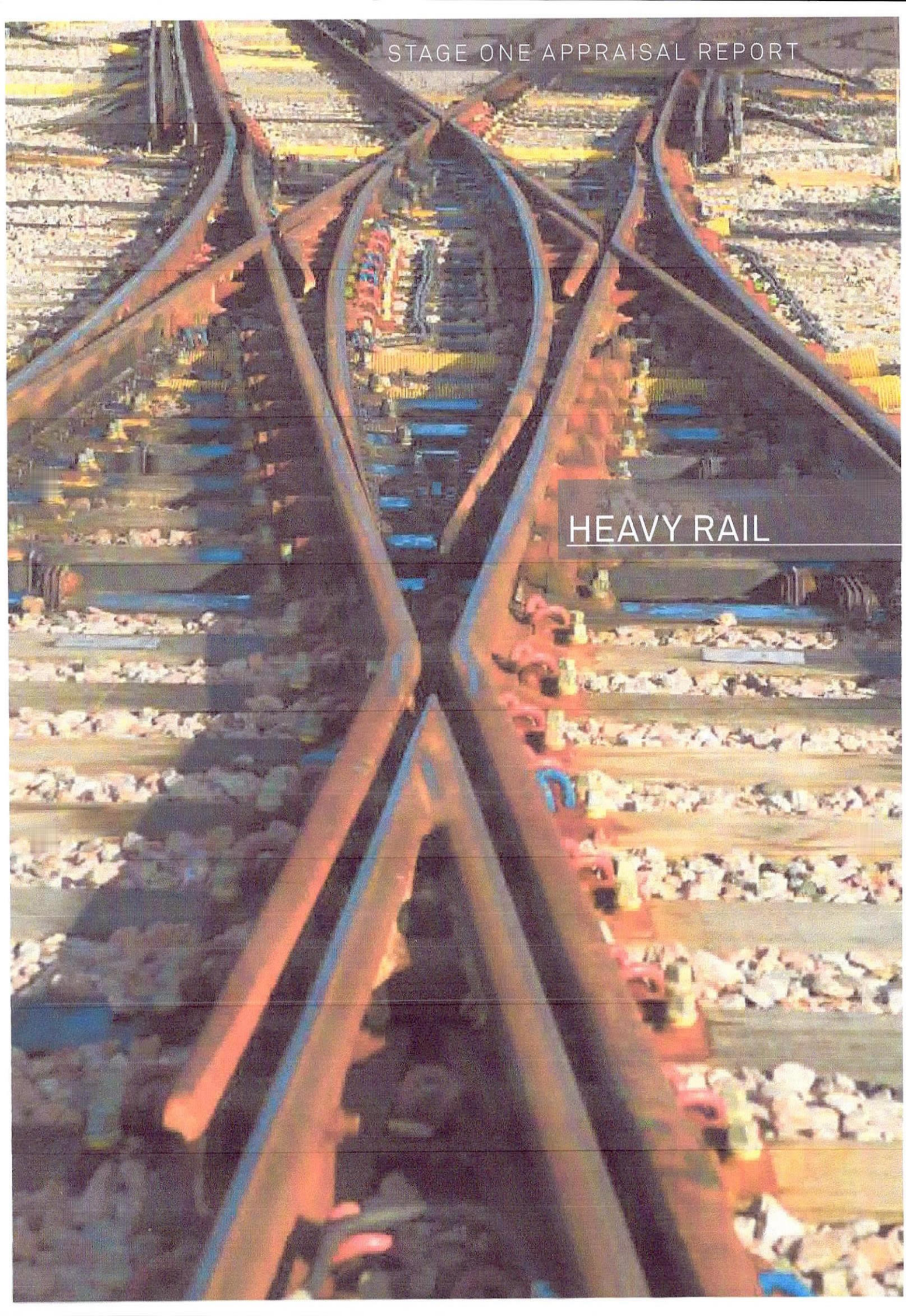
- Details of the scheme promoter or developer;
- A general description of the scheme including alignment and areas served. Where cost estimates and projected benefits have been calculated previously by scheme promoters this is also highlighted;
- Infrastructure considerations to be taken into account which may have an impact on the cost or deliverability of the scheme;
- Impacts of the construction of the scheme at a conceptual level are presented;
- Environmental issues based on a conceptual proposal of the scheme; and
- A summary of considerations arising for this appraisal process.

1.6 Report Structure

The remainder of this report sets out the results of the stage 1 appraisal of these options, and is laid out as follows:

- Section 2 presents each of the heavy rail options for consideration in the sketch appraisal;
- Section 3 presents each of the light rail options for consideration in the sketch appraisal;
- Section 4 presents the bus rapid transit options for consideration in the sketch appraisal;
- Section 5 presents a combination of options to be considered in the sketch appraisal;
- Section 6 sets out the principles used to shape the appraisal criteria and the approach that has been taken to applying them in assessment;
- Section 7 presents results of the appraisal and recommends options for further development; and
- Finally, in Section 8, a summary of the overall recommendations is provided.

STAGE ONE APPRAISAL REPORT



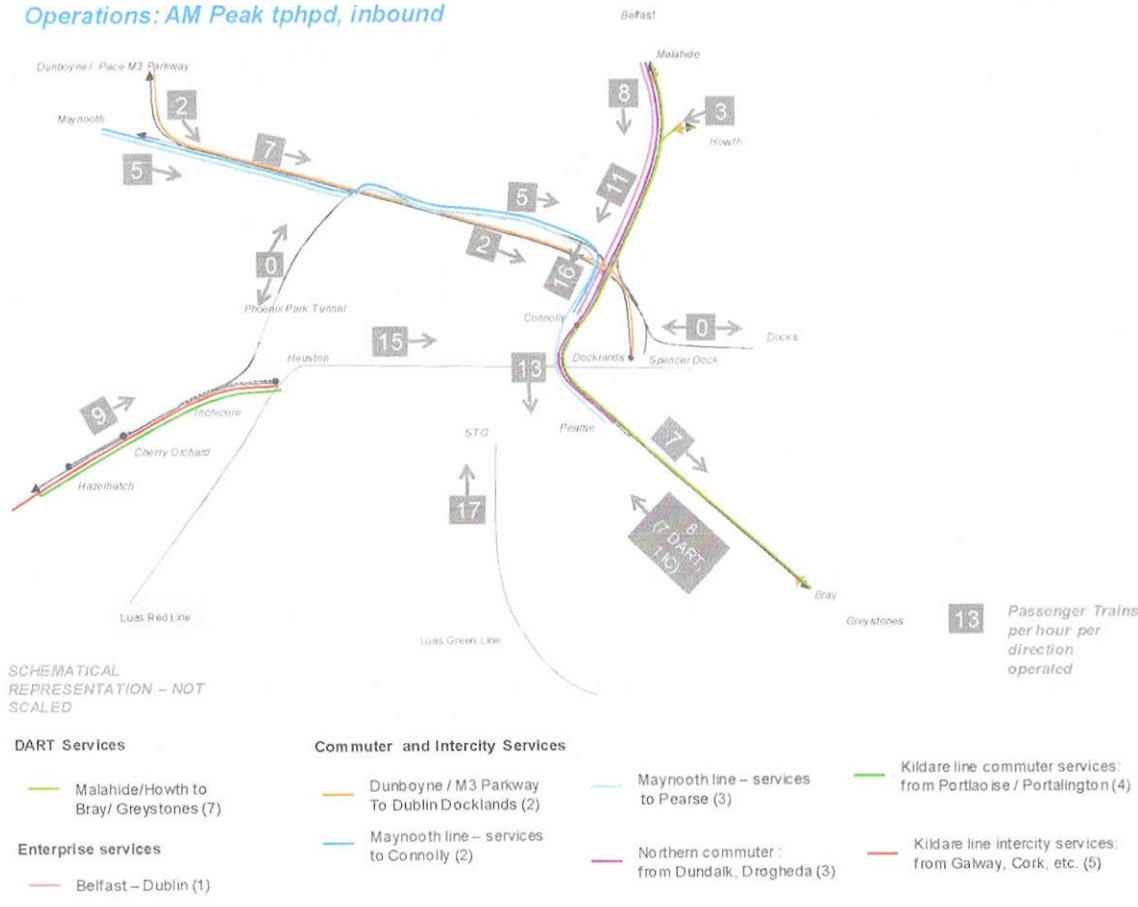
HEAVY RAIL

2.0 Heavy Rail

Understanding the potential for expansion of the heavy rail network within the Study Area to respond to the project objectives was an important priority in developing scheme options. The current heavy rail network within the area is relatively dense and includes DART services and commuter services on the Northern Line, Western Line and Kildare Line as well as the Intercity Rail Network.

DART is likely to be of most relevance for the current study given its function in responding to commuter demand within the Greater Dublin Area. The network is 53km in length and runs on a track gauge of 1,600mm, powered by 1500VDC. Services run every 15 minutes between Howth Junction and Bray off peak, with an extension to Greystones every half-hour. An additional number of trains run on the network at peak times to the city centre, see Figure 2.1. Trains north of Howth Junction serve either Malahide or Howth unevenly with Malahide Station supplemented by Northern Commuter trains.

Figure 2.1: Current Operations, Heavy Rail



The capacity of the DART system varies depending on the number of carriages on the service. While all DART platforms have been recently upgraded to allow eight carriages services, services normally run as six or eight carriage trains in peak periods, reducing to four or two carriage trains at other times. The overall capacity of the network is also largely dependent on the possible number of services per hour which is dependent on existing infrastructure, notably: the number of tracks, signalling, number of level crossing junctions and track profiles. Ultimately,

the maximum capacity per hour is limited to 20 trains per hour which generates a maximum of 32,000ppdph (ppdph=passengers per direction per hour) on the network. The DART currently carries more than 55,000 passengers daily[3] with some overcrowding on peak hour services. In addition, commuter services in the Greater Dublin Area carry around 44,000 passengers daily, leading to a total number of daily heavy rail journeys in the GDA of 100,000.

The major benefit of the existing heavy rail network is its integration within the City Centre and key trip generators across the network. Future developments of the rail network around Dublin include:

- The city centre re-signalling project, which will increase the Northern Line capacity and will allow more services to run to Grand Canal Dock where a reversing facility will be implemented;
- The use of Phoenix Park tunnel for commuter services; and
- The DART Expansion Programme including proposed DART Underground project.

This last project is the main proposal for the heavy rail network within the study period. As outlined in Section 1, the scheme is projected to form part of the 'Do Minimum' network for the study area in 2035. The scheme, which will be approximately 7.6km in length, will connect the Northern and Kildare lines, with underground stations strategically located at Spencer Dock, Pearse, St. Stephen's Green, Christchurch and Heuston, as well as a new surface DART station at Inchicore. As such, DART Underground and DART Expansion would link all rail systems - DART, Commuter, Intercity, Luas and potentially Metro - to form an accessible integrated transport network for Dublin.

The following schemes will also be undertaken as part of DART Underground/Expansion delivery:

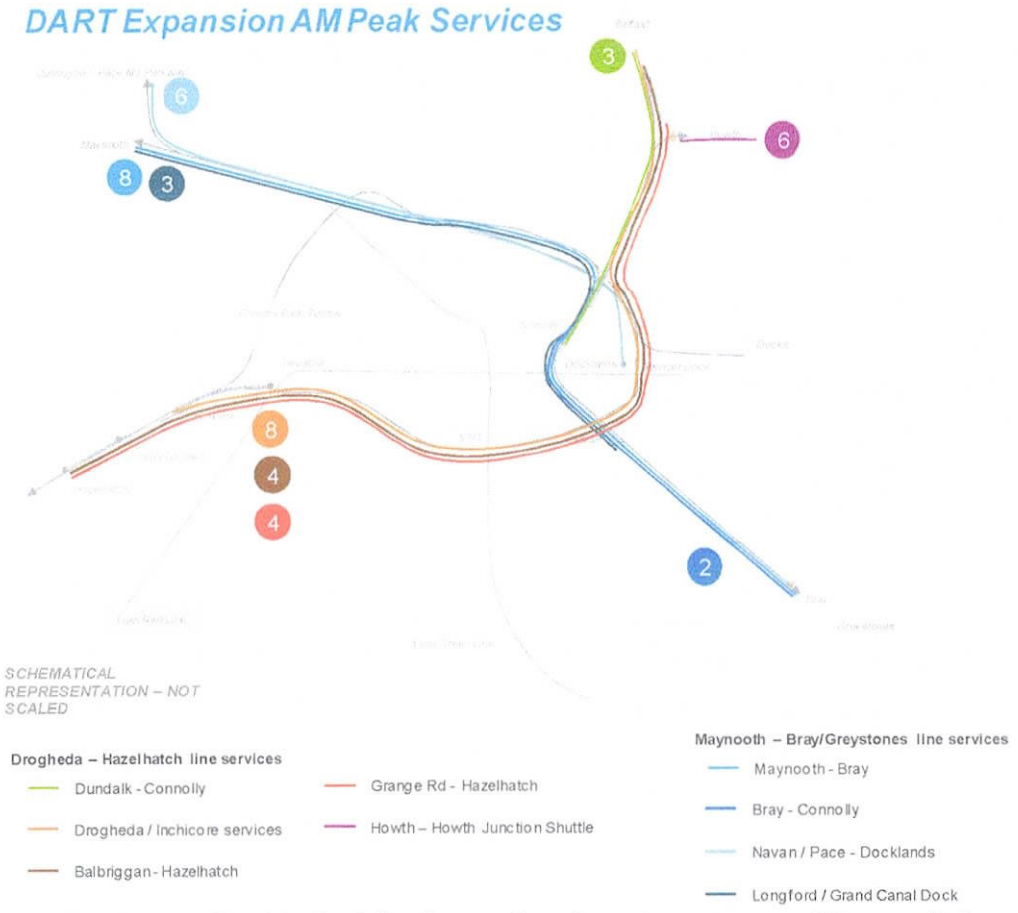
- Electrification of lines to extend the DART towards Drogheda, Maynooth and Hazelhatch;
- Signalling and track capacity enhancements to allow more trains to run more frequently; and
- Significant expansion of the fleet and train depot facilities.

The DART Underground project is set to be developed with a capacity for up to 20 trains each direction per hour, allowing up to 64,000 commuters to use the line hourly. The DART Expansion would result in a dramatic increase of frequency and capacity for commuters on DART Northern, Maynooth and Kildare lines and relieve congestion at Connolly Station.

In terms of available capacity on the heavy rail network, the City Centre re-signalling project coupled with the DART Underground project will create more capacity especially on the Northern Line and around Connolly Station, which is currently a bottleneck on the network. However, the DART Expansion programme will make use of most of this available capacity; therefore precise operational patterns will have to be looked at in detail in the next stage of the study.

[3] Rail Census 2013, Table 5

Figure 2.2: Do Min Suburban Rail Operations, with Dart Expansion (as per Dublin Underground Business Case, 2010)



New heavy rail options outlined in the following sections have been proposed in consultation with key stakeholders and include spurs from the existing mainlines as well as new lines connecting to main stations on the network. The scheme options are presented on a conceptual basis with further work required in developing shortlisted options at the next stage of project delivery.

2.1 HR1: Clongriffin to Airport

2.1.1 Scheme promoter or developer

This option was proposed by Irish Rail as part of the 2030 Strategic Rail Review. Thereafter, it formed the basis for more detailed development and a preliminary business case for the scheme was developed in 2011 (Dublin Airport Rail Link Preliminary Business Case, August 2011).

2.1.2 General description of the scheme

The scheme involves the development of a 7.5km spur almost directly west from the existing DART line at Clongriffin Station to Dublin Airport. The route would pass through mostly agricultural land. Irish Rail had proposed one new station at the airport but with potential for a future Park and Ride station between the Airport and Clongriffin. Various options have been proposed for the connection to the airport terminals which are subject to further investigation.

The scheme would provide connectivity to the City Centre and the Airport but not to Swords and therefore does not fully respond to the objectives of this study.

The Preliminary Business Case prepared for HR1 by Irish Rail estimates delivery costs in the region of €200m although this is depending on the final selected route and station location. The service was envisaged to run every 15 minutes. This could be facilitated by converting some existing Howth services to a shuttle arrangement. On this basis, there remains substantial additional capacity of a minimum of 7 trains per hour (green running) and 11 trains per hour (double yellow running) to cater for other potential Northern Line services[4].

Appraisal of the scheme in the business case prepared by Irish Rail indicates that it would provide substantial benefits of up to approximately €1 billion in Net Present Value terms, with an Internal Rate of Return of 24%. It is noted that a review of the Preliminary Business Case by the NTA concluded that the costs were likely to be significantly higher than the amount put forward by the promoter and the benefits would be likely to be less than half of the amount stated in the Preliminary Business Case.

2.1.3 Infrastructure considerations

The rail junction at Clongriffin is likely to require a grade separated junction with a flyover for the new inbound line. The proposed route would be mostly elevated crossing local and regional roads, such as the R107.

A major bridge structure will be required to carry the rail over/under the M1 motorway. The precise nature of this infrastructure will be determined based on proposals for the Airport station and will be looked at in more detail at the next stage of the study if necessary.

2.1.4 Impact during construction

As much of this alignment is across farmland, construction for these sections should cause minimal disruption. The disruption will be of short duration for the elevated crossings of the M1 motorway and local roads.

There would also be short term disruption as the new railway flyover at Clongriffin is installed. To accommodate the new railway viaduct at the airport would likely result in delays and disruptions to traffic.

[4] Estimates without DART Underground/Expansion in place

2.1.5 *Environmental issues*

An assessment of environmental constraints along the alignment has been undertaken. The proximity of Baldoyle Bay, approximately 0.5km to the proposed rail junction at Clongriffin and several other Natura Sites, would most likely require an Appropriate Assessment screening report, in accordance with Habitats Directive, to be undertaken to investigate the likely effect of the scheme.

The alignment is proposed to pass through G3 zoned areas designated in the Fingal County development Plan. These areas have been designated to protect and enhance high amenity area and protect and provide for a greenbelt. Requirements of this zoning would need to be raised with Fingal County Council.

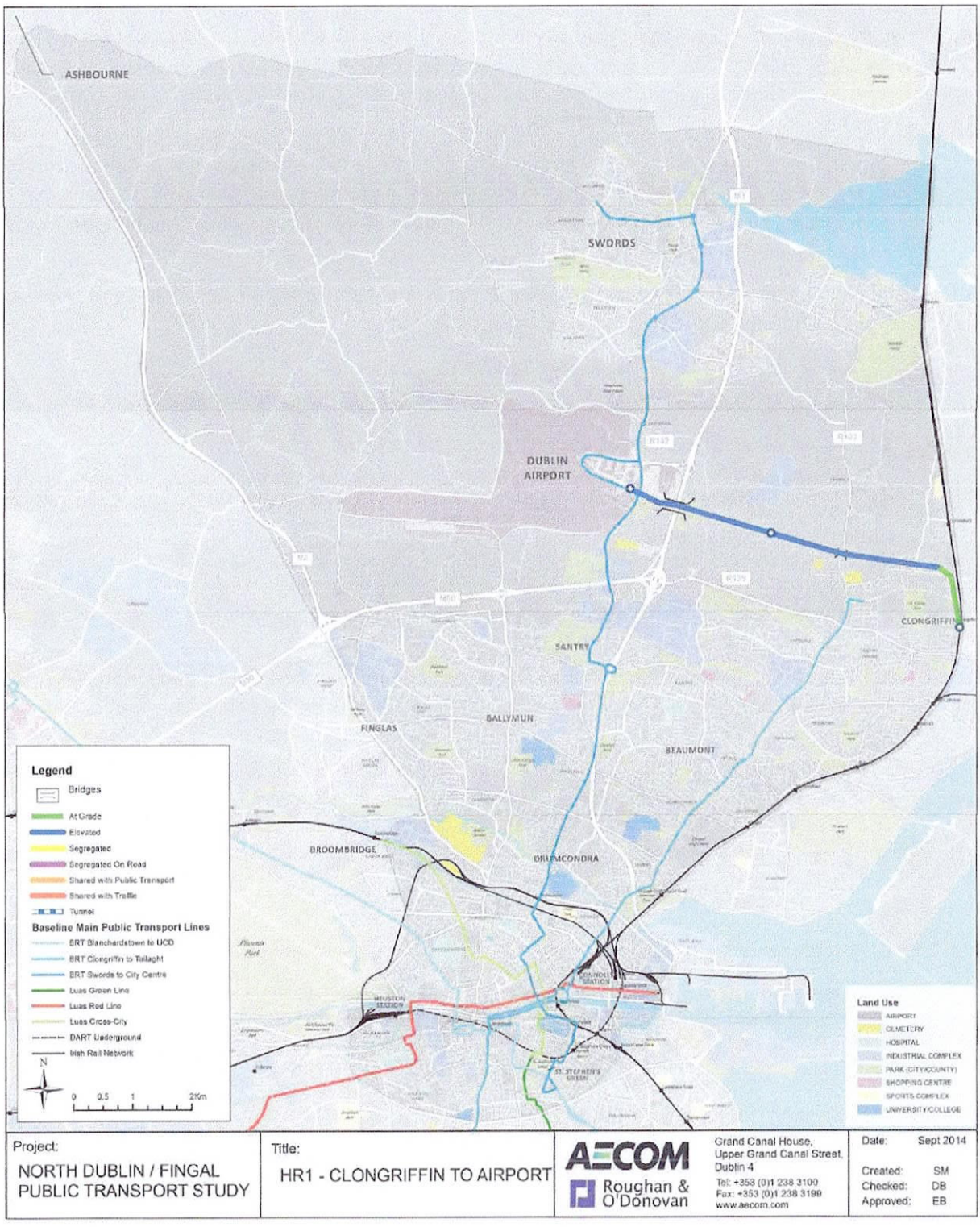
Should this alignment be taken forward, further more detailed investigations would be required to satisfy Strategic Environmental Appraisal requirements.

2.1.6 *Considerations for the appraisal process*

The following considerations should be taken into account during the appraisal process:

- This scheme can be delivered from a technical perspective;
- The scheme does not meet the fundamental requirement of the study, to: `identify the optimum medium to long term public transport solution connecting Dublin City Centre, Dublin Airport and Swords';
- The station location at Dublin Airport would need further investigation and discussion with Dublin Airport Authority to develop the best solution;
- Implications of DART Underground and DART Expansion on the scheme in terms of journey times and capacity would need to be studied in more detail;
- Although the scheme integrates with current commuter services, it does not serve an extensive new catchment area as there is little residential development between Clongriffin and the Airport;
- This scheme could possibly connect to BRT or Light Rail at the airport to provide a link to Swords; and
- The possibility of extending the scheme to Swords should be investigated.

Figure 2.3: HR1 - Clongriffin to Airport



2.2 HR2: Extension of HR1 to Swords

2.2.1 Scheme promoter or developer

This scheme was proposed to connect HR1 to Swords. The scheme would operate as an integrated component of the DART Network.

2.2.2 General description of the scheme

This heavy rail option builds on the Irish Rail proposal for an Airport DART spur from Clongriffin as per HR1, by proposing an extension to the railway and services to Swords.

The total length of this option would be 12 km (an additional 4.8km to HR1). The scheme would consist of 10km of railway at-grade and 2.0km of tunnel which would take the railway line underneath the Airport and the R132.

The proposal would include four new stations as shown in Figure 2.4. The alignment between Clongriffin and the Airport would be identical to the HR1 option. At the airport, the rail line would need to turn almost due north and enter Swords along the alignment of the R132. Alternatively, should a turning movement at the Airport prove technically difficult, an alignment to the west of Swords may be required. The exact alignment will be subject to more detailed investigation if the scheme was to progress to the next stage of the study.

Although the initial costs for the rail connection from Clongriffin to the Airport were relatively cost effective, the connection to Swords is likely to add substantial additional costs to the project.

In terms of integration with land use planning, this alignment supports future Airport and Swords expansion satisfactorily but does not provide a connection to the North Dublin City/Ballymun corridor.

2.2.3 Infrastructure considerations

There is some uncertainty about the exact details of this option for two reasons:

i) Development constraints at Dublin Airport may influence land available for the alignment; and

ii) Complexity in providing a turning movement for the rail line at the airport, north to Swords.

It may be possible, that two interconnecting lines could be built which would require some level of interchange between the two lines. However the introduction of an interchange requirement is unlikely to be attractive to passengers from Swords travelling to the City Centre, or from an airport operations perspective.

Infrastructure considerations for the Clongriffin section of the alignment have already been set out under HR1. Between Swords and the Airport the railway could be elevated on either viaduct or embankment. The alignment shown in Figure 2.4 serves the east of Swords, this may require construction of underground tunnels due to development constraints. However, should the alignment serve the west of Swords an at-grade alignment may be possible.

2.2.4 Impact during construction

As much of the Clongriffin section of the alignment is across farmland, construction of these sections should cause minimal disruption. The disruption will be of short duration for the elevated crossings of the M1 motorway and the local roads. There would also be short term disruption also as the new railway flyover at Clongriffin is installed.

To accommodate the new railway viaduct at the airport would result in delays and disruptions to traffic.

In addition, there will be short term disruption if a tunnel is constructed under the R132 north of the Airport.

2.2.5 Environmental issues

The environmental impacts for this option are similar to those set out for HR1.

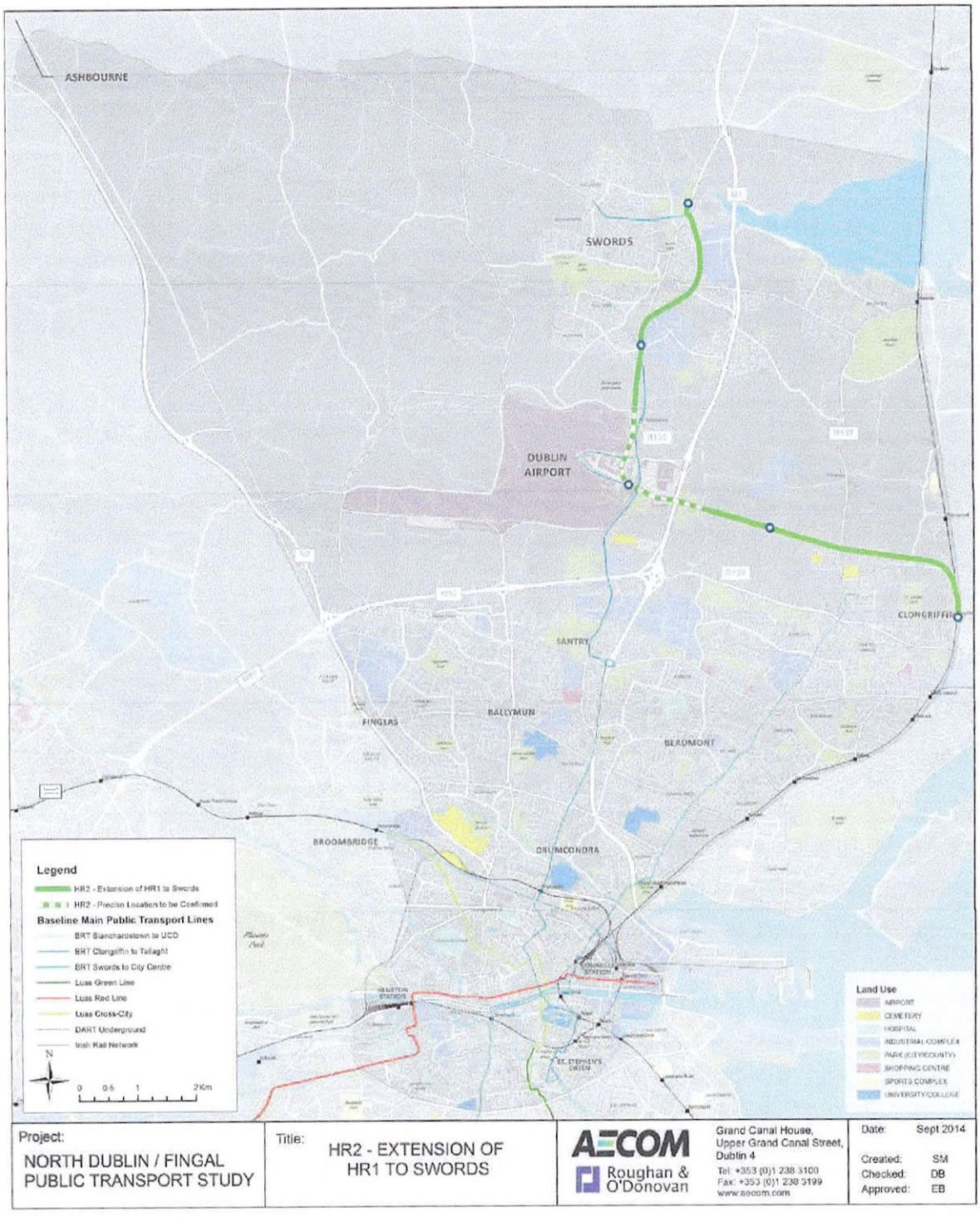
On the route section north of the airport towards Swords, there are no concerns for the historical environment or natural heritage. However, consideration will have to be given for zoning policies of the Fingal Development Plan as the scheme follows the line of the R132. Issues such as visual impact and noise will need to be considered.

2.2.6 Considerations for the appraisal process

The following considerations should be taken into account during the appraisal process:

- This scheme can be delivered from a technical perspective;
- The station location at Dublin Airport would need further investigation and discussion with Dublin Airport Authority;
- Implications of DART Underground and DART Expansion on the scheme in terms of journey times and capacity would need to be studied in more detail; and
- The precise alignment to connect with Swords is dependent on technical feasibility of the Airport turning movement.

Figure 2.4: HR 2 - Extension of HR1 to Swords



2.3 HR3: Malahide to Airport via Swords

2.3.1 Scheme promoter or developer

This option was developed by AECOM as an alternative means of connecting the Northern Rail Line to Swords and the Airport. The scheme would operate as an integrated component of the DART Network.

2.3.2 General description of the scheme

This heavy rail option provides a spur off the Northern Line at Malahide to Dublin Airport via Swords, passing through Swords on the R132. The route is 8.5km in length and will provide a rail link from Dublin Airport and Swords to the wider public transport network linking to the Northern Rail Line.

Due to the extent of residential density along the alignment, it is estimated that 5km of tunnelled sections would be required through Malahide and Swords.

At least three new stations are proposed on the line, including one at the Pavillions with potential for an additional station west of Malahide. The existing Malahide Station would also require upgrade.

In terms of integration with land use planning, this alignment supports future Airport and Swords expansion satisfactorily but does not provide a connection to the North Dublin City/Ballymun corridor.

2.3.3 Infrastructure considerations

The railway junction at Malahide would likely require grade separating with a dive-under for the new inbound line. The space available to accommodate new infrastructure is constrained at the existing Malahide station; therefore, the station may need to be relocated further south.

Between Swords and the Airport, the railway would be elevated with short bridges to cross over local and regional roads. A major bridge structure would be required to cross the M1 motorway to the east of Swords. Further investigation would be needed to determine station requirements at the Airport. This may be constrained by existing infrastructure and development plans.

2.3.4 Impact during construction

A large compound for tunnelling operations would be required near Malahide, which could be disruptive.

There would be a short term closure of the M1 motorway to accommodate installation of a bridge.

The new railway dive-under at Malahide could be installed during a short term closure or tunnelled at a lower level to reduce disruption further.

Short term disruptions to the railway at Malahide are also likely in order to install new switches and crossings.

2.3.5 Environmental issues

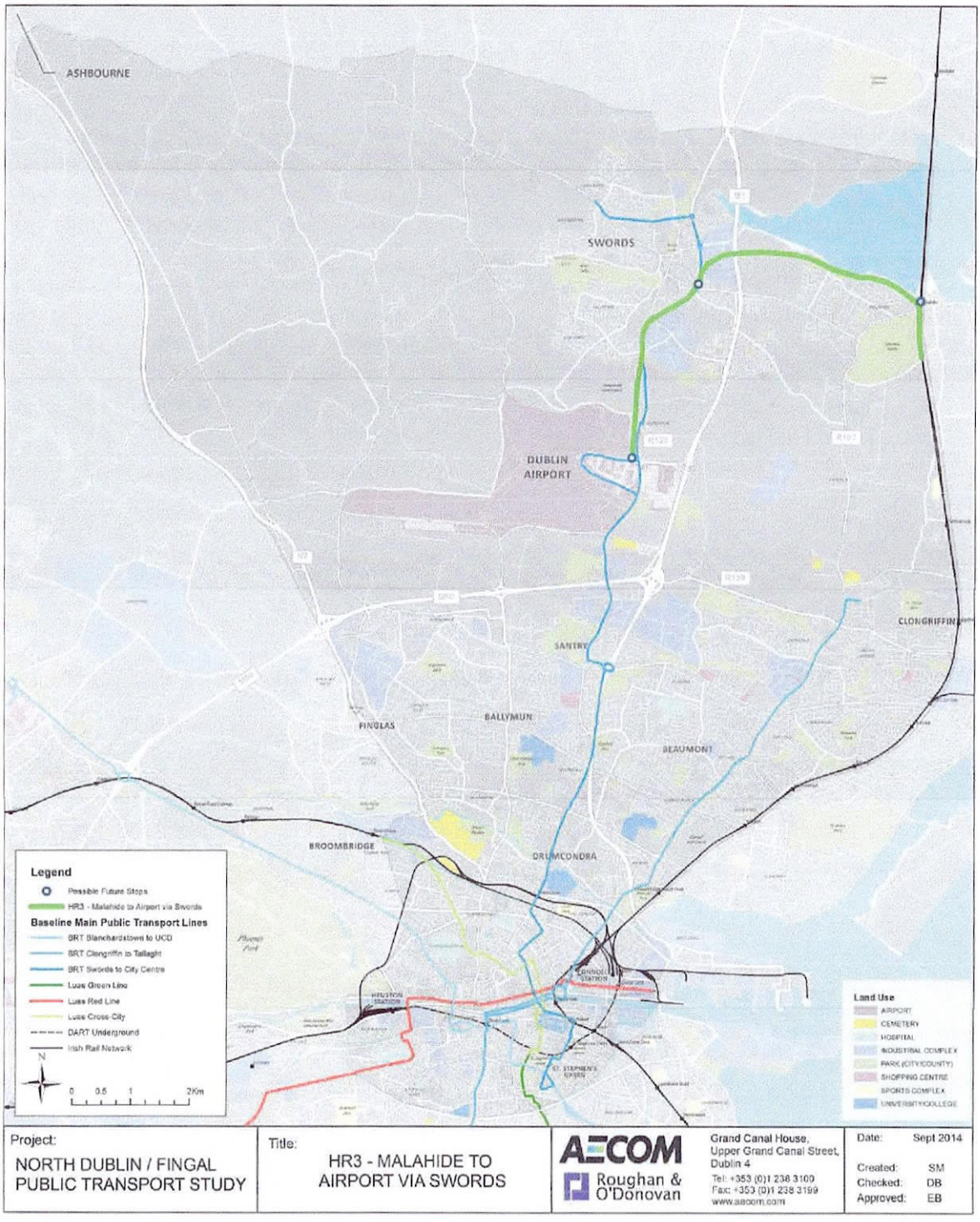
There are a number of possible impacts on the historical and cultural heritage adjacent to the existing Malahide station. There are a number of sites and monuments near to this station, which include churches, earthworks and holy wells and if sub-surface works took place, there would likely be an impact on these. Construction of a new underground station would have to take consideration of the nearby Malahide Estuary Special Protection Area (SPA) and Special Area of Conservation (SAC).

2.3.6 *Considerations for the appraisal process*

The following considerations should be taken into account during the appraisal process:

- This scheme can be delivered from a technical perspective. However, geotechnical investigations would be required in relation to the tunnelling requirements to confirm tunnelling feasibility close to the Estuary;
- Although this scheme does meet the overarching objective of the study, it does not give a direct route from the Airport to the City Centre. Passengers would have to travel north to Swords then east to Malahide before continuing on to the City Centre. This will inevitably incur higher journey times compared with more direct routes or alternative modes of transport;
- As a significant amount of tunnelling is associated with this option, the scheme is relatively expensive on a cost per km basis;
- Implications of DART Underground and DART Expansion on the scheme in terms of journey times and capacity would need to be studied; and
- Moderate disruption during construction is likely due to the various roads that need to be crossed and the extent of the residential area it runs through.

Figure 2.5: HR3 Malahide to Airport via Swords



2.4 HR4: North Malahide Estuary to Airport via Swords West

2.4.1 Scheme promoter or developer

This option was proposed as an alternative means of serving the Airport and Swords using a spur off the Northern Rail Line. The scheme would operate as an integrated component of the DART Network.

2.4.2 General description of the scheme

This scheme is similar to HR3 but it runs off the Northern Line at the north of Malahide Estuary and then runs to the West of Swords.

This scheme involves a 13.5km heavy rail spur from the Northern Line, north of Malahide Estuary. The line runs to the western side of Swords, then south towards the Airport.

A large proportion of this route could be delivered at-grade, with a connection to the Airport possibly requiring a tunnel.

Three new stations are proposed on the line: one north of Swords, one to the west of Swords and one at the airport.

2.4.3 Infrastructure considerations

A grade separated railway junction would be the preferred solution to integrate the new railway line at Malahide. The rail line west of Malahide would be at-grade so either a flyover or dive-under could be constructed for the new inbound line.

Between Malahide and the Airport, the railway line will be mostly at-grade. A number of level crossings or small bridge structures would be provided to cross local and regional roads. A long span bridge structure would be required to cross the M1 to the north east of Swords.

Two options for the station at the Airport, which would require further detailed investigation and consultation would be either at-grade and based around the perimeter of the airport, or in a tunnel underneath the terminals.

2.4.4 Impact during construction

Based on conceptual proposals for this scheme, there would be short term closure of the M1 to accommodate installation of a bridge. The new railway dive-under at Malahide could be installed during a short term closure or tunnelled at a lower level to reduce disruption further. Short term disruptions to the railway at Malahide are also likely in order to install new switches and crossings.

2.4.5 Environmental issues

In the area north of Malahide Estuary, there is a high concentration of recorded sites and monuments. The proposed route would have to take account of the zones of influence of certain archaeological sites in the area, in particular, the church and graveyard site near the route option.

West of the R132, there are further concentrations of recorded sites and monuments. The area is zoned in the current Fingal Development Plan as RU – to protect and promote in a balanced way, the development and agricultural and rural related enterprise, biodiversity, the rural landscape and the built and cultural heritage.

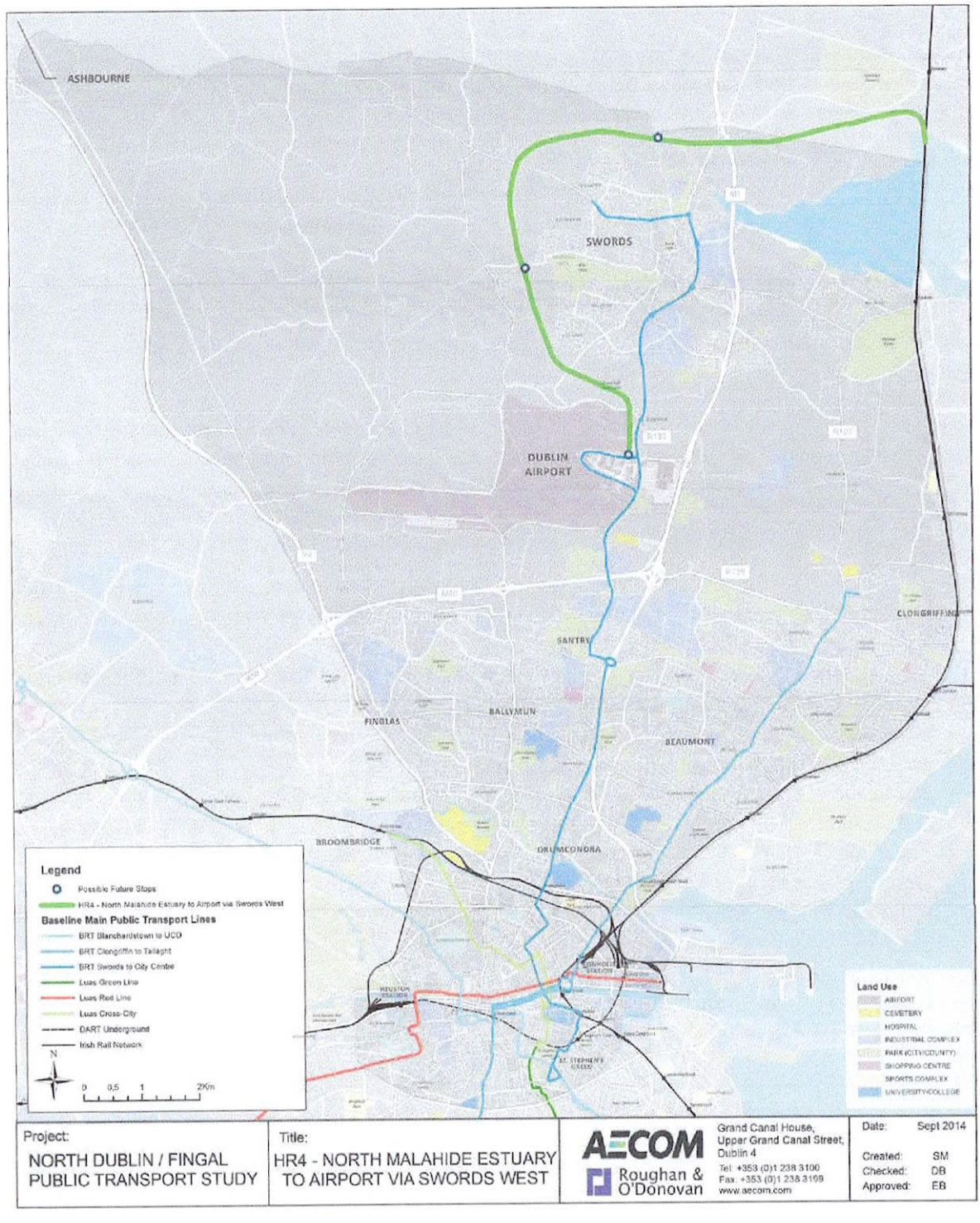
There are two rivers to cross along this alignment, the Broad Meadow River and the Ward River, which may impact on the natural heritage.

2.4.6 Considerations for the appraisal process

The following considerations should be taken into account during the appraisal process:

- This scheme could be delivered from a technical perspective;
- As most of the alignment is at-grade, the cost is low compared to other options requiring tunnelled sections;
- There are many environmental issues to consider on the route alignment that would need to be investigated in further detail;
- Implications of DART Underground and DART Expansion on the scheme in terms of journey times and capacity would need to be studied; and
- Journey times to the airport would be higher than other heavy rail options as the rail line extends further north and west connecting to the City.

Figure 2.6: HR 4 North Malahide Estuary to Airport via Swords West



2.5 HR5: Combination HR1 and HR3

2.5.1 Scheme promoter or developer

This scheme was proposed as means of providing a looped spur from the Northern Rail Line to serve the Airport and Swords. This scheme is a combination of HR1 and HR3. The scheme would operate as an integrated component of the DART Network.

2.5.2 General description of the scheme

This scheme would create a railway loop from Clongriffin passing through the Airport, Swords and then on to Malahide before rejoining the Northern Line just south of the Malahide Estuary.

The proposed rail line would be 16.4km long and include five new stations, with the possibility to accommodate others for Park and Ride facilities or future development.

Alternate commuter services on the Northern Line would run via the Airport and Swords.

2.5.3 Other considerations

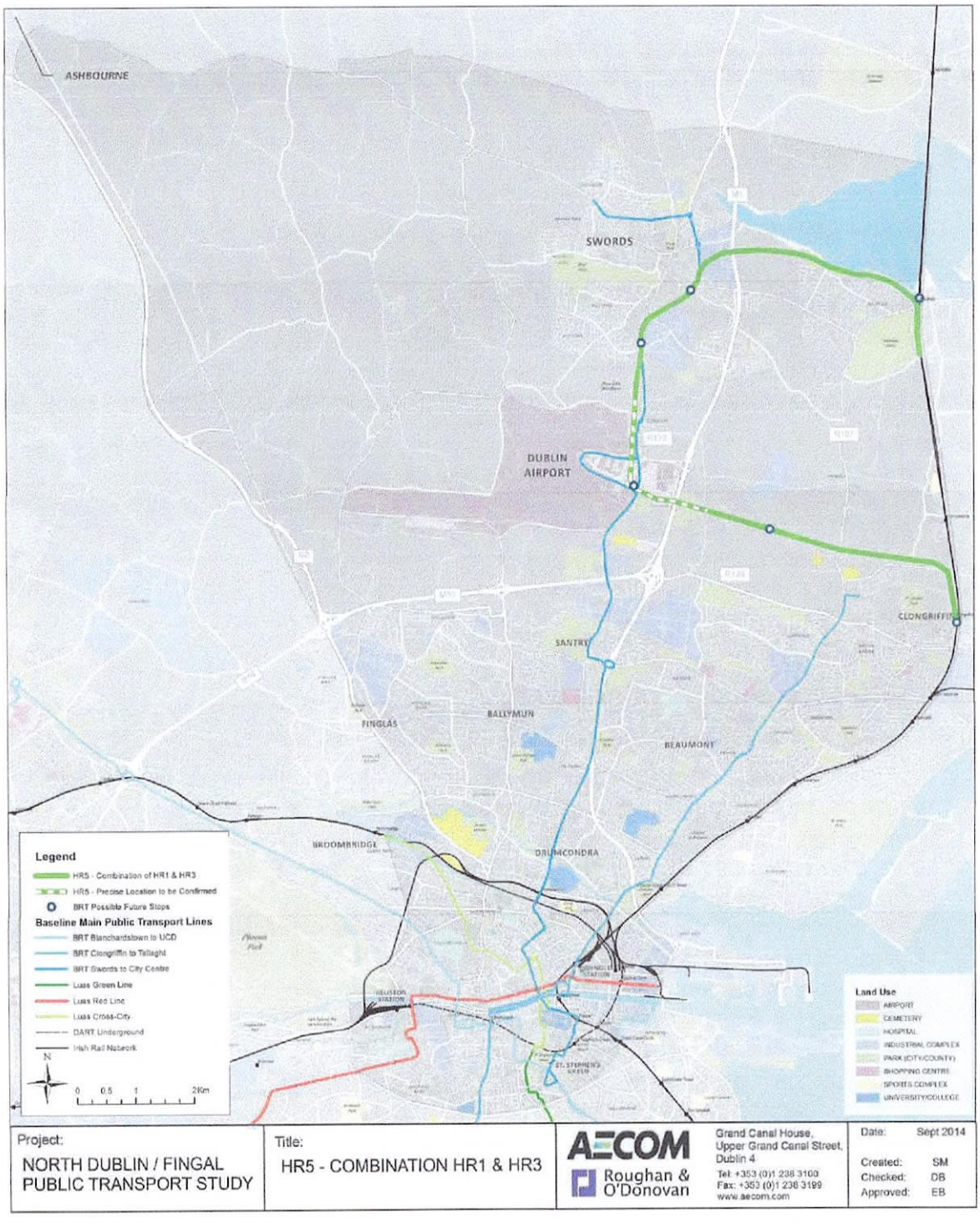
The considerations for infrastructure, disruption and environment will be the same as for the options HR1 and HR3 as this option is simply a combination of both proposals.

2.5.4 Considerations for the appraisal process

The following considerations should be taken into account during the appraisal process:

- This scheme can be delivered from a technical perspective, however, geotechnical investigations would be required in relation to the tunnelling requirements to confirm tunnelling feasibility close to the Estuary;
- As a significant amount of tunnelling is associated with this option, the scheme is relatively expensive on a cost per km basis;
- Moderate disruption during construction is likely due to the various roads that need to be crossed and the extent of the residential area it runs through.
- The station location at Dublin Airport would need further investigation and discussion with Dublin Airport Authority to develop the best solution;
- Implications of DART Underground on the scheme in terms of journey times and capacity would need to be studied; and
- Although the scheme integrates with current commuter services, it does not serve an extensive new catchment area as there is little residential development between Clongriffin and the Airport.

Figure 2.7: HR5 – Combination HR1 and HR3



2.6 HR6: HR1 with spur from Malahide to Swords

2.6.1 Scheme promoter or developer

This scheme was proposed as an alternative means of serving the Airport and Swords from the Northern Rail Line. The scheme would operate as an integrated component of the DART Network.

2.6.2 General description of the scheme

This scheme is composed of three elements as follows:

- A 7.5km spur off the Northern Line at Clongriffin as outlined in HR1;
- A second spur from Malahide to connect to Swords, similar to HR3; and
- Use of the planned Swiftway BRT between the Airport and Swords.

Collectively, the two rail spurs would include additional rail lines of 12.7km (7.5km from Clongriffin to the airport and 5.2 km from Malahide to Swords). An additional four stations would be proposed for this option, including an upgrade to Malahide Station.

Whilst this option can connect the Airport and Swords to the City Centre by heavy rail, an interchange would be required to connect Swords with the airport.

2.6.3 Other considerations

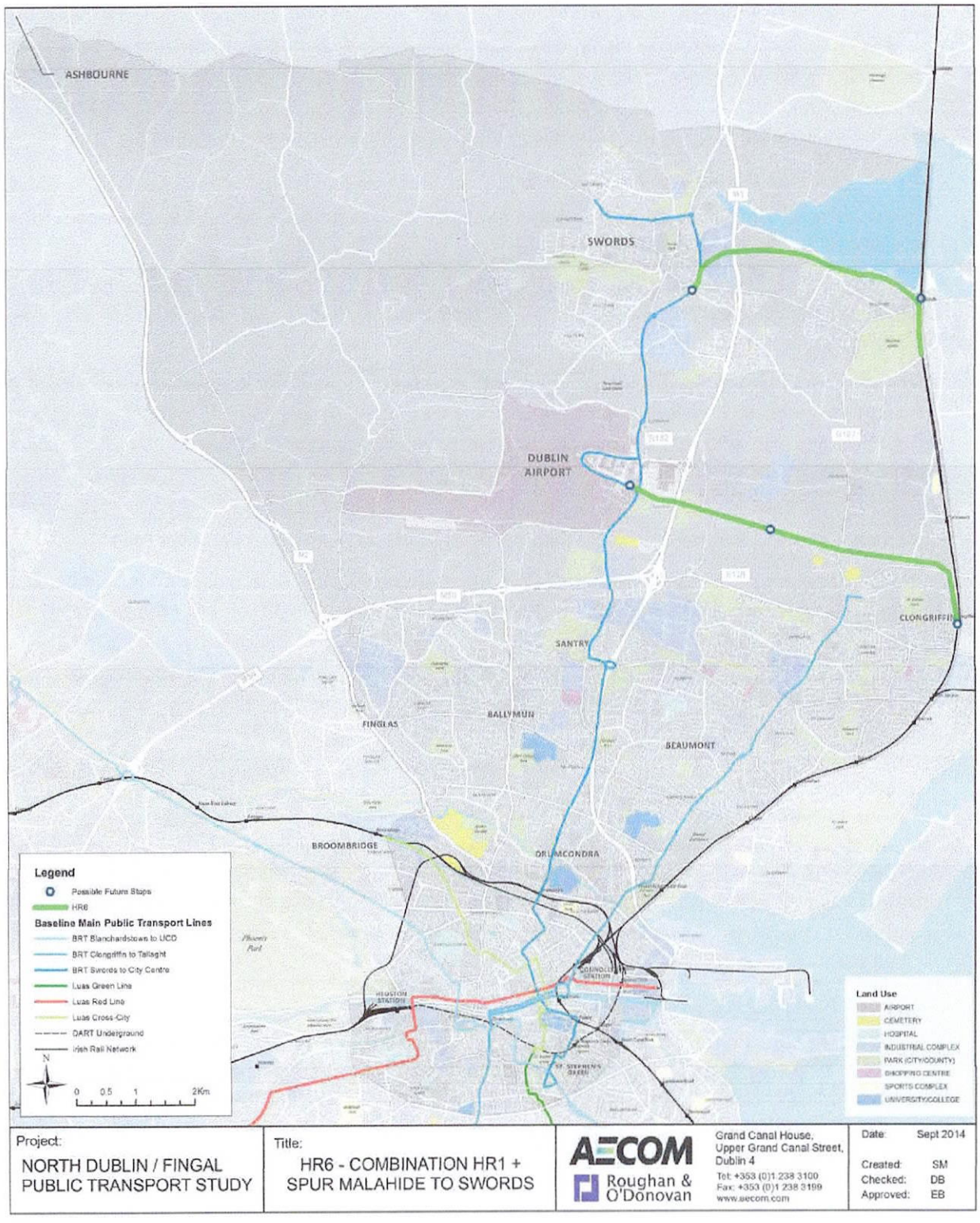
The considerations for infrastructure, disruption and environment will be the same as for the options HR1 and HR3 as this option is simply a combination of both, with the exception that unlike the HR3 option, the railway line will terminate at Swords and will not continue south to the airport.

2.6.4 Considerations for the appraisal process

The following considerations should be taken into account during the appraisal process:

- The scheme does not have a direct link between Swords and the airport, which therefore requires some form of interchange to connect the two destinations;
- This scheme can be delivered from a technical perspective, however, geotechnical investigations would be required in relation to the tunnelling requirements to confirm tunnelling feasibility close to the Estuary;
- As a significant amount of tunnelling is associated with this option, the scheme is relatively expensive on a cost per km basis;
- Moderate disruption during construction is likely due to the various roads that need to be crossed and the extent of the residential area it runs through;
- This scheme would present greater capacity constraints on the Northern Line as connections are required on two different sections of the line; and
- The station location at Dublin Airport would need further investigation and discussion with Dublin Airport Authority to develop the best solution.

Figure 2.8: HR6 - HR1 with spur from Malahide to Swords



2.7 HR7: Maynooth Line (Broombridge) to Swords via the Airport

2.7.1 Scheme promoter or developer

This scheme is an adaptation of an alignment previously investigated by Irish Rail. However, since this option was previously considered, extensive residential development along the corridor means it would not be possible to deliver the same scheme which was proposed at-grade. The alignment can still be considered, however with different infrastructure requirements.

2.7.2 General description of the scheme

This scheme would run from the Western Line close to Broombridge and run to the west of the M50 before running north to the Airport.

The scheme would require a new track of 16.4km in length, of which, 2.6km would be within a twin bored tunnel. Six new rail stations are proposed for this option, five at-grade and one underground at Dublin Airport.

From Broombridge, the railway line would continue west to Ashtown Station, at which point it would turn north and cross the canal. The line would run at-grade through agricultural land at Scribblestown. The line would cross Dunsink Lane, still heading north and enter the old Dunsink Landfill site.

Further north, the railway would cross the M50, before turning eastwards, following roughly the alignment of the M50. The line would then continue at-grade before crossing over the N2.

The line then runs north and into a tunnel underneath the Airport, emerging from the tunnel just north of Naul Road. It continues north, just to the west of the R132, before crossing over the R132.

The line runs at-grade for a short section along the east side of the R132 before being elevated to cross the Pinnockhill roundabout. At Swords, the station would be located at the Pavillions.

2.7.3 Infrastructure considerations

To connect with the Western Line near Ashtown, a new junction would need to be developed. This could be grade separated with a new flyover or dive-under for the outbound line. Major bridge structures would be required to cross the M50 motorway and the N2. This alignment also assumes that the railway line and station would be underneath Dublin Airport. A twin bored tunnel would be constructed to accommodate the railway line. To cross other local and regional roads, a combination of localised elevated sections, bridges or cut and cover tunnels will be constructed.

2.7.4 Impact during construction

There would be short term disruption to the Western Line while new switches and crossings are installed. There would also be short disruption to rail services while flyover or dive-under is installed as part of the grade separated junction for the connection. Similar to other options, delays would be expected while new bridge decks are put in place with short term road closures. Longer term disruptions are likely north of the Airport while new tunnels are constructed.

2.7.5 Environmental issues

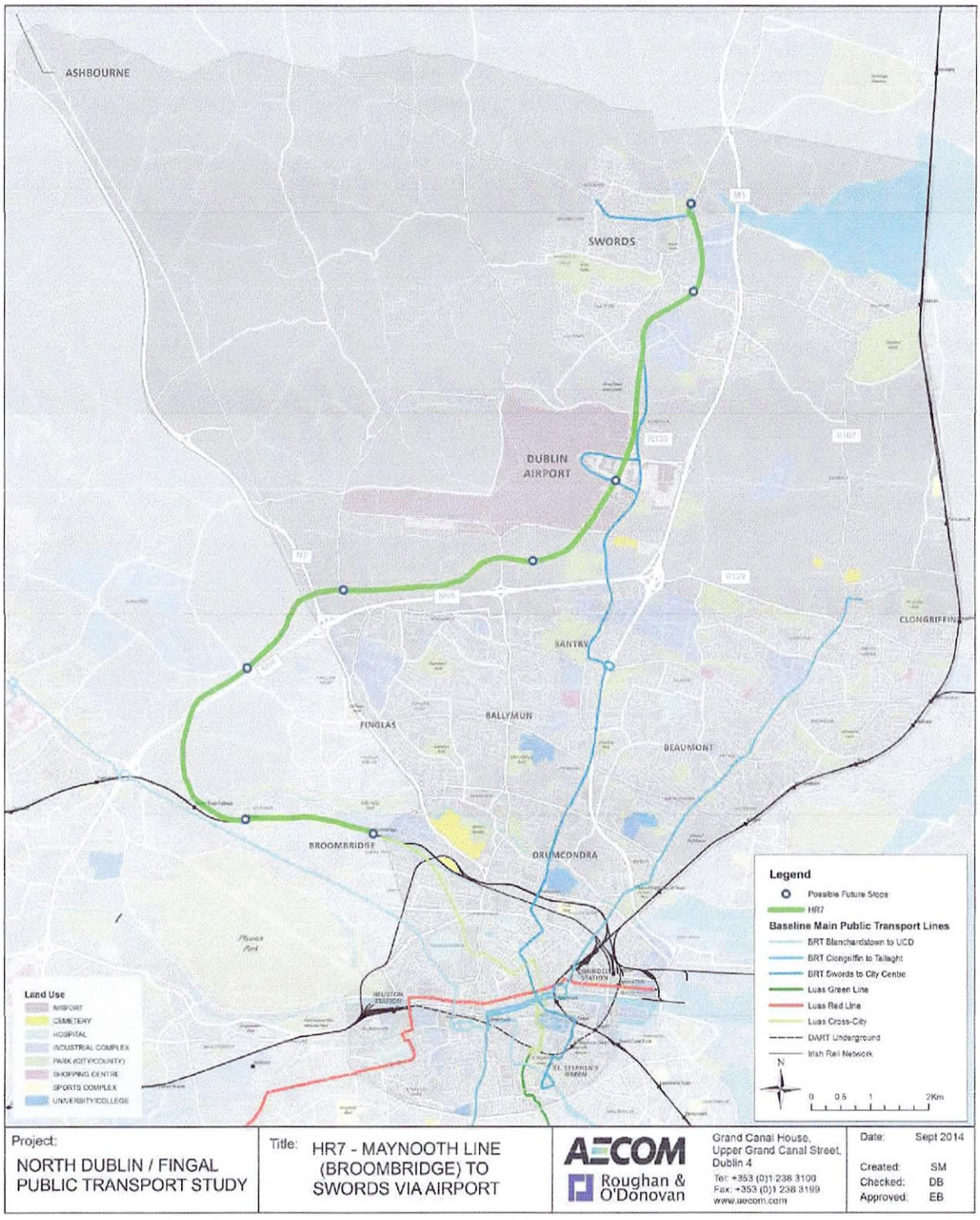
The new bridge crossing the Royal Canal will have to be sensitive to the historic significance of the canal. Further investigation of the impact of the canal crossing would be needed if this option were to go ahead, due to the wildlife using the canal. Any impacts on the landfill site will have to be carefully considered including the release of harmful gases such as methane during construction.

2.7.6 *Considerations for the appraisal process*

The following considerations should be taken into account during the appraisal process:

- Of the heavy rail options, this is one of the longest alignments, heading the furtherest west of any of the options;
- Due to the alignment, the catchment is likely to be lower than other heavy rail options passing through more densely populated residential areas; and
- Journey times from Swords and the Airport are likely to be less favourable than some other heavy rail options.

Figure 2.9: HR7 Maynooth Line (Broombridge) to Swords via the Airport



2.8 HR8: Maynooth Line (Drumcondra) to Airport and Swords

2.8.1 Scheme promoter or developer

This scheme was proposed as an alternative means of connecting the Airport and Swords to the existing main line services. The scheme would operate as an integrated component of the DART Network.

2.8.2 General description of the scheme

This railway line is 12.6km in length linking the Western Line at Drumcondra to Dublin Airport and Swords. Just over half of its length (6.6km) is suggested to run underground with the remaining 6km at-grade. In total, eight new stations are proposed for this option, five at-grade and the remaining three underground.

Use of the existing rail line from Drumcondra Station is proposed before turning north into a tunnel under Glasnevin Cemetery.

North of Glasnevin Cemetery, the railway line would be aligned under the median of the Ballymun Road. A railway bridge would be required to cross the M50 motorway, before turning north east and underneath Dublin Airport.

Similar to earlier options, the tunnel would emerge just north of Naul Road and follow the same alignment as option HR7 into Swords.

2.8.3 Infrastructure considerations

The connection of heavy rail at Drumcondra would be preferably by a new grade separated junction with an underpass for the outbound line. The railway would be in a twin bored tunnel underneath Glasnevin Cemetery, the Botanic Gardens and Ballymun. A major bridge structure would be required to cross the M50 motorway. The railway would then revert back into a tunnel underneath Dublin Airport. North of the Airport the same alignment as HR7 would be used and would have the same infrastructure considerations north of the Airport to Swords.

2.8.4 Impact during construction

The railway line follows a large section of the Ballymun Road. This would require cut and cover tunnelling which would cause long term disruption to the highway.

Twin bored tunnels along the other sections would limit disruption to the area at the tunnel portals.

The new bridge deck to cross the M50 motorway could be constructed adjacent to the motorway and either launched or lifted into position during an overnight closure of the motorway.

Similarly, short term disruption would be caused by construction of crossings of local and regional roads north and south of the airport.

2.8.5 Environmental issues

Glasnevin Cemetery will be a sensitive issue to consider for this alignment. The route also passes through a highly populated residential area which may cause concerns for noise.

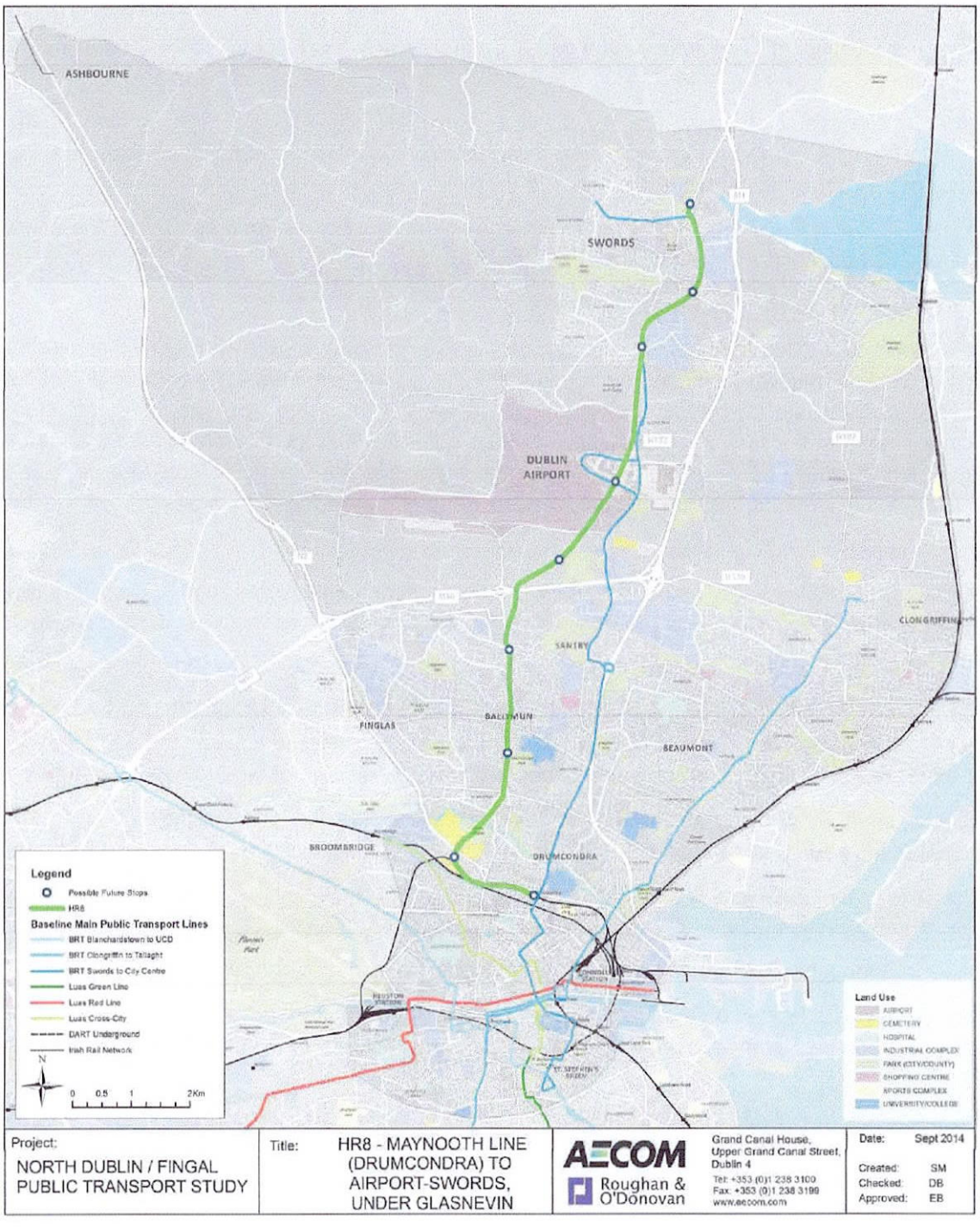
There are fewer concerns on the historical and cultural environment for this project than for other heavy rail options. Environmental considerations will be similar to the same as option HR7 north of the Airport.

2.8.6 *Considerations for the appraisal process*

The following considerations should be taken into account during the appraisal process:

- The cost of this option would be high in comparison with others due to the amount of tunnelling required;
- Disruption on Ballymun Road would be significant as the tunnel is constructed;
- This scheme is heavily dependent on capacities available on the Western Line;
- The route serves a very dense catchment area.

Figure 2.10: HR8 Maynooth Line (Drumcondra) to Airport and Swords



2.9 HR9: Heuston to Swords via Phoenix Park Tunnel

2.9.1 Scheme promoter or developer

This scheme was proposed as means of connecting Heuston Station, and potentially the DART Underground/Expansion service to the Airport and Swords. The scheme would operate as an integrated component of the DART Network.

2.9.2 General description of the scheme

Similar to HR8, this heavy rail option would require 12.6km of new rail line. It would commence at Heuston Station and continue to Swords via Dublin Airport. This option would run from Platform 10 at Heuston Station which would allow the service to connect easily to the Phoenix Park Tunnel. A new tunnel would be constructed under Glasnevin Cemetery and from this point the route to Swords would be the same as that proposed in HR8.

2.9.3 Infrastructure considerations

A railway connection already exists from Heuston Station to Cabra heading north which is intended to be brought into scheduled passenger service as part of the opening of Phoenix Park Tunnel Link in 2016. From a point just south of Glasnevin Cemetery, the alignment is similar to HR8.

2.9.4 Impact during construction

Based on conceptual proposals for this alignment, the railway line along the Ballymun Road would require cut and cover tunnelling which would cause long term disruption to the highway. Twin bored tunnels along the other sections would limit disruption to the area at the tunnel portals. The new bridge deck to cross the M50 motorway could be constructed adjacent to the motorway and either launched or lifted into position during an overnight closure of the motorway. Similarly, short term disruption would be caused for construction of bridge crossings of local and regional roads north and south of the airport.

2.9.5 Environmental issues

At the southern end of the proposed railway, between Heuston and Cabra, there are few environmental concerns as an existing railway alignment will be used.

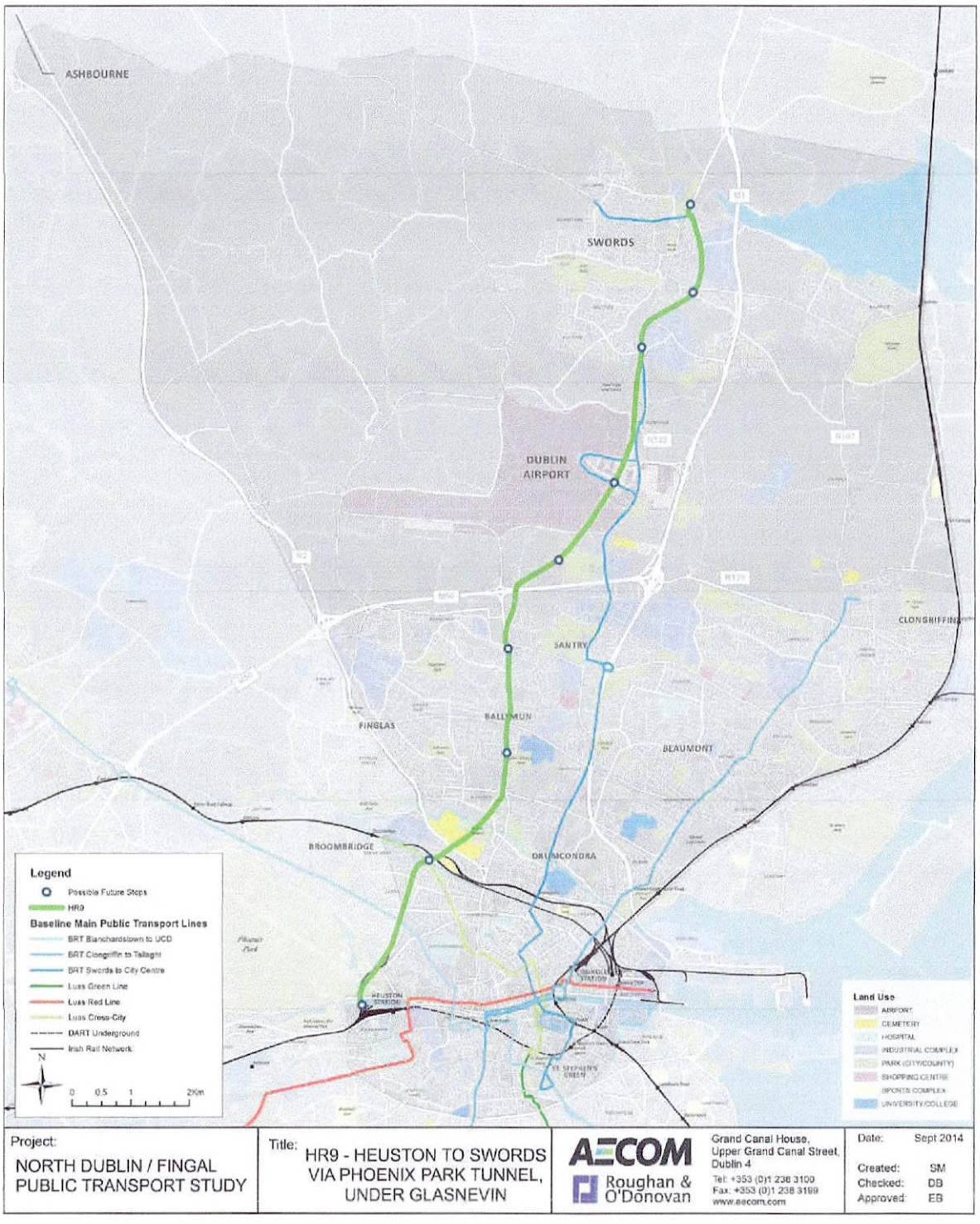
For the remainder of the route, the same environmental issues raised for HR8 will arise. Glasnevin Cemetery will be a sensitive issue and the route also passes through a highly populated residential area which may cause concerns for noise.

2.9.6 Considerations for the appraisal process

The following considerations should be taken into account during the appraisal process:

- There will be high costs compared to some of the heavy rail options due to the amount of tunnelling;
- Disruption at the Ballymun Road area will be significant as the cut and cover tunnel is constructed;
- This route could possibly be connected to Heuston Station in the future;
- Platform 10 is quite segregated from the main body of Heuston Station and would require relatively long walking distances to get to the Luas and taxi ranks;
- Successful operation of this scheme is largely contingent on delivery of DART Underground and DART Expansion;
- Interchange opportunities with Luas Cross City at Broombridge would need to be considered in more detail; and
- The underground station at the airport would need to be further considered in discussions with Dublin Airport Authority.

Figure 2.11: HR9 - Heuston to Swords via Phoenix Park Tunnel



2.10 HR10: Metro Dublin (St James's Hospital to Malahide)

2.10.1 Scheme promoter or developer

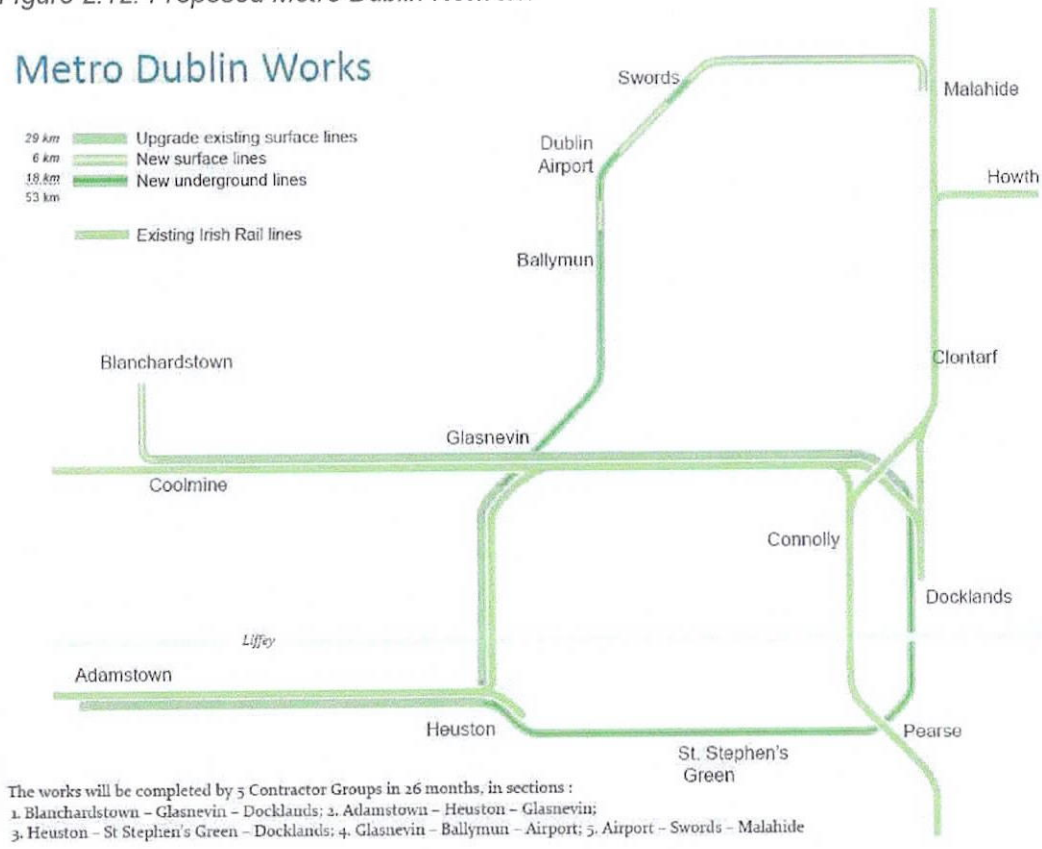
This scheme is being proposed by the Metro Dublin consortium.

2.10.2 General description of the scheme

Metro Dublin includes a proposal for a new metro system that includes and extends the proposed DART Underground/Expansion. The system is 53 kilometres in length with 3 lines as follows:

- Blanchardstown – Glasnevin – Docklands – St Stephens Green (SSG);
- Adamstown – Heuston – SSG – Pearse – Docklands; and
- Malahide – Swords – Airport – Ballymun – Heuston – SSG.

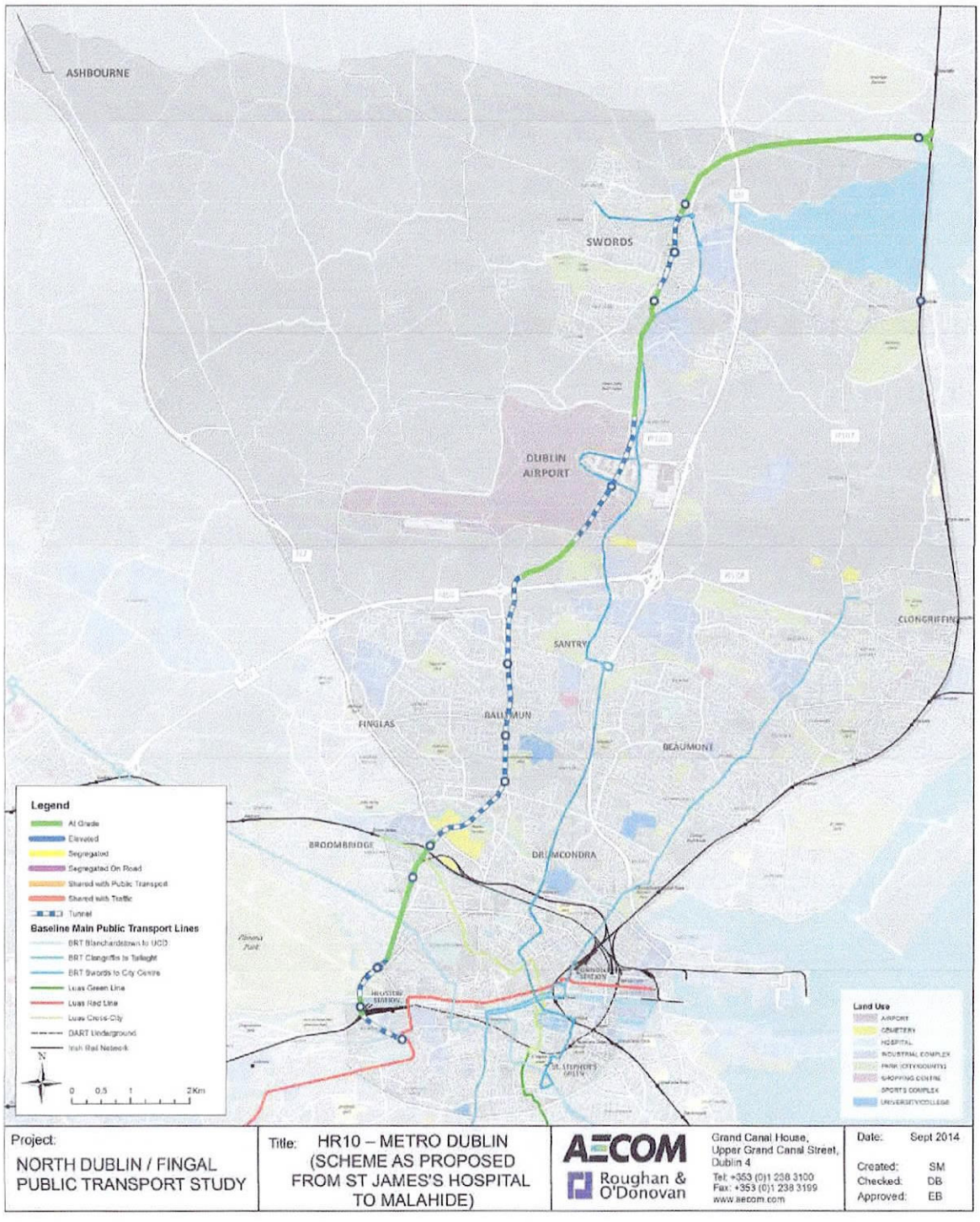
Figure 2.12: Proposed Metro Dublin Network



It should be noted that for the purpose of this study, it was agreed with Metro Dublin that only the alignment from Malahide to St James's Hospital would be taken into account. On this section, Metro Dublin is approximately 22km in length, of which 10.8km is in a single bore tunnel and 11km at grade.

Figure 2.13 shows the alignment within the study boundary, the areas of at grade running and tunnelled sections.

Figure 2.13: HR10 - Metro Dublin



The system is proposed to run on Irish Rail gauge with EMU Serie 7000 trains in six and three car units with a capacity of 1,274 passengers. The service will run at frequencies of 6, 9 12 and 15 minutes (peaks, off-peaks, evenings & rest).

Although travel demand assessments for the route have not been undertaken, Metro Dublin estimates a total patronage of 130m per year for the overall network.

Capital costs for Metro Dublin are stated by the Promoter as being €1.9bn for delivery of the three lines on the network. These costs include all capital works, land acquisition, rolling stock, procurement, control centres and depots.

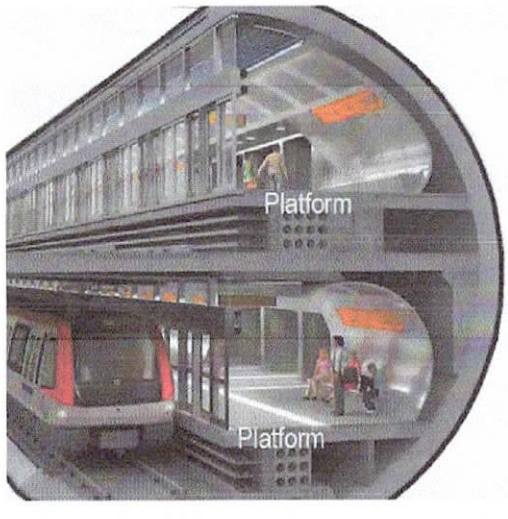
Metro Dublin has proposed a programme of 42 months to deliver the full rail network. Within this 42 month period, the first 14 months is to include the planning process. Five separate Contractor Groups would be selected to deliver the project. It is proposed that the contractors would be in place by month 14 with full delivery of the network in 28 months.

2.10.3 Infrastructure considerations

Preliminary/detailed design drawings of Metro Dublin have not been provided for review by AECOM. However, the following information on Metro Dublin infrastructure proposals has been made available:

- Some sections of the alignment already exist; therefore the actual length to be built would be 10km tunnelled and 9km at grade;
- Seven new stations would be underground and a further five stations at grade;
- Tunnel depths will generally be at least 20m below surface between stations and about 10m at stations;
- The proposed infrastructure is largely based on recent works on the Madrid Metro;
- The alignment will serve a new underground station at St James's before reaching Heuston, emerging from the tunnel and crossing the River Liffey via the existing bridge;
- The existing Phoenix Park Tunnel will be used by Metro Dublin and therefore a double junction with the existing railway would be required between Heuston station and the River Liffey;
- A significantly larger interchange at Malahide is likely to be required;
- The network will run separate to the Irish Rail network and is not expected to be interoperable;
- Single bore tunnels have been proposed which for safety reasons is likely to raise significant concerns.

Some key concerns in relation to the proposed network include:



- There appears to be insufficient space to accommodate the proposed Metro Dublin alignment at Heuston. The distance between the existing at-grade railway lines outside Heuston and the River Liffey is insufficient to accommodate a tunnel portal, an achievable track gradient and a double junction;
- As with other heavy rail options, connecting the new railway line into the existing Malahide station may be difficult and could require a relocation of the station from its existing position. The current station is already constrained by existing buildings and roads;
- It is unclear whether geotechnical surveys of the full tunnelled section have been completed;
- Safety risks and a mitigation strategy for use of a single bore tunnel in favour of twin bored tunnels has not been presented;
- It is unclear whether the Phoenix Park tunnel can be satisfactorily adapted for use by Metro Dublin and how this might affect the wider network;
- There is concern that the proposed methodology is based on techniques applied in Spain as opposed to Ireland or even the UK where there are similar planning, design and delivery standards and procedures. Focus on the methodology used in Madrid has recently raised

significant issues and costs on projects in the UK where the proposed techniques were not transferable.

2.10.4 Impact during construction

There may be long term disruption to localised areas within the city centre during construction of the new underground stations. Further long term disruptions could be caused by construction compounds at tunnel portals, for the removal of spoil, manufacture or storage of tunnel segments and tunnel boring machine assembly. Disruption for crossings of the motorway, local and regional roads will be the same as for other heavy rail options.

2.10.5 Environmental issues

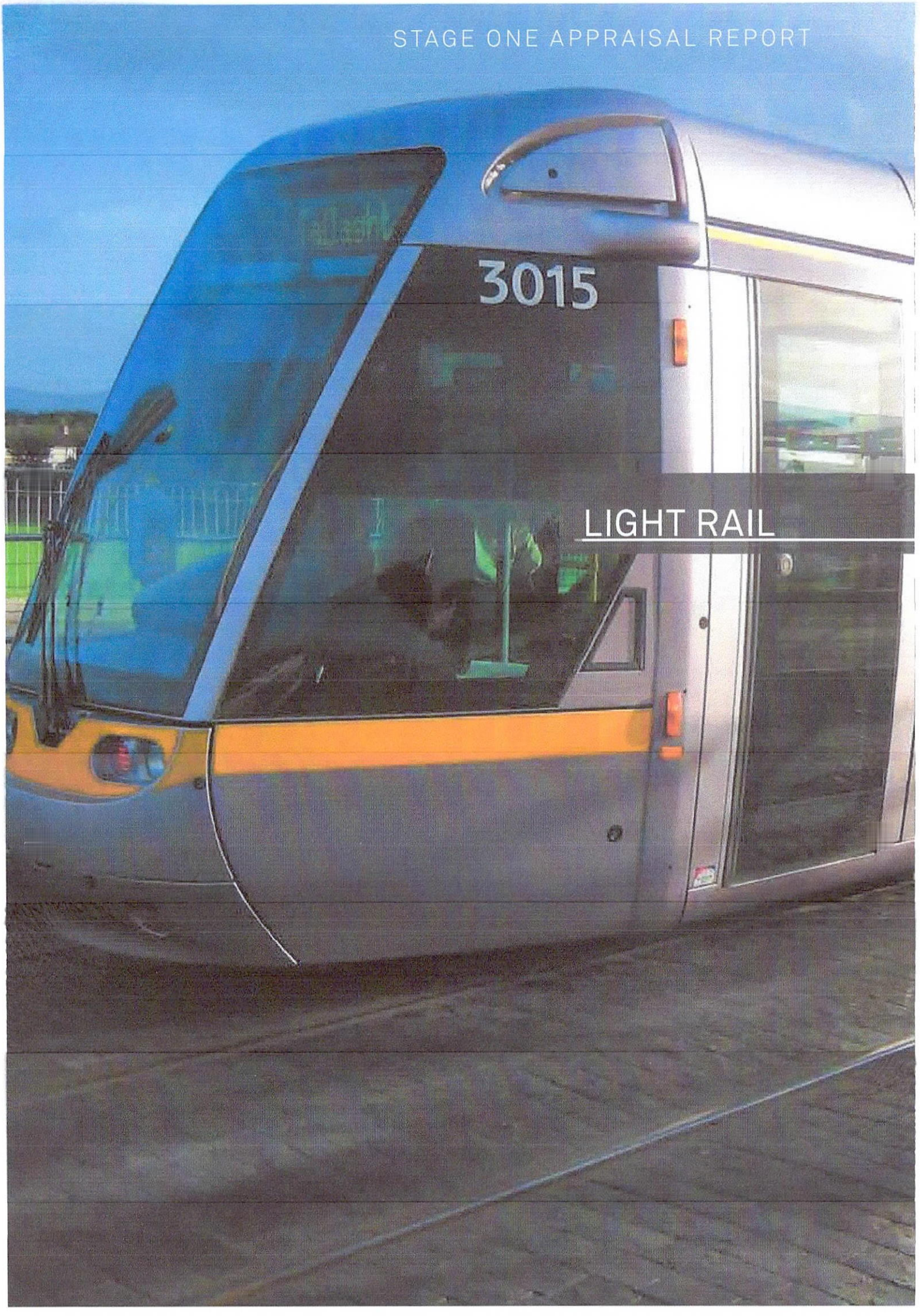
An assessment of the environmental impacts of Metro Dublin has not yet been undertaken. While many of the same environmental issues previously raised for the heavy rail options will also affect this option, the impacts on the Malahide Estuary Special Protection Area and Special Area of Conservation are likely to be significant.

2.10.6 Considerations for the appraisal process

The following considerations should be taken into account during the appraisal process:

- Detailed drawings of the proposed scheme have not been provided and as such it is difficult to validate technical feasibility;
- The proposed alignment from Heuston to Swords, although it doesn't connect with the 'city centre' could present significant benefit based on a dense catchment area;
- Travel demand assessment for the route has not been provided, although the full scheme is stated to carry 130m passengers per year;
- The proposed programme for delivery appears extremely ambitious in the context of similar schemes recently delivered in Ireland;
- The patronage and level of city centre access provided by the scheme is highly contingent on the delivery of the DART Underground scheme;
- The lack of fleet interoperability with existing Irish Rail infrastructure will result in the availability of Phoenix Park Tunnel train paths being heavily restricted for Kildare line services; and
- There are some concerns regarding technical feasibility of the scheme, particularly in relation to the use of Phoenix Park Tunnel and route alignment at Heuston Station.

STAGE ONE APPRAISAL REPORT



LIGHT RAIL

3.0 Light Rail

Ireland's recent experience of Light Rail is restricted to the Dublin area at present where the Luas has been in place since 2004 when the Green and Red Lines opened. Both lines have been extended since they opened, with the overall network now comprising 38km and 54 stations. The main extensions to the system since 2004 are:

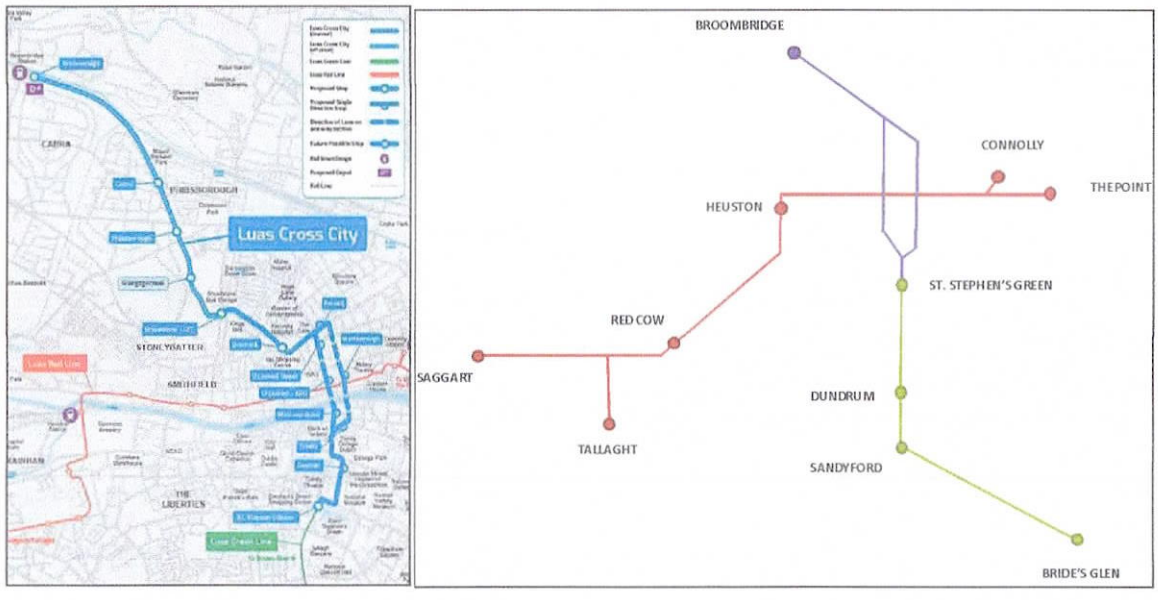
- Red Line C1 – December 2009 – Connolly Station to the Docklands opened;
- Green Line B1 – October 2010 – Sandyford to Cherrywood opened; and
- Red Line A1 – July 2011 – Saggart to Belgard opened.

Introduction of the Luas to Dublin has been a remarkable success and has significantly changed nature of travel as well as spatial development in the city. By 2006, 50 million trips were made on both lines combined and today the system carries 90,000 passengers per day or 30.5m per year (2013). Demand for the service is high, especially in the morning and evening peaks when crowding on the network is evident.

The Luas system operates on a 750 VDC overhead power supply and uses the international standard rail gauge of 1,435 mm, rather than the Irish standard of 1,600 mm. In terms of capacity, the system initially operated on the basis of 30m carriages with an overall capacity of 235 passengers per unit. These carriages were upgraded such that 43m carriages are now more common on the system, increasing the tram capacity to 280 passengers per unit.

Construction work is underway at present on the third Luas extension which will connect the Red and Green lines. The line, called Luas Cross City, will connect the Green Line at St Stephens Green with the Red Line on Abbey Street before running further north to Parnell Street, DIT at Grangegorman, Cabra and Broombridge where it will connect with main line commuter heavy rail services. Luas Cross City is to be completed and operational in 2017 and therefore forms part of the baseline network proposed for this study in 2035.

Figure 3.1: Luas Cross-City (LCC) project and integration in the future Luas network



Expansion of the current light rail system to serve the Study Area could present significant benefits as follows:

- Light rail is a high quality product with high capacity that has already been well received within the City;
- Expansion of the network would present significant integration benefits and maximise the overall offer presented by the network;
- Light rail integrates well into the urban environment which will be important for areas like the north inner city and Swords;
- Light rail has a proven ability to drive urban renewal and economic growth which is an important objective within the current Study Area;
- Light rail, unlike heavy rail, can have shared use sections where space is limited, although ideally it should be segregated as much as possible;
- Light rail presents a suitable option where the level of demand is between bus and heavy rail capacities;
- The current light rail network includes a number of Park and Ride facilities that will further encourage a shift from car mode for commuting trips;
- Light rail is highly legible with a high commuter awareness of routes, catchment areas as well as facilities to enable ease of utilisation; and
- Emissions from light rail are low and remote from the vehicle.

Despite these advantages, the provision of light rail services presents significantly higher capital costs than traditional bus or BRT solutions and requires a minimum threshold of demand to support a business case for development.

The following sections present a series of light rail options which have been proposed either by the RPA or AECOM for the study area and in general build on the planned LRT network for the City. The list includes the proposed Metro North as well as a more cost-optimised approach to delivery of a similar scheme.

3.1 LR1: Broombridge to Finglas

3.2 Scheme promoter or developer

This scheme has been promoted by the RPA as Line D1. The scheme has been promoted to extend the Luas Cross City line further north to increase the catchment area being served by the Luas network.

3.3 General description of the scheme

The total length of this light rail option is 4.8km, all of which is at-grade. Six new stations proposed on the route, all of which are at-grade.

This alignment starts with an extension off the Luas Cross City line at Broombridge Station. It crosses the canal and the railway line and continues at-grade along Broombridge Road. The line then crosses Ballyboggan Road and enters Tolka Valley Park. The route crosses the Tolka Valley Road and enters green space between Barnmore Grove and Carrigallen. The route remains segregated until it reaches Wellmount Road. After Wellmount Road, it continues along Patrickswell Place, bears left onto Cappagh Road then right into Finglaswood Road. The route then crosses Mellowes Road and continues to run within Mellowes Park on the eastern side of Casement Road. The route then joins St Margaret's Road on the east side of the N2.

The route runs through a dense residential area presenting potential for a high catchment. However, the route does not respond to the objective of this project in serving the Airport and Swords.

RPA estimated cost in the order of €250m to deliver this Luas extension.

3.4 Infrastructure considerations

Land acquisition will be required to accommodate the corridor in the southern part of the route. A new bridge would be required to cross the Tolka River and valley. Parts of the route are totally segregated and other parts shared with general traffic. Crossing the N2 at the top of Casement Road would require upgrading the junction to full signalisation. The southern section of St Margaret's Road may need to become one way to accommodate segregated on road provisions for the Luas service.

3.5 Impact during construction

As parts of the route are off road, this would minimise any lengthy disruption during construction. The on road shared route, will inevitably cause signifcant disruption and delays to traffic.

3.6 Environmental issues

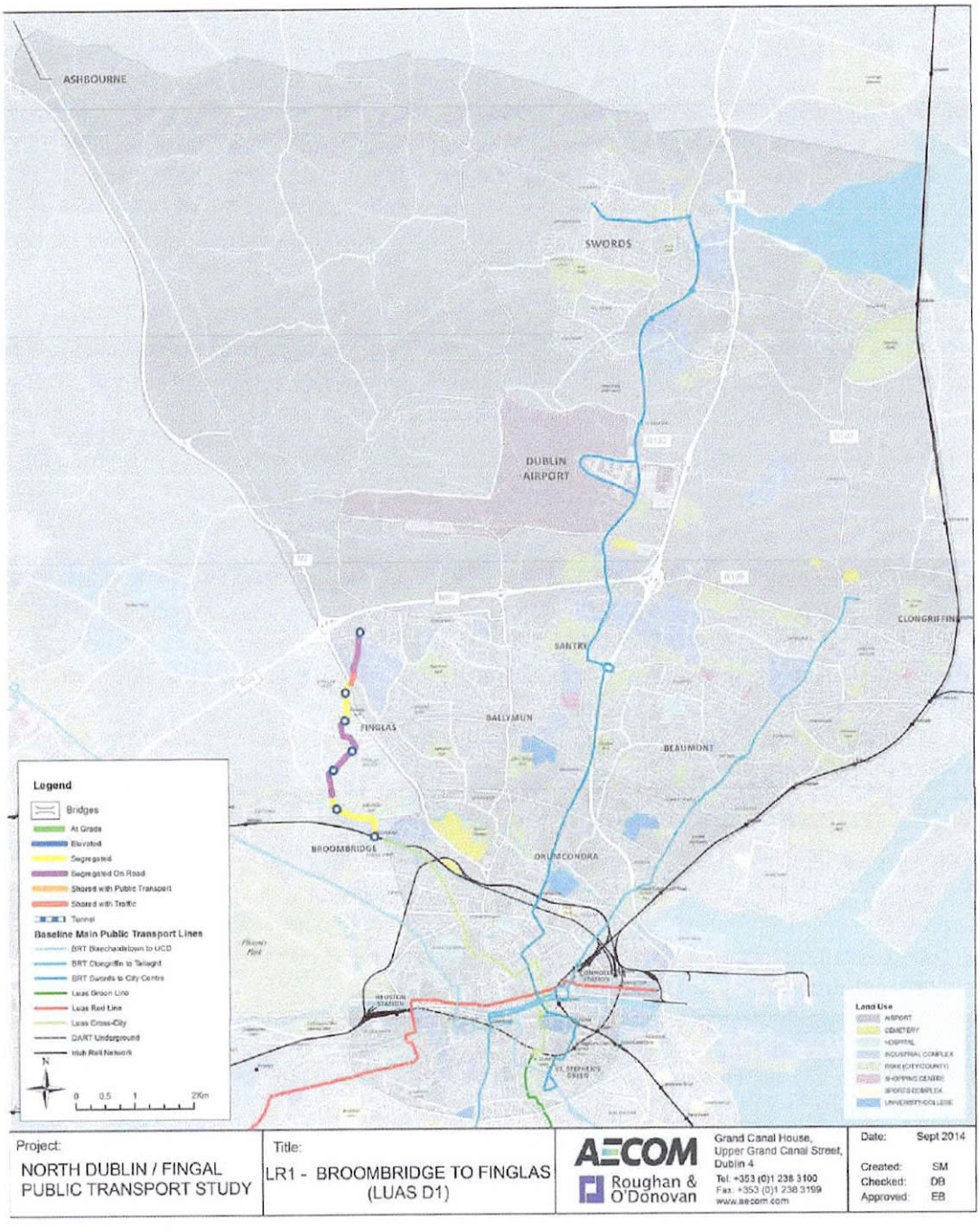
The proposed line uses the existing bridge to cross the Royal Canal, designated a Natural Heritage Area (NHA). If works are required to the bridge to accommodate the new services, this will need further investigation. Finglas House is listed on the Sites and Monuments records and is located in the Tolka Park. The detailed design of the route would need to take this into consideration. There may be protected species in the riparian zone along the river in Tolka Park, which will need to be further considered if this option were to progress. Noise would need to be considered on those parts of the route passing through residential areas. Parts of the route are also within a zone of Archaeological interest listed under the Dublin City Development Plan 2011-2017. Mellowes Park provides an ecological corridor for wildlife in the area, the park would need to be examined for protected flora and fauna.

3.7 *Considerations for the appraisal process*

The following characteristics of Light Rail option LR1 should be taken into account during scheme appraisal:

- The scheme is deliverable from a technical perspective and serves a wide catchment area; and
- The route does not meet the overall objective of the study in that it is an extension of the Luas Cross City route, which was never intended to serve Dublin Airport or Swords.

Figure 3.2: LR1 Broombridge to Finglas



3.8 LR2: Broombridge to Swords via Dublin Airport and Finglas

3.8.1 Scheme promoter or developer

This scheme has been proposed with the intention of extending the route LR1 to the Airport and Swords to meet the objectives of this study.

3.8.2 General description of the scheme

The total length of this light rail option is 15km, all of which is at-grade. Seventeen new stations are also proposed along the route, all at-grade.

The first 4.8km of the southern part of this route is identical to option LR1, the extension runs north from this point towards the airport and Swords. At the northern end of St Margaret's Road, the line crosses the M50 motorway. The line then turns eastwards just to the north of the M50, where it is segregated from traffic. The route continues east until the R132 and turns north following the R132. The proposed station at the airport is located west of the R132 just south of the airport roundabout where a people mover would be used to connect passengers to the Aiport terminals. Alternatively, a one-way loop around the airport could be considered although this would require some redistribution of road space.

The route continues north off road on the west side of the R132, crossing the Naul Road at-grade. The route crosses the west side of Pinnockhill Roundabout. From this point, the route becomes a medium to low speed penetration light rail to serve Swords, for the last 2.1km of the route. Three stops are proposed in Swords; namely Pavillions, Castle and Estuary.

While the route would serve both the Airport and Swords, journey times from the City Centre would be high given the circuitous route via Finglas.

3.8.3 Infrastructure considerations

The infrastructure considerations for the southern part of the route are identical to LR1. In addition, a new bridge would be required to cross the M50 motorway at the northern end of St Margaret's Road. The stop at the Airport would require construction of a people mover to connect passengers to the terminal buildings with the alternative being a restriction on road capacity to allow the introduciton of a one-way loop. A new bridge would be required to cross the Cloughran Valley at the northern end of the route. For two tracks to be segregated in Swords town, a one way system would be required on Dublin Road and Main Street.

3.8.4 Impact during construction

Some short term disruption would be expected at Broombridge when the new flyover junction is constructed. As parts of the route are off road, this will minimise any lengthy disruption during construction. A short to medium term disruption may occur with the bridge installation over the M50 motorway. Long term disruption would be expected on the roads where the route would be constructed, around Broombridge and Swords.

3.8.5 Environmental issues

The southern section of this route is the same as LR1 and the environmental issues are identical. North of the M50, the route passes through an area of green belt which may provide a habitat for certain species, requiring further detailed investigation if the route progresses further. This section also passes through an area of G3 zoning in the Development Plan which seeks to protect and enhance high amenity area and protect and provide for a green belt. Sillogue Park Golf Course is also located on the proposed route. North of the airport, the route passes through further G3 zoning.

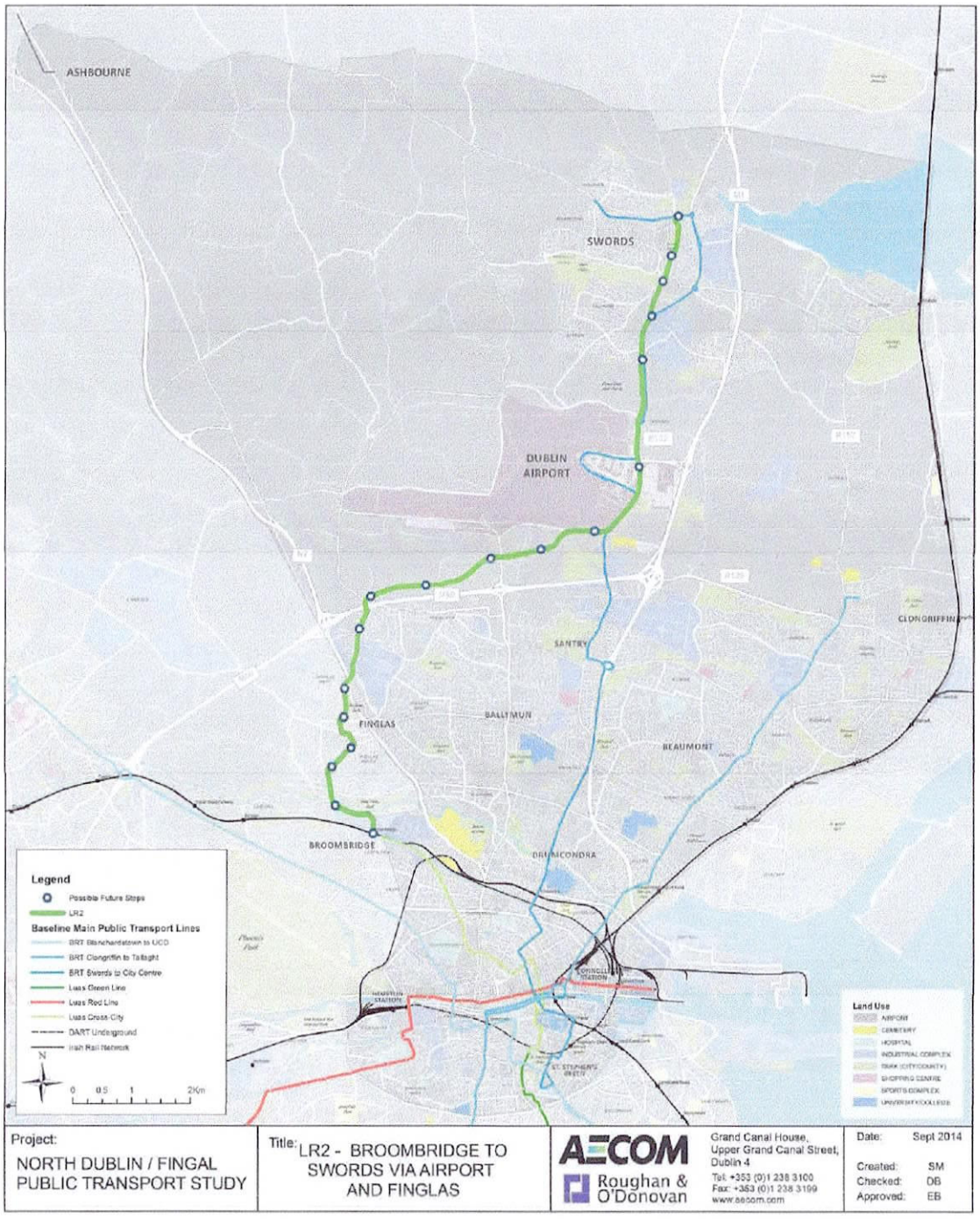
In Swords, any impacts on protected structures or listings on the SMR along Swords Main Street will need to be taken into account if this route goes ahead.

3.8.6 Considerations for the appraisal process

The following characteristics of Light Rail option LR2 should be taken into account during scheme appraisal:

- The route is technically feasible;
- This scheme has very good integration with the existing and proposed public transport options and good integration with land-use policies;
- This scheme is a cost effective solution as it does not include tunnelling or other major infrastructure;
- The catchment population is relatively low in comparison to other LRT options mainly due to the longer section of route which runs through currently undeveloped land north of the M50 through Dardistown; and
- As the route follows a westerly, indirect, path the journey time to the City Centre is particularly long in comparison to other LRT options.

Figure 3.3: Option LR2 Broombridge to Swords via Dublin Airport and Finglas



3.9 LR3/4/5 – Route Options for Luas Line D2

3.9.1 Scheme promoter or developer

These schemes are variations on a route proposed by the RPA (D2). Three different options are proposed as follows:

- LR3 - Cabra to Swords via Dublin Airport under Glasnevin Cemetery;
- LR4 - Cabra to Swords via Phibsborough and Dublin Airport; and
- LR5 - Cabra to Swords via Drumcondra and Dublin Airport.

While the RPA preferred option is a route under Glasnevin Cemetery, each of these options is brought forward for the current appraisal.

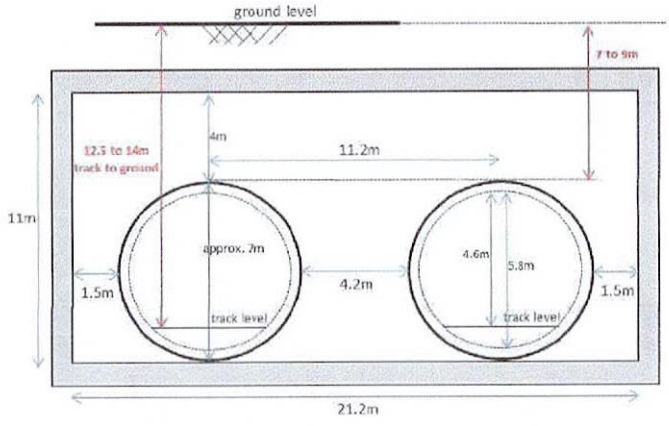
3.9.2 General description of the scheme

This scheme proposes an extension of the Luas Cross City from Cabra to Swords. While much of the route follows a relatively similar alignment apart from the Airport to Swords, different alignment are proposed for the southern section as follows:

- **LR3 (see Figure 3.4):** The total length of this light rail option is 13.5km, of which, 11.4km is at-grade and the remaining 2.1km is tunnelled. Twelve new stations are proposed for the route with one underground. The route follows a similar alignment to the proposed Metro North (LR6/7) route using a 2.2km tunnel to pass under Glasnevin Cemetery, and then following Ballymun Road and the R132 to Swords via at-grade infrastructure;



Glasnevin Tunnel



- **LR4 (See Figure 3.5):** LR4 is effectively an at-grade variation of LR3, following existing roads through Phibsborough and Glasnevin. As it is using existing roadways the traffic impact is much more significant then LR3 and the implementation of the infrastructure on some sections may be challenging, with significant detrimental impacts on Luas journey times and traffic;
- **LR5 (See Figure 3.6):** This route follows an alternative alignment via Drumcondra and Santry to reach the airport. This route would make use of the Quality Bus Corridors (QBC) along the route to provide dedicated LRT infrastructure. As with LR4 traffic impact in this congested inner suburban location will be significant as a result of the at-grade running. Average Luas speeds on the route would also reduce due to traffic impacts.

The main difference between these route alignments and the original Metro North alignment is that the route follows existing roads around the airport rather then linking directly to the Terminals. Along the airport frontage (R132) the LRT would share the existing bus lanes and will not enter the airport grounds. Therefore a "people-mover" will be required to link to the airport terminal buildings unless road capacity could be redistributed within the Airport to introduce a one way loop for the LRT. While the system links well into the existing the public transport system, the requirement for a people-mover link to the airport reduces the ease of integration somewhat.

RPA suggest that journey times on line D2 (via Glasnevin) from St Stephens Green to the Airport would be 35 minutes. Estimated capital costs for delivery of the project are stated by the RPA to be in the region of €640m.

3.9.3 Infrastructure considerations

The main features of this route are outlined below for each option:

- **LR3:** A new double junction would be constructed for the connection with Luas Cross City at Cabra. A tunnel would be required below the Botanic Gardens, approximately 2km in length. The tunnel would be a combination of bored tunnel and cut and cover sections;
- **LR4:** Limited road space throughout the Phibsborough and Glasnevin area which will result in either shared running or significantly reduced traffic capacity approaching the city from the N2 and Finglas; and
- **LR5:** The existing QBC/ proposed BRT would have to be removed to make space for the LRT infrastructure. The limited space particularly through Drumcondra and Santry will result in either shared running or a significant reduction in traffic capacity approaching from Santry/Swords and N1.

Each of the above options share road space along large sections and crosses roads at-grade with traffic signal control. A major bridge structure will be required to cross the M50 motorway for all options. As the Airport station is not within the terminal facilities, a people mover will be required to access the terminals from the stop west of the R132. The potential to introduce a one way loop around the Airport could be looked at although this will result in a reduction in road capacity. After the Airport, the routing would be the same as LR2 towards Swords with a bridge structure required to cross the Cloghran Valley.

3.9.4 Impact during construction

Medium term disruption would be expected around the tunnel portal construction compounds near Cabra and Glasnevin Cemetery.Short term disruption would be expected whilst the bridge structure was placed across the M50 motorway. However, longer term disruptions would be expected between Glasnevin and Swords while the light rail line is constructed on the shared roads.

For the at-grade options via Phibsborough and Drumcondra significant traffic disruption can be envisaged, with medium to long term road closures required to facilitate construction in this constrained suburban environment.

3.9.5 Environmental issues

The cut structure that this route proposes at Cabra will minimise much of the potential conflict with natural heritage and environmental topics. Several Sites and Monument Record locations are listed around Glasnevin, and the cemetery site itself is very sensitive for historical and cultural heritage. Construction noise and the effects on the local population should be considered when the line emerges along Ballymun Road. An old estate house exists to the east of Charter School Hill. If this

area is impacted by the scheme, it would result in significant impact on the landscape. North of the airport and through to Swords, the environmental issues are consistent with option LR2.

Through Phibsborough and Drumcondra this option follows existing roads, which would limit environmental impact, however there are listed structures along both of these alignments some of which may be impacted by the necessary infrastructure.

3.9.6 Considerations for the appraisal process

The following characteristics of these options should be taken into account during scheme appraisal:

- The schemes are technically feasible and would extend the existing Luas network through high density residential areas;
- These options offer good integration with the existing and proposed public transport options as well as land use policies;
- Opportunities to integrate with Dublin Airport need to be looked at in further detail;
- LR3 through Glasnevin is the most expensive of the three proposed options as it requires tunnelling however the impact of traffic is likely to be significantly less than the other two options; and
- As the route requires shared running on some sections, particularly to the front of the airport, the capacity of the route may be reduced as a result.

Figure 3.4: Option LR3 Cabra to Swords via Dublin Airport under Glasnevin Cemetery

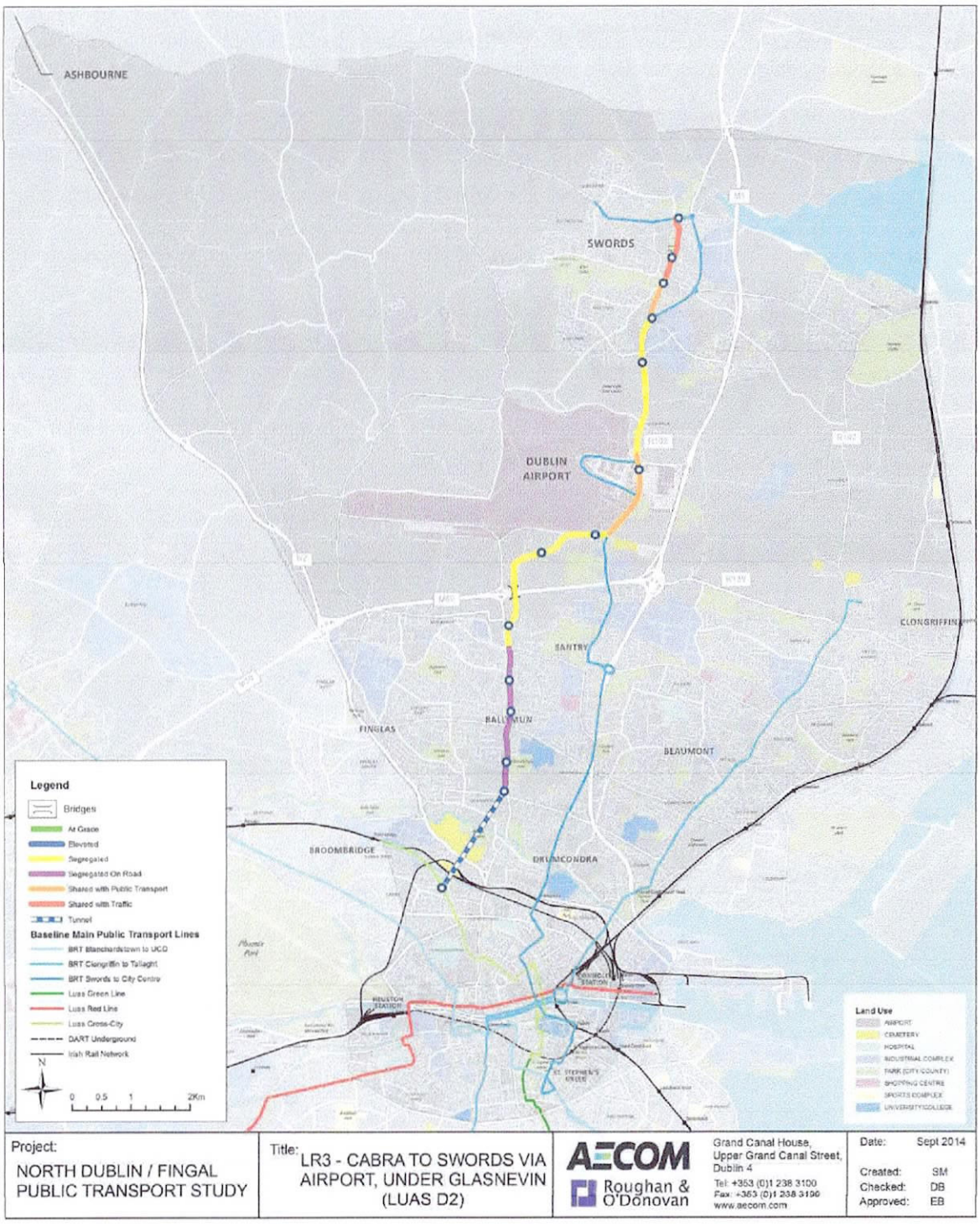


Figure 3.5: Option LR4 Cabra to Swords via Phibsborough and Dublin Airport

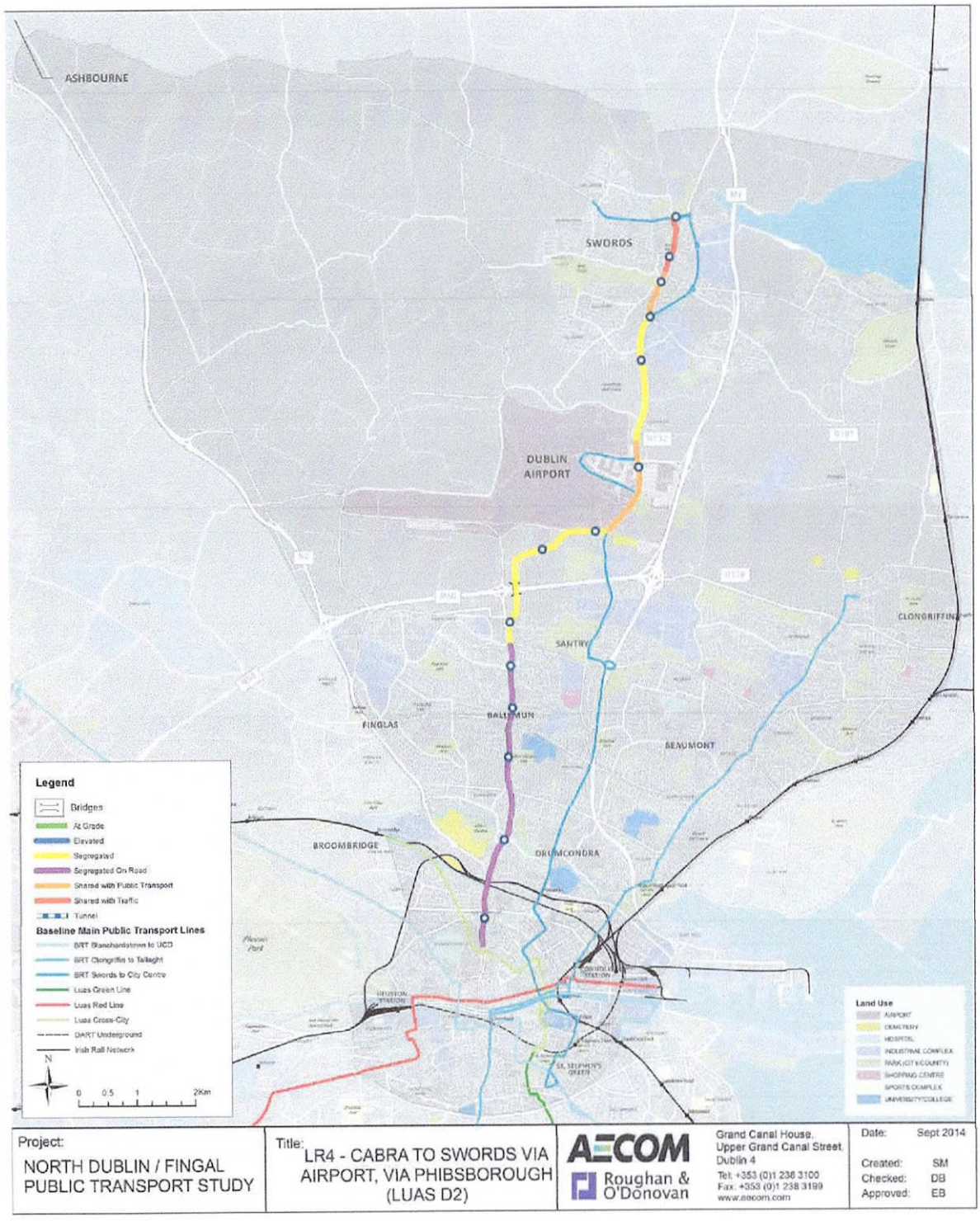
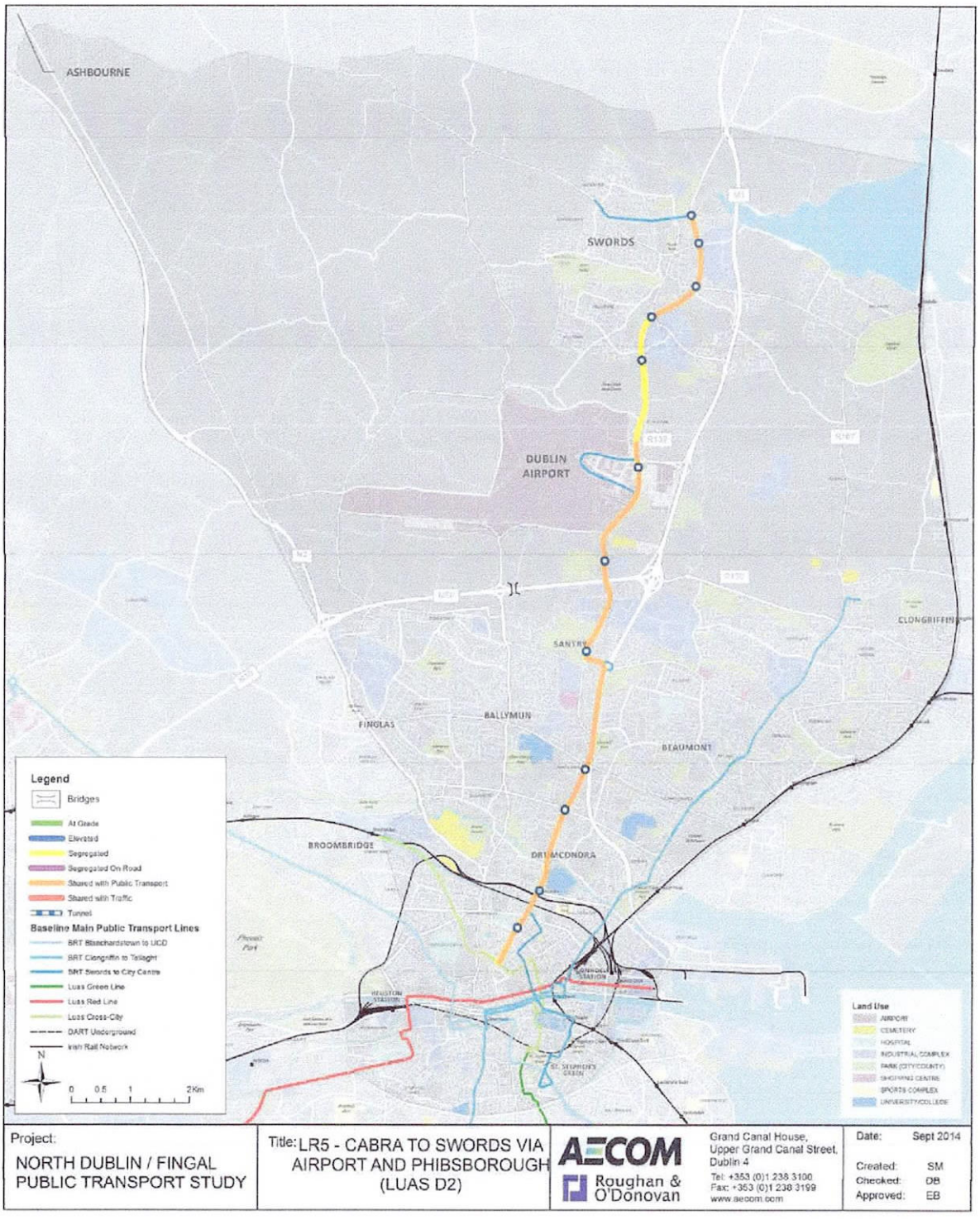


Figure 3.6: Option LR5 Cabra to Swords via Drumcondra and Dublin Airport



3.10 LR6. Metro North

3.10.1 Scheme promoter or developer

This is the original Metro North Scheme as proposed by the RPA and approved by An Bord Pleanala in 2010.

3.10.2 General description of the scheme

Metro North was proposed for development as part of the Transport 21 investment programme in 2005 as part of Dublin's integrated light rail network. However, despite granting of a Railway Order for the scheme in 2010 as well as advanced procurement, the scheme was deferred in 2011 due to financial constraints. The scheme, estimated to cost in region of €2.5bn (excluding inflation), will provide a light rail connection from St. Stephen's Green to Swords in 30 minutes via Dublin Airport.

The approved route is 16.5km long and runs between Estuary, to the north of Swords, and St. Stephen's Green in the city centre as shown in Figure 3.7. The proposed route runs largely at ground level and on elevated viaducts from Estuary to north of the Airport, in tunnel through the airport, and back to ground level through the lands south of the airport, crossing over the M50 and then going underground again from north of Ballymun to its terminus at St. Stephen's Green.

There are 14 stops along the route, nine underground and five at ground level. Underground stops will be provided at the Airport, Ballymun, Dublin City University, Griffith Avenue, Drumcondra, Mater, Parnell Square, O'Connell Bridge and St Stephen's Green. At ground level stops will be provided at Estuary, Seatown, Swords, Fosterstown, Dardistown, and Northwood. Park & Ride facilities are provided at Dardistown and Fosterstown.

Metro North is an important component of the Draft Greater Dublin Area Transport Strategy as well as development plans for Fingal County Council and Dublin City Council. The scheme forms the basis for a revised spatial development pattern based on high density development close to the corridor. The scheme was also the basis for an Economic Corridor connecting the City Centre with Dublin Airport and Swords. As such, the current transport and land use planning policy context for the Study Area has been developed on the basis of Metro North progressing.

Metro North was proposed with a capacity of 8,000 passengers per direction per hour (ppdph) based on 5 minute headways in the AM peak. Capacity was proposed to increase incrementally through the procurement of additional vehicles with the ultimate capacity, based on a 2 minute headway, in the order of 20,000 ppdph. This capacity reflected an expected forecast demand at the time of approximately 17,000 ppdph.

The scheme was proposed to be inter-operable with Luas with a track gauge of 1435 mm and a nominal operating voltage of 750V DC.

The Metro North Business Case, developed by the RPA, indicated a strong economic case for Metro North. The benefit to cost ratio of the project was estimated in excess of 1.5:1 using traditional economic appraisal methods, and at 2:1 when taking account of wider economic benefits.

3.10.3 Infrastructure considerations

The following infrastructure aspects of the Metro North are proposed:

- **Tunnelling:** Nearly 70% of the Metro North alignment is proposed to run underground. This adds significant complexity and cost to the project. The bored tunnel diameter is approximately 6m with an average depth to track level approximately 20m deep. The proposed tunnelling configuration is as follows:
    - Twin-bore running tunnels between St. Stephen's Green and Albert College Park portal;
    - A ventilation and intervention shaft will be provided between the Stops at Drumcondra and Griffith Avenue;
    - Twin-cell cut and cover running tunnels between Albert College Park up to immediately south of Northwood Stop;
    - Twin-bore running tunnels beneath Dublin Airport;
- **Structures:** A total of seven bridges, two viaducts, three footbridges and three underpasses are proposed as part of the alignment. Most significant of these are the M50 crossing at Northwood and the R132 viaducts and underpasses;
- **Stops:** Nine sub-surface stops and five at-grade Stops. Platforms on all stops are proposed at 94 metres in length. Platform surfaces are 280 mm above rail level and the face of the platform 1242 mm from the centreline of the track. For at-grade Stops the minimum platform widths are 3.5m on side platforms and 6 metres on island platforms. These stop will be very similar to the Luas stops;
- **For sub-surface stops,** the minimum platform widths are 3.5m on side platforms and typically 9 to 12 metres on island platforms. These have been increased to 14 metres at the Airport and 20 metres at St. Stephen's Green terminus to accommodate the estimated increased passenger flows. Sub-surface stops will have platforms 10 to 20m below the surface with permanent surface features such as entrance canopies, lift and ventilation shafts;
- **Depot:** Metro North is to have its own dedicated depot located south of the Airport at Dardistown. This will provide accommodation for a headquarters and administration building, vehicle maintenance and stabling facilities and an infrastructure maintenance facility;
- **Track:** Three different types of track bed are proposed along the length of the line. The width of track is typically 8m wide. The engineering requirement of a particular location will dictate the type of track bed required at that location, and can be summarised as follows:
    - Ballast track - In long sections with no pedestrian access (typically at grade);
    - Slab track - On structures (in tunnels, on viaducts and bridges) and in sections adjacent to public roads;
    - Embedded track - In stop areas and wherever vehicles or the public have access to the track;
    - Grass track - Where required for aesthetic reasons;
- **System**: The 750V DC overhead catenary system will be similar to the Luas system with overhead wiring and pole structures. There will also be the need for a number of sub-stations to provide power to the system;

- **Vehicles**: Bi-directional light metro vehicles (LMVs) with a width of 2.4 metres, a nominal length of 45 metres were proposed. The vehicles have a minimum of 70% low floor area and will be able to operate continuously at 70 kph. A fleet of 84 LMVs was the estimated requirement to accommodate the ultimate peak service of two minute headways. An initial fleet of 36 LMVs required initially to accommodate the peak opening service running at five minute headways; and
- **Fare Collection System:** An automated fare collection system, compatible with the Integrated Ticketing System, is proposed.

3.10.4 Environmental Issues

Metro North was granted a Railway Order on 27th October 2010.

The environmental issues for Metro North were fully assessed within the Environmental Impact Assessment (EIA) undertaken as part of the RPA Railway Order Application, prepared in accordance with the legal provisions set out in the Transport (Railway Infrastructure) Act of 2001, Section 39.

The EIA describes the main environmental issues and potential impacts due to the introduction of Metro North. These related to the effects of temporary construction operations and their associated nuisances such as noise, dust, visual impacts as well as impacts to traffic and protected structures and risks related to settlement and spoils disposal. On completion of Metro North there will be potential operational issues such as noise, vibration, air and visual impacts. Impacts can be positive or negative.

RPA consulted widely with the public during the development of the proposed scheme. Some of the issues raised during those consultations are outlined below and have been dealt with within the EIS:

- Impact of the proposed scheme on local businesses;
- Potential for negative health effects during construction;
- Potential for negative effects on existing utilities and the navigation system at Dublin Airport;
- Nuisance and disturbance associated with noise and vibration and air quality;
- Visual intrusion;
- Impact of the proposed scheme on ecology - flora and fauna;
- Potential to pollute surface water and groundwater;
- Traffic disruption;
- Impacts on buses, pedestrians and cyclists;
- Potential negative effects on property;
- Potential for negative effects on St. Stephen's Green.

3.10.5 Impacts During Construction

Construction works would be expected to start at the same time at various locations along the route, including all stop locations. Due to the linear nature of the construction site it is possible for certain activities to overlap with others or to run concurrently. Total construction duration is expected to take up to 60 months.

RPA has identified a number of packages of enabling works that will commence in advance of the main construction works including contracts for utility diversions; heritage works, including

relocating a number of monuments either to the National Museum of Ireland or into storage for safekeeping; junction reconfigurations to facilitate traffic management; a temporary bridge over the River Liffey to accommodate traffic during construction of some of the stops in the city centre; the construction of a part of the stop box at the Mater campus; and other ancillary works such as archaeological and building surveys, to assist in ensuring the site is available for the contractor to carry out the main works. The majority of these works are now complete.

In general the construction of the Metro North main works will involve the following phases:

- Site preparation;
- Establishing site offices, compounds and security;
- Utilities diversion;
- Excavation and construction of underground stops;
- Construction of tunnels and structures;
- Installation of the trackbed and rails;
- Installation of mechanical, electrical and operating equipment;
- The fitting out of stops and associated equipment; and
- Finishing to surfaces and soft landscaping.

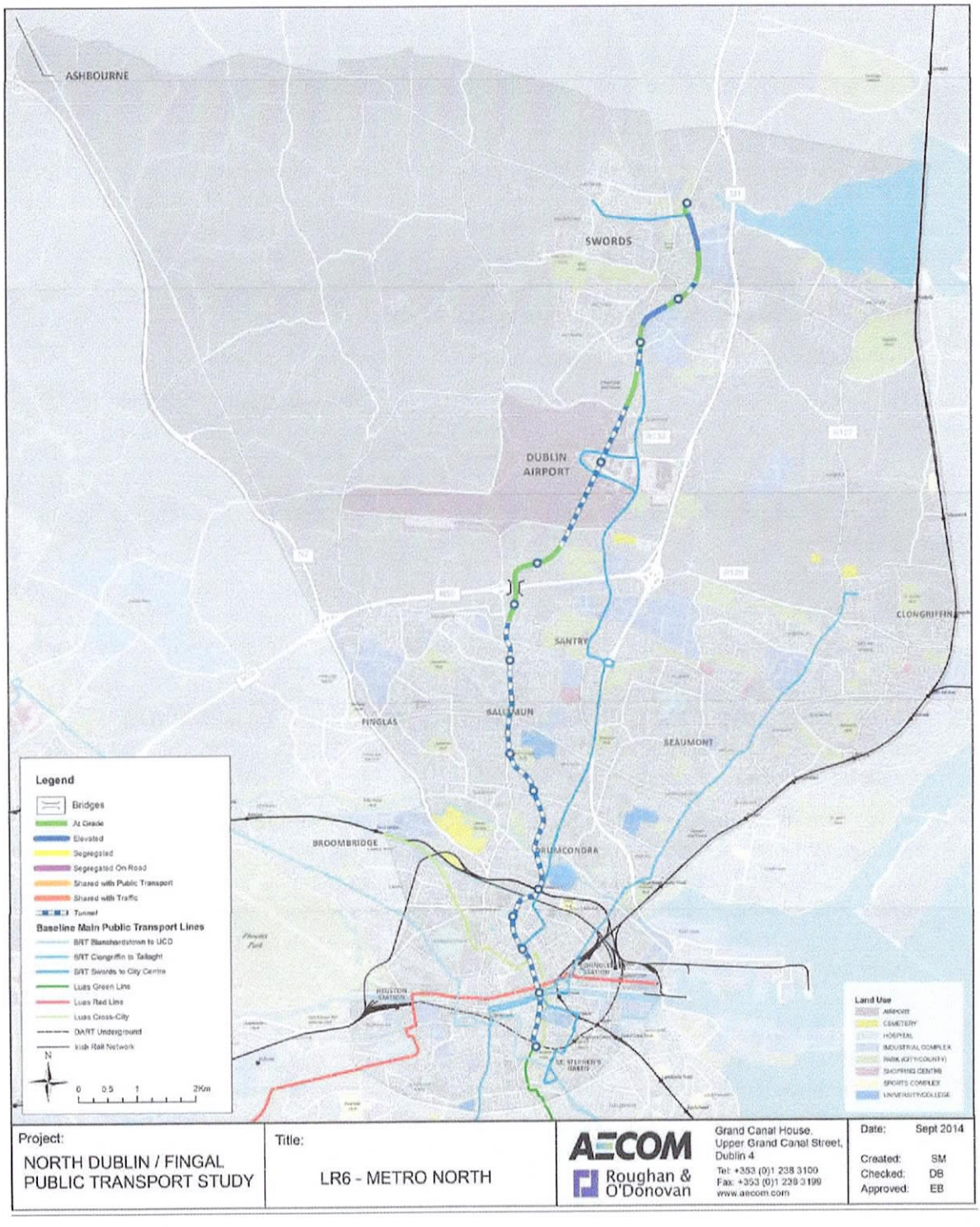
Throughout the construction phase, monitoring would be carried out e.g. for noise, vibration and air quality. Areas of temporary land take would be required to support the 25 construction compounds for site accommodation and offices to manage the works, for the storage of materials, plant and equipment, fabrication and vehicle parking.

3.10.6 Considerations for the appraisal process

The following characteristics of Metro North should be taken into account during scheme appraisal:

- The scheme satisfies the project objectives and, having already been developed to detailed design, is technically feasible;
- The proposed route serves a very dense catchment area and many of the major trip generators within the study area;
- The service has a very high capacity potential which would need to be examined against estimated demand through detailed modelling;
- The service offers excellent journey times owing to the level of frequency and segregation proposed;
- The proposed Metro North alignment has formed the basis for spatial plans within the study area for some time, therefore it integrates excellently with future planning proposals;
- The scheme has already been through the required statutory planning processes and was granted planning approval to be developed; and
- The cost of the scheme is high relative to all other schemes being assessed.

Figure 3.7: LR6 – Metro North



3.11 LR7. Optimised Metro North

3.11.1 Scheme promoter or developer

This scheme has been proposed by the RPA as a revised version of Metro North with a number of amendments made to the scope of the project to reduce capital costs.

3.11.2 General description of the scheme

The scheme would follow the same alignment as Metro North but incorporates a number of different infrastructure proposals. The revised scope is on the basis of revised patronage forecasts for Metro North. Forecasts for the route have been reduced as a result of:

- Reduced economic growth and impacts of the recession;
- Changes in plans for traffic demand management; and
- Changes in delivery plans for schemes outlined in A Platform for Change.

Based on these circumstances, the RPA has revised long term patronage forecasts for Metro North to no more than 12,000 ppdph, although this is subject to more detailed modelling.

3.11.3 Infrastructure considerations

Arising from the revised demand forecasts for Metro North, the scope of the scheme has been revised as follows:

- **Smaller Stations:** It is assumed that a 60m long tram will provide sufficient capacity to meet the long term demand on the Airport-Swords corridor. This would allow the station platforms to be reduced from their current 94m to 60m. Reducing the length of platforms in stations to 60m would result in savings of approximately €79 million;
- **Rolling stock:** In addition to the construction savings outlined above, the revised capacity requirement of 12,000 ppdph reduces the quantity of rolling stock required by one third. This results in an additional saving of €46m;
- **Fewer Stations:** The opening of Luas Cross City will provide greater accessibility around the city centre for public transport users. This offers an opportunity to review and rationalise the Metro North city centre stations. At present, Metro North includes stations at O'Connell Bridge and Parnell Square. The O'Connell Bridge station involves major construction sites in both Westmoreland Street and O'Connell Street Lower, with consequent significant disruption to Luas Cross City services. The Parnell Square station was complex and involved difficult interfaces with both the Rotunda Hospital and the Abbey Presbyterian Church. Parnell Square station is also relatively close to the next station to its north at the Mater Hospital. Greater accessibility provided by Luas Cross City offers an opportunity to combine these two stations into a single station at O'Connell Street Upper. The street at this point is wide and would allow for phased delivery of the station in a manner which would minimise disruption to Luas Cross City services. Omitting O'Connell Bridge and Parnell Square stations in favour of a station at O'Connell Street Upper is estimated to save approximately €131 million; and
- **Vertical Alignment Changes:** Running the service at grade where possible could offer significant savings. An at-grade alignment for Metro North through Ballymun was previously considered. It is recommended that Metro North revert to an at-grade alignment in this area and any grade separation required in the future be included in the scope of the Metro West project. Metro North ran on an elevated viaduct along the R132 at Swords. It is recommended that this also reverts to an at-grade alignment. Adopting an at-grade

alignment through Ballymun, Dardistown and on the R132 at Swords would save approximately €196 million.

3.11.4 Impact during construction

The impacts during construction will be similar to those outlined for Metro North, although some sections will be less significant, for example on Ballymun Road where the route will no longer be in a tunnel.

3.11.5 Environmental issues

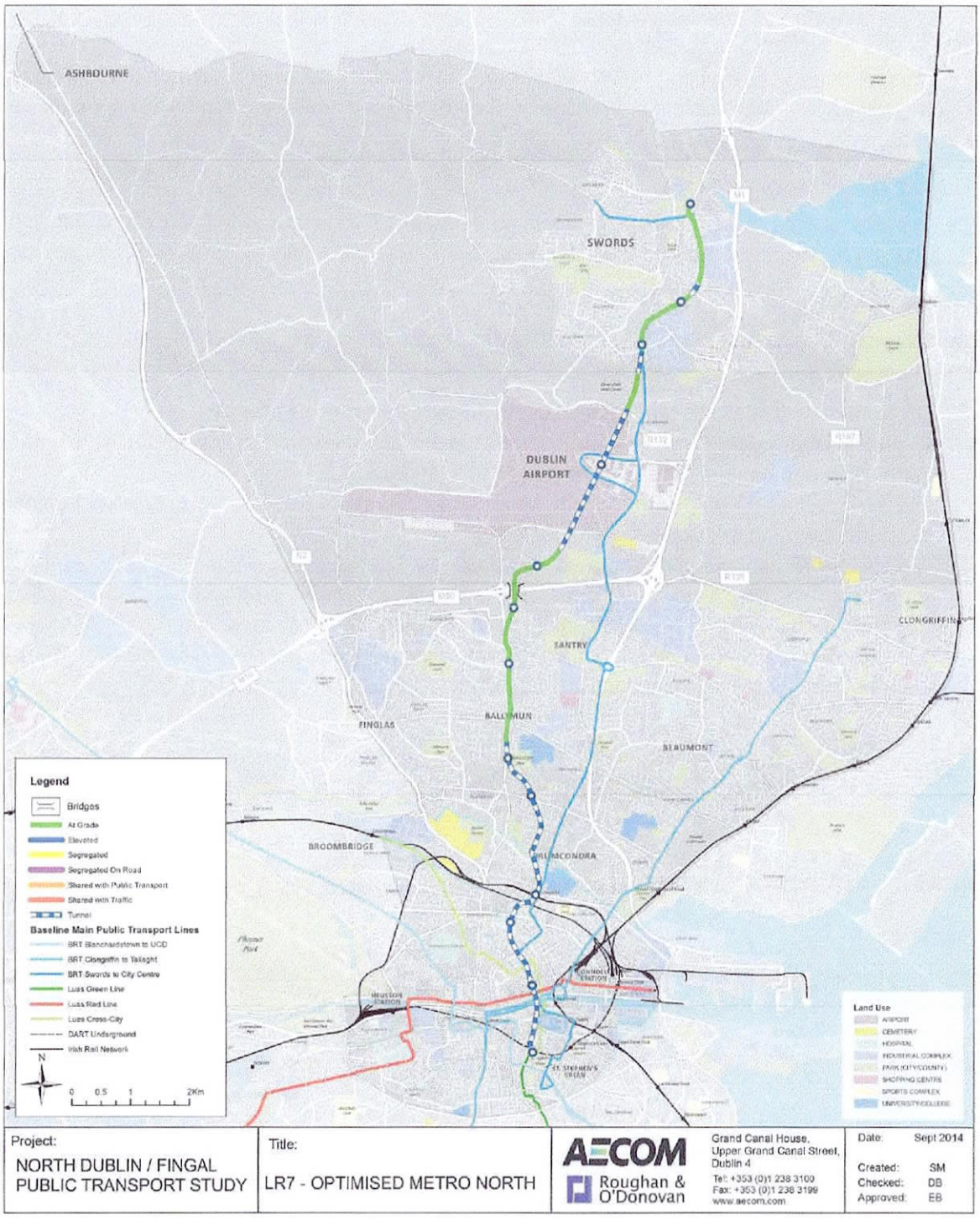
The impacts will be similar to those identified for Metro North but will need more detailed investigation due to revised at-grade alignments.

3.11.6 Considerations for the appraisal process

The following characteristics of Optimised Metro North should be taken into account during scheme appraisal:

- The scheme satisfies the project objectives and is technically feasible;
- The proposed route serves a very dense catchment area and many of the major trip generators within the study area;
- The service has a very high capacity potential which would need to be examined against estimated demand through detailed modelling;
- The proposed alignment has formed the basis for spatial plans within the study area for some time, therefore it integrates excellently with future planning proposals;
- The scheme has already been through preliminary planning processes; and
- The cost of the scheme is high, but is 20% lower than the original Metro North Scheme with a saving of €461m in comparison with the original Metro North proposal.

Figure 3.8: LR7 – Optimised Metro North



3.12 LR8. City Access Transit (CAT)

3.12.1 Scheme promoter or developer

This scheme was proposed by Drumcondra 2005, an amalgamation of Residents Associations from the Drumcondra, Dublin 9 area. It was proposed as an alternative to the Metro North Scheme which was to run further west of Drumcondra which, in the Residents Association's view, was too expensive and was missing a significant catchment area. The route would serve both the Airport and Swords and is therefore in line with the brief for the project.

3.12.2 General description of the scheme

The primary corridor is approximately 17km in length and is an extension of the Luas Cross-City route which is currently under construction. This route follows a similar route as the existing Swords Quality Bus Corridor, along Dorset Street and Drumcondra Road (R132), as far as Santry where it would be routed to the east to pick up employment zones in the Clonshaugh Industrial Area. The route would continue north from Clonshaugh and cross over the M1 to the Airport, and subsequently terminate to the north of Swords.

The CAT proposal also has a secondary routing in order to link the Finglas and Ballymun areas to the wider public transport network, through a further extension of the Luas Cross-City at Broombridge (Liffey Junction). This LRT route would run into Finglas on a similar routing to that of LRT1, proposed by the RPA. At Ballymun the routing would continue along Santry Avenue, Coolock Lane and Oscar Traynor Road until it reaches the DART Line at Howth Junction; although the routing of the last section following Oscar Traynor Road is complex. This extension would provide interchange options with the Airport/Swords LRT at Santry and also interchange possibilities with the DART. This scheme runs to a distance of approximately 12km.

The primary corridor, via Drumcondra, meets the brief in that it links the City Centre with the Airport and Swords. Therefore only the primary route would be considered as part of this assessment.

3.12.3 Infrastructure considerations

Dorset Street and Drumcondra Road are heavily trafficked routes leading to and from Dublin City Centre, currently carrying in the region of 35,000 AADT, with congestion evident for much of the day. The route also accommodates the existing Swords QBC and proposed Swords BRT. The implementation of a light rail scheme along this route would require the full removal of the QBC/BRT lanes along Dorset Street and Drumcondra Road, and would also require the removal of (mainly) right turning facilities at many junctions. While physically possible to provide the LRT route along this corridor the traffic impact would be significant, particularly for local movements due to the reduction in the number of turning facilities. In addition, the trees along this section of the route would be negatively impacted by the overhead cables and the possible widening of the carriageway.

After the Collins Avenue junction, space is available to provide LRT infrastructure to one side of the existing carriageway, to the east of the Tunnel Portals. Space is also available along Coolock Lane (R139) to provide LRT facilities, although existing bus priority facilities may need to be removed.

Along Clonshaugh Road the cross-section is much narrower with one lane in each direction and many houses fronting onto the street. As a result significant land expropriation would be required and some residential units may need to be removed. An alternative route via the IDA Park could be considered in order to avoid these constraints, although impact on businesses could be significant.

After Clonshaugh Road the routing primarily follows agricultural land to the East of the M1, and would have to cross over the M1 on a bridge before entering the Dublin Airport Long Term Car Parking Area. The route would then travel at-grade into the proposed Public Transport Hub between Terminal 1 and 2, although there are significant challenges with the construction of this route as space is significantly constrained due to the presence of utilities above and below the ground. As a result some impact on the traffic capacity of the routes within the Airport is envisaged with this route option.

On leaving the airport the route would turn north towards Swords and would follow the R132 alignment which has sufficient space to accommodate the proposed LRT, although some land expropriation is envisaged, and traffic impact, particularly around the Airside Park, is likely as a result of a reduction in capacity of the already congested junction.

3.12.4 Impact during construction

Construction impacts on Dorset Street and Drumcondra Road would be very significant as space to facility diverted traffic is not available over much of its length. From this initial assessment it is likely that these roads would have to be closed for a prolonged period to facilitate the construction of a central running LRT system.

North of Collins Avenue, the constructability of this option improves, although significant localised impacts can be expected around Clonshaugh Industrial Estate and the Airport.

3.12.5 Environmental issues

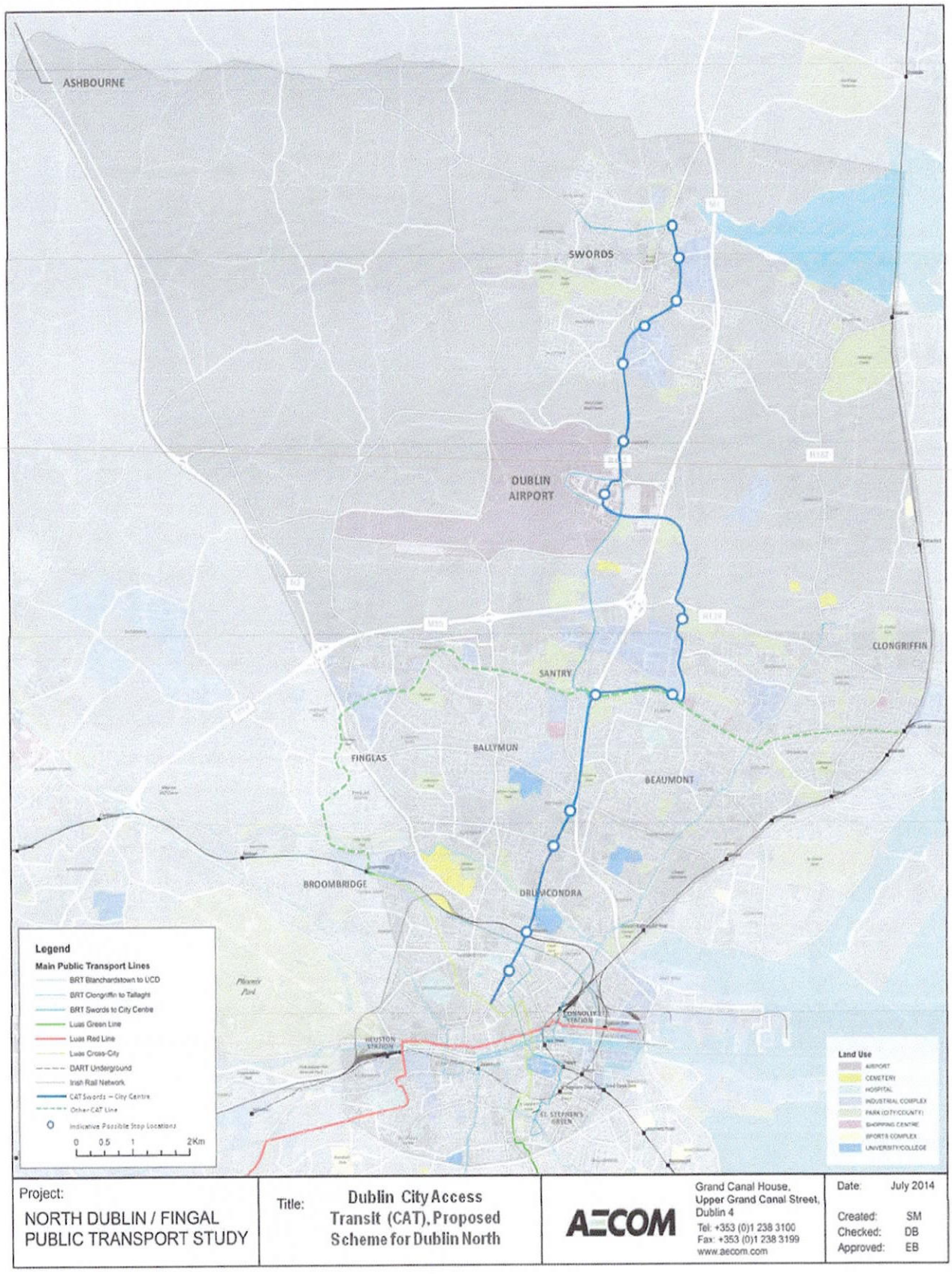
Through Drumcondra the route follows existing roads, which would limit environmental impact. However, there are listed structures along the routes some of which may be impacted by the proposed infrastructure. To the north, the route passes through agricultural land which may also generate some negative impacts. Overall, the environmental impact of this option is considered to be relatively low, although it would need to be reviewed in detail if this project was to proceed to the next stage.

3.12.6 Considerations for the appraisal process

The following characteristics of the CAT Alignment should be taken into account during scheme appraisal:

- The routing via Dorset Street and Drumcondra Road would be challenging to deliver, and would result in a significant loss of capacity for other modes on this important route into the City Centre;
- The route is relatively circuitous, and would probably need to share some sections with other services due to aforementioned alignment constraints, leading to journey times in the area of 1 hour from the City Centre to the Airport. This would not provide a competitive service as journey times are expected to be in the region of 40 minutes by bus and 20 minutes by taxi;
- The scheme does not respond well to the current transport and land use objectives set out in the Fingal and Dublin City Development plans, particularly in relation to the need for a north/south economic development corridor as it is located further to the east where development potential is limited; and
- Based on similar schemes being delivered in Ireland, the estimated cost of the scheme would be comparable with LR4 and LR5.

Figure 3.9: LR8 – City Access Transit (CAT)



STAGE ONE APPRAISAL REPORT

BUS RAPID TRANSIT



4.0 Bus Rapid Transit

Bus Rapid Transit (BRT) can be described as a bus mass transit system which uses a segregated and integrated network with highly accessible, high capacity vehicles. BRT was pioneered in South America but since the 1980s it has increasingly been deployed in Europe, Africa, the US and China as a flexible, cost effective solution for medium scale travel demand.

BRT seeks to emulate the service, performance quality, and amenity characteristics of modern light rail-based transit systems at a lower cost whilst offering a certain degree of flexibilty. As such, some of the typical design features of BRT include:

- Segregated routes with priority at junctions giving buses significant advantage over general traffic;
- Frequent and high-capacity services;
- High quality waiting and interchange facilities with platforms, shelter and information very similar to standard light rail stations;
- High-quality vehicles that are easy to board, quiet, clean and comfortable;
- Integrated fare systems with pre-paid fare collection to minimise boarding delays;
- Attractive and convenient user information and marketing campaigns;
- Modal integration, with BRT service coordinated with walking and cycling facilities, taxi services, intercity bus, rail transit, and other transportation services; and
- High level of security for transit users and pedestrians.

The potential capacity of BRT varies significantly with some systems capable of carrying up to 36,000ppdph (Bogota, Columbia) where double lanes are introduced with potential for express services. The average carrying capacity of systems currently being developed in China and the US is 6,000ppdph. In Istanbul, a large BRT network is in place with a maximum peak throughput of approximately 19,000ppdph. In France, a number of more modestly sized BRT schemes are in place across the country in Paris, Lyon and Nantes with an average peak throughout of approximately 2,000ppdph.

The success of BRT is largely focused on its ability to carry high passenger numbers with similar benefits to conventional light rail but with significantly lower costs. Studies have found that capital costs per km of light rail schemes are on average three times greater than those for BRT schemes.

Closer to home, BRT has been developed in 14 towns/cities in the UK with a further 8 under construction/planned. In Ireland, although significant experience has evolved in the past 20 years through the roll-out of Quality Bus Corridors (QBCs), BRT has not been developed until recent plans for the Swiftway BRT system were proposed in Dublin.

Swiftway is proposed to be a high quality network which uses buses on roadways or dedicated lanes to transport passengers quickly and efficiently. Swiftway offers many benefits compared to other transport solutions – including the important advantages of being relatively quick to commission, cost-effective to install and less intrusive during the construction phase compared to light rail or underground alternatives.

The proposed Swiftway network would include three BRT lines as follows:

- **Swords to City Centre:** This scheme is intended to serve the busy corridor between Swords and the City Centre, with 24 stops at key locations along the route and a potential three additional future stops identified;



- **Blanchardstown to UCD:** This scheme is intended to serve the busy corridor between Blanchardstown and UCD including the City Centre, with 34 stops identified at key locations along the route.



- **Clongriffin to Tallaght:** This scheme is intended to serve the busy corridor linking Clongriffin, the City Centre and Tallaght. While an Emerging Preferred Route has been identified between Clongriffin and Rathfarnham, work is ongoing to determine the route from Rathfarnham to Tallaght.



Planning and design of each of the three routes is currently ongoing. Public consultation on preliminary designs for the Swords/Airport route recently concluded and the design is currently being prepared for a statutory approval application in 2015. Some of the key features of the proposed Swiftway BRT network are summarised below.

Vehicle

- High quality, modern, attractive and comfortable vehicles
- Fully accessible for wheelchairs, prams and mobility impaired persons
- 18m single articulated vehicle with multiple doors to facilitate fast boarding and alighting and increase reliability
- Capacity for 120 persons per vehicle

Stops

- High quality design, with amenities similar to Luas as standard
- Level boarding from stop platforms on and off the vehicles
- Stops conveniently located to optimise catchment accessibility and service reliability
- Off-board ticketing through vending machines at stops and Leap Card ticket validation

Cost

- Construction is generally about 1/3 of the cost of a light rail system
- The construction period for BRT is often shorter than for light rail meaning that the benefits can be delivered sooner
- Typically reduced costs in relation to land and property costs as the BRT system will predominantly operate on the existing road network
- Avoids major relocation of utilities and track construction



Segregation & Priority

- High quality, smooth and level running surface
- High level of separation from normal traffic
- Uses shared Bus/BRT lane or own BRT lane
- Priority at traffic signals and junctions



Integration

- Development of a network of routes and services
- Interchanges and links with other transport nodes at key points
- Safe access to and from stops for both walking and cycling
- Cycling facilities provided at stops
- Integrated ticketing

Branding / Attractiveness

- Own distinctive brand identity to set it apart from conventional bus services
- Vehicles to have attractive livery matching the brand identity
- Coordinated use of the BRT brand at stops and on information material
- Purpose of branding is to promote a strong public and visual presence for the BRT service

The following sections set out proposals for a number of additional BRT services within the Fingal/North Dublin study area that may have the capacity to meet future demand. Each route is presented at a conceptual level and appraised in Sections 6 and 7.

4.1 BRT1. Clongriffin to Airport via Malahide

4.1.1 Scheme promoter or developer

This scheme was proposed to respond to the requirements of the study by connecting the City Centre with the Airport and Swords via the Malahide Road corridor. The scheme would act as an extension to the proposed Swiftway from Tallaght to Clongriffin and could therefore be developed in addition to, or in tandem with, this scheme.

4.1.2 General description of the scheme

This scheme is a 10.8km extension of the Tallaght/Clongriffin BRT line through Malahide, Swords and Dublin Airport. The route is proposed to provide connectivity to the large residential catchment in Malahide and Dublin Airport. Ultimately, the route would provide a connection from Tallaght and the city centre to Clongriffin, Malahide and Dublin Airport.

It is proposed that the scheme would run along the R107 to Malahide, turning west on the Swords Road/R106 and then down the R132 where bus lanes are already provided as part of the Swords BRT scheme. A possible addition to this route would be for the BRT to operate along a spur to Malahide railway station to offer connections between the heavy rail network and the Airport. This route would link Malahide to the BRT network in addition to providing a link between Connolly Station and Dublin Airport.

4.1.3 Infrastructure considerations

The R107 is a moderately busy route (estimated 10,000-17,000 AADT). It is a single carriageway route with no bus lanes between Clongriffin and Malahide at present. As such, to introduce a segregated BRT at present would be virtually impossible without acquiring significant land for development of the scheme. This may be possible as the extent of active frontage on the route is relatively limited in parts. The introduction of segregated facilities along various sections of the route could be combined with improved priority at junctions and bus stops to minimise journey times. It is noted that the Fingal Development Plan 2011-2017 includes a road upgrade/realignment of the R107 Malahide Road as well as an East-West Distributor Road. This proposed BRT scheme could therefore be incorporated into that upgrade.

At Malahide, it is proposed that the route would turn west on the R106. A spur to connect with Malahide Train Station is also recommended although this would add significant journey time, especially for travellers to the Airport from locations south of Malahide.

As there is no junction between the R106 and the M1, the proposed service would connect with the R132 in Swords and utilise the existing BRT lanes to connect to the Airport. This route would provide access to the Airside Business Park where the service would interchange with the Swords BRT service.

4.1.4 Impact during construction

Construction impacts will be limited to movement along the R107 and R106. Should land be acquired along this corridor, it may be possible to limit construction impact. Additional impact would be expected at junctions were additional lanes may be required and signals upgraded.

4.1.5 Environmental issues

A review of environmental concerns along the proposed alignment suggests that protected structures along the R107 may present an obstacle to acquisition of land for segregated bus lanes. In addition, lands on either side of the R107 are protected by the following policies from Fingal CDP 2011-2017:

- OS - Preserve and provide for open space and recreational amenities;

- GB - Protect and provide for a Greenbelt area; and
- HA - Protect and enhance areas of high amenity.

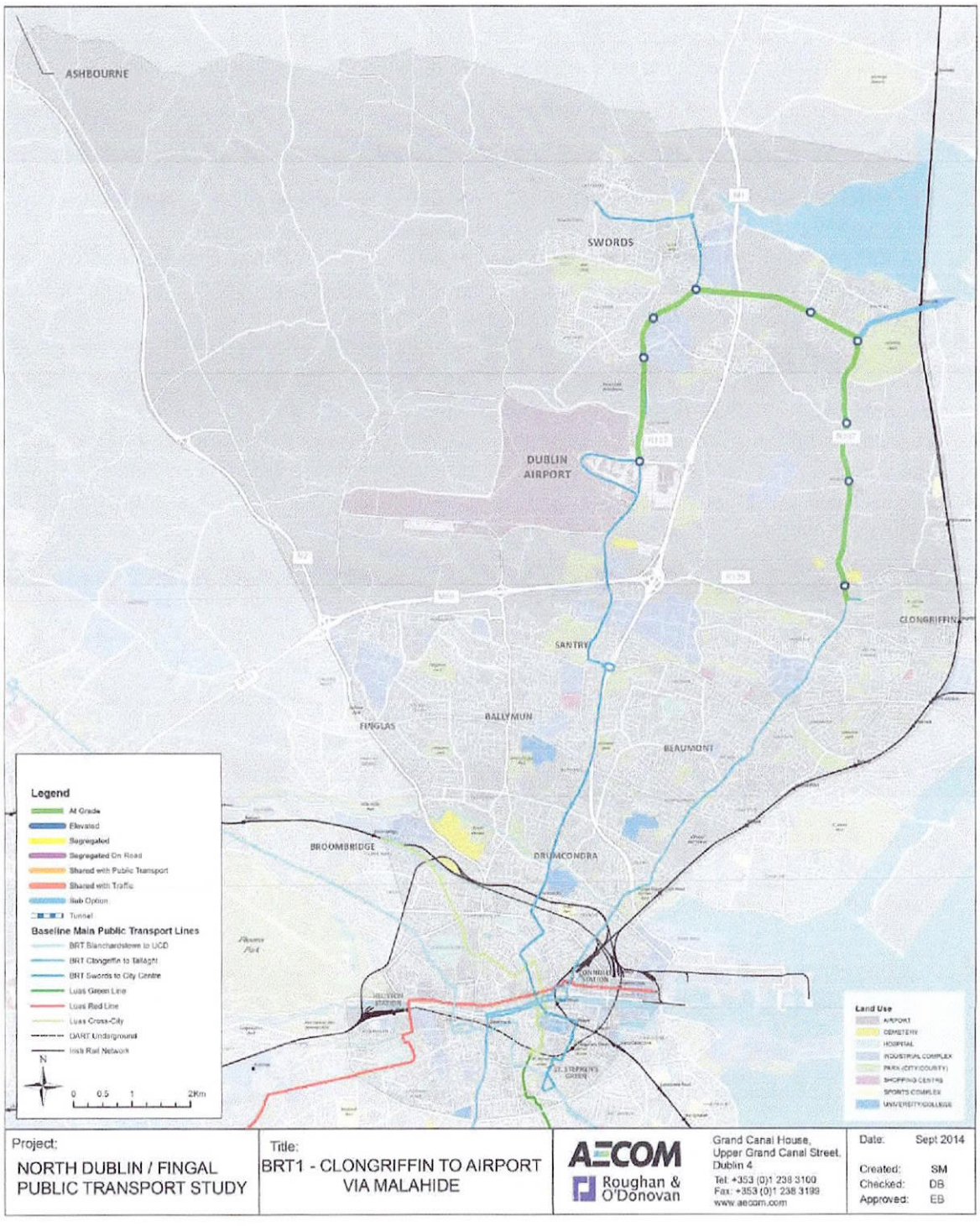
It is concluded that the proposed scheme could have a significant environmental impact. Further development of the scheme would be subject to more detailed environmental appraisal.

4.1.6 Considerations for the appraisal process

The following characteristics of BRT 1 should be taken into account during scheme appraisal:

- The scheme is deliverable from a technical perspective and would utilise approximately 3km of existing bus lane within its overall 10.8km length;
- The route is relatively circuitous leading to journey times in excess of 50 minutes from the City Centre to the Airport. This would not provide a competitive service as current bus journey times are 40 minutes by bus and 20 minutes by taxi;
- The route does not serve the centre of Swords but would connect with proposed development areas to the east of Swords and provide interchange with the proposed Swords BRT at the Swords Central, Swords South, Airside and the Airport stops;
- Capacity along the route would be limited to 7,000 ppdph assuming high frequency services.
- The scheme does not respond well to the current transport and land use objectives set out in the Fingal and Dublin City Development plans, particularly in relation to the need for a north/south economic development corridor; and
- Based on similar schemes being delivered in Ireland, the estimated cost of the scheme would be €80m-€100m.

Figure 4.1: BRT 1 Clongriffin Airport via Malahide



4.2 BRT 2 Clongriffin to Airport

4.2.1 Scheme promoter or developer

This scheme was proposed as a means of accessing the Airport directly from the proposed Tallaght/Clongriffin BRT and Clongriffin DART Station. The scheme would act as an extension to the proposed Swiftway from Tallaght to Clongriffin and could therefore be developed as part of this package by the NTA.

4.2.2 General description of the scheme

This scheme would involve an 8.9km extension of the proposed Tallaght/Clongriffin BRT line that would run from Clongriffin Train Station to Dublin Airport. The BRT service would initially run along Main Street in Clongriffin where an existing bus lane is in place for approximately 1 km. The service would then run along the 'Hole in the Wall Road' where a bus lane is in place before turning right onto the R139 which has a bus lane is place for the majority of its length to the M1.

The route would connect to the proposed Swords BRT route at the airport and could be delivered relatively inexpensively. It would improve connections from across the Dublin Area to the Airport by connecting rail and BRT routes. If a high level of segregation is not provided, journey times could be quite dissuasive.

4.2.3 Infrastructure considerations

As outlined above, the proposed route would predominantly use existing bus lanes for its entire length. The main infrastructure works required would be minor and involve upgrades at junctions along the R139 and at the M1. In order to provide a greater level of priority for the BRT, the potential to designate a bus only lane during peak hours on the M1 could be investigated.

4.2.4 Impact during construction

The impact during construction of the proposed route would be minimal and would be limited to junctions, bus stop upgrade and potential works along the M1.

4.2.5 Environmental issues

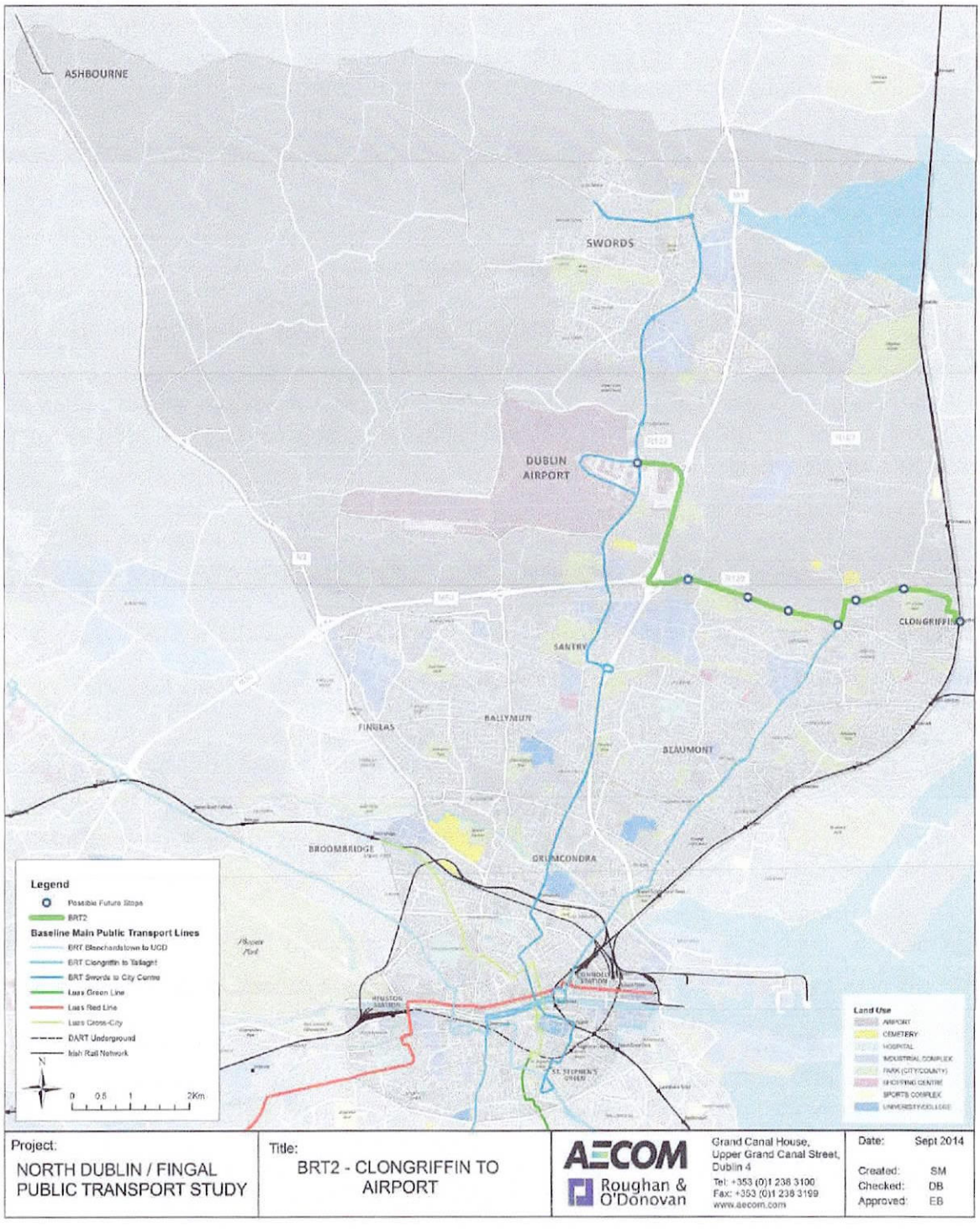
An assessment of the environmental constraints along the proposed option has concluded that there are no likely significant impacts of the proposed scheme. This is largely due to the fact that proposed work will be restricted to the existing carriageway.

4.2.6 Considerations for the appraisal process

The following characteristics of BRT 2 should be taken into account during scheme appraisal:

- The proposed route does not connect with Swords directly and therefore does not align with the overall objective of the feasibility study.
- The scheme is technically feasible and would be relatively inexpensive to deliver due to its short length.
- The scheme would provide an excellent level of integration with existing services by extending the proposed BRT to Clongriffin Station and the Airport.
- Capacity along the route would be limited to 4,500 ppdph assuming high frequency services.
- The scheme does not respond well to the current transport and land use objectives set out in the Fingal and Dublin City Development plans, particularly in relation to the need for a north/south economic development corridor.

Figure 4.2: BRT 2 Clongriffin to Airport



4.3 BRT 3. City Centre to Airport via Ballymun

4.3.1 Scheme promoter or developer

This scheme was proposed as a means of accessing the Airport directly from along an alternative corridor to that already proposed. This proposed route would follow a similar alignment to the proposed Metro North.

4.3.2 General description of the scheme

BRT 3 is a 11.2km route from the City Centre to the Airport via Ballymun. It would extend the BRT network serving the Dublin Area, offering direct connections from the city centre to Grangegorman, Phibsborough, Glasnevin, Ballymun, Santry and an additional BRT link to the Airport.

This route would start on King Street North where it would provide interchange with the proposed Blanchardstown/UCD BRT route. It would then run northwards along the R108 to Ballymun and the M50. The route would then link to the Airport through the Old Airport Road from the R108/M50 interchange. An alternative option would be to follow the M50 and M1 to Dublin Airport.

4.3.3 Infrastructure considerations

Providing a high standard of BRT within the north inner city will be difficult to achieve because the current road network is heavily trafficked, quite narrow and serves a large residential area. Restricting traffic movements in the area would therefore be very difficult to achieve without significantly impacting upon access.

North of Glasnevin, the R108 is much wider with existing bus lanes which could be used for BRT. In these areas, junctions would require upgrade to prioritise BRT.

From the M50 to the airport the BRT could either follow the existing M50/M1 motorway network or the R139 where the potential to introduce segregated facilities could be investigated.

4.3.4 Impact during construction

Depending on the delivery approach taken, delivery of a BRT along the R108 could present significant delays both during and after construction. Unless the route is given priority, especially in the North Inner City area, it is unlikely to deliver the level of journey time benefits required to justify the cost.

4.3.5 Environmental issues

An assessment of the environmental constraints along the R108 suggests that the greatest constraints would be the adverse environmental and safety impact generated by traffic diverting through residential areas following reduced capacity on the main arterial routes.

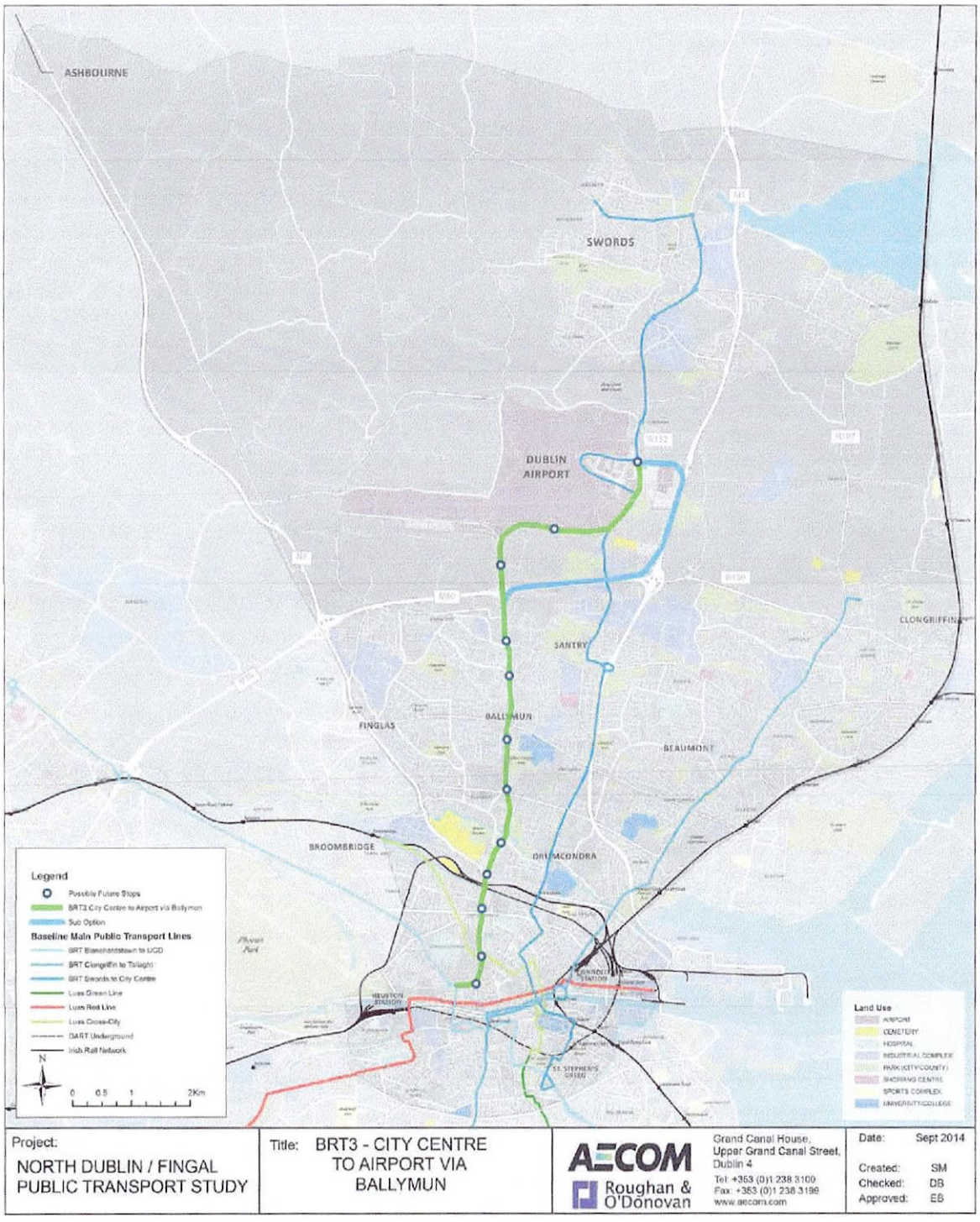
4.3.6 Considerations for the appraisal process

The following characteristics of Route BRT 3 should be taken into account during scheme appraisal:

- This scheme would not connect directly with Swords but provide an interchange at the Airport to connect with the Swords Swiftway.
- Although delivery of a BRT route on the R108 is technically feasible, it is likely to generate significant disruption to existing traffic, especially in the North Inner City and Phibsborough. Restricting use of the R108 to traffic in these areas is likely to have a significant negative impact on traffic congestion in area and on residential areas along the corridor.
- The scheme would provide a good fit against transport and land use policies for the area. However, unless a high quality, high priority BRT could be delivered these benefits are unlikely to materialise.
- Capacity along the route would be limited to 4,500 ppdph assuming high frequency services.

- The scheme does not provide direct integration with existing rail services due to its proximity to stations.

Figure 4.3: BRT 3 City Centre to Airport via Ballymun



4.4 BRT 4. Docklands to Swords via Tunnel

4.4.1 Scheme promoter or developer

This scheme was proposed as a means of providing a direct, fast route to the Airport and Swords. This route is quite similar to current express service to the Airport and Swords (747, Swords Express).

4.4.2 General description of the scheme

This route would run from Dublin's Docklands to the Airport through the Port Tunnel. On exiting the tunnel, the BRT service would run along the M1 and connect to the Airport via the R132. At the Airport, this service would connect to the Swords BRT route providing the possibility of interchange for some services. Overall, 12.6km of new BRT lanes would be provided or upgraded, excluding the Port Tunnel.

To provide shorter journey times, the central reservation of the M1 could be used by the BRT on exiting the Tunnel. This would then ramp up to an elevated section which would connect into the Airport junction and provide access to the Airport via the R132.

This option would provide the additional benefit of fast journey times between the City Centre and the Airport/Swords but with fewer stops and catchments served.

4.4.3 Infrastructure considerations

One of the main infrastructure considerations for this study is the feasibility of using the Tunnel for the BRT service. This would need to be developed in partnership with the NRA in addition to proposals for the elevated ramp to the Airport junction.

4.4.4 Impact during construction

If the M1 and R132 are used to access the Airport then the proposed infrastructure work would be limited. However should the M1 median be utilised this would require significant traffic management on the M1 during construction.

Should an elevated ramp be developed to provide access to the airport from the M1 this would have significant impacts on operations along the M1. Impacts during construction on the Tunnel would be limited due to the high quality carriageway and safety precautions already in place.

4.4.5 Environmental issues

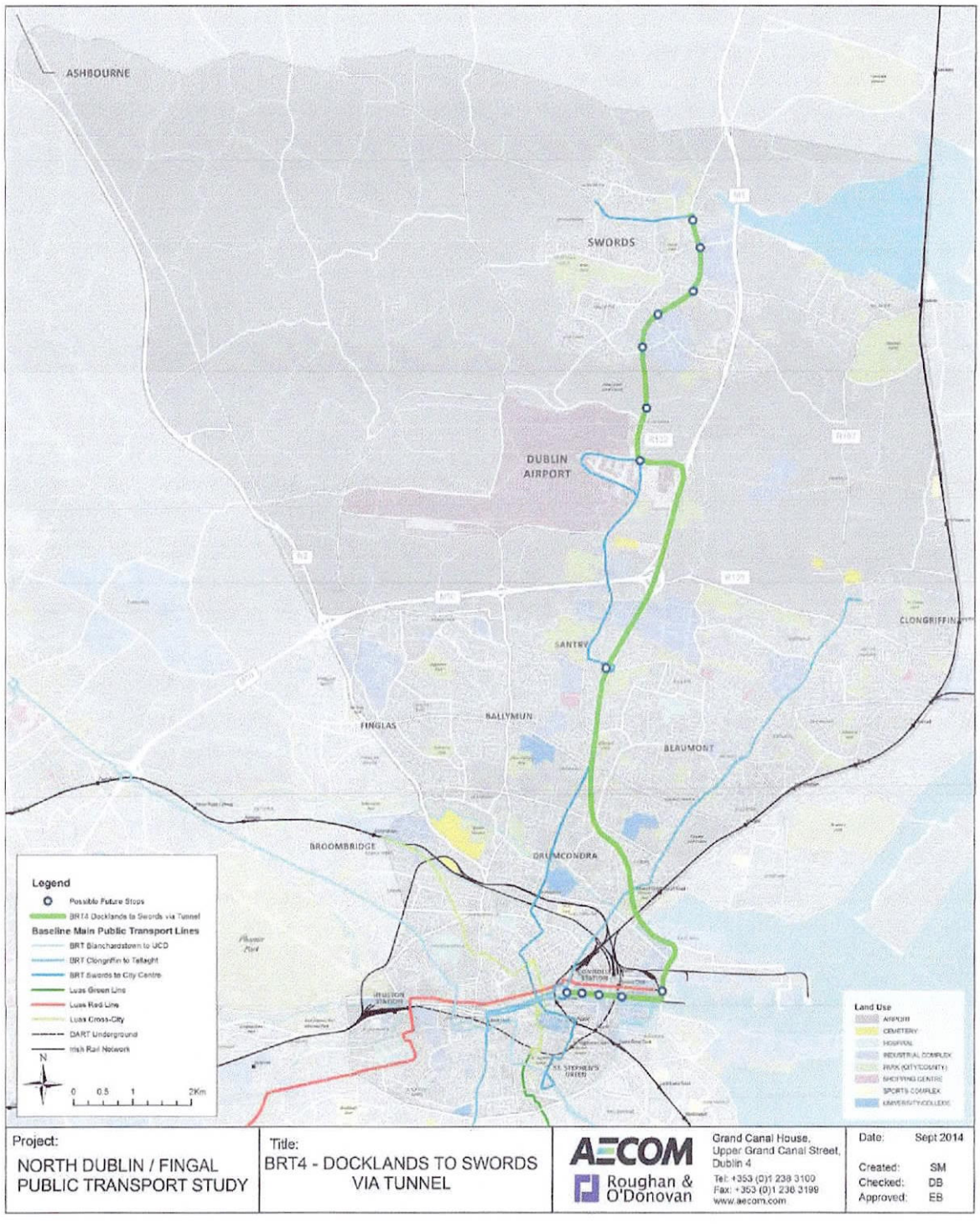
An assessment of the environmental constraints along the proposed route has concluded that there are no likely significant impacts of the proposed scheme.

4.4.6 Considerations for the appraisal process

The following characteristics of Route BRT 4 should be taken into account during scheme appraisal:

- The scheme is technically feasible but will need significant NRA involvement to ensure the impact upon tunnel traffic during construction is minimised;
- The route will act purely as a direct route from the City to the Airport and Swords with limited catchment served in-between these three nodes;
- The route would have a cost estimate of €100 - 130m;
- BRT vehicles, similar to buses with standing passengers, are subject to a speed limit of 60kph. The impact of such a service on tunnel capacity and safety would require detailed consideration;
- Capacity along the route would be limited to 4,500 ppdph assuming high frequency services;
- The scheme would provide a good level of public transport integration, connecting with the existing rail network and the proposed DART Underground in the Docklands as well as the proposed Swords BRT at numerous stops at the airport and further north.

Figure 4.4: Option BRT4 Docklands to Swords via Tunnel



4.5 BRT Option 5 : Combination of BRT 2,3 and 4

4.5.1 Scheme promoter or developer

This package of BRT schemes was proposed as a means of providing greater access to the Airport and Swords from the City Centre across a wider catchment area. The package combines each of the proposed BRT lines outlined above (2, 3 and 4).

4.5.2 General description of the scheme

This scheme combines BRT2, BRT3 and BRT4 to provide an additional 32.7km of BRT lane provision. This option would strengthen the Swords to City Centre corridor whilst significantly increasing the destinations served by the proposed Swiftway BRT system to include Ballymun, Phibsborough, Clongriffin (with DART connection), Dublin Docklands and Connolly Station.

4.5.3 Infrastructure considerations

A summary of the main infrastructure considerations as outlined above for these options includes:

- **BRT 2:** Limited new infrastructure required;
- **BRT 3:** Securing prioritisation for BRT through the North Inner City; and
- **BRT 4:** Use of the tunnel for BRT and the feasibility of any prioritisation.

4.5.4 Impact during construction

A summary of the construction impacts of the three proposed options is as follows:

- **BRT 2:** The impact during construction of the proposed route would be minimal and would be limited to junctions, bus stop upgrade and potential works along the M1;
- **BRT 3:** Could present significant delays during and after construction; and
- **BRT 4:** If the M1 and R132 are used to access the Airport then the proposed infrastructure work would be limited however significant traffic management required if M1 median utilised.

4.5.5 Environmental issues

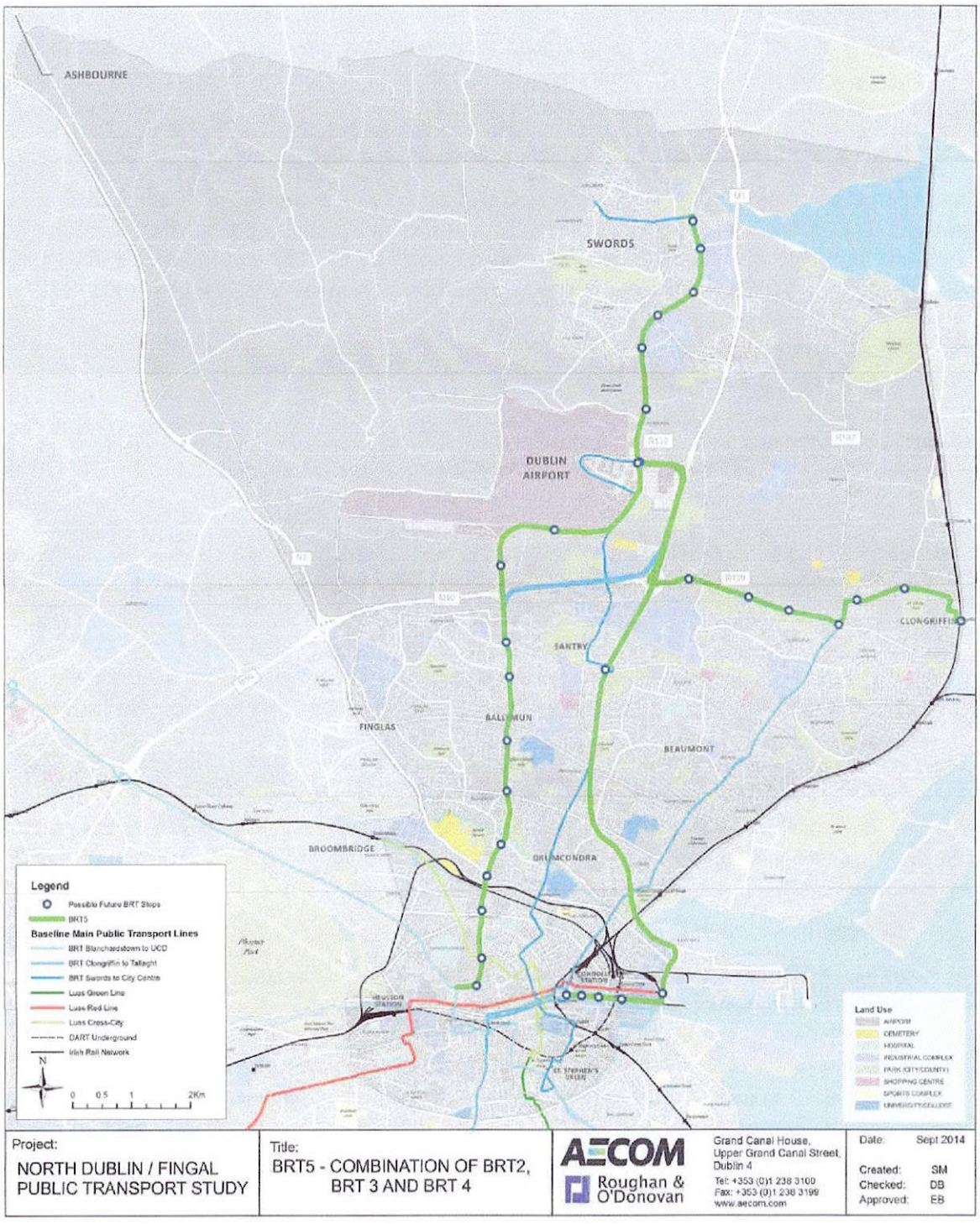
The only environmental constraints identified by the overall package of BRT options is the potentially adverse impact due to rat running and diverted traffic following construction of a BRT with priority on the R108.

4.5.6 Considerations for the appraisal process

The following characteristics of a package of BRT routes through the study area should be taken into account during scheme appraisal:

- The combined package of routes covers an extensive catchment area.
- Each of the routes is technically feasible, subject to further scheme development.
- Although each individual route is relatively cost effective, the combined package of routes is estimated to cost between €250 - 330m. As such, the network would be expected to present significant benefit to the commuter.
- The capacity of each individual route would be no greater than 4,500 ppdph assuming high frequency service patterns.
- The capacity and safety aspects associated with routing the BRT service through the Dublin Port Tunnel.

Figure 4.5: Option BRT5 – Combination of BRT 2, 3 and 4





COMBINED OPTIONS

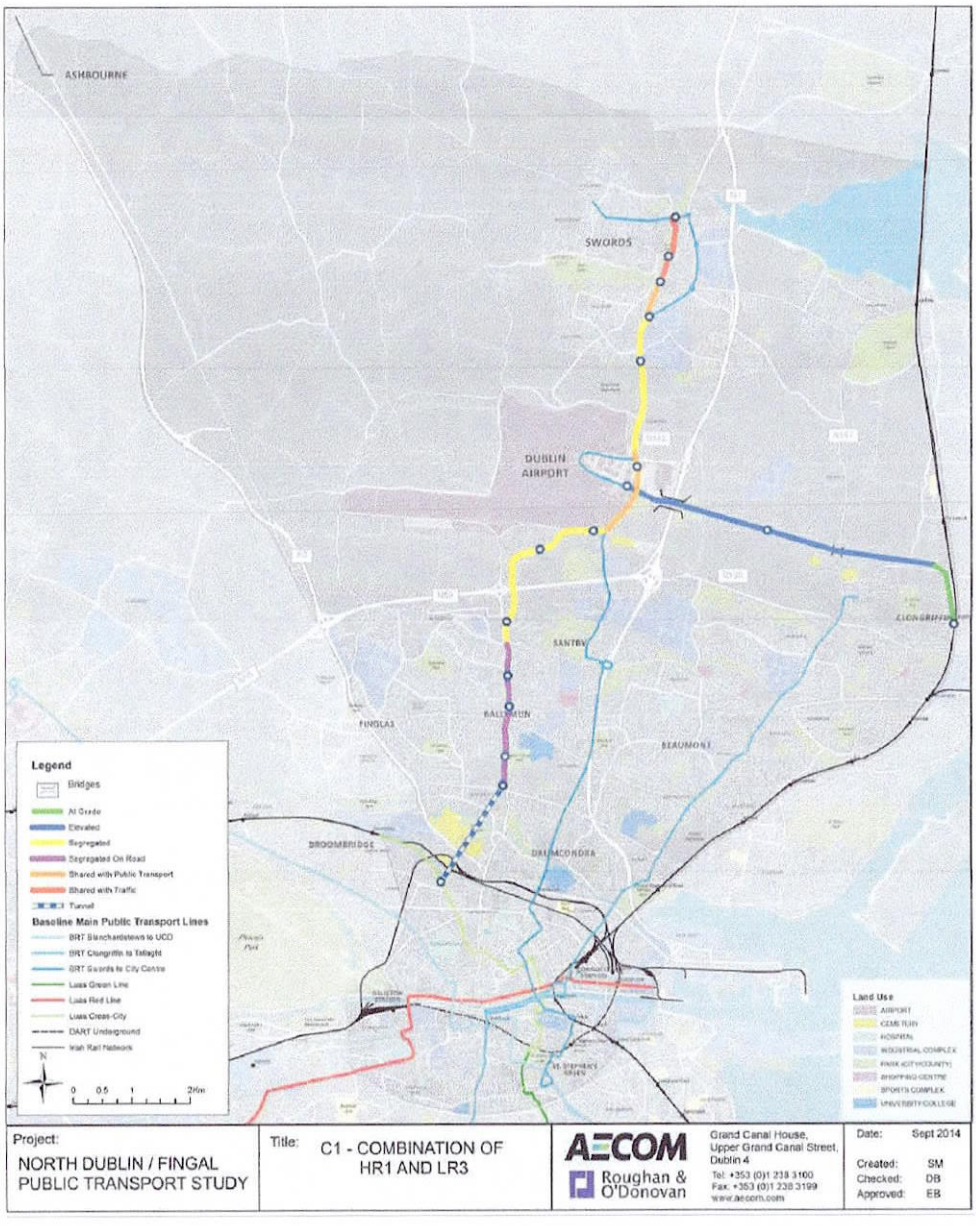
5.0 Combined Options

In addition to setting out separate scheme options for each mode, combinations of schemes are proposed where they could present advantage in responding to the project objectives. Each 'combination' is set out in the following sections.

5.1 C1. Combination of HR1 and LR3

This scheme would combine HR1 - a heavy rail scheme from the Northern Line to the airport – with LR3 - a Luas line from the Luas Cross City at Cabra to Swords. Passengers from Swords could therefore benefit from a direct access to the City Centre with Luas, while from the airport, passengers could benefit from both heavy rail and light rail services to reach the City Centre. This option was suggested during the stakeholder workshop and received the support of both Irish Rail and the RPA. This option overcomes the issue of HR1 not serving Swords, a requirement of the study.

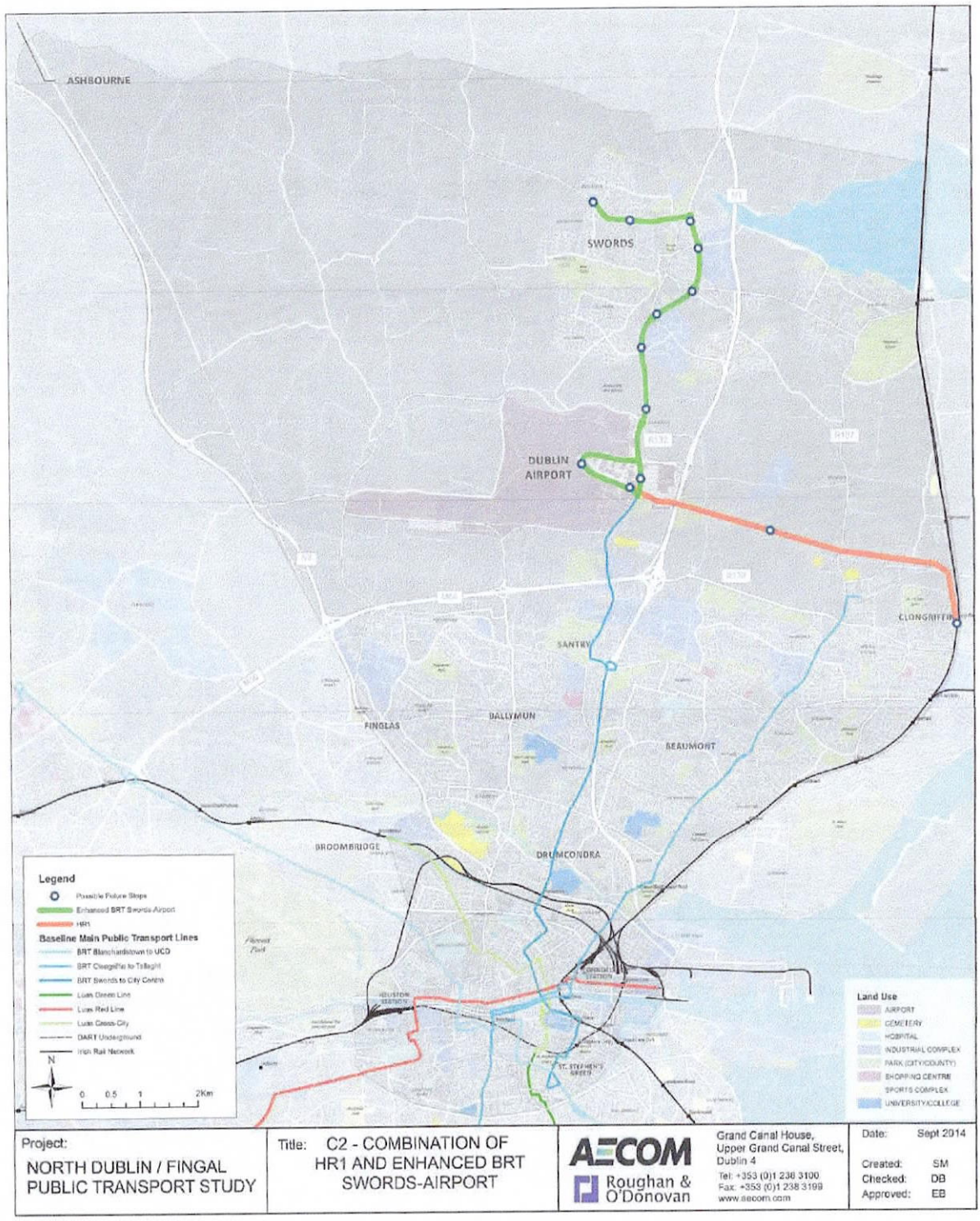
Figure 5.1: Option C1

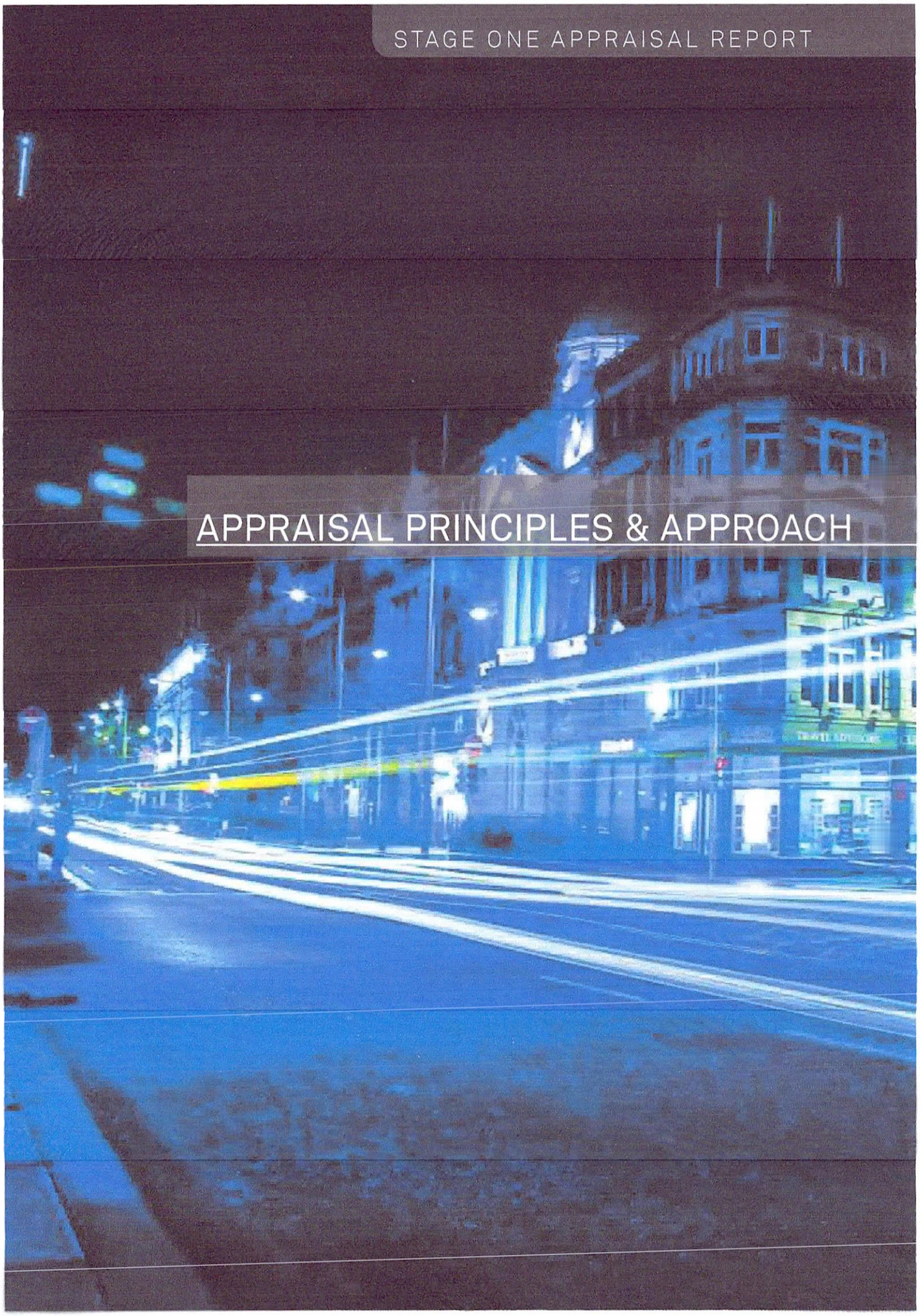


5.2 C2. Combination of HR1 and high-capacity BRT Swords-Airport

This scheme was suggested as an enhancement of the proposed Irish Rail scheme from Clongriffin to the Airport. It would combine the rail spur with an enhanced high-capacity 5km BRT line to Swords. This BRT would have full segregation from traffic, a high level of priority at junctions and could operate with high-frequency. An interchange would be required at the airport for passengers from Swords to connect to the rail network.

Figure 5.2: Option C2





APPRAISAL PRINCIPLES & APPROACH

6.0 Appraisal Principles and Approach

6.1 Introduction

As outlined in Sections 2 to 5, a long list of 25 suggested options to meet the transport needs of the study area have been identified. The next step in this study is to carry out a preliminary or "sketch" appraisal of all of these options to identify a short list that should be taken forward for further investigations and a full appraisal. This section of the report describes the principles and process that were adopted for the preliminary appraisal. Results of the appraisal are outlined separately in Section 7.

6.2 Guidelines for Appraisal

The Public Spending Code and the Common Appraisal Framework for Transport Projects and Programmes govern the appraisal of public capital investments. The current official guidance on the application of the 'Guidelines on a Common Appraisal Framework (CAF) for Transport Projects and Programmes' published by the Department of Transport (DoT, now DTTAS), June 2009, requires schemes to undergo a 'Multi-Criteria Analysis' (MCA) under the following criteria;

- Economy;
- Safety;
- Environment;
- Accessibility and Social Inclusion; and
- Integration.

A full appraisal of a proposed transport scheme under the Economy criterion requires a full cost-benefit analysis is undertaken in respect of the principal options identified. The purpose of this preliminary appraisal is to identify these "principal options" to be taken forward for full appraisal in line with the CAF.

The approach devised is based on identifying readily available measures that will predict how an option would be rated under each of these five criteria when a full appraisal was carried out. In this way, we can ensure that the short list of options taken forward for full appraisal includes the optimum options that would be identified as the best approach if all 25 options in the long list were subjected to a full appraisal.

In order to make the analysis more tractable, the focus was on three of the criteria that are most relevant to strategy development viz:

- Economy;
- Integration; and
- Environment

The Economy criterion embraces the effectiveness of the options and the efficiencies to which they give rise.

Integration concerns the compatibility of the options with land use plans and policies, as well as physical integration issues such as interaction with other modes and the rest of the public transport network.

The Environment criterion includes an impact assessment of scheme options on a range of environmental aspects such as air quality, noise, landscape and visual quality, biodiversity, cultural, archaeological and architectural heritage.

Each of the remaining criteria, Safety and Accessibility and Social Inclusion will be assessed in more detail at the next stage of appraisal.

6.3 Screening

As a first step, two screening questions were posed in relation to each of the options. Options that did not receive a positive answer to both of these questions were rejected and not considered further in the appraisal process. The screening questions were:

- Is the scheme technically feasible?; and
- Does the scheme meet the fundamental project objectives by providing public transport for travellers between Dublin City Centre, Dublin Airport and Swords.

6.4 Coding

A three colour coding system was established to summarise the performance of each option under each of the three appraisal criteria as shown in Figure 6.1.

In general, an option has been rated green if it presented advantages over other options, amber if neutral relative to other options and red if it presented disadvantages compared to other options.

Figure 6.1: Colour coding used for the appraisal table

Colour	Description
	Some advantages over other options
	Neutral compared to other options
	Some disadvantages over other options

6.5 Preliminary Measurement of "Economy" Criterion

The full appraisal of the economic impact of a transport investment is based on measuring the full economic benefits of the proposal for travellers and others, and the full costs of the proposal. For this preliminary appraisal, a number of variables were identified which could act as an appropriate proxy for potential benefits of the option. The purpose of these proxy measures for economic benefits was to allow an assessment of the relative amount of benefits that each option could be expected to deliver.

In addition, parameters were devised to allow the calculation of preliminary estimates of the capital cost of each option. The purpose of these preliminary estimates of costs is to allow an assessment of the relative costs of each option.

Taken together, the proxies for benefits and the preliminary estimates of capital cost, allow an appraisal of the relative economic impacts of the options identified at this stage.

Catchment per kilometre of additional route

The effectiveness of any option is determined in large part, by the extent to which it can attract passengers and thus deliver economic benefits. Modelling of passenger demand was not feasible at this preliminary appraisal stage. However, indicators of potential demand per kilometre of additional public transport route provided were used in order to assess the relative economic efficiency of the options.

The first indicator of potential demand was the projected future population and employment in the catchment areas of the additional routes to be serviced by each option. This was assessed by considering the stations/stops associated with each network option and the catchment areas associated with them. The total catchment population per route kilometre served by each option was then calculated.

The second indicator of potential demand was the projected job numbers in the route catchments. This indicator was included for two reasons:

- it would help reflect the capacity of each option to cater for commuter traffic, plus the transfer from the car usually provides significant benefits in the form of congestion alleviation; and
- it would provide an indicator of wider economic benefits associated with the options, which focus on the extent to which transport networks widen labour markets and increase the potential for inter-firm interactions.

The population and level of employment in the catchment area of each option was measured by:

- Using the zone structure for the Greater Dublin Area defined by the NTA for modelling purposes;
- Deriving forecasts of future population and employment in each zone based on the NTA's central growth scenario;
- Defining a physical catchment area of each option based on a 1km radius around light and heavy rail stops and a 600m radius around BRT stops (new stops only);
- Estimating the future population and employment level of each new catchment area served by summing the full population of any zones that fall completely within a catchment area and a proportion of the population and employment of any zones that fall partly within a catchment area. This proportion was equal to the proportion of the area of the zone that fell within the catchment area.

There was a wide variation in range for population and employment per route kilometer catchment across the study area. For example, the minimum population was approximately 1,300 while the maximum was 8,400. Similarly, the minimum employment catchment was 700 and the maximum was 11,700.

Based on these values, coding was assigned to threshold bands for population and employment as set out below:

Table 6.2: Coding for population and employment catchments

Code	Pop or Employment per Km	Total Population and Employment
	> 5,000	>10,000
	2,000 to 5,000	4,000 to 10,000
	<2,000	< 4,000

Journey Times

The efficiency of each option involves consideration of the level of service offered in terms of reduced journey times. Values for journey times for each of the options were derived from the following sources:

- Metro North journey times were based on information made public by the RPA in connection with the scheme;
- Heavy rail journey times were based on the average speed on the existing system between Connolly and Clongriffin, according to the Irish Rail 2014 timetable. While this is an acceptable approach for this 'high level' stage of project development, it is acknowledged that some heavy rail options could have shorter journey times owing to express services and longer distances between stations;

- Light rail journey times were based on the RPA projections prepared for each option[7] or the average speed of these services where specifics were not available; and,
- Although average journey speeds for BRT range from 20-25kph, the BRT journey times for the purpose of appraisal were based on the current estimates from design work on the Swords Swiftway[8].

It should be noted that only in-vehicle time has been taken into account. Additional time for access, egress and interchange are taken into account through the 'Integration' criterion.

The average speeds assumed are outlined in Table 6.3.

Table 6.3: Average Speeds (including dwell times)

	Speeds (kph)
Metro	34
DART	31
Luas	14-27 depending on precise route
BRT	26

Based on these values, codes were assigned to bands of values for journey times as follows:

Table 6.4: Colour codes, journey times

Code	**Swords-City Centre**
	< 30 min
	30 to 45 min
	> 45 min

[7] RPA, Luas D1: Analysis of route options, Oct 2013, page 41, for LR2 journey times.
RPA, Luas Line D2 to Airport-Swords: Concept Design Report, June 2014, page 41, for LR3 journey times.
RPA, Luas D2 to Airport-Swords: Analysis of route options, page 41, for LR4 and LR5 journey times – used as well to derivate LR8 journey times based on LR5 average speed.
RPA, North Dublin Transport Study, Metro and Light Rail Options, Aug 2014, pages 4-5, for LR7 journey times

[8] Based on consultation with the design team currently developing the Swiftway proposal, as authorised by the NTA, and the information released as part of the public consultation held in Oct/Nov 2014.

Capital Cost

The overall indicative cost of implementing each scheme is used as a measure of economic efficiency in the appraisal. Costs generally comprise the capital costs of infrastructure and vehicles/rolling stock as well as operational and maintenance costs. However, it was decided to assess capital costs only for practical reasons and because all the other costs are dependent on the level of service that vary over the lifetime of the transport system.

An "order of magnitude" level estimate of the cost of each option was calculated based on a common set of parameters of the cost per km and cost per station of each mode. This was developed based on an assessment of similar recent/planned schemes in the Irish context. The costs were then checked against current industry standards at present costs.

The parameters used are not intended to give an estimate of the cost of actually implementing any of the options, merely to indicate the likely relative cost of options. The parameters used are set out in Table 6.5.

Table 6.5: Parameters, Capital Costs

Mode	Type	Cost Min (€m)	Cost Max (€m)	Unit
BRT	Tunnelled	n/a	n/a	per km
	At grade	€6.4	€8.3	per km
LRT	Tunnelled	€70	€130	per km
	At-grade	€28	€40	per km
	At-grade Station	€1.3	€2.6	per station
	Underground Station	€44.6	€118.9	per station
Heavy Rail	Tunnelled	€ 145	€ 170	per km
	At-grade (greenfield site)	€ 17	€ 25	per km
	At-grade Station	€ 9	€ 14	per station
	Underground station	€ 120	€ 145	per station

These parameters were derived from a review of business cases and studies for specific current projects and proposals[9]. An additional factor was applied to each value to account for risk and contingencies at this early stage of project development. These were reviewed and verified by AECOMs cost estimation team.

The maximum values per kilometre, or per unit, from the above table were applied to each proposed option. Codes were then assigned to each scheme cost based on the overall threshold set out below:

[9] The parameters for BRT costs were based on a feasibility study for the Swiftway BRT prepared for the NTA in June 2014. The parameters for LRT costs were based on an RPA study of Metro and Light Rail options for North Dublin Transport from August 2014. The heavy rail parameters were based on Cost estimates of the DART Underground project prepared for Irish Rail, and previous Irish Rail business cases.

Table 6.6: Coding used for Capital Costs

Code	Capital Cost
	< €1bn
	€1bn - €1.5bn
	>€1.5bn

6.6 Preliminary Measurement of "Integration"

The appraisal of each proposed option in relation to integration impact was based on a qualitative assessment of the following criteria on each proposed scheme:

- Compatibility with Land Use Planning Policies;
- Integration with Public Transport Networks; and
- Integration with Other Modes.

The coding applied to each option in relation to integration impact was as follows:

Table 6.7: Coding applied for Integration Criteria

Code	Impact
	Very Good
	Good
	Fair

Compatibility with Land Use Planning Policies

Further development of Swords and the Airport are key features of land use policy for the study area. While the initial screening process ensured each option connected with these areas, the appraisal also considered the extent to which the proposed options supported the development of Swords and the airport.

The general thrust of planning policy for the study area, as identified in the Strategic Context Report, focused on:

- The consolidation of land uses in the city centre, gateways and other focal points; and
- The use of transport infrastructure and particularly rail-based infrastructure to support the consolidation of activity.

The implications of these aspects of land use policy have been included in the land use scenario underpinning the Do-Minimum Strategy. As a result, they have been broadly assessed under the Economy criterion, when population and job numbers in the catchment were calculated.

A further consideration is the extent to which different options have the capacity to deliver the required land use distribution. Land use decisions are made by private decision-makers, whether property developers or consumers such as house buyers or companies setting up commercial premises. While there is a general consensus that rail systems have land use impacts that ordinary bus services do not, it is not clear that this conclusion holds for BRT services.

Integration with Public Transport Networks

Public transport integration incorporates two aspects, as follows:

- The extent to which each of the options offers services that avoid the need to interchange with other public transport services to complete journeys within the Dublin City-Airport-Swords corridor; and
- The ease with which each of the options offers services that facilitates public transport based journeys to destinations off the Dublin City-Airport-Swords corridor.

With regard to the former, it is appropriate to consider two journeys: Dublin City – Airport and Dublin City-Swords and assess the extent to which interchange is required to complete these journeys. Where interchanges are required, the quality of that interchange is also assessed.

The second criterion considers the extent to which the option has connectivity with other rail, light rail and proposed BRT services. As ordinary bus services are relatively ubiquitous, connectivity with these services is unlikely to prove a discriminating attribute. Access to stations was also looked at, as some options would offer a more local level of service with more frequent stops.

Integration with Other Modes

As all options serve the airport, this criterion relates to the ease of transfer to the air mode that is offered by each option. At this stage of project delivery, the precise level of connectivity to the airport is yet to be determined. For this reason, each option has been rated as 'Good' in this regard.

6.7 Preliminary Measurement of "Environment"

An environmental constraints assessment was undertaken for each of the proposed options using the following criteria:

- Historical Environment (Cultural Heritage);
- Natural Heritage/Environmental Topics;
- Plan Policies/Zoning; and
- Nature Development Areas within each local authority.

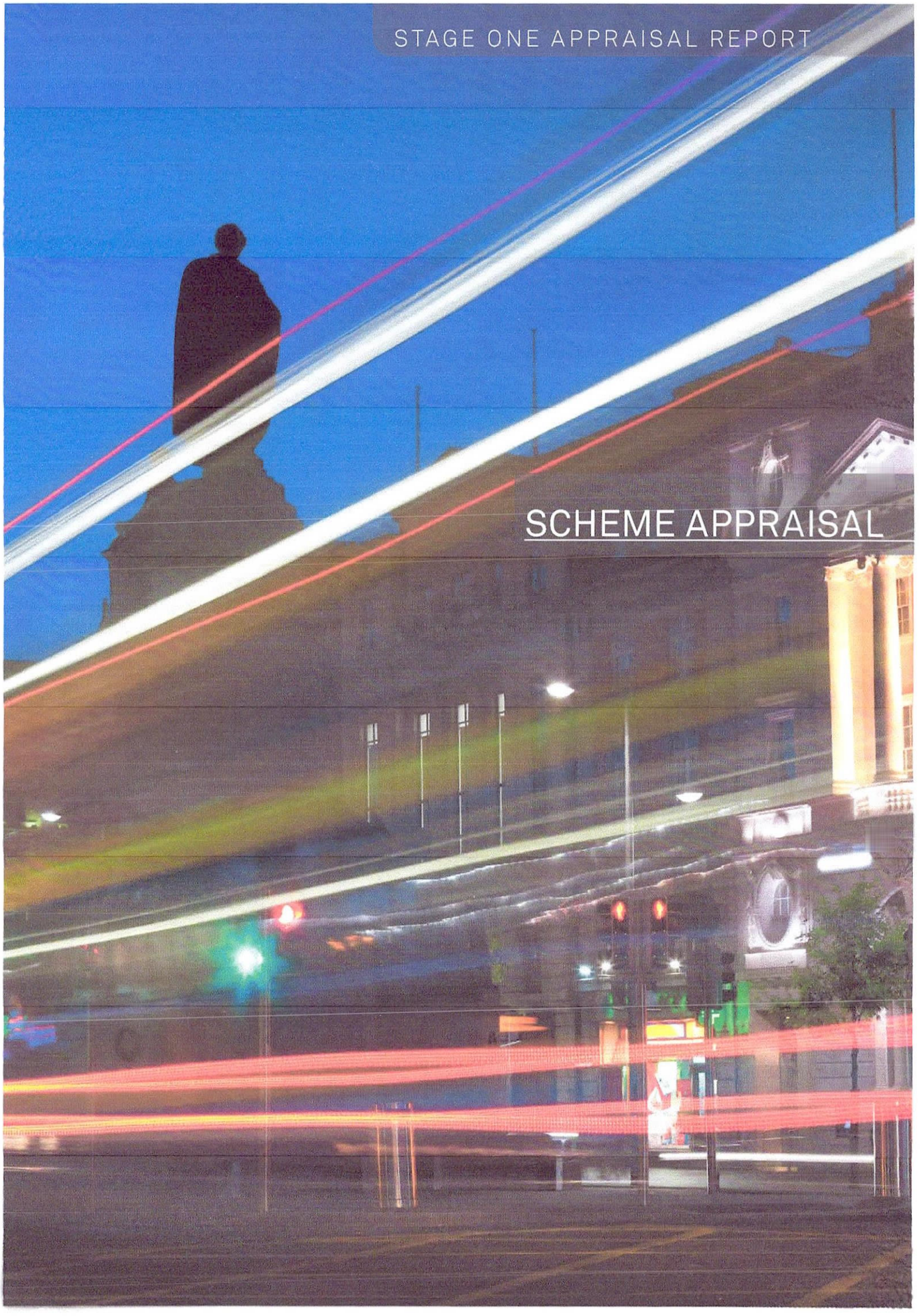
Based on the analysis provided, a conclusion was drawn as to whether each option had negligible, moderate or significant (negative) environmental impacts. This was recorded on the appraisal table using the coding outlined below.

Table 6.8: Coding used for Environmental Criterion

Code	Impact
	Negligible
	Moderate
	Significant

Application and results of the preliminary appraisal are outlined in the next section.

STAGE ONE APPRAISAL REPORT



SCHEME APPRAISAL

7.0 Scheme Appraisal

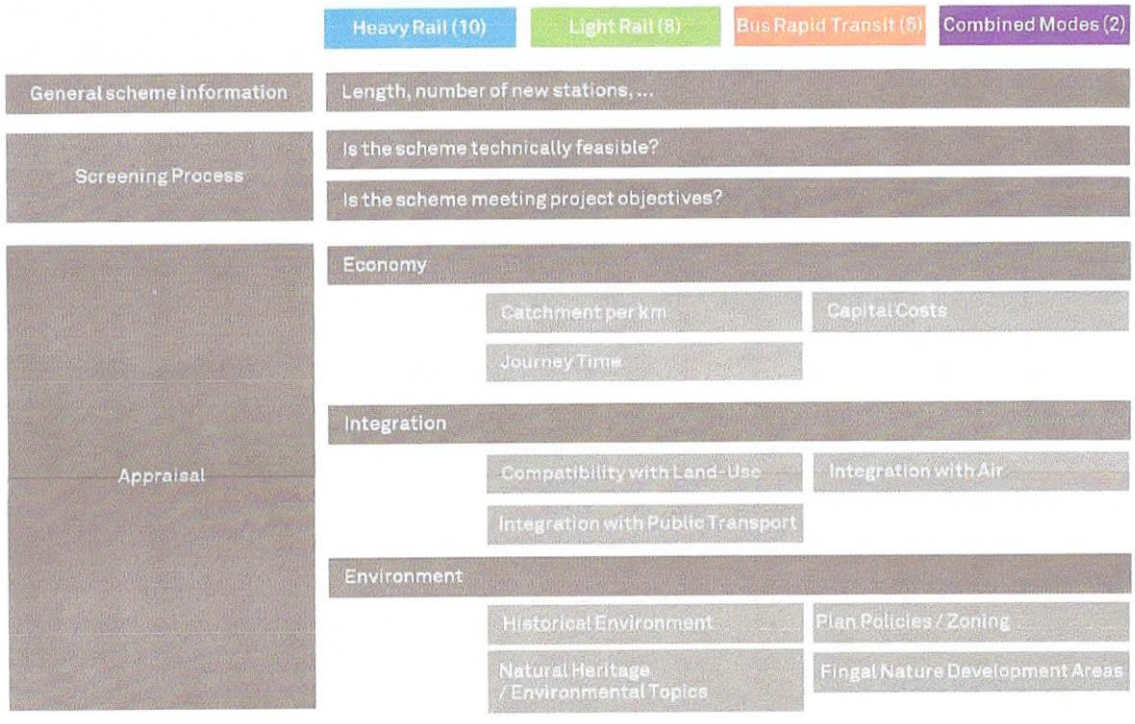
7.1 Introduction

The purpose of the preliminary appraisal is to select a representative set of options which cover all potential approaches to fulfilling the identified project need. This ensures that the detailed appraisal of shortlisted options will identify the optimum approach to meeting the public need.

On this basis, the approach taken by the appraisal is to identify the best option or options from each mode (as opposed to selecting the overall best five or six options). Following this approach ensures that the best option is included in the short list taken forward for further development and appraisal.

With this in mind, the appraisal process described in Section 6 was applied to each of the options and the results were brought together in a summary appraisal table as shown in Figure 7.1. Some general information on each option is provided followed by the screening process questions. Where options do not satisfy the screening process, no further information for that option has been developed. For those proceeding to appraisal, quantified and qualitative information on each option is presented for the three appraisal criteria.

Figure 7.1: Appraisal table structure



7.2 Screening

As previously outlined, each of the options was subject to an initial screening process regarding the project objectives and technical feasibility. Any option which did not satisfy each of these criteria was excluded from further appraisal. On this basis, the following options did not proceed to the appraisal process:

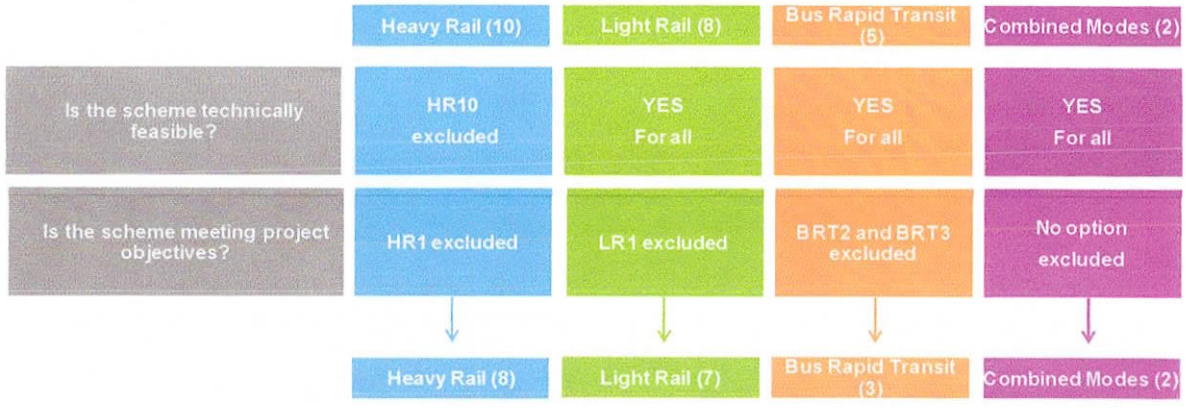
- HR1 does not meet the basic project objective of serving Swords. (However this proposed rail spur from Clongriffin to the Airport forms part of combined option C1 which will be brought forward for full appraisal);
- HR10, the "Metro Dublin", has been rejected on the basis of technical feasibility particularly in relation to measures required to integrate the scheme between St James' Hospital and

Heuston Station. Concerns were also raised in relation to the use of Phoenix Park Tunnel. However, there are strengths to the proposed alignment and as such a similar alignment, HR8, is brought forward to the next stage of the study for further development and appraisal;

- LR1 can be eliminated on the basis that it does not meet the high level project objective of connecting to Dublin Airport and Swords (However an expanded version of this scheme, LR2, that runs from Cabra/Finglas to the airport and on to Swords has been proposed and included in this appraisal exercise); and
- BRT Lines 2 and 3 can be eliminated on the basis that neither of them directly serve Swords.

Figure 7.2 below summarises the impact of the screening process which has resulted in the overall number of options for sketch appraisal reducing from 25 to 20. The appraisal of each of these options is presented in the following sections on a mode specific basis.

Figure 7.2: Screening process



7.3 Heavy Rail Options

Table 7.1 overleaf sets out the preliminary appraisal results for the heavy rail options. It should be noted that few of the heavy rail options perform well in relation to catchment. This is largely due to the fact that only 'new' catchments served are taken into account. These rail options involve the construction of new rail lines in areas of relatively low population and employment rather than in the city centre.

7.3.1 Summary Appraisal of Heavy Rail Schemes

As previously set out, HR1 and HR10 were eliminated during the screening process. A summary of the principal results with respect to each of the remaining eight options is outlined below.

HR2: Extension of HR1 Rail Spur to Swords

This scheme scores relatively well on the economic criteria. The proposed spur serves a reasonable level of population per extra kilometre of track, and at this stage it appears to be a relatively low cost option compared to other heavy rail options. However the cost estimate made at this stage assumes that only 2km of tunnel will be needed to build this rail spur from Clongriffin to Swords. Once further design work is undertaken it could emerge that significant additional tunnelling is actually needed to serve and traverse the airport. This would significantly increase the costs of this option.

This scheme integrates reasonably well with other policies, as it would serve the planned development of Swords, integrate with existing public transport infrastructure and provide a high quality link to Dublin Airport. The scheme does present some environmental risks which would have to be addressed further in the design phase.

HR3: Malahide to Airport via Swords

This scheme performs relatively poorly on the economic criterion. The route is shorter than HR2; however, the sparsely populated lands around this route and the costs of the tunnelling needed lead to a lower catchment per kilometre and a higher cost than HR2. The proposed routing also integrates less well with land use policy as it does not serve the development of Swords as well as HR2. Although the journey time from Swords to Dublin City Centre is acceptable, this option serves the airport via Swords so it must be noted that the journey time from the airport to Dublin City Centre is high.

HR4: North Malahide Estuary to Airport via Swords West

The appraisal results for this option are essentially the same as for HR3. The cost of this option is lower than HR3 as no tunnelling is required. However, the journey times between the City Centre and Dublin Airport would be higher.

HR5: Combination of HR1 and HR3

Similar to HR4, this option is longer than HR2 leading to a lower catchment per kilometre, and relatively poor economic performance compared to HR2 notably due to tunnelling requirements.

HR6: Combination of HR1 and a spur from Malahide to Swords

This option also performs poorly on the economic criterion as it involves constructing a relatively large length of track to serve a small catchment. In addition, it integrates poorly with land use polices as it does not enhance the planned Airport-Swords corridor. It also integrates poorly with public transport by placing extra demands on the existing rail network, and integrating poorly with existing services.

HR7: Maynooth Line (Broombridge) to Swords via Airport

This is one of four options to build a new heavy rail link from the city centre northwards to Dublin Airport and Swords. (The others are HR8 and HR9). These all score more highly than the rail spurs on the catchment criterion as they serve populated and developed areas. HR7 is the longest of these three options and has significantly greater journey times. HR7 also scores lower than the other two new rail lines on integration with public transport as it provides fewer connections to other public transport services.

HR8: Maynooth Line (Drumcondra) to Airport and Swords via Tunnel under Glasnevin

This proposal for a new rail line from the city to the airport and Swords delivers the same relatively high scoring for catchment as HR7 and HR9. It also provides excellent journey times by taking a fast direct route via a tunnel. This option is highly compatible with land use polices and integrates very well with the existing public transport network.

HR9: Heuston to Swords via Phoenix Park Tunnel, under Glasnevin

This option scores similarly to HR8 on a preliminary appraisal. However it must be considered the weakest of the three proposals for a new rail link to the airport and Swords as:

- There are likely to be operational constraints associated with use of the Phoenix Park Tunnel;
- There are likely to be issues in relation to interchange options at Heuston; and
- Its commencement at Heuston does not present a favourable city centre destination; however, it may be possible to interchange at Cabra with the LCC;

Table 7.1 Appraisal overview table, 10 Heavy Rail Options

Indicator	Unit	HEAVY RAIL HR1	HR2	HR3	HR4	HR5	HR6	HR7	HR8	HR9	HR10
GENERAL SCHEME INFORMATION											
Option Description		Clongriffin to Airport	Extension of HR1 to Swords	Malahide to Airport via Swords	North Malahide Estuary to Airport via Swords West	Combination HR1 + HR3	Combination HR1 + Spur Malahide to Swords	Maynooth Line (Broombridge) to Swords via Airport	Maynooth Line (Drumcondra) to Airport Swords, under Glasnevin	Heuston to Swords via Phoenix Park Tunnel, under Glasnevin	Metro Dublin (scheme as proposed from St James's Hospital to Malahide)
Transport mode		HEAVY RAIL	HEAVY RAIL	HEAVY RAIL	HEAVY RAIL	HEAVY RAIL	HEAVY RAIL	HEAVY RAIL	HEAVY RAIL	HEAVY RAIL	HEAVY RAIL
New stations to be built at grade	number	2	4	1	3	4	3	5	5	5	5
New stations to be built underground	number	0	0	2	0	1	1	1	3	3	7
Length to be built:	km	7.5	12.3	8.5	13.5	16.4	12.7	16.4	12.6	12.6	18.4
Tunnelled (twin)	km	0.0	2.0	5.0	0.0	2.8	2.8	2.6	6.6	6.6	0.0
Tunnelled (1)	km	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8
At grade	km	7.5	10.3	3.5	13.5	13.6	9.9	13.8	6.0	6.0	8.6
SCREENING PROCESS											
Is feasible?		Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Is meeting project objectives?		N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Going through appraisal?		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
APPRAISAL											
1. Economy											
1.1 Catchment											
Population served in catchment, per km	n. per km		2,500	1,500	1,300	2,100	2,300	2,200	5,100	5,100	
Employment served in catchment, per km	n. per km		1,500	1,700	700	1,200	1,500	1,800	3,100	3,100	
TOT Population + Employment, per km	n. per km		4,000	3,200	2,000	3,300	3,800	4,000	8,300	8,300	
1.2 Estimated Journey Time											
Swords Centre (Pavilions) - Dublin City Centre (STG)	mm		44	41	41	41	41	43 *	28 *	27 **	
1.3 Capital Costs											
Estimated capital cost (range)	m€		600 - 790	1240 - 1490	310 - 460	960 - 1230	870 - 1100	940 - 1210	1760 - 2130	1760 - 2130	
2. Integration											
2.1 Compability with Land-use policies											
Development of Swords and Airport			Good	Fair	Fair	Good	Fair	Good	Very Good	Very Good	
2.2 Integration with PT											
Access to stations, interchange and destinations			Good	Good	Good	Good	Fair	Fair	Good	Good	
2.3 Service to the Airport											
Integration with Air Mode			Good	Good	Good	Good	Good	Good	Good	Good	
3. Environmental Constraints											
3.1 Historical Environment			Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	
3.2 Natural Heritage / Environmental Topics			Significant	Significant	Significant	Significant	Significant	Moderate	Moderate	Moderate	
3.3 Plan Policies / Zoning			Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	
3.4 Fingal Nature Development Areas			Negligible	Moderate	Moderate	Moderate	Negligible	Moderate	Negligible	Negligible	
APPRAISAL CODING											
1. Economy											
1.1 Catchment											
Population served in catchment, per km											
Employment served in catchment, per km											
TOT Population + Employment, per km											
1.2 Estimated Journey Time											
Swords Centre (Pavilions) - Dublin City Centre (STG)											
1.3 Capital Costs											
Estimated capital cost (range)											
2. Integration											
2.1 Compability with Land-use policies											
Development of Swords and Airport											
2.2 Integration with PT											
Access to stations, interchange and destinations											
2.3 Service to the Airport											
Integration with Air Mode											
3. Environmental Constraints											
3.1 Historical Environment											
3.2 Natural Heritage / Environmental Topics											
3.3 Plan Policies / Zoning											
3.4 Fingal Nature Development Areas											

* Journey Time to Connolly Station

** Journey Time to Heuston Station

7.3.2 *Heavy Rail Options brought forward for further study*

The results of this appraisal suggest that the following schemes do not perform well, relative to others, and can therefore be eliminated. These include:

- HR3 and HR4, which are both spurs from the northern line at Malahide, can be rejected on the basis of excessive journey times to the airport, capacity limitations, poor integration with land use policies and environmental concerns, and lower catchment per kilometre;
- HR5, a 'loop' from Clongriffin to Malahide via the airport and Swords, can be eliminated on the basis of similar reasons including: relatively low catchment area, journey times, capacity limitations and poor integration with land use policies; and,
- HR6, which is comprised of a spur at Clongriffin and a separate spur at Malahide, raises concerns regarding capacity on the northern line and poor land/public transport integration.

Of the remaining schemes, three present similar proposals for a new heavy rail line from the city to the airport and Swords (HR7, HR8 and HR9). The strongest of these is HR8, and this will be taken forward for further appraisal. This further appraisal will include preliminary design work which will optimise the actual route proposed for this new rail line.

It is also proposed to bring forward HR2, an expanded version of Irish Rail's proposal to build a rail spur from Clongriffin on the Northern Line to the airport. The appraisal results suggest that this could be an attractive option, if a heavy rail line can be brought through the airport at a reasonable cost.

The technical feasibility of this scheme as well as environmental constraints will be investigated during the next stage of scheme development.

In summary: of the original 10 heavy rail schemes proposed, 2 were eliminated at the screening stage of appraisal (HR1 and HR10). Following this, the sketch appraisal has been used to suggest two schemes for detailed appraisal, one as a spur from the Northern Line (HR2) and another from Maynooth Line (HR8).

HEAVY RAIL APPRAISAL SUMMARY		
HR1	Clongriffin to Airport	Eliminated at Screening Process
HR2	Extension of HR1 to Swords	Progress to Detailed Appraisal on the basis of effectiveness, efficiency and integration
HR3	Malahide to Airport via Swords	Eliminated due to excessive journey times, capacity limitations and poor integration with land use policies
HR4	North Malahide Estuary to Airport via Swords West	Eliminated due to excessive journey times, capacity limitations and poor integration with land use policy
HR5	Combination HR1 + HR3	Eliminated due to relatively low catchment area, journey times, capacity limitations and poor integration with land use policy
HR6	Combination HR1 + Spur Malahide to Swords	Eliminated due to capacity issues on the Northern Line and poor land/public transport integration
HR7	Maynooth Line (Broombridge) to Swords via Airport	Eliminated due to relatively higher cost per km
HR8	Maynooth Line (Drumcondra) to Airport-Swords, under Glasnevin	Progress to Detailed Appraisal on the basis of catchment, journey times and integration
HR9	Heuston to Swords via Phoenix Park Tunnel, under Glasnevin	Eliminated due to relatively higher cost per km
HR10	Metro Dublin (scheme as proposed from St James's Hospital to Malahide)	Eliminated at Screening Process

7.4 Light Rail Options

Table 7.2 overleaf highlights the appraisal results for the eight proposed light rail schemes. As previously highlighted, LR1 (Luas extension to Finglas) was rejected at the screening stage. As such, seven light rail options have been appraised. The principal results with respect to each option are outlined below.

LR2: Broombridge to Swords via Airport and Finglas

In common with most of the light rail options, LR2 scores highly on cost and integration with other public transport. It also scored neutrally on catchment per km of route, integration with land use policies and environmental considerations. However the journey time estimated (68 minutes from Dublin city centre to Swords) is very high relative to other options, and it scores very poorly on this criterion, i.e. this option's potential economic benefits are limited by its limited attractiveness to travellers and the limited benefits it would provide to any users.

LR 3, 4 and 5: LCC to Swords via Airport, under Glasnevin (Luas D2)

These three schemes were proposed by the RPA for an extension of the LUAS network to the Airport and Swords via Glasnevin, Phibsborough and Drumcondra respectively. LR4 and LR5 score better on catchment per kilometre than LR3 on the basis that they serve busy parts of the city. However LR4 and LR5 score poorly on journey times relative to LR3. All of these options score well on cost and integration. It is clear that this route should be considered further and so brought forward to the next stage of appraisal. The eventual choice between these three options is a matter of relatively detailed route choice and would have to be based on more detailed examination of these schemes and their technical feasibility.

LR6: Metro North

Metro North has already been subject to extensive development and appraisal. As one might expect, it scores highly in terms of potential benefits, but poorly for on cost. It also integrates very well with land use and transport policy.

Any decision to adopt a Metro type approach would have to be based on a forecast of high passenger demand which would mean that the Metro could deliver its full potential and be a cost effective approach to responding transport needs.

LR7: Optimised Metro North

LR7 is an optimised version of the original Metro North proposal that has been developed by the RPA. It proposes providing a similar service at significantly reduced costs. It produces the same preliminary appraisal results as Metro North but at a significantly reduced cost and therefore presents significant benefit.

LR8: Dublin City Access Transit

Very little information is available on this proposal. Its primary purpose is to improve public transport links in north Dublin City, rather than to provide a link to the Airport or Swords. As a result, journey times from the City Centre to Dublin Airport and Swords are relatively high.

Table 7.2 Appraisal overview table, 8 Light Rail Options

Indicator	Unit	LIGHT RAIL LR1	LR2	LR3	LR4	LR5	LR6	LR7	LR8
GENERAL SCHEME INFORMATION									
Option Description		Broombridge to Finglas (Luas D1)	Broombridge to Swords via Airport and Finglas	LCC to Swords via Airport, under Glasnevin (Luas D2)	LCC to Swords via Airport, via Phisborough (Luas D2)	LCC to Swords via Airport, via Drumcondra (Luas D2)	Metro North	Optimised Metro North	Dublin City Access Transit (CAT)
Transport mode		LIGHT RAIL	LIGHT RAIL	LIGHT RAIL	LIGHT RAIL	LIGHT RAIL	LIGHT RAIL	LIGHT RAIL	LIGHT RAIL
New stations to be built at grade	number	6	17	12	14	12	5	6	14
New stations to be built underground	number	0	0	1	0	0	9	7	0
Length to be built	km	4.6	15.0	13.5	14.3	14.4	16.5	16.5	16.9
Tunnelled (twin)	km	0.0	0.0	2.1	0.0	0.0	11.2	9.7	0.0
Tunnelled (1)	km	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
At grade	km	4.6	15.0	11.4	14.3	14.4	5.3	6.8	16.9
SCREENING PROCESS									
Is feasible?		Y	Y	Y	Y	Y	Y	Y	Y
Is meeting project objectives?		N	Y	Y	Y	Y	Y	Y	Y
Going through appraisal?		**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
APPRAISAL									
1. Economy									
1.1 Catchment									
Population served in catchment, per km	n. per km		5,100	5,800	6,600	7,000	8,400	8,200	6,100
Employment served in catchment, per km	n. per km		2,700	3,400	4,300	5,000	11,700	11,200	4,400
TOT Population + Employment, per km	n. per km		7,800	9,200	10,900	11,900	20,200	19,400	10,500
1.2 Estimated Journey Time									
Swords Centre (Pavilions) - Dublin City Centre (STG)	min		68	45	51	58	25	27	71
1.3 Capital Costs									
Estimated capital cost (range)	m€		530 - 770	630 - 1050	500 - 730	500 - 730	1610 - 3300	1430 - 2860	590 - 850
2. Integration									
2.1 Compability with Land-use policies									
Development of Swords and Airport			Good	Very Good	Very Good	Good	Very Good	Very Good	Good
2.2 Integration with PT									
Access to stations, interchange and destinations			Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good
2.3 Service to the Airport									
Integration with Air Mode			Good	Good	Good	Good	Good	Good	Good
3. Environmental Constraints									
3.1 Historical Environment			Moderate	Moderate	Negligible	Negligible	Moderate	Moderate	Negligible
3.2 Natural Heritage / Environmental Topics			Significant	Significant	Significant	Significant	Significant	Significant	Significant
3.3 Plan Policies / Zoning			Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
3.4 Fingal Nature Development Areas			Moderate	Moderate	Moderate	Moderate	Negligible	Negligible	Negligible
APPRAISAL CODING									
1. Economy									
1.1 Catchment									
Population served in catchment, per km									
Employment served in catchment, per km									
TOT Population + Employment, per km									
1.2 Estimated Journey Time									
Swords Centre (Pavilions) - Dublin City Centre (STG)									
1.3 Capital Costs									
Estimated capital cost (range)									
2. Integration									
2.1 Compability with Land-use policies									
Development of Swords and Airport									
2.2 Integration with PT									
Access to stations, interchange and destinations									
2.3 Service to the Airport									
Integration with Air Mode									
3. Environmental Constraints									
3.1 Historical Environment									
3.2 Natural Heritage / Environmental Topics									
3.3 Plan Policies / Zoning									
3.4 Fingal Nature Development Areas									

* Journey Time to Connolly Station

** Journey Time to Heuston Station

7.4.1 Light Rail Options brought forward for further study

These appraisal results suggest that two schemes can be eliminated at this stage. LR2 can be eliminated on the basis that journey times to key focal points within the study area, such as Swords and the airport, are excessive. The employment catchment areas served are also significantly lower than other schemes. The original "Metro North" project and the optimised Metro North ar esentailly variants of the one proposal and the revised scheme (LR7) should be brought forward on the basis of its slightly revised scope and significantly lower costs. However, further validation of the technical and operational feasibility of LR7 is required, and will be undertaken at the next stage.

In the interim, an Optimised Metro North will be brought forward for further appraisal, including modelling work to predict patronage. Only a full modelling and cost benefit exercise will allow a judgement as to whether the capacity delivered by a Metro will be needed, and that the level of usage would justify the expected cost.

In addition to LR7, it is also proposed that a light rail scheme extending from Luas Cross City through to the Airport and Swords be investigated at the next stage of appraisal. This is proposed on the basis of good journey times, cost and integration impacts. At this stage the RPA's preferred option, LR3 will be brought forward. However, the precise routing for the southern section of the route will become clearer at the next stage of project development.

A summary of the appraisal is provided as follows:

LIGHT RAIL APPRAISAL SUMMARY		
LR1	Broombridge to Finglas (Luas D1)	Eliminated at Screening Process
LR2	Broombridge to Swords via Airport and Fingal	Eliminated due to excessive journey times, and lower employment catchment served
LR3	LCC to Swords via Airport, under Glasnevin (Luas D2)	Progress to Detailed Appraisal, on the basis of good journey times, cost and integration impacts. At this stage LR3 will be brought forward, however, the precise routing for the southern section of the route is to be determined
LR4	LCC to Swords via Airport, via Phibsborough (Luas D2)	
LR5	LCC to Swords via Airport, via Drumcondra (Luas D2)	
LR6	Metro North	As this and LR7 are essentially variants of the one proposal, LR7 is being brought forward due to its reduced scope and lower costs.
LR7	Optimised Metro North	Progress to Detailed Appraisal on the basis of adjusted demand requirements and lower costs
LR8	Dublin City Access Transit (CAT)	Rejected due to excessive journey times for key areas in the corridor. However, a light rail alignment through Drumcondra (LR5) is a possible sub-option for next stage

7.5 Bus Rapid Transit Options

Table 7.3 highlights results of the appraisal process for the five proposed Bus Rapid Transit schemes. BRT 2 and 3 have already been rejected through the screening process, as such, three BRT schemes have been appraised as outlined below.

BRT1: Clongriffin to Airport via Malahide

This scheme should be rejected on the grounds of excessive journey times, limited capacity and catchment area as well as poor integration with land use policies and public transport.

BRT 4: Docklands to Swords via the Port Tunnel

As discussed in Section 4, this is a relatively low capacity option, but within those limits it scores well on preliminary appraisal. It has the potential to deliver benefits in a cost effective way and integrates well with other policies. It represents a small amount of additional capacity for a low cost. It is proposed that it be combined with other BRTs for further appraisal (see BRT5).

BRT5: Combination of BRT2, BRT3 and BRT 4

Because the cost of BRT Lines 2, 3 and 4 is relatively low, it is possible to combine them to arrive at a relatively low cost/low capacity option. This option is proposed as a further scheme, BRT 5. If future demand is relatively low, BRT5 may be the most cost effective approach to meeting the public transport needs of the airport and Swords. As a result, BRT5 should be taken on to the next stage of the study for modelling and cost benefit appraisal.

A summary of BRT appraisal is as follows:

BRT APPRAISAL SUMMARY		
BRT1	Clongriffin to Airport via Malahide	Eliminated due to excessive journey times, limited capacity and catchment area, as well as poor integration with land use policies and public transport
BRT2	Clongriffin to Airport via R139	Eliminated at Screening Process
BRT3	City Centre to Airport via Ballymun	Eliminated at Screening Process
BRT4	Docklands to Swords via Tunnel	Relatively low capacity option, scoring well on preliminary appraisal. Proposed that it be combined with other BRTs for further appraisal (see BRT5)
BRT5	Combination of BRT2, BRT3, BRT4.	Progress to Detailed Appraisal

Table 7.3 Appraisal overview table, 5 Bus Rapid Transit Options

Indicator	Unit	BUS RAPID TRANSIT BRT1	BRT2	BRT3	BRT4	BRT5
GENERAL SCHEME INFORMATION						
Option Description		Clongriffin to Airport via Malahide	Clongriffin to Airport via R139	City Centre to Airport via Ballymun	Docklands to Swords via Tunnel	Combination of BRT2, BRT3, BRT4.
Transport mode		BRT	BRT	BRT	BRT	BRT
New stations to be built at grade	number	9	7	12	13	30
New stations to be built underground	number	0	0	0	0	0
Length to be built	km	10.8	8.9	11.2	12.6	32.7
Tunnelled (twin)	km	0.0	0.0	0.0	0.0	0.0
Tunnelled (1)	km	0.0	0.0	0.0	0.0	0.0
At grade	km	10.8	8.9	11.2	12.6	32.7
SCREENING PROCESS						
Is feasible?		Y	Y	Y	Y	Y
Is meeting project objectives?		Y	N	N	Y	Y
Going through appraisal?		**Yes**	**No**	**No**	**Yes**	**Yes**
APPRAISAL						
1. Economy						
1.1 Catchment						
Population served in catchment, per km	n. per km	1,300			3,300	3,700
Employment served in catchment, per km	n. per km	500			5,800	3,700
TOT Population + Employment, per km	n. per km	1,800			9,100	7,400
1.2 Estimated Journey Time						
Swords Centre (Pavilions) - Dublin City Centre (STG)	min	33*			27 *	27 *
1.3 Capital Costs						
Estimated capital cost (range)	m€	80 - 110			100 - 130	250 - 330
2. Integration						
2.1 Compability with Land-use policies						
Development of Swords and Airport		Fair			Good	Very Good
2.2 Integration with PT						
Access to stations, interchange and destinations		Fair			Good	Very Good
2.3 Service to the Airport						
Integration with Air Mode		Good			Good	Good
3. Environmental Constraints						
3.1 Historical Environment		Moderate			Negligible	Negligible
3.2 Natural Heritage / Environmental Topics		Negligible			Negligible	Negligible
3.3 Plan Policies / Zoning		Negligible			Negligible	Negligible
3.4 Fingal Nature Development Areas		Negligible			Negligible	Negligible
APPRAISAL CODING						
1. Economy						
1.1 Catchment						
Population served in catchment, per km						
Employment served in catchment, per km						
TOT Population + Employment, per km						
1.2 Estimated Journey Time						
Swords Centre (Pavilions) - Dublin City Centre (STG)						
1.3 Capital Costs						
Estimated capital cost (range)						
2. Integration						
2.1 Compability with Land-use policies						
Development of Swords and Airport						
2.2 Integration with PT						
Access to stations, interchange and destinations						
2.3 Service to the Airport						
Integration with Air Mode						
3. Environmental Constraints						
3.1 Historical Environment						
3.2 Natural Heritage / Environmental Topics						
3.3 Plan Policies / Zoning						
3.4 Fingal Nature Development Areas						

* Journey Time to Connolly Station

** Journey Time to Heuston Station

7.6 Combined Options

Table 7.4 highlights results for the two proposed options which combine various options previously proposed. The appraisal results for these are as follows:

C1: Combination of HR1 and LR3

This scheme is a combination of the HR1 spur from Clongriffin to the airport with the LR3 light rail from Cabra to the airport and on to Swords. This combines two schemes to meet the study objectives, so providing high capacities and low journey times. The scoring on economy is limited by the extent of the extra route length needed.

C2: Combination of HR1 and enhanced Airport – Swords BRT

This scheme is a combination of HR1 with a high capacity BRT from Swords to the airport. The appraisal scores are relatively neutral, but this does not reflect the capacity of the scheme. In fact, this scheme provides only a limited additional service to Swords and can be rejected at this stage on grounds of capacity. This combined scheme also fails to provide a fixed rail commuting service to Swords residents.

On the basis of relatively better service and capacity, it is proposed that C1 is brought forward for further development and full appraisal.

A summary of appraisal of combined options is as follows:

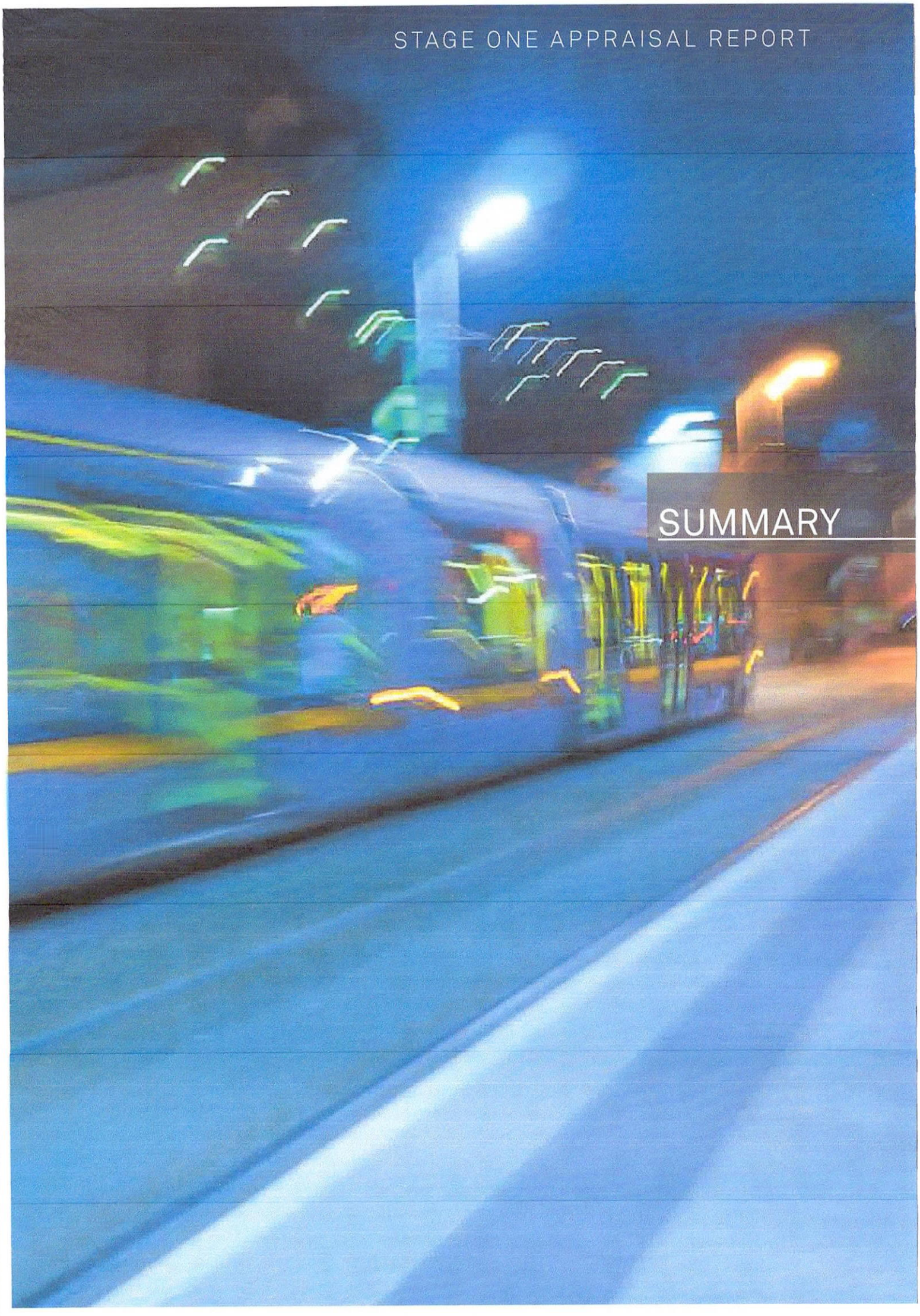
COMBINED OPTIONS APPRAISAL SUMMARY		
C1	Combination of HR1 and LR3	Progress to Detailed Appraisal
C2	Combination of HR1 and enhanced BRT Swords-Airport	This would provide only limited additional service to Swords, is rejected at this stage on grounds of capacity and potential interchange constraints

Table 7.4 Appraisal overview table, 2 Combination Options

Indicator	Unit	MODES COMBINATION C1	C2
GENERAL SCHEME INFORMATION		**GENERAL SCHEME INFORMATION**	
Option Description		Combination of HR1 and LR3	Combination of HR1 and enhanced BRT Swords-Airport
Transport mode		LRT + HR	HR + BRT
New stations to be built at grade	number	14	12
New stations to be built underground	number	1	0
Length to be built	km	21	12.4
Tunnelled (twin)	km	2.1	0.0
Tunnelled (1)	km	0	0
At grade	km	18.9	12.4
SCREENING PROCESS		**SCREENING PROCESS**	
Is feasible?		Y	Y
Is meeting project objectives?		Y	Y
Going through appraisal?		**Yes**	**Yes**
APPRAISAL		**APPRAISAL**	
1. Economy		**1. Economy**	
1.1 Catchment			
Population served in catchment, per km	n. per km	4,500	3,100
Employment served in catchment, per km	n. per km	2,400	1,700
TOT Population + Employment, per km	n. per km	7,000	4,800
1.2 Estimated Joumey Time			
Swords Centre (Pavilions) - Dublin City Centre (STG)	min	45	44
1.3 Capital Costs			
Estimated capital cost (range)	m€	810 to 1310	220 to 310
2. Integration		**2. Integration**	
2.1 Compability with Land-use policies			
Development of Swords and Airport		Very Good	Fair
2.2 Integration with PT			
Access to stations, interchange and destinations		Very Good	Very Good
2.3 Service to the Airport			
Integration with Air Mode		Good	Good
3. Environmental Constraints		**3. Environmental Constraints**	
3.1 Historical Environment		Moderate	Moderate
3.2 Natural Heritage / Environmental Topics		Significant	Significant
3.3 Plan Policies / Zoning		Moderate	Moderate
3.4 Fingal Nature Development Areas		Moderate	Negligible
APPRAISAL CODING		**APPRAISAL CODING**	
1. Economy		**1. Economy**	
1.1 Catchment			
Population served in catchment, per km			
Employment served in catchment, per km			
TOT Population + Employment, per km			
1.2 Estimated Joumey Time			
Swords Centre (Pavilions) - Dublin City Centre (STG)			
1.3 Capital Costs			
Estimated capital cost (range)			
2. Integration		**2. Integration**	
2.1 Compability with Land-use policies			
Development of Swords and Airport			
2.2 Integration with PT			
Access to stations, interchange and destinations			
2.3 Service to the Airport			
Integration with Air Mode			
3. Environmental Constraints		**3. Environmental Constraints**	
3.1 Historical Environment			
3.2 Natural Heritage / Environmental Topics			
3.3 Plan Policies / Zoning			
3.4 Fingal Nature Development Areas			

* Journey Time to Connolly Station

** Journey Time to Heuston Station



SUMMARY

8.0 Summary

This report has outlined and considered, by appraisal methods, 25 public transport infrastructure options for possible development to serve the future development of the Fingal/North Dublin study area. The amount of development, population and employment growth, was the subject of a previously submitted Strategic Context Report. The scheme options were developed on the basis of stakeholder consultation, in the first instance, together with a one to one conversation with various stakeholders to elicit their preferred scheme options for appraisal. Further options were developed by AECOM to meet the overall study objectives. All options were reported back to key stakeholders to ensure that there were no possible options or schemes missing from the appraisal process.

The scope and method of appraising the 25 schemes has been undertaken on the basis of:

- A preliminary 'screening' to ensure the schemes meet the project objectives and are technically feasible. Through this process, 5 schemes have been excluded from further appraisal;
- A sketch appraisal based on the guidelines and criteria incorporated within the CAF. On the basis of the sketch appraisal, just 6 of the 20 options are suggested for further investigation. These schemes are summarised below.

The appraisal has indicated that these schemes are certain to be preferable to the schemes that have been eliminated at this stage. The choice of the optimum approach from this reduced set of options requires further design work to confirm the feasibility and exact route of some of these shortlisted options. In addition, identifying the most cost effective option will require modelling work to forecast the passenger demand for each of these options. In essence, the remaining choice is between high capacity, fast options that may offer the most cost effective solution if they attract sufficient patronage and lower capacity cheaper options.

Table 8.1: Summary of shortlisted schemes

HR2	A heavy rail spur from Clongriffin to the airport and Swords This scheme appears to provide a high quality, high capacity service to the airport and Swords. However, further work is needed to ensure that it is practical to bring a heavy rail service through Dublin Airport.
HR8	A new heavy rail line from the Maynooth Line to the airport and Swords via a tunnel under Glasnevin. This scheme is a new rail service from Dublin City Centre, through the northern suburbs to the airport and Swords. This also offers a high quality, high capacity service and increases public transport provision in the city. Further design work will be needed to determine the exact route, and demand forecasting will be needed to determine whether this approach is cost effective.
LR3	Light rail from Cabra to the airport and Swords via a tunnel under Glasnevin (Luas D2) This aims to extend Luas Cross City to the airport and Swords. Further design work will be needed to determine the exact route and demand forecasting will reveal whether this approach provides enough capacity and is cost effective.
LR7	Optimised Metro North The RPA have proposed this cost optimised approach to providing Metro North. If demand forecasting indicates sufficient passenger demand this may be the most cost

	effective approach to providing enhanced links to the airport and Swords.
BRT5	This scheme is a combination of a number of proposed Bus Rapid Transit services. Demand modelling may indicate that this relatively low capacity, low cost option is the most cost effective approach to providing enhanced links to the airport and Swords.
C1	Combination of HR1 and LR3, i.e. a heavy rail spur from Clongriffin to the airport and light rail from Dublin to Swords via the airport. The HR1 scheme could be an effective way to provide a high capacity link to the airport. Combining this with a light rail service may meet the needs of both the Airport and Swords in a cost effective way.

A summary of the overall appraisal of these options is presented in Table 8.2, more detailed appraisal tables are presented earlier in this report. The schemes have been assessed on a quantitative and qualitative basis and are recommended for further development on the basis of their relatively strong performance against other schemes options.

Table 8.2: Summary of appraisal of shortlisted schemes

Indicator	HEAVY RAIL		LIGHT RAIL		BUS RAPID TRANSIT	MODES COMBINATION
	HR2	HR8	LR3	LR7	BRT5	C1
GENERAL SCHEME INFORMATION						
Option Description	Heavy rail line from Clongriffin serving the Airport and Swords	Maynooth Line (Drumcondra) to Airport-Swords, under Glasnevin	Cabra to Swords via Airport, under Glasnevin (Luas D2)	Optimised Metro North	Combination of BRT2, BRT3, BRT4.	Combination of HR1 and LR3
SUMMARY APPRAISAL COLOUR-CODED RANKS						
1. Economy						
1.1 Catchment per km						
1.2 Journey Times						
1.4 Capital Costs						
2. Integration						
2.1 Compatibility with Land-use policies						
2.2 Integration with Public Transport						
2.1 Service to the Airport / Integration with Air Mode						
3. Environmental Constraints						
3.1 Historical Environment						
3.2 Natural Heritage / Environmental Topics						
3.3 Plan Policies / Zoning						
3.4 Fingal Nature Development Areas						

Colour	Description
	Some advantages over other options
	Neutral compared to other options
	Some disadvantages over other options

The next stage of the study will take each of the shortlisted schemes forward for further scheme development including:

- Technical development, both engineering design and operational parameters;
- More detailed costing and environmental assessment; and
- Modelling and cost benefit analysis.

AECOM

FOIA Disclaimer

AECOM Limited consider that the following constitutes exempt information on grounds of confidentiality and commercially sensitive information under the terms of the Freedom of Information Act 2000, which shall not be disclosed to third parties -

- Documentation relating to third parties including, but not limited to, credentials and references for work for other clients.
- All documentation relating to our pricing and financial modelling including the basis on which our proposed commercial arrangement are calculated and our cost base.
- Information relating to AECOM's business plans, strategy and competitive position, approach and performance. This information is contained throughout the document.
- AECOM's approach, methodologies and programme information. This information is contained throughout the document.

The above information is not to be made available to the public for at least six years from the end of the project, unless specifically agreed otherwise. Any specific enquiries about what may be commercially sensitive or queries about disclosure should be directed to Joe Seymour, joseph.seymour@aecom.com

We would be grateful to be informed of all requests by third parties for information contained in this document.

100 Griffith Avenue
Dublin 9
19 January 2015

National Transport Authority
Dun Scéine
Harcourt Lane
Dublin 2.

Re. **Fingal/North Dublin Transport Study**
Stage one appraisal Report Nov 2014 produced by AECOM

A chara,

I call for this report to be rejected in full as

- The terms of reference set by the National Transport Authority are flawed
  - It excludes Blanchardstown, which is part of Fingal;
- The consultants fail to meet even these flawed terms of reference
  - eg. they ignore Finglas and Ashbourne which are part of the study area
- the report is seriously misleading in its presentation of options
  - it ignores the privately developed Metro East proposal of which the consultants doing this study were fully aware;
- the report is tendentious in its assessments of the options presented
  - the consultants developed at least one option of their own, but did not apply this policy to possible light rail options for North Dublin;
- the conclusions do not match the complete terms of reference.

This latest report continues the pussyfooting that the public authorities have engaged in for years as they persist in trying to placate the many feuding baronies now involved in public transport in our capital city. This report leaves a lot to be desired in terms of the quiet competence we need.

Dublin still needs the Drumcondra CITY ACCESS TRANSIT CAT which involves

1. Two mainly on-street light rail lines looped around the North City, including the Airport and Swords;
2. A Docklands loop linking the existing Green and Red on-street LUAS lines;
3. A light rail link from the proposed North Dublin loop to Howth Junction;
4. A complete redesign of bus services Dublin area;
5. Serious consideration to having another north-south road tunnel

instead of going ahead with the not-fit-for purpose Bus Rapid Transit between the City Centre-Drumcondra-Dublin airport- Swords

The public authorities must get a grip to ensure on this situation to ensure that our city achieves and sustains an internationally attractive place in which to live, work, play and visit.

I attach my submission.

Is mise

Donal O'Brolchain

100 Griffith Avenue
Dublin 9
29 April 2016

Information Officer,
National Transport Authority,
Dún Scéine,
Harcourt Lane,
Dublin
D02 WT20.

Re. Study of options for Fingal Corridors in advance of Metro North

A chara,

Under the Freedom to Access on Information on the Environment Regulations 2007, I seek access to

1. all papers, documents and records held by the National Transport Authority on the terms of reference, data collection and methodology for this Study of Transport Options for Fingal Corridors;
2. The final report of this study.

I seek these papers, documents and records in PDF format on a commonly available electronically generated medium.

Is mise

Donal O'Brolchain

Údarás
Náisiúnta Iompair
National Transport Authority

Dún Scéine, Cúirt Uíbh Eachach,
Lána Fhearchair, Baile Átha Cliath 2

Dún Scéine, Iveagh Court,
Harcourt Lane, Dublin 2

t 01 879 8300
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info@nationaltransport.ie
www.nationaltransport.ie

Donal O'Brolchain
100 Griffith Avenue,
Dublin 9

Recd Fri 20 May 2016

19th May 2016

Re: AIE request- Study of options for Fingal Corridors in advance of Metro North

Dear Mr O'Brolchain,

I refer to the requests which you made under the Access on Information on the Environment Regulations 2007 on the 29th April 2016, for access to:

- All papers, documents and records held by the National Transport Authority on the terms of reference, data collection and methodology for this study of Transport options for Fingal Corridors;
- The final report of this study.

I, David King, Head of Public Transport Investment in the National Transport Authority have now made a final decision to grant your request on 19th May 2016.

You have sought access to the records in preferably in digital format and I consider this an appropriate form of access in this case.

In line with the regulations, a Public authority may however, charge a reasonable fee for supplying environmental information in accordance with the Regulations.

This fee is calculated upon receipt of a request and is calculated according to the volume of work involved in compiling information where it has not been previously available in an accessible format. This fee is €20 per hour. Requesters will be informed in writing of the fees involved, on receipt of their request, and a 20% deposit will be required to be paid to the National Transport Authority before commencement of the work involved. The requester has an opportunity to review or amend his/her request at this stage. The process will not commence until the deposit has been received by the Authority. It should also be noted that the date for the final decision on the AIE request (which is normally within one month of receipt by the Authority of the request) will be determined by reference to the date of receipt of the deposit payment.

As there is a significant amount of information being sought there will be a fee involved in gathering and compiling this information. The fees involved will be €640.00, based on four working days.

Notwithstanding the above, I am in position to furnish you with the following documents free of charge, which may provide you with the information that you seek:

- All Tender Documents for the Study;
- Stakeholder Workshop Presentation;

- Stakeholder Workshop Agenda;
- Stakeholder Workshop Meeting notes;
- Strategic Context Report;
- Stage 1 Appraisal Report;
- The Final Report for the Study (which includes methodology); and
- A redacted copy of all submissions from the public consultation.

Appealing a decision:

Under Article 11 of the AIE Regulations you have a right to seek an internal review of this decision. You may also request an internal review if you have not received a response within the appropriate timeframe. An internal review must be requested within one month of receipt of the original decision. There is no charge for requesting an internal review.

An internal review involves a complete reconsideration of the matter by a member of the staff of the NTA, who may affirm, vary or annul the original decision made.

A written outcome of the review informing you of the decision, the reason for the decision and advising you of your right of appeal to the Commissioner for Environmental Information, including the time limits and fees associated with such an appeal, will be issued to you within one month of the date of receipt of the request for the review.

If you are not satisfied with the outcome of the internal review, you can appeal to the Commissioner for Environmental Information (CEI). You must appeal within one month of receiving the decision on the internal review from the public authority. However, the Commissioner may extend this time limit in individual cases.

Should you wish to discuss the above, and/or to confirm whether you wish to avail of the free of charge material then please do not hesitate to contact me directly on (01) 881 5504

Yours sincerely

David King

David King
Head of Public Transport Investment

100 Griffith Avenue
Dublin 9
24 May 2016

David King
Head of Public Transport Investment
National Transport Authority,
Dún Scéine,
Harcourt Lane,
Dublin
D02 WT20

.

Re. Study of options for Fingal Corridors in advance of Metro North

Dear David,

Further to your response (dated 19th May last) to my request (of 29 April last) , under the Freedom to Access on Information on the Environment Regulations 2007, I seek access to

1. all papers, documents and records held by the National Transport Authority on the terms of reference, data collection and methodology for this Study of Transport Options for Fingal Corridors;
2. The final report of this study

And our telephone conversation this morning, I wish to clarify that the study I refer to is the April 2012 titled Study of Transport Options for Fingal corridors in advance of Metro North.

Your colleague Hugh Cregan supplied this document to me on 17th November last. I attach a copy of the front page of that document.

I trust that this clarifies the document is the basis of my request of 29th April last.

I seek these papers, documents and records in PDF format on a commonly available electronically generated medium.

Is mise

Donal O'Brolchain

Údarás
Náisiúnta Iompair
National Transport Authority

DRAFT

Study of Transport Options for Fingal Corridors in advance of Metro North

National Transport Authority
Dun Scéine
Harcourt Lane
Dublin 2

April 2012

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1 Introduction

Following the publication of the Government's *Infrastructure and Capital Investment 2012 – 2016* plan in November 2011, the NTA undertook a study of transport needs and possible transport solutions for the main transport corridors between Fingal and the City Centre – given the decision within that plan to postpone the construction of Metro North. The initial study had two main parts as follows:

- The first phase was to undertake a general analysis of existing travel demand and travel patterns on the main transport corridors between Fingal and the City and identify issues and problems that will need to be addressed; and
- The second phase was to examine possible transport options and solutions to address the issues identified in the first part of the study and that could support travel demand prior to the development of Metro North.

Following the identification of the main transport issues in part 1 of the study, it was clear that the main transport solutions / options to emerge in part 2 would need to focus in particular on the Swords area. It was also clear that any transport solutions would need to address the issue of trips locally within the Swords area, in addition to addressing the need to provide better access between Swords and the city centre and other key destinations. Hence, prior to suggesting possible transport solutions / options for the Swords area, the second part of the study began with a more in-depth analysis of the patterns of local trip movements within Swords itself and the capacity of the road network to cater for these trips.

The NTA intends that a final phase of the study would be undertaken in consultation with Fingal County Council. The purpose of that phase of the study would be to further assess and finalise the transport options and the appropriate phasing of development to match the delivery of the agreed transport solutions.

2 Current travel demand and travel patterns

Before going on to examine possible transport solutions for the Fingal Corridors in the absence of Metro North, the first part of this study undertook an analysis of existing patterns of travel demand and transport issues – thereby identifying the problems that the transport solutions would need to address. The approach taken was to identify a number of sectors corresponding to the main district or town centres feeding onto each transport corridor, and for each sector to undertake an analysis of three key transport indicators as follows:

- Overall travel demand and the patterns of travel;
- Public transport versus car mode shares (for trips to the city centre); and
- Public transport versus car journey times (for trips to the city centre).

The analysis of travel demand and patterns of travel used data from the GDA model for the AM Peak in 2006 that includes travel by all journey purposes. The analysis of mode share and journey times used the POWCAR travel to work dataset and examined work trips between the identified sectors and the city centre.

The main focus of the analysis was to compare these three transport indicators for each sector, and hence distinguish sectors that were performing well in 2006 from those that had a poor transport offer and will require transport solutions. Following the analysis of 2006 demand, an estimate of 2011 travel demand was undertaken – based on preliminary population data from the 2011 Census and on recent CSO data on employment levels in the GDA as a whole. The analysis of travel demand in 2006 and 2011 provides an indication as to what transport interventions would be appropriate to service existing demand and to facilitate future development and resultant travel demand over the next 10 years.

2.1 Description of Sectors

To facilitate calculation and give a realistic comparison of the three transport indicators (bulleted above), the study area was broken up into a number of sectors – as shown in Figure 1 below. These sectors correspond to the major town and district centres that feed onto the main transport corridors between Fingal and the City Centre. In most cases, each sector can be identified with one specific transport corridor into the city. However, the sector served by the M1/N1 corridor was split into three (i.e. Balbriggan, Swords, Dublin Airport), to enable an analysis of the interactions between these centres.

Figure 1 below shows a diagrammatical representation of the different sectors associated with the main transport corridors between Fingal and the city centre.

Figure 1 – Main Fingal transport corridors to/from the City Centre

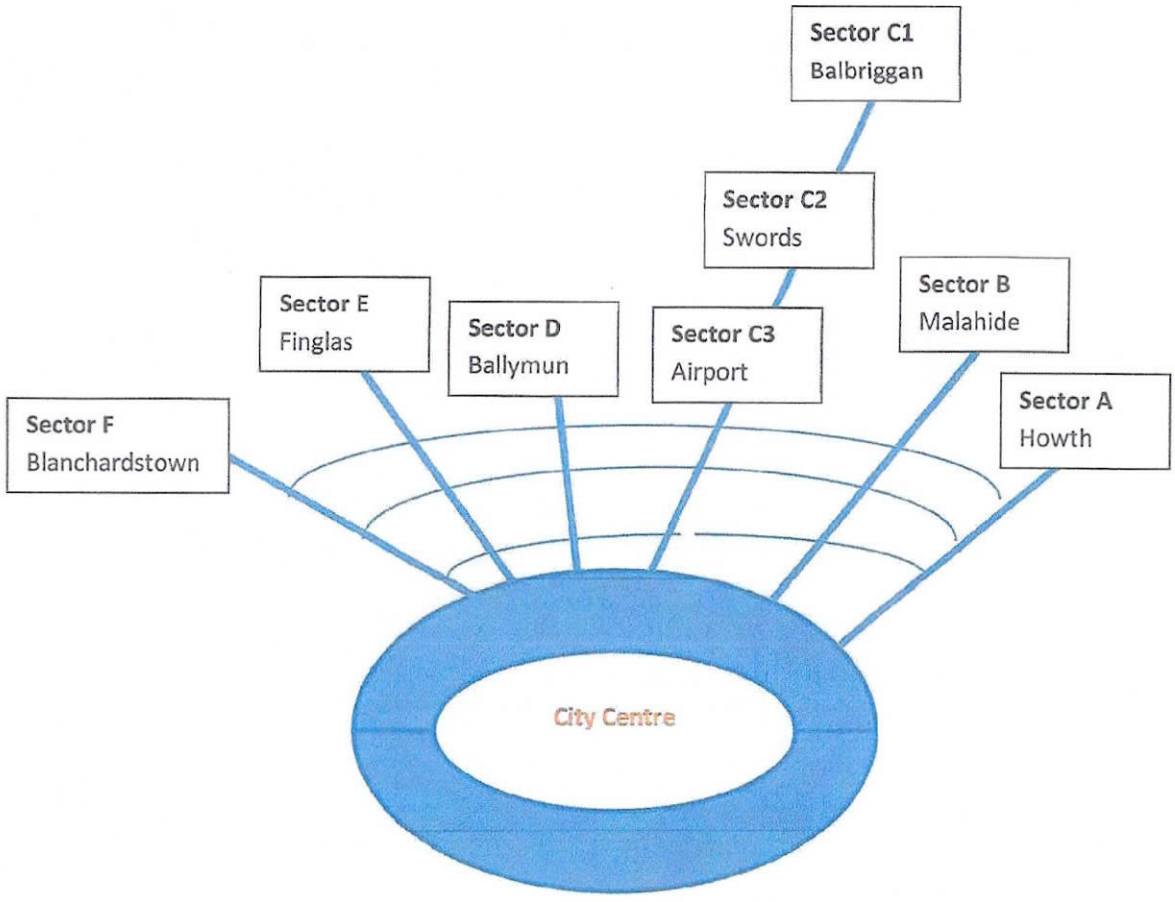
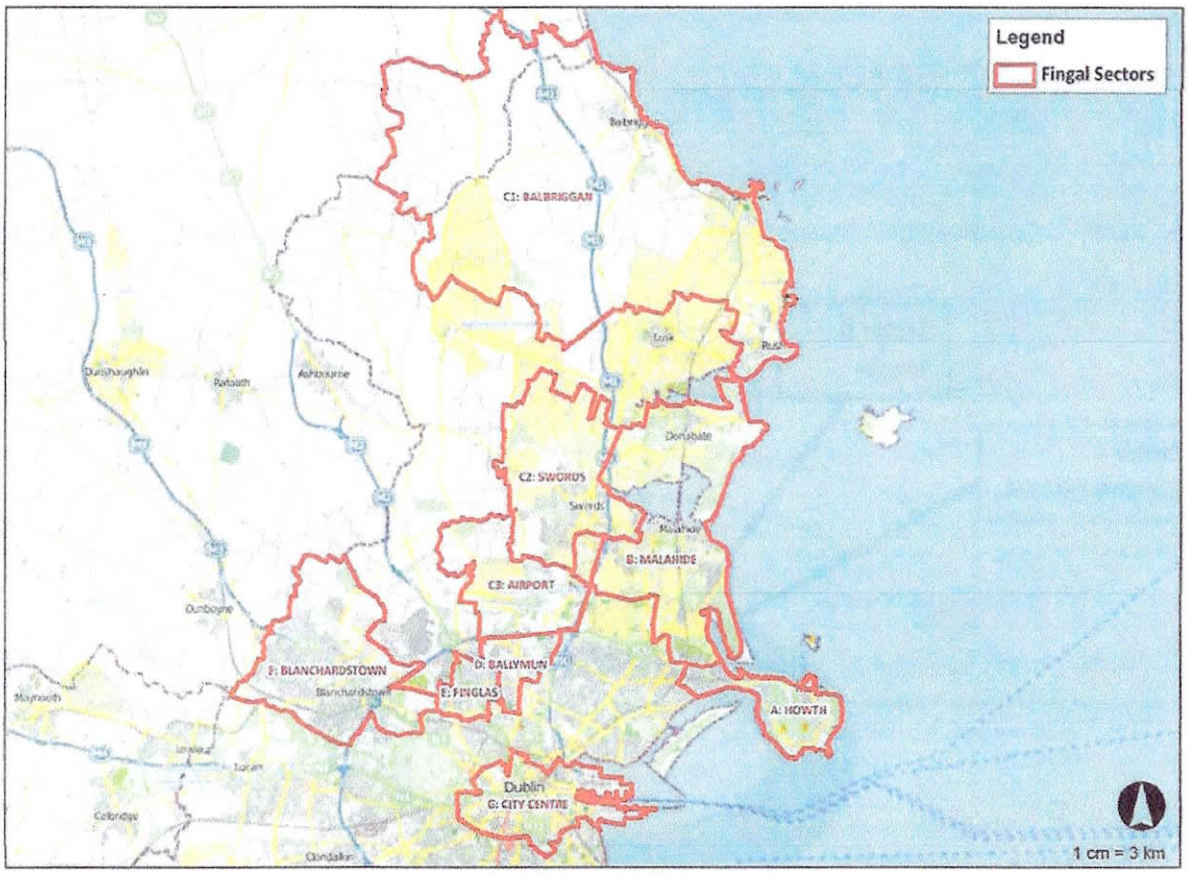


Figure 2 is a map showing the centres included in the different sectors.

Figure 2 – Map of the Fingal Sectors and the City Centre



A description of each sector is given below:

Sector A – Howth

This sector is represented by Howth and two zones in the Sutton Cross area. These zones represent the residential areas within the catchment of the DART spur from Howth to Howth Junction.

Sector B – Malahide

Sector B is represented by the district centres of Clongriffin, Portmarnock, Malahide and Donabate all of which are within the catchment of the Northern Rail Line.

Sector C1 – Balbriggan

This sector includes the towns of Balbriggan and Skerries.

Corridor C2 – Swords

This sector includes Swords town centre and both the residential and industrial parts of Swords.

Sector C3 – Airport

This sector includes Dublin Ariport and Metro Park.

Sector D – Ballymun

This is represented mainly by zones in Ballymun that are in the City Council administrative area (just south of the M50). Also included are two Fingal zones, Sillogue Park and Santry Demesne.

Sector E – Finglas

This is represented by the Janelle district centre – all zones are within the City Council administrative area.

Sector F – Blanchardstown

All zones in the district centres of Blanchardstown and Blanchardstown Town Centre are used to represent this sector.

City Centre

Of particular importance in examining the patterns of travel from the 8 defined sectors is their relationship to the city centre. The city centre in this analysis includes the area inside the canals, the docklands area and two Ballsbridge zones (just south of the canals) that include significant office based employment.

2.2 Travel Demand and Patterns of Travel

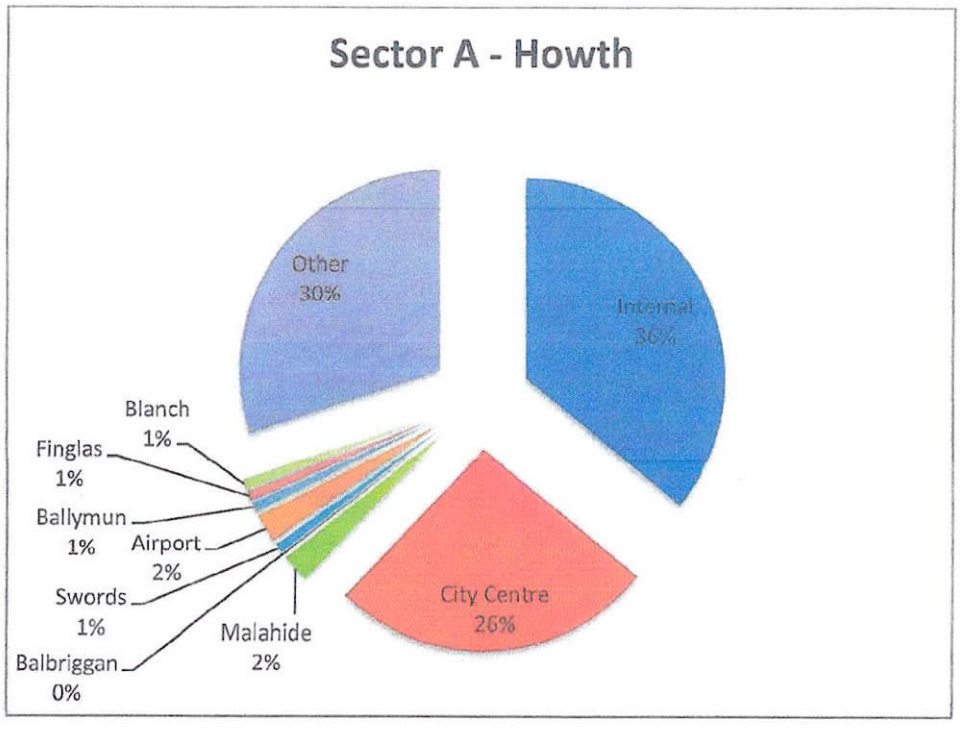
Using the travel demand data from the 2006 base year GDA model, an analysis was undertaken of the patterns of travel demand for trips with origins within eight defined sectors on each of the six Fingal transport corridors. In each case, travel demand is based on the total trips in the morning peak period (7 to 10). A description of each sector in terms of the patterns of travel to each of the other 7 sectors and to the city centre is given below. In the analysis below, trips to "Other" represents trips from the given sector to other parts of the GDA (i.e. outside the other 7 sectors and outside of the city centre).

Trips from Sector A – Howth

A breakdown of trip destinations for trips originating in Howth is given in the table and chart below:

Trips from Sector A - Howth

Trips to	Trips	%
Internal	3,816	36%
City Centre	2,778	26%
Malahide	248	2%
Balbriggan	13	0%
Swords	83	1%
Airport	241	2%
Ballymun	83	1%
Finglas	86	1%
Blanch	85	1%
Other	3,200	30%
Total	**10,633**	**100%**



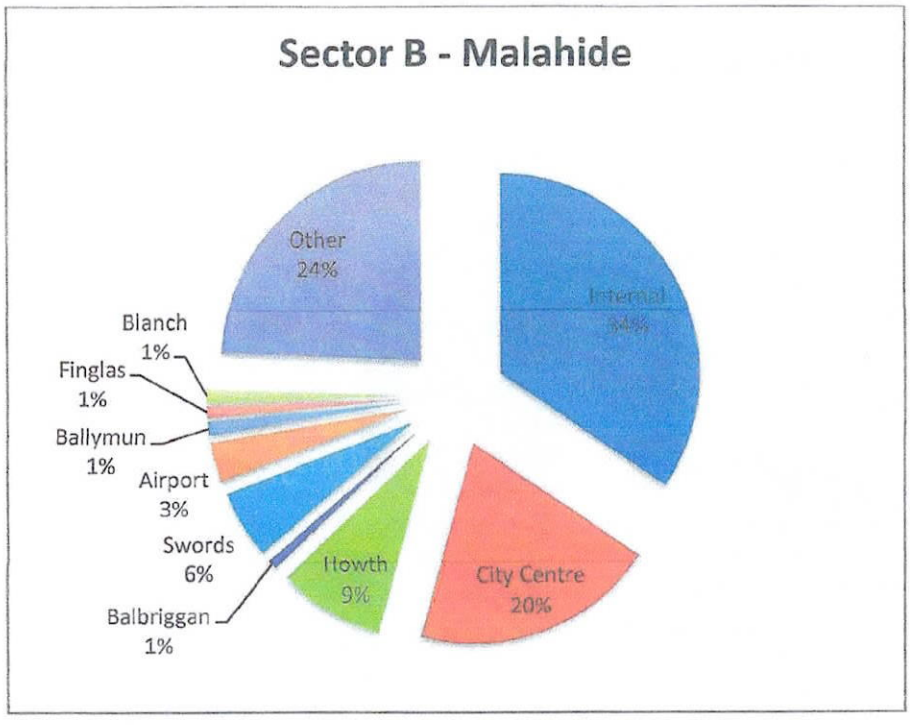
The chart shows that apart from internal trips, there is a strong linkage between Howth and the city cente (26% of trips), and that there is little or no trip linkage between Howth and the other 7 sectors.

Trips from sector B – Malahide

A breakdown of trip destinations for trips originating in Malahide is given in the table and chart below:

Trips from Sector B - Malahide

Trips to	Trips	%
Internal	8,833	35%
City Centre	5,053	20%
Howth	2,199	9%
Balbriggan	205	1%
Swords	1,418	6%
Airport	826	3%
Ballymun	289	1%
Finglas	243	1%
Blanch	297	1%
Other	6,231	24%
Total	**25,594**	**100%**

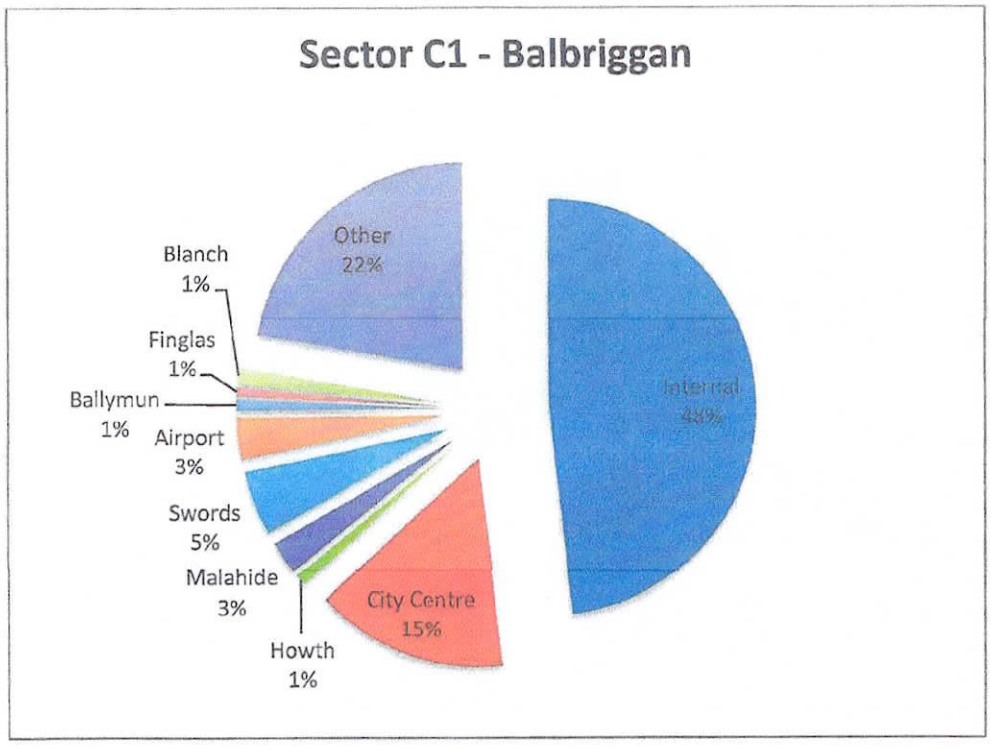


In the case of the Malahide sector, though the predominant movement is towards the city centre, there are significant orbital trip movements to Howth , Swords and Dublin Airport.

Trips from sector C1 – Balbriggan

A breakdown of trip destinations for trips originating in Balbriggan is given in the table and chart below:

Sector C1 - Balbriggan		
Trips to	Trips	%
Internal	12,159	48%
City Centre	3,792	15%
Howth	222	1%
Malahide	649	3%
Swords	1,267	5%
Airport	803	3%
Ballymun	242	1%
Finglas	165	1%
Blanch	332	1%
Other	5,602	22%
Total	25,232	100%

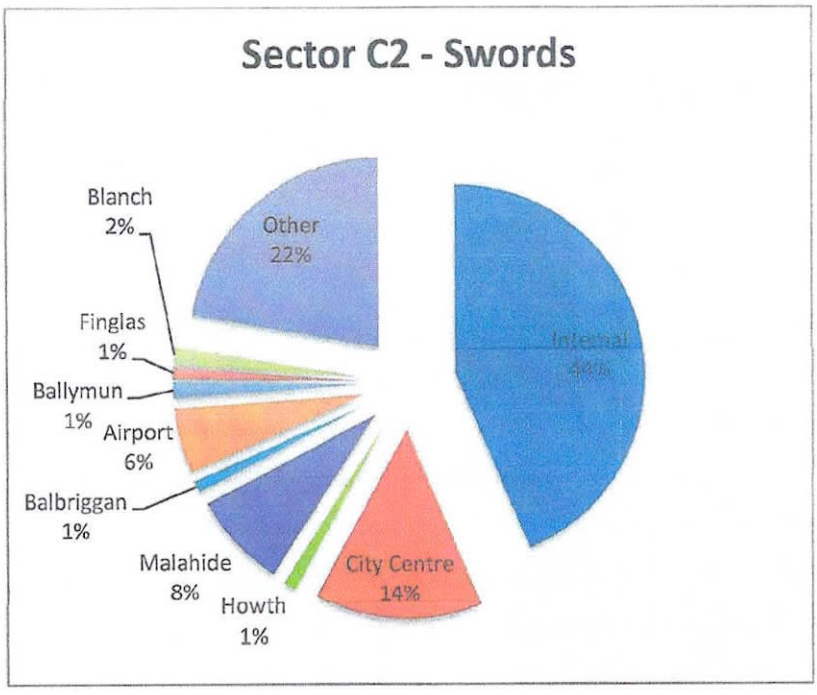


Balbriggan has a high level of internal trips, reflecting the high level of employment locally. There are strong linkages to Swords, Malahide and Dublin Airport. Hence the % of trips destined for the city centre is lower than for most other sectors.

Trips from sector C2 – Swords

A breakdown of trip destinations for trips originating in Swords is given in the table and chart below:

Sector C2 - Swords		
Trips to	Trips	%
Internal	11,372	44%
City Centre	3,739	14%
Howth	289	1%
Malahide	2,135	8%
Balbriggan	259	1%
Airport	1,443	6%
Ballymun	353	1%
Finglas	256	1%
Blanch	389	1%
Other	5,805	22%
Total	**26,039**	**100%**

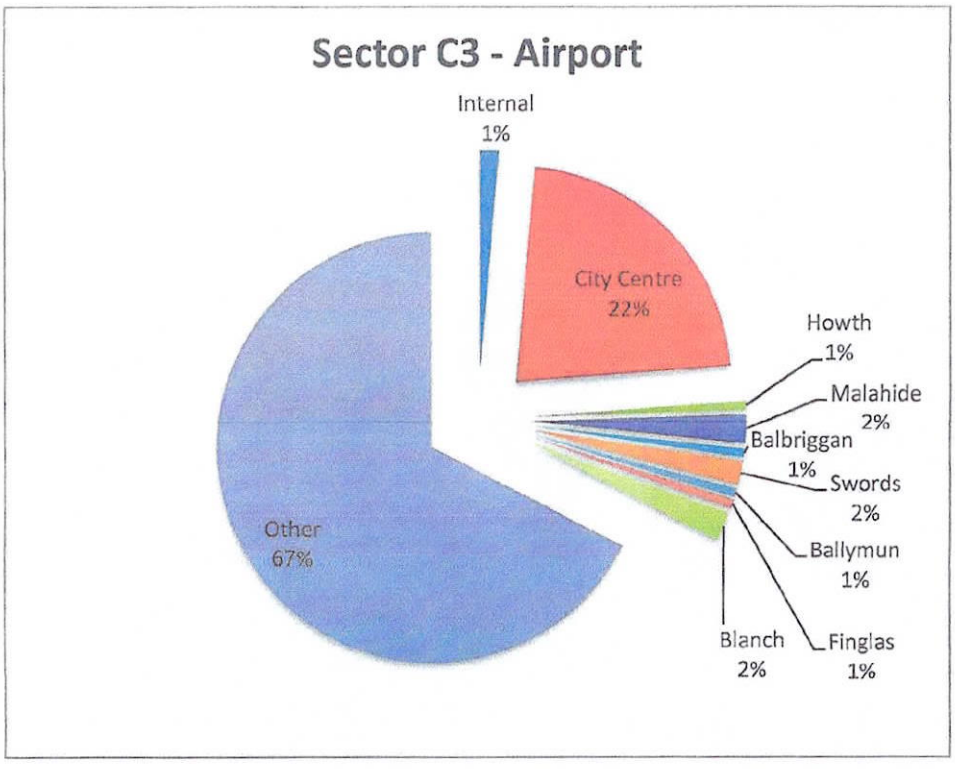


Like Balbriggan, Swords has a high level of internal trips reflecting the level of employment in Swords. There is also a significant trip linkage to Dublin Airport and Malahide. Consequently, while still high in number terms, a smaller portion of trips (on a percentage basis) from Swords have destinations in the city centre than is the case for most other sectors.

Trips from sector C3 – Dublin Airport

A breakdown of trip destinations for trips originating in Dublin Airport is given in the table and chart below.

	Sector C3 - Airport	
Trips to	Trips	%
Internal	103	1%
City Centre	1,617	22%
Howth	47	1%
Malahide	162	2%
Balbriggan	45	1%
Swords	127	2%
Ballymun	49	1%
Finglas	50	1%
Blanch	157	2%
Other	4,862	67%
Total	**7,218**	**100%**

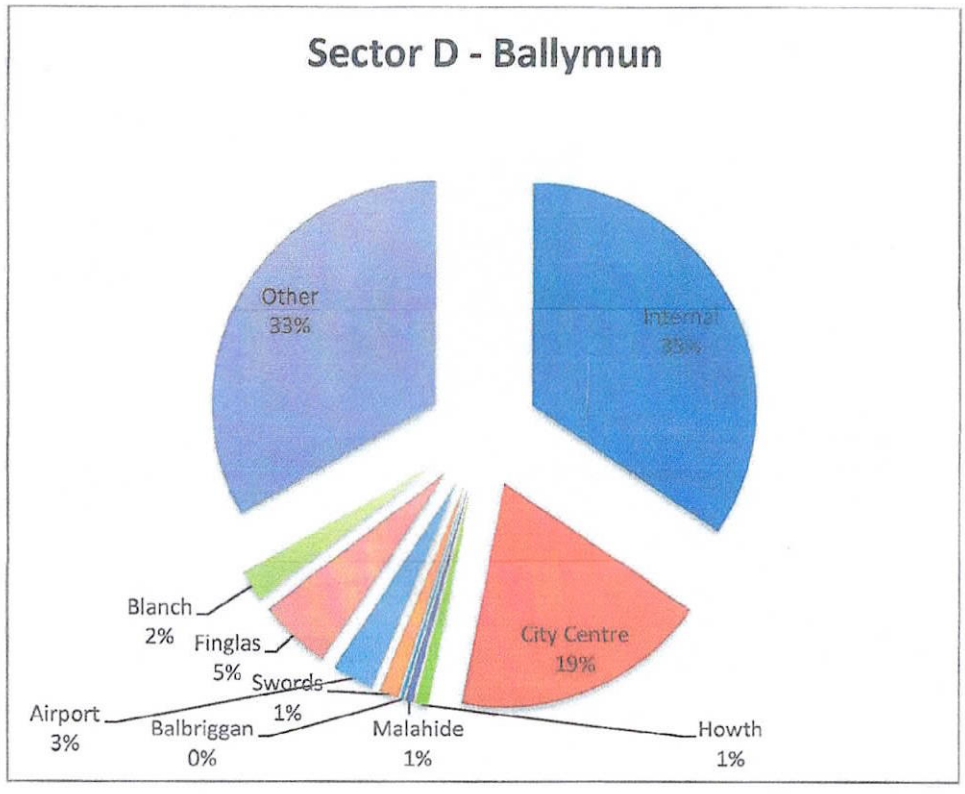


As the Airport is non residential, all trips originating in this sector are air passengers – hence the large % of trips to other areas, including trips to other parts of the country outside the GDA. The only other strong trip linkage is to the city centre (22%).

Trips from sector D – Ballymun

A breakdown of trip destinations for trips originating in Ballymun is given in the table and chart below:

Sector D - Ballymun		
Trips to	Trips	%
Internal	4,468	35%
City Centre	2,399	19%
Howth	124	1%
Malahide	71	1%
Balbriggan	32	0%
Swords	182	1%
Airport	395	3%
Finglas	683	5%
Blanch	284	2%
Other	4,298	33%
Total	**12,937**	**100%**

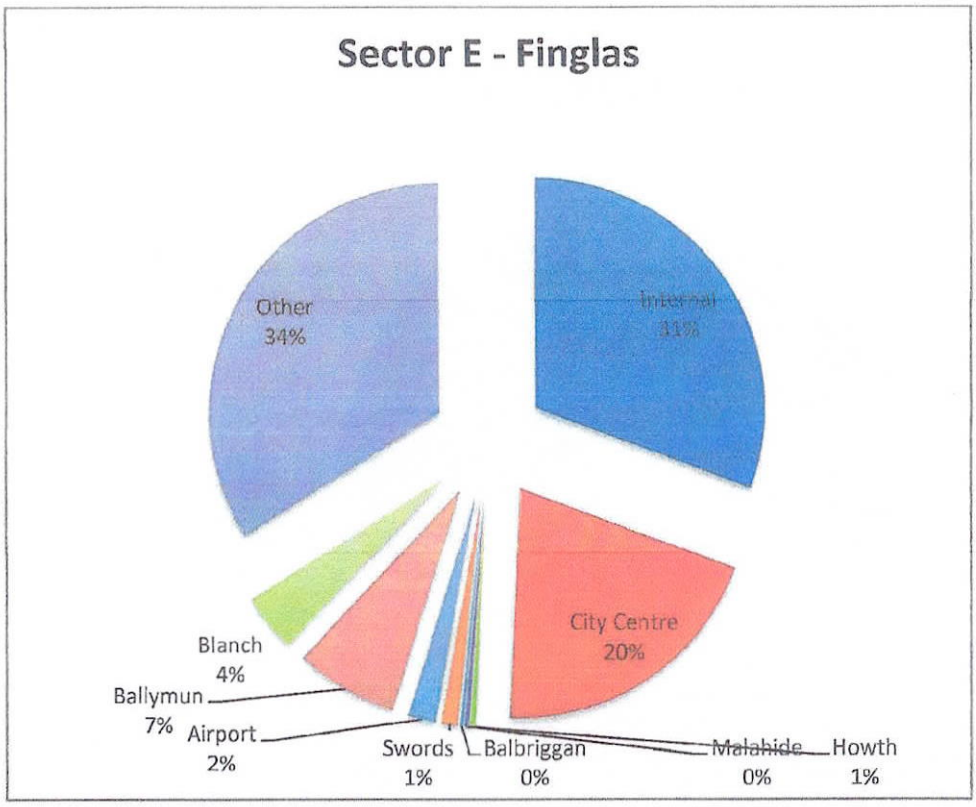


In the case of trips from the Ballymun, apart from the strong focus of trips to the city centre, there is also an orbital trip movement to neighbouring Finglas.

Trips from sector E – Finglas

A breakdown of trip destinations for trips originating in Finglas is given in the table and chart below:

Sector E - Finglas		
Trips to	Trips	%
Internal	4,425	31%
City Centre	2,888	20%
Howth	54	0%
Malahide	51	0%
Balbriggan	33	0%
Swords	164	1%
Airport	285	2%
Ballymun	1,038	7%
Blanch	581	4%
Other	4,899	34%
Total	**14,419**	**100%**

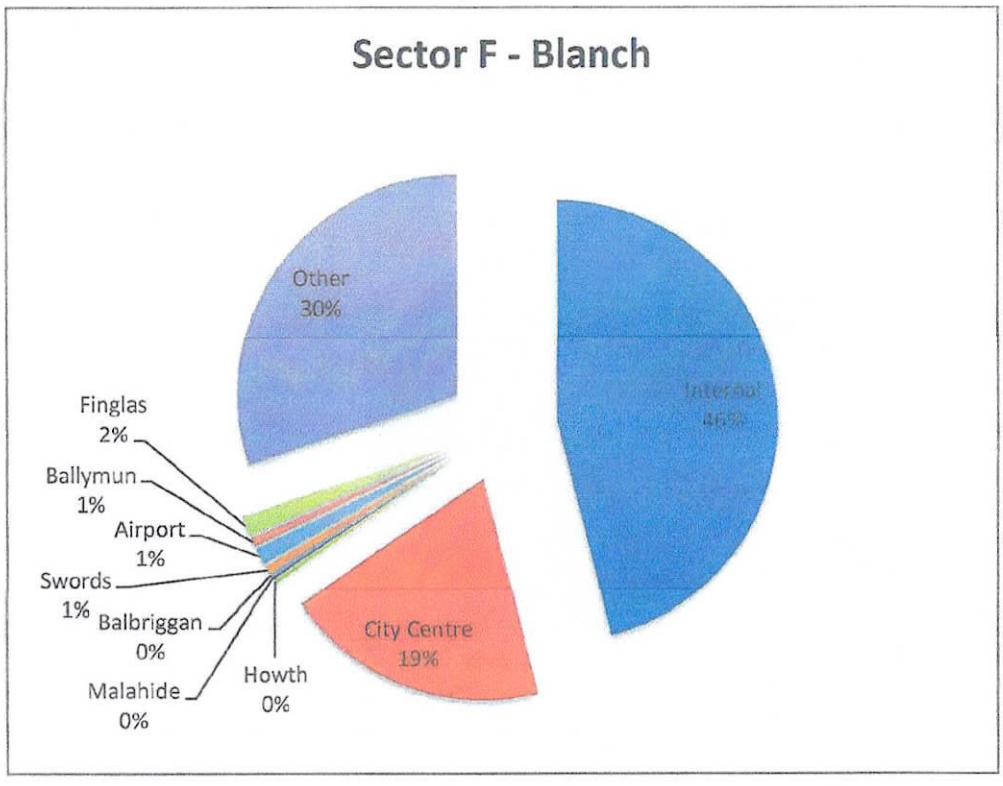


The pattern of trips from Finglas is similar to that of Ballymun, with similar % of internal trips, similar % of trips to the city centre and an orbital trip movement to Ballymun.

Trips from sector F – Blanchardstown

A breakdown of trip destinations for trips originating in Blanchardstown is given in the table and chart below:

	Sector F - Blanch	
Trips to	Trips	%
Internal	25,682	46%
City Centre	10,778	19%
Howth	154	0%
Malahide	140	0%
Balbriggan	53	0%
Swords	328	1%
Airport	675	1%
Ballymun	355	1%
Finglas	800	1%
Other	16,753	30%
Total	**55,719**	**100%**

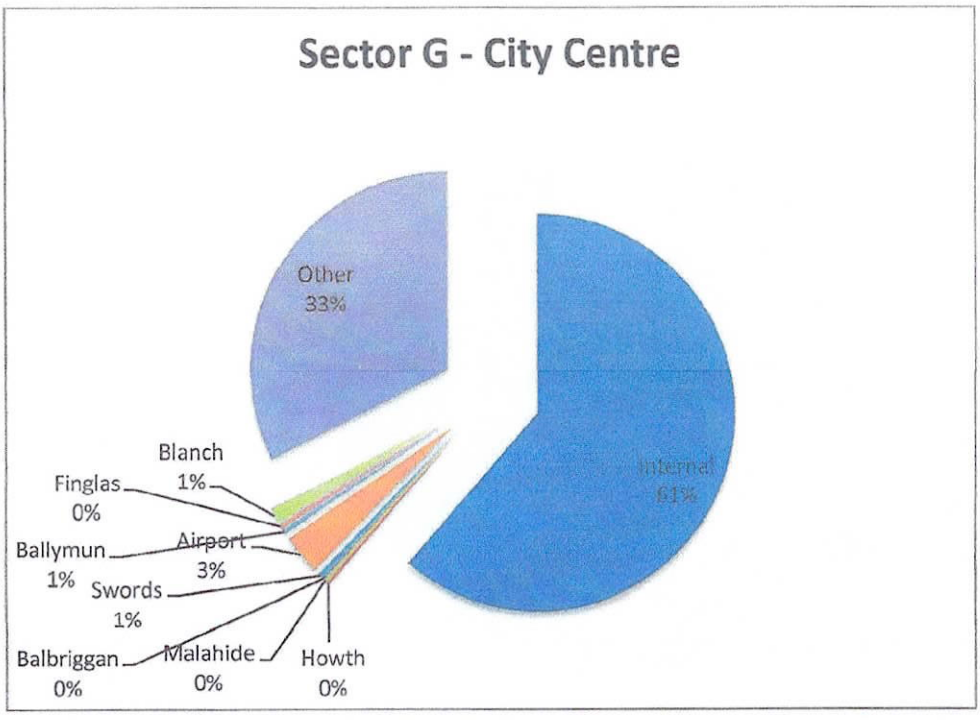


Like Swords and Balbriggan, Blanchardstown has a high level of internal trips, reflecting the levels of employment locally. Unlike Swords, however there is little or no other prominent trip destination other than the city centre and little or no orbital movements to other Fingal centres.

Trips from the City Centre

A breakdown of trip destinations for trips originating in the City Centre is given in the table and chart below:

Sector G - City Centre		
Trips to	Trips	%
Internal	50,140	61%
Howth	226	0%
Malahide	162	0%
Balbriggan	111	0%
Swords	335	0%
Airport	2,673	3%
Ballymun	340	0%
Finglas	322	0%
Blanch	966	1%
Other	26,548	32%
Total	**81,824**	**100%**



As can be expected, the majority of trips originating in the city centre have destinations within the city centre. However, there are a significant number of trips (mainly air passenger trips) between the city centre and Dublin Airport. This leads to a higher level of outbound travel demand on the M1 / N1 corridor in the AM peak than would be the case for the other Fingal corridors.

2.3 Travel Demand in 2011

Using preliminary population data from the 2011 Census, and the latest CSO data on employment levels in the GDA (from the latest QNHS report), an estimate was made of the changes in travel demand from each of the identified sectors. It should be noted that the breakdown of employment levels by sector will not be available until the CSO release the POWCAR 2011 dataset in the second half of 2012. Hence, no change in the patterns of travel between the various sectors can be assumed at this stage.

Table 1 below gives the growth in population between 2006 and 2011 in the identified sectors:

Table 1 – Sectoral change in population between 2006 and 2011

Sector	Pop06	Pop11	%increase
*Howth	18,497	21,045	14%
Malahide	36,826	41,751	13%
Balbriggan	42,217	48,003	14%
Swords	37,764	42,965	14%
Airport	2,602	2,960	14%
Ballymun	21,146	22,000	4%
Finglas	24,379	25,302	4%
Blanchardstown	83,891	95,446	14%
City Centre	125,717	130,478	4%
Other	1,269,508	1,371,089	8%
Total GDA	1,662,547	1,801,039	8%

**The Howth sector includes a part of the Clongriffin development adjacent to Clongriffin rail station.*

The table shows that despite the economic downturn, there has been a significant increase in population since 2006 – and that in the case of many of the Fingal population centres this increase has been much larger than for the GDA as a whole.

Despite the significant increase in population in the Fingal sectors, the GDA as a whole has experienced a 10% reduction in people at work, due to the rising levels of unemployment. For the purposes of estimating 2011 levels of travel demand in the AM peak, it is assumed that the reduction

in people at work will impact proportionally on all work related trips but will have no impact on other trips (e.g. trips to education, shopping and other purposes). In the case of these non-work related trips, it is assumed that travel demand has grown between 2006 and 2011 in proportion to the growth in population in each sector.

Trips from Dublin Airport have to be treated as a special case, as these are related to air passenger numbers. Latest DAA figures show that the 2011 level of passenger throughput through Dublin Airport will show a reduction of circa 10% on the 2006 figures. Hence, it can be assumed that AM Peak trips from Dublin Airport will show a corresponding 10% decrease over 2006 levels.

The resultant estimate of the changes in travel demand in the AM Peak from each of the identified sectors between 2006 and 2011 is shown in Figure 2 below:

Table 2: Estimated change in travel demand in the AM Peak by sector 2006 - 2011

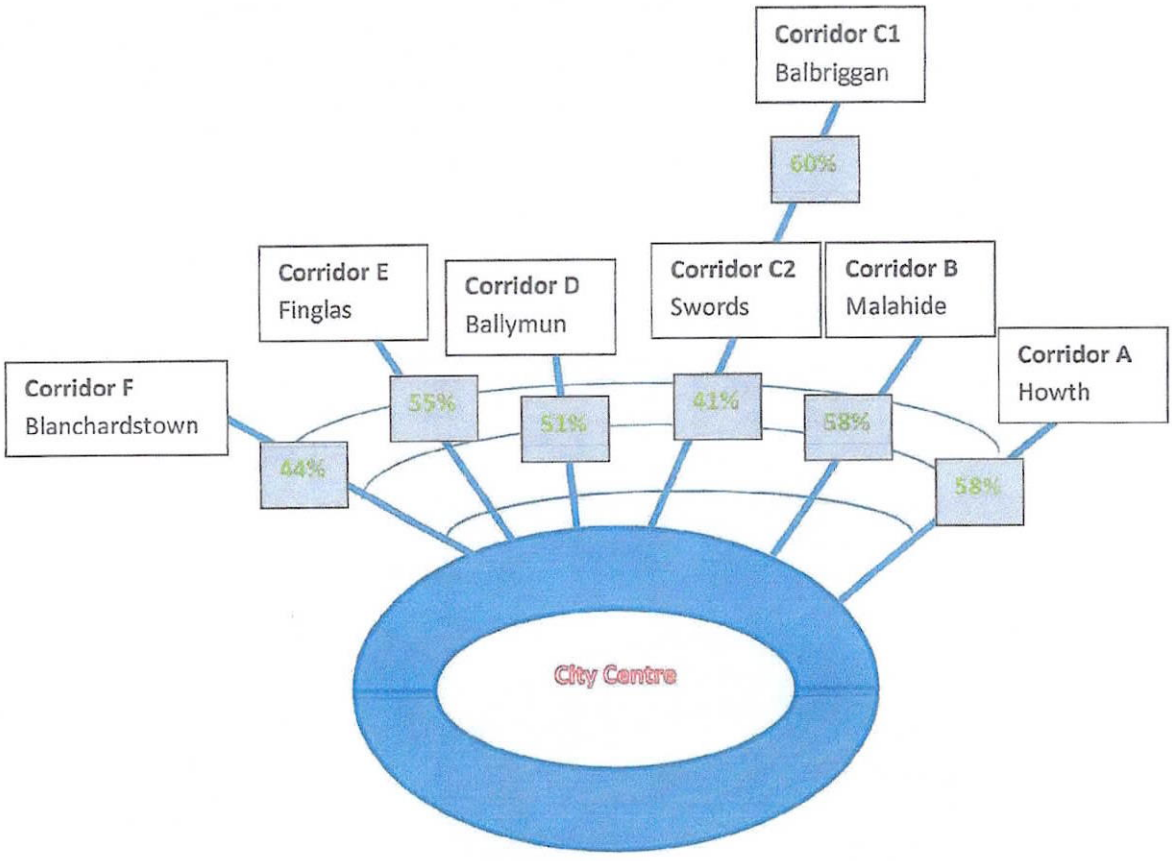
Sector	Trips06 AM Peak	Trips11 AM Peak	%increase
Howth	10,670	10,994	3%
Malahide	25,594	26,486	3%
Balbriggan	25,232	26,038	3%
Swords	26,039	26,851	3%
Airport	7,218	6,496	-10%
Ballymun	12,937	12,319	-5%
Finglas	14,419	13,635	-5%
Blanchardstown	55,719	57,398	3%
City Centre	81,824	75,973	-7%
Other	809,731	793,764	-2%
Total GDA	1,069,384	1,049,684	-2%

Table 2 shows that despite the economic downturn and the decline in people in employment in the GDA, it is expected that the overall levels of travel demand in 2011 will be similar to levels in 2006. Some sectors with strong population growth will show a small increase in travel demand, while other sectors with average or lower population increase will show a small decrease in travel demand due to the rise in levels of unemployment.

2.4 Mode Share

Using the POWCAR dataset, an analysis of the % Public Transport (PT) mode share of trips to work between each sector and the City Centre was undertaken – and this is shown in figure 2 below. As there are no work trips originating in sector C3 (Dublin Airport), this sector is not shown. In each case, the PT mode share is calculated as the % of mechanised mode (car and public transport) trips that use public transport:

Figure 3 - % PT mode share for trips to work from each Sector.



The above diagram shows that the PT mode share for work trips to the city centre from Swords is much lower than for the other sectors, and falls well below the Smarter travel target. Even though parts of Blanchardstown are served by rail, the PT share for here is also low. By contrast, the PT mode share is highest from Balbriggan that is well served by the Northern Rail line. The other sectors of Howth and Malahide that are also served by this rail line also enjoy a healthy PT mode share for trips to work in the city centre. PT services from both Swords and Blanchardstown would require significant improvement to reach the PT mode share of the three sectors currently served by the Northern Rail line.

2.5 Journey Time

The POWCAR dataset was used to analyse the average journey times by Car and by Public Transport to the city centre from each of the Fingal sectors. Dublin Airport was excluded from this analysis as there are no trips to work originating in this sector. It should be noted in this analysis that PT journey times include access times to the public transport node at each end of the journey. Average journey times by Car (top figure) and by PT (bottom figure) in minutes to the city centre from each sector are shown in Figure 4 below:

Figure 4 – Journey times by car and public transport to the city centre from the main Fingal centres

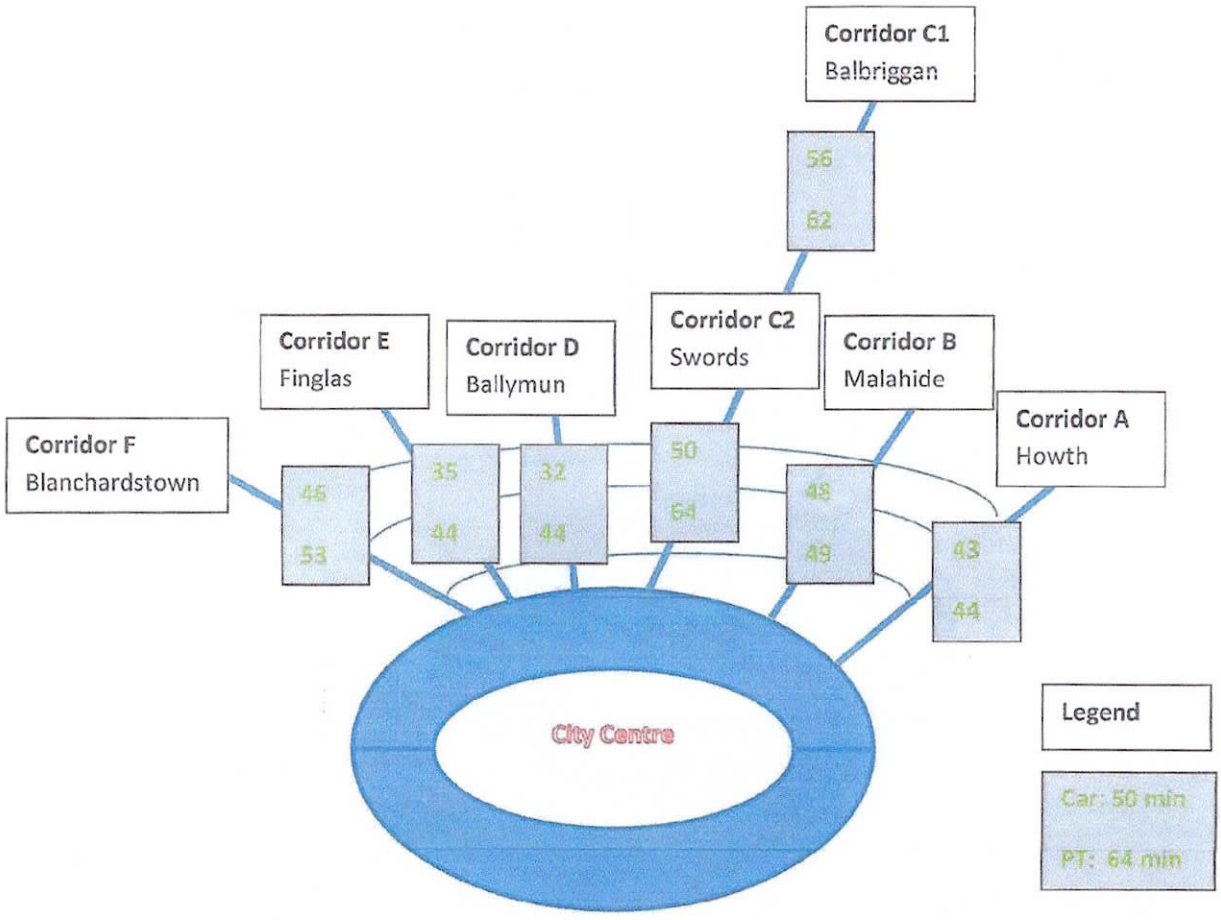


Figure 4 shows that PT journey times from the Sectors served by the Northern Rail Line compare favourably with car journey times. These are also the Sectors with the highest PT mode share. The longest journey time (64 mins) by PT is from Swords where PT offers a much poorer journey time compared to Car. The PT journey time from Swords to the city centre is longer than from Balbriggan to the city centre, the latter being served by the Northern Rail corridor. Even though journey times

by PT from Ballymun and Finglas are well under an hour, they do not compete well with equivalent car journey times. PT journey times from Blanchardstown to the city centre are also poor relative to journey times by car.

2.6 Conclusions from analysis of transport issues

The key transport issues identified in this analysis of current travel demand, patterns and journey times from the main Fingal sectors are as follows:

- Fingal centres adjacent to the Northern Rail Line in general have a good Public Transport mode share and a PT journey time to the city centre that is competitive with car journey times. However, the Public Transport mode share for the major centres of Swords and Blanchardstown are low and PT journey times for trips to the city centre are significantly above the equivalent car journey times.
- Ballymun and Finglas centres also need improvement in journey times by PT to attract a better PT mode share.
- Apart from trips to the city centre, Swords has a strong trip linkage to Dublin Airport and there are also significant trip movements between Swords and Malahide.
- Blanchardstown has little or no trip linkage to other Fingal centres and hence can be considered separately in terms of transport solutions. It should be the subject of a separate study.

3 Focusing on issues in Swords

The next part of this study is to examine possible transport options / solutions to address the transport issues identified in the analysis of current travel patterns and travel demand. Given the issues emerging from this analysis, and given that Blanchardstown will be the subject of a separate study later, the main focus of short to medium term transport solutions will be to address issues in the Swords area in advance of the delivery of Metro North. Following this, proposals are examined to improve the public transport offer for the Ballymun and Finglas sectors.

In the absence of Metro North, it is clear that proposed transport solutions for the Swords area will need to rely in the main on best use of the limited road capacity available to cater for the key travel patterns identified. The focus of the solutions will be to cater for travel demand to the key destinations, improve accessibility and provide a better level of service in terms of journey time.

Prior to proposing possible transport solutions for Swords, it is clear that the success of any proposals is critically dependent on managing and catering for the large number of local trips within Swords and its environs. Hence the following approach was adopted:

- Undertake a more detailed examination of travel demand and trip movements within Swords;
- Examine the capacity of the road network to meet this demand – in particular, the network serving Swords internally and the roads that link Swords to the city and other key destinations; and
- Examine public transport options for increasing the trip carrying capacity of this available road network.

Following this more detailed examination of trip movements in the Swords area, this part of the study goes on to propose a number of specific measures / transport options to improve the transport offer for Swords and the other Fingal sectors of Ballymun and Finglas.

3.1 Travel Demand - Swords

As identified in the first part of this study, there is a high level of internal trip movements in Swords - i.e. 44% of ***all***[1] [1] trips originating in Swords in the AM peak period have destinations within the town and its environs. The success of any proposed transport solutions for Swords is critically dependent on serving this local travel demand while not negatively impacting on the efficiency (in terms of journey time and reliability) of potential solutions to satisfy trip demand between Swords and the city centre and other key destinations (including Dublin Airport and Malahide).

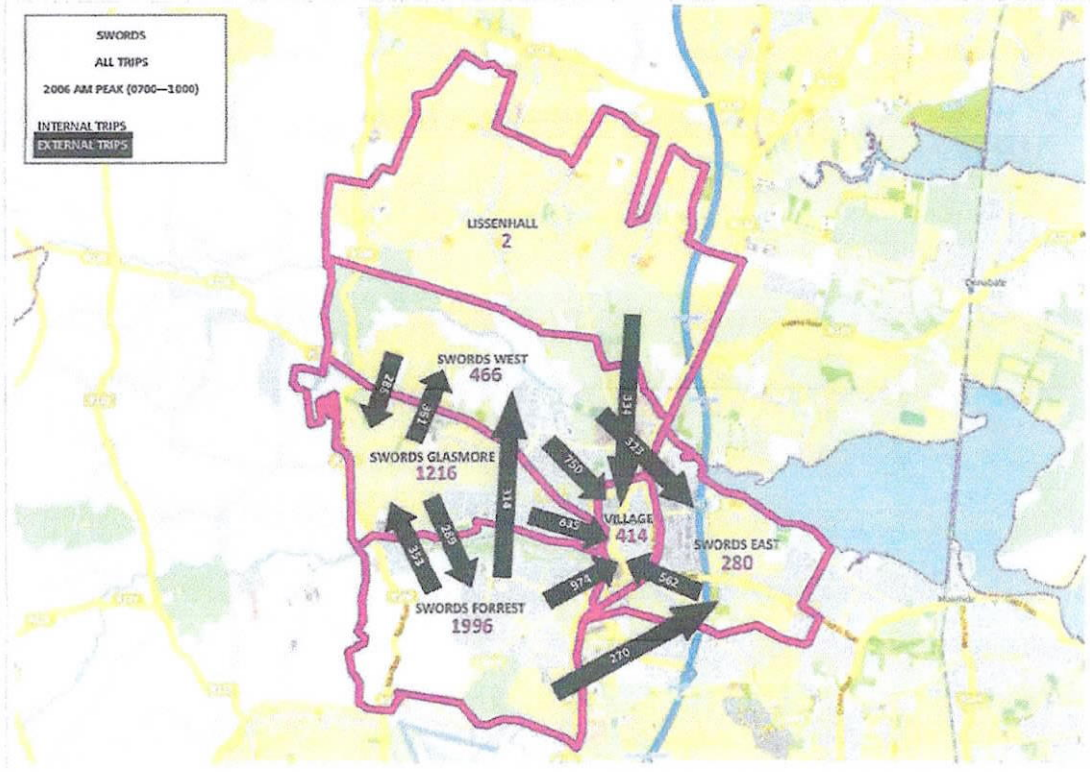
Figure 5 below shows in diagrammatic form the patterns of travel internally within Swords during the morning peak (7 to 10) – using data taken from the 2006 GDA model. The Figure shows the

[1] *All trips include trips to work, education, shopping leisure and other.*

strong convergence of trips on Swords town centre in particular and also the demand for travel between the residential areas to the West of Swords and the industrial area to the East.

Though there are also a large number of walking trips within and between the residential areas, these in the main are children accessing local schools. This level of local travel demand within Swords puts considerable strain on the local road network that must also cater for external travel demand between Swords and other key destinations.

Figure 5 – Internal trip movements within Swords



3.2 Road Capacity

In examining the available road capacity in the environs of Swords, it is important to note that the local road network must serve ***all*** trip movements – i.e. trips:

- Internally within Swords and its environs;
- Between Swords and the city centre; and
- Between Swords and other key destination – in particular Dublin Airport and the Malahide area.

3.2.1 Capacity for Internal Trips

As identified in 3.1 above, there is a strong internal trip movement from the residential areas to the West of Swords to both the town centre and the industrial area to the East of Swords. The bulk of these trips are well outside walking distance and currently travel in the main by car to Swords town centre or through the town to the industrial area East of the Bypass.

In general, the local road network providing access to the Pavillions Shopping Centre and to the employment areas in the town centre and to the East of the town is of low capacity. Car trips accessing retail and employment must cross / converge in the centre of Swords and must share road capacity with car trips between Swords and all other external destinations. Given this limited road capacity locally, and the need for most local trips to cross between West and East, there is a critical need for traffic management measures in the town centre to:

- Improve journey time and journey time reliability for bus services passing through the centre of Swords; and
- Improve the environment for walking and cycling in the critical central area of the town.

- The physical layout of the two main residential areas in Swords and their location relative to local employment and other local services, allied to the low capacity of the local road network connecting these, severely restricts the capacity of Swords to cater for any increase in local trips.
- There is a critical need for traffic management measures in the centre of Swords in order to improve bus journey times through the town and better provide for walking and cycling trips in this critical central area.

3.2.2 Capacity for Trips between Swords and the City Centre

Only two main roads serve trips between Swords and the City Centre – i.e. the R132 (formerly the N1) and the new M1. In terms of car capacity, the R132 south of Cloghran is a single lane for cars and a bus lane – and hence capacity on this road for car trips to the city centre is approximately 1,000 trips per hour. The M1 has 3-lane capacity from Swords to the entrance to the Port Tunnel, but south of this is also down to a single lane. In addition, in the morning peak most of the capacity of the M1 is already used up by trips that have already joined the motorway north of Swords. Any future year development north of Swords would further take from this capacity.

It should also be noted that the capacity provided by these two roads must serve ***all*** trips using them to access the city centre (i.e. not just trips originating in Swords). As there are no proposals to increase road capacity for car trips within the M50, in practice the capacity for car trips between Swords and the City Centre is capped at current levels. In summary:

- The only way to increase trip capacity between Swords and the City Centre in the absence of Metro North is by extracting more capacity from the existing road network by reallocating space to Bus and / or BRT services.

3.2.3 Capacity for Trips between Swords and other areas

As identified in Phase 1 of the study, in addition to local trips and trips to the city centre, there are significant trip linkages between Swords and Dublin Airport and Swords and Malahide. As in the case of trips to the City Centre, car trip capacity between Swords and Dublin Airport is restricted in the main by available capacity on the R132 and M1. Car trips to Malahide in the main use the narrow single lane R106 that already experiences significant amounts of congestion at peak times.

Bus services between Swords and the Airport and Swords and Malahide currently serve to expand the overall trip capacity to these two destinations beyond what can be achieved by car trips alone. The only way to increase this capacity is by further enhancements to these services and by improving bus priority to each. In summary:

- In advance of the development of Metro North, it is critical that capacity for trips between Swords and other key destinations – including Dublin Airport and Malahide – be enhanced by improved bus priority and services on routes serving these destinations.

3.2.4 Road capacity for trips from Ballymun and Finglas

Both Ballymun and Finglas are served by a single road that in each case reduces to a single lane for car traffic as trips approach the city centre. Hence the capacity to serve car trips between these two towns and the city centre is capped at current levels and the only way to increase trip capacity is to improve or enhance public transport services in each case.

3.3 Options to increase road capacity

Following the review of existing available road capacity in 3.2 above, and given that there are no current proposals for additional radial roads in the study area, the measures available to increase the trip carrying capacity of the available road network include:

- Reallocating existing road space to bus, improving bus journey times and reducing journey time variability;
- Adding capacity to the Northern Rail line and delivering a mode shift from car to rail on this corridor – thereby generating spare road capacity for allocation to bus and appropriate car use;
- Improving bus service frequency;

- Providing better and more direct services; and
- Introducing complementary traffic management measures to ensure better and more reliable bus journey times and provide for a better walking and cycling environment – in particular in Swords town centre.

To quantify the capacity required to serve trips to the city centre, the approach taken was to set the PT mode share target for Swords, Ballymun and Finglas to the best existing mode share – i.e. that of Balbriggan at 60% PT mode share for trips to the city centre. Based on existing travel demand, this gives a theoretical PT capacity required for AM peak demand for trips to the city centre from these sectors. In addition, transport solutions for the Swords, Ballymun and Finglas corridors will have to have a PT journey time to the city centre that is competitive with existing car journey times.

Table 1 below sets out the bus service frequencies that would be required to meet this potential PT mode share target for the Fingal sectors of Swords, Dublin Airport, Ballymun and Finglas in the AM peak.

Table 1 – Bus services to meet PT mode share target of 60% for trips from Fingal sectors to City Centre in the 3-hour AM peak.

Trips to the City Centre ONLY	2011 Demand	Mode Split based on Balbriggan (Rail)	Resultant Public Transport Demand	Peak 1 Hour based on 60% of 3 Hour	Peak 1 Hour Buses Required based on 100 Passengers per Bus	Frequency Required (Minutes)
Swords	3,855	60%	2,313	1,388	14	4
Airport	1,382	60%	829	498	5	12
Ballymun	2,399	60%	1,439	864	9	7
Finglas	2,731	60%	1,639	983	10	6
M1 / DPT Requirements						
Swords + Airport	5,238	60%	3,143	1,886	19	3

Given that there are currently no major road schemes proposed to serve these sectors, a review of existing public transport proposals was undertaken. There are two major QBC enhancements proposed; the Enhanced Swords Road QBC and the further development of Ballymun QBC. Additionally, there is a major signalling project on the northern rail line as well as a proposal to extend the electrification of the line as far as Balbriggan, thereby facilitating DART services to this location. These capacity enhancements have the potential to generate a shift from car to rail trips on this corridor and hence free up capacity on the road network for bus and appropriate car use.

Based on these schemes and their potential to provide additional capacity and better journey time, a number of transport options were derived to service this target demand for trips to the city centre. It is clear that network capacity from Swords is limited. The Enhanced Swords Road QBC is expected to deliver a capacity of between 2,500 to 3,500 passengers per hour with similar capacity available at the M50 on the Finglas and Ballymun QBCs. In this analysis of matching target PT demand to potential capacity it should be noted that stopping QBC services from Swords, Finglas and Ballymun

will also serve the inner suburbs of the city and hence all trip capacity cannot be allocated solely to trips originating in the three towns.

4 Transport Options / Solutions

In response to the issues highlighted through the analysis reported in this study, a number of transport solutions have been identified for further analysis and detailed consideration. The principle behind these choices is that additional capacity at the level required can only be achieved by enhancing the Public Transport provision. In particular, if the target public transport mode share for Swords is to be achieved, consideration will need to be given to the implementation of measures to meet the demand for trips to the city centre and to achieve the necessary competitive journey times. The proposed interventions put forward for further analysis are set out in the following sections.

4.1.1 Public Transport Focal Point

Of considerable importance to the development of enhanced public transport usage in Swords is the establishment of a core public transport hub which would provide a focal point for the provision of public transport services and their integration with other modes of travel. Good linkages from the main residential areas to the hub location will be important as well as appropriate links with the town centre. Accordingly the following measures are proposed for further analysis and development:

- The development of a high quality public transport focal point at Swords. This should be located so that it is easily accessible to the town centre and the residential hinterland – the most likely appropriate location being close to the Pavillions shopping centre. The interchange should provide a high quality environment for bus users with waiting areas, off-bus ticket availability, information provision and, if commercially viable, refreshment sales. An indicative layout is attached as Appendix 1;

- Provision of high-quality bus priority to the Swords transport focal point from the residential areas of Swords, particularly to the west. This will require traffic management measures to protect bus journey times and affect a fundamental change to the private vehicle / public transport balance- particularly in the centre of Swords; and

- Provision of an enhanced pedestrian and cycling network in Swords to provide good access to the public transport focal point by these modes and to serve the high level of internal trips within Swords.

4.1.2 Swords Road Enhanced QBC

Coupled with the development of a public transport hub in Swords, the enhancement of the existing Swords Road QBC would remove pinch points along its route and provide improved priority along its full length. This will provide reduced journey times for bus travel along this corridor, making the journeys more competitive relative to car trips; ensuring a competitive journey time will be essential in increasing the attractiveness of the route. The option of future-proofing the scheme to ensure its compatibility for possible BRT services should be assessed.

4.1.3 Service Measures between Swords and City Centre

The development of the above public transport interchange and enhanced QBC corridor will facilitate the potential development of the following service options by bus to serve trips between Swords and the City Centre:

1. *Swords Interchange to City Centre Direct via Dublin Port Tunnel*

   Enhancement of frequency of direct non-stop service from the Swords Interchange to O'Connell Bridge and/or Merrion Square/St. Stephen's Green via the Port Tunnel. There are limited constraints on this route, as QBC enhancements in the city centre would allow for priority to and from the tunnel on the city centre side. Journey times would be expected to be around 25 minutes and a significant capacity is available for this service given its use of the M1 motorway and tunnel links;

2. *Swords Interchange to City Centre via Airport and Dublin Port Tunnel*

   This service would use the Enhanced Swords Road QBC from Swords to the existing Airport bus Interchange and then use the M1 and Port Tunnel. Journey times would be similar to option 1 with the addition of the pick-up and drop-off time at the Airport. Capacity would also be similar to option 1, but some delays from other services on the QBC could reduce this.

Those trips accessing the areas between the city centre and the M50 would also gain from these interventions and would continue to be served by the Enhanced Swords Road QBC.

3. *Swords Interchange to City Centre via Swords Road Enhanced QBC*

   The development of an enhanced Swords Road QBC will enable reduced journey times, potentially 35 minutes from the Swords Interchange to O'Connell Street and 44 minutes to Merrion Square. The service could deliver a capacity of between 2,500 to 3,000 passengers per hour per direction. An option to upgrade the Enhanced QBC to BRT style services can also be examined subject to feasibility and cost effectiveness.

The above three options are the main viable transport service options that could be implemented for Swords in the shorter term, within current financial constraints. Further options that can be looked at for the medium term include:

4. *Swords Interchange to DART*

   Existing bus services could be used to provide a link from Swords to Malahide DART station. However it would be essential to provide guaranteed bus journey times on this link through traffic management measures and the use of bus only segments where feasible.

   Current rail journey times between Malahide and the city centre when added to the bus journey time and the interchange time at Malahide would make this a less attractive option. It is possible that rail journey time improvements could be achieved following completion of the resignalling project and the introduction of limited stop services. In the longer time frame the

provision of extra track capacity has the potential to deliver better and more reliable journey times between Malahide and the city centre.

4.1.4 Possible Measures on other Corridors

Addressing the Ballymun and Finglas corridors, a number of possible proposals have been identified which could be considered in the medium term. These include:

1. *Improvements to Ballymun QBC*

   Similar to the Swords Road QBC, the removal of pinch points and an increased level of priority for buses would improve the attractiveness and use of the Ballymun corridor.

2. *Ballymun QBC extension to Airport Interchange*

   Were the Ballymun QBC to be extended to the Airport, passengers from Swords wishing to travel to destinations along the Ballymun corridor such as DCU would be facilitated as would other people accessing the airport using this corridor. However, substantial additional work is required to assess the commercial case for such an extension.

3. *Possible Extensions to Luas BXD Light Rail*

   The alignment of Luas BXD facilitates its possible future extension along the Fingal Road to serve Finglas and adjacent areas. While clearly this would have to await the completion of the Luas BXD project, and could only therefore be considered in the medium term, it would deliver a high capacity service along this corridor.

   Potentially, this line could then be further extended along the Metro West and Metro North corridors to act as a pre-cursor to Metro West and Metro North along the South Fingal fringe. However, the cost of providing this extension and the longer journey times associated with it make it unlikely that this could be considered as a viable proposition.

Some of these various transport proposals set out above are shown in figure 6 below:

4.1 Ensuring maximum use of the bus options for swords

In order to make maximum use of the three proposed bus services from Swords, it is essential that people in the two major residential settlements south and north of the Ward River are facilitated in accessing the proposed services. Parts of both residential areas are well outside walking distance to the Pavillion shopping centre. Possible solutions to this include:

- By extending one or both bus services from Swords to begin with a stopping service further out on the Rathbeale road and going through the interchange point, most of the residential area adjacent to the Rathbeale road could be served. A further branch of one of these services could be used to serve the River Valley area to the interchange point. However, these branch services would have to be supported by traffic management measures in the centre of Swords to ensure competitive journey times for the stopping services to the interchange point.

Or

- A local bus service connecting the two residential areas to the Pavillions interchange point. However, in this option it is critical that the bus journey time to the interchange point does not render the total bus jouney time to the city centre to be non-competitive with car journey times.

- The provision of a parking area in the vicinity of the Cloghran Roundabout, would facilitate people in the River Valley estate in accessing bus services using the Swords QBC.

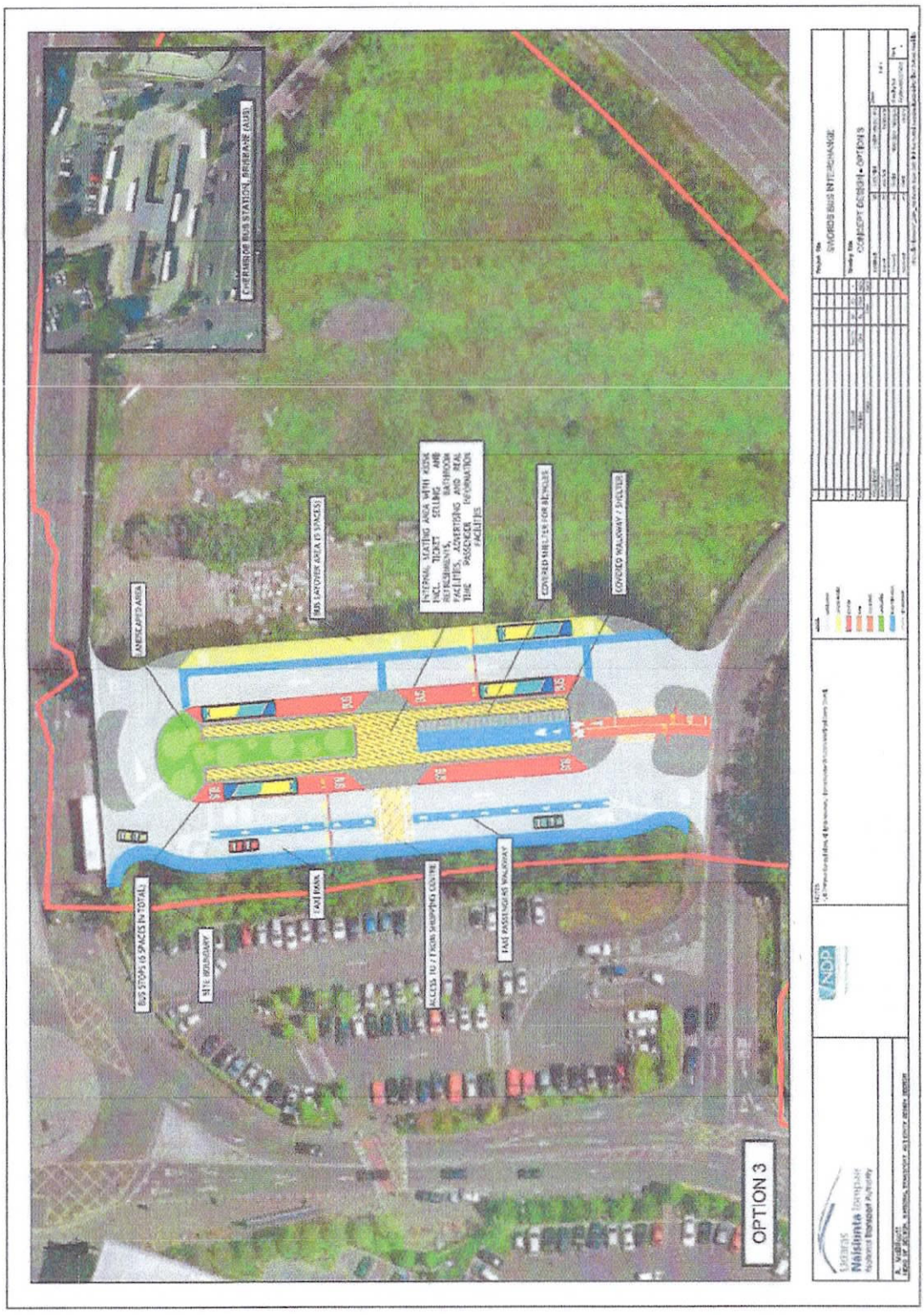
The selection of the preferred option for ensuring good access to the proposed interchange point will require a more detailed assessment and an examination of financial viability.

4.2 Implications for Metro North

The transport options proposed in this study are measures that make more efficient use of the currently available road network and / or build on measures already proposed for delivery within the next ten years and within current financial constraints. They will provide an improved level of service and transport offer for the Fingal sectors in advance of the delivery of Metro North. None of the measures can in any way be viewed as an alternative to Metro North, but rather are measures that fully support the delivery of Metro North in the longer term.

In advance of Metro North, it must be recognised that the capacity to serve travel demand in particular between Swords and the city centre and other key destinations will be limited. In addition, as argued in 3.2 above, the ability of Swords to cater for an increased level of local trip movements while simultaneously serving the demand to external destinations is also limited - even with the introduction of the measures proposed. In this context, it is critical that future development in Fingal be phased and matched to the timetable for delivery of the transport solutions and the capacity they will provide.

Appendix 1: Possible Layout of Swords Public Transport Hub



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The Project Manager

MetroLink
Transport Infrastructure Ireland
Parkgate Business Centre
Parkgate Street
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Date: 11/05/2018
Subject: MetroLink Public Consultation

A chara,

In 2006, William Murray & Associates made a submission to the route selection process for the then Metro North project, advocating an eastern route option – generally east of the R132 north of Drumcondra. The eastern route was proposed to pass through Drumcondra, Whitehall, Santry, Kilmore, and Clonshaugh, with a stop provided in each place. The currently proposed Metro alignment instead runs through Phibsboro, Glasnevin and Ballymun. Refer to enclosed Drawing Figure 1.

The 2006 submission was supported by comprehensive planning, economic and engineering analysis in favour of the proposed alignment. All of the analysis demonstrated a robust business case in favour of the eastern route, which would serve a larger population catchment, support significant redevelopment of brownfield sites, and would not differ appreciably from the then-proposed RPA alignment cost-wise. Furthermore, the eastern alignment would have the significant advantage of serving catchments not already served by high quality public transport along existing QBCs.

The intervening period has seen various developments, the most significant and relevant of which is the BusConnects project. The state has committed €2bn in funding to this project under the National Planning Framework. This will see a comprehensive redesign of Dublin's bus network to enhance the reliability and quality of service along the principal bus corridors. This plan will see considerable investment in enhanced public transport along the Ballymun and Swords Quality Bus Corridor [QBC] corridors. The proposed MetroLink route will duplicate these QBCs.

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A route further east would service an entirely new catchment in the 3km wide gap between the R132 Swords QBC and R107 Malahide QBC corridors. This would complement and enhance, rather than duplicate, the upgraded BusConnects QBC network. It would also open up extensive landbanks to development and urban regeneration – far more so than in the case of the currently indicated corridor through Ballymun. The 2006 assessment further demonstrated that it would serve a larger existing and future residential population. Our analysis of the 2016 census has shown that this remains the case.

The terms of reference for the 2017 Metro Alignment Study included a study area centred on the earlier RPA Central Route, which was in 2006 the RPA's preferred route. The Study Area did not include the extensive area between the R132 and R107 QBCs that is currently unserved by high quality public transport. This is incomprehensible, especially having regard to the considered and detailed representations made to the 2006 Metro North public consultations. While TII has made significant adjustments to the 2006 alignment in the city centre and the north inner suburbs based on a detailed re-appraisal of the route, the same effort hasn't been made in scrutinising the alignment further north, where the currently proposed route will traverse relatively low population areas in Glasnevin and Ballymun.

The Environmental Impact Assessment process requires a comprehensive assessment of available alternatives. What has been done to date for MetroLink falls far short of this requirement. We appreciate that the new MetroLink project is at an early stage, and that not all assessments have yet been undertaken. However, it is concerning that even the preliminary assessments have been undertaken based on an excessively limited study area. The ultimate railway order application will require a comprehensive route options assessment in order to demonstrate to An Bord Pleanála that the scheme presented for planning best achieves the objectives of the project. This assessment must include detailed consideration of a route east of the R132, which we believe will better serve the needs of the city and the region.

The 2006 submission, and an updated population catchment analysis based on the 2016 census data are appended herewith. We, and other local businesses and stakeholders, are available to discuss these with TII at any stage.

Is mise le meas,

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Emerging Preferred Route vs Eastern Variation Route Catchment Analysis

2016 Census data for the electoral divisions within the catchment of the section of the MetroLink 'Emerging Preferred Route' between the Royal Canal and Dublin Airport and the 2006 Eastern Route Variation has been collated and assessed, and are summarised in ***Table 1*** below.

Table 1: *2016 CSO Summary Data for Metrolink 'Emerging Preferred Route' and Eastern Route Variation*

Route	Emerging Preferred Route Catchment	Eastern Route Variation Catchment
Population	73,071	75,890
Employed	33,092	36,176
Education	8,883	8,501

Detailed analysis for the 'Emerging Preferred Route' is presented in ***Table 2*** below. Similar data for the 2006 Eastern Route Variation, proposed in the 2006 submission to the Metro North public consultation, was assessed and is presented in ***Table 3***. The total resident population numbers within each electoral division have been considered, along with the numbers of people employed and in education within the division as these people are likely to use the proposed MetroLink service as part of their daily commute.

The catchment area considers the 2km corridor around each route option. As the electoral division boundaries do not always align with the catchment corridor of each proposed route option, catchment factors have been applied to each electoral division according to the approximate proportion of the area that falls into the catchment corridor.

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Table 2: 2016 CSO Data for MetroLink 'Emerging Preferred Route' (from CSO SAPMAPS):

Electoral Division	Totals on Emerging Preferred Route			Factored Totals on Emerging Preferred Route			
	Population	Employed	Education	Factor	Population	Employed	Education
Rotunda A	5,965	3,231	616	35%	2,088	1,131	216
Mountjoy B	3,963	1,987	674	65%	2,576	1,292	438
Ballybough B	3,698	1,954	406	75%	2,774	1,466	305
Inns Quay A	3,919	1,626	387	100%	3,919	1,626	387
Botanic C	2,222	1,211	285	100%	2,222	1,211	285
Botanic B	3,481	1,800	419	100%	3,481	1,800	419
Drumcondra South C	3,517	1,665	510	100%	3,517	1,665	510
Whitehall A	3,286	1,085	834	90%	2,957	977	751
Whitehall B	4,128	1,688	643	85%	3,509	1,435	547
Ballymun C	6,112	2,147	709	100%	6,112	2,147	709
Airport	5,018	2,938	372	100%	5,018	2,938	372
Ballymun B	4,379	1,397	422	100%	4,379	1,397	422
Ballymun D	2,458	770	246	100%	2,458	770	246
Ballymun E	1,562	635	149	100%	1,562	635	149
Ballygall C	3,521	1,314	354	100%	3,521	1,314	354
Botanic A	3,174	1,514	331	90%	2,857	1,363	298
Cabra East A	5,650	3,054	592	75%	4,238	2,291	444
Arran Quay A	1,785	866	315	90%	1,607	779	284
Inns Quay B	3,666	1,954	503	65%	2,383	1,270	327
Cabra East B	3,737	1,618	300	95%	3,550	1,537	285
Drumcondra South A	5,064	2,868	514	20%	1,013	574	103
Whitehall C	2,153	968	217	65%	1,399	629	141
Turnapin	1,700	822	174	30%	510	247	52
Balgriffin	3,113	1,464	183	1%	31	15	2
Ballymun A	4,765	2,059	371	25%	1,191	515	93
Ballygall B	1,887	711	1,887	20%	377	142	377
Ballygall D	2,531	1,123	180	45%	1,139	505	81
Cabra East C	4,085	2,077	434	30%	1,226	623	130
Arran Quay B	4,166	2,289	451	35%	1,458	801	158
Totals	Population	Employed	Education		Population	Employed	Education
	104,705	48,835	13,478		73,071	33,092	8,883

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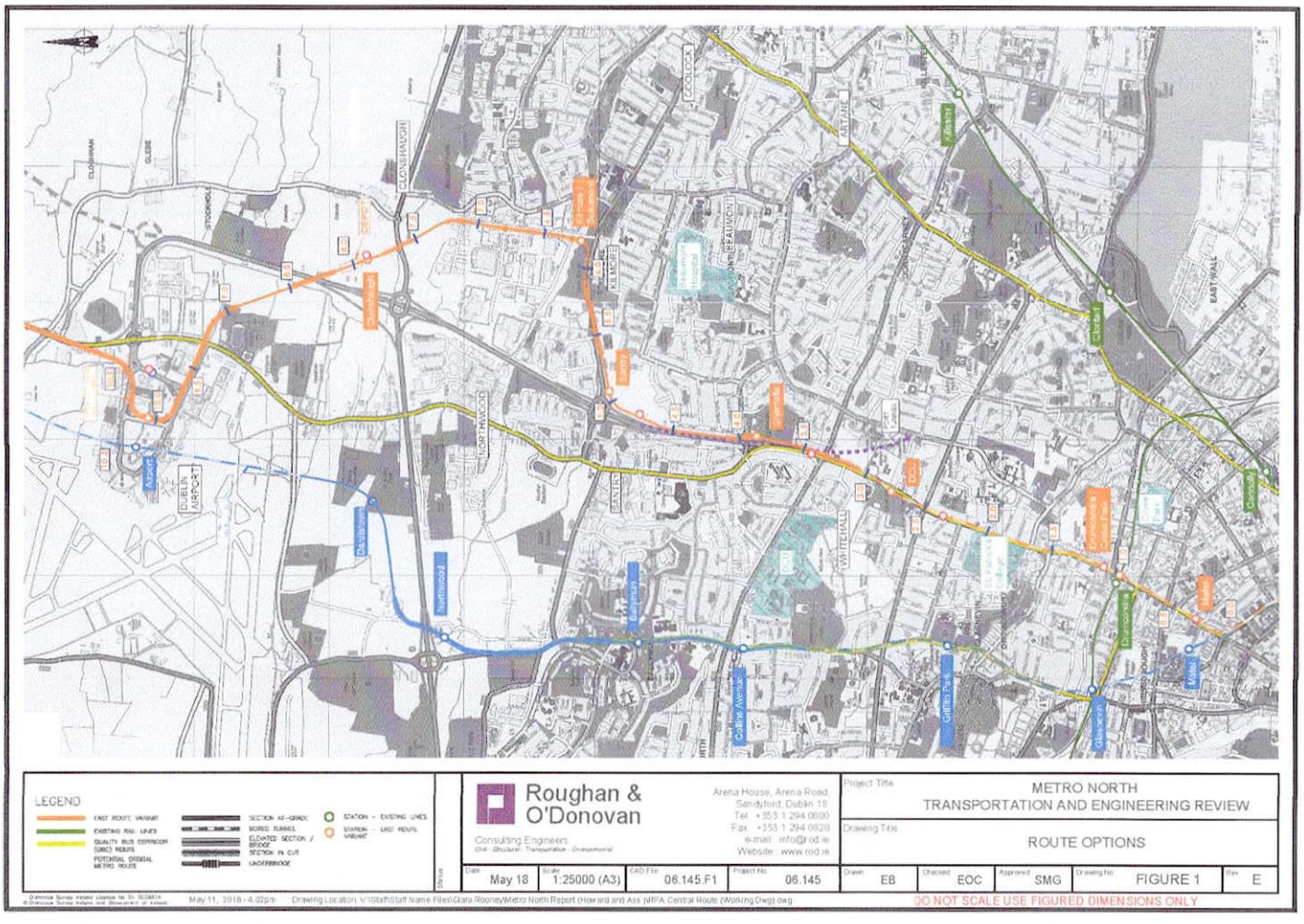
Table 3: 2016 CSO Data for Eastern Route Variation (from CSO SAPMAPS):

Electoral Division	Totals on Eastern Route Variation			Factored Totals on Eastern Route Variation			
	Population	Employed	Education	Factor	Population	Employed	Education
Rotunda A	5,965	3,231	616	35%	2,088	1,131	216
Mountjoy B	3,963	1,987	674	65%	2,576	1,292	438
Ballybough B	3,698	1,954	406	100%	3,698	1,954	406
Mountjoy A	5,389	2,819	629	20%	1,078	564	126
Ballybough A	3,718	1,540	357	50%	1,859	770	179
Drumcondra South B	1,697	976	177	100%	1,697	976	177
Drumcondra South A	5,064	2,868	514	100%	5,064	2,868	514
Grace Park	5,806	2,669	603	50%	2,903	1,335	302
Whitehall D	3,456	1,568	281	100%	3,456	1,568	281
Beaumont F	3,590	1,629	391	90%	3,231	1,466	352
Beaumont A	2,463	1,011	206	100%	2,463	1,011	206
Beaumont B	4,962	2,074	358	60%	2,977	1,244	215
Kilmore B	2,681	899	180	100%	2,681	899	180
Kilmore A	3,660	1,659	400	100%	3,660	1,659	400
Priorswood A	1,618	708	131	95%	1,537	673	124
Balgriffin	3,113	1,464	183	5%	156	73	9
Airport	5,018	2,938	372	30%	1,505	881	112
Turnapin	1,700	822	174	100%	1,700	822	174
Whitehall C	2,153	968	217	100%	2,153	968	217
Whitehall B	4,128	1,688	643	50%	2,064	844	322
Whitehall A	3,286	1,085	834	65%	2,136	705	542
Drumcondra South C	3,517	1,665	510	100%	3,517	1,665	510
Botanic A	3,174	1,514	331	35%	1,111	530	116
Botanic B	3,481	1,800	419	100%	3,481	1,800	419
Botanic C	2,222	1,211	285	100%	2,222	1,211	285
Inns Quay A	3,919	1,626	387	100%	3,919	1,626	387
Inns Quay B	3,666	1,954	503	65%	2,383	1,270	327
Arran Quay A	1,785	866	315	90%	1,607	779	284
Cabra East A	5,650	3,054	592	100%	5,650	3,054	592
Kilmore D	2,032	807	147	5%	102	40	7
Kilmore C	1,490	446	133	15%	224	67	20
Priorswood E	2,839	1,230	185	35.0%	994	431	65
Totals	Population	Employed	Education		Population	Employed	Education
	110,903	52,730	12,153		75,890	36,176	8,501

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Comparison of the totals within the catchment of each route shows that the overall population within the catchment area of the *'Eastern Route Variation'* is higher than along the current *'Emerging Preferred Route'* and therefore the TII should consider the Eastern Route Variation as a viable option for MetroLink.

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LEGEND
EAST ROUTE VARIANT
EXISTING RAIL LINES
QUALITY BUS CORRIDOR (QBC) ROUTE
POTENTIAL ORBITAL METRO ROUTE
SECTION AT-GRADE
BORED TUNNEL
ELEVATED SECTION / BRIDGE
SECTION IN CUT
UNDERBRIDGE
STATION - EXISTING LINES
STATION - EAST ROUTE VARIANT
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Rev E
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