

Northern Ireland viewed across the Irish Sea from South West Scotland



Source: Flickr.com

Connecting Great Britain and Northern Ireland

A short report

Greengauge 21

January 2020

A bridge to Northern Ireland needs new connections and HS2 to ensure success

Prime Minister Johnson wants a bridge built across the Irish Sea, linking Scotland with Northern Ireland. First step would be a feasibility study. The Republic of Ireland's *Taoiseach*, Leo Varadkar, agrees the idea is worth considering.

In [our work](#) of July 2019 for the UK2070 Commission, we considered the idea of just such a link as part of an examination of ways to improve connectivity for the UK's 'left behind' places. At the time, we ruled it out as step too far, but with the political ambition that has emerged since, it's time to think again.

While the PM speaks in terms of a bridge, it would be wise to consider tunnelled options too (as being advocated in an upcoming Institution of Civil Engineers report).

During the design competition that ultimately led to the Anglo-French *Eurotunnel*, a bridge proposal was developed that entailed constructing two artificial Islands in the English Channel. The Irish Sea lacks the density of shipping that helped put paid to that idea, but where it narrows between South West Scotland and Northern Ireland, there is a trench. Known as Beaufort's Dyke, (30 miles long, 2 miles wide and up to 1,000 ft deep) it might be avoidable with a very long-spanned bridged solution, but it would affect the depth of any tunnelled designs. And both a bridge and a tunnel would face the problem that this area of the Irish Sea was the site of major munitions dumping (perhaps as much as 2m tonnes of explosives) after the first and second world wars. So, some obvious challenges to address in any feasibility study. A rail tunnel under this part of the Irish Sea, incidentally, was first proposed in the 1880s.

But ahead of these engineering challenges must lie questions about the function of such a link. Ensuring that Northern Ireland retains – strengthens even – its connectivity with the rest of the UK may well be the political objective and a fixed link would no doubt increase trade flows. But alongside economic virtues, all infrastructure being contemplated in the decades ahead with the committed and necessary progression to net zero carbon will also rightly come under intense environmental scrutiny. Construction is a carbon intensive activity. The question is whether there is a carbon reduction dividend, which in this case could arise from new patterns of travel that a fixed link would stimulate.

Could the link, for example, reduce long-haul lorry haulage through the much lower carbon solution of freight on electrified rail? Because if the new fixed link is built, cross-Irish Sea freight traffics will increase. And can an Irish Sea fixed crossing be used to provide a low (in future, zero) carbon alternative to the many short haul flights between British and Irish (especially Northern Irish) airports? If a competitive journey can be offered by electrified rail, the answer to both of these questions is potentially yes, and a substantial carbon dividend could be on offer.

A bridge (or tunnel) on its own is not going to work

As was the case with the channel tunnel, the question of access links cannot be avoided if the link is to work at all well. And here, there is a problem. The British end of an Irish Sea crossing would be in the western-most parts of Dumfries and Galloway (outlined in purple below). That's a 100-mile drive to reach Britain's national motorway network (the A74(M) in the map). The existing trunk road (A75) has a notoriety, being little improved across its length over the years.



Source: Google Maps

But at least it's there. The railway from Dumfries through Newton Stewart to Stranraer (the 'Port Road') was closed in 1965 (a 'Beeching' cut). With no direct route, Carlisle – Stranraer journey times by train (via Ayr, Kilmarnock and Dumfries) are now generally over 4 hours on a very roundabout route.

The Irish side is better placed, through rail and road connections from Bangor and/or Larne, each of which offers good connections to Belfast. But here too, the road and/or rail networks would need to be improved to accommodate the likely new patterns of traffic.

In short, any scheme has to be developed and considered as a combined package of a cross-Irish Sea fixed link and the necessary connections – road and rail – recognising that the scale of these land-based investments are themselves likely to be substantial.

Indeed, a business case could probably be more easily made right now for an A75 upgrade and a restored rail link to the existing ferry operation *rather than* a bridge or tunnel linked to unimproved access infrastructure.

So, it's worth looking at what improved connections might need to be considered to make sure that any feasibility study has the right remit. Greengauge 21 would argue that a cross-Irish Sea connection should be rail-based. A tunnelled (rather than bridge) option gets rid of the risk, significant in this area, of operational shut-downs because of high winds, and it will be able to be built to more economic design standards as a *rail* facility (no need for vehicle exhaust extraction systems). The ease with which a Euro-shuttle style functionality can be added to create an efficient and safe way of supporting road-based transport has been proven. It is an approach that while not strictly 'drive-thru', avoids a host of security, air quality, safety and amenity issues.

But this does mean thought would need to be given to both highway and railway access facilities. The highway improvements needed would be a complete upgrade of the A75 to the M74 as well as the A77 northwards *via* Ayr and Kilmarnock to Glasgow.



Photo: itv.com

New Transport Connections

In terms of rail, the idea of re-opening the Dumfries-Stranraer line is said to remain on the table at Transport Scotland. Encouraged by the success of the Borders railway (Edinburgh – Galashiels/Tweedbank), this might fall into a ‘reversing the Beeching cuts’ category for which a £0.5bn budget was allocated in the recent Conservative party manifesto. But a budget of several £bn would likely be needed for this single scheme alone. And the truth is, it might make more sense to simply think of building a new railway rather than trying to re-establish the difficult route chosen to reach Stranraer in the 19th century, where key missing bridgeworks will need replacement, redevelopment has taken in place across the alignment (for instance through Newton Stewart) and where today’s design standards would require major civil engineering works throughout, only to achieve a sub-optimal, speed-limited, alignment.

Part of the long-closed 'Port Road' railway line in Galloway, SW Scotland



Photo: Christopher Hall

Of course, there is also the question of rail links northwards within Scotland from any new fixed crossing as well as to England. Train services to Stranraer run from Glasgow via Ayr, and service frequencies have been improved in recent years, but passenger volumes are low, especially since the ferry terminal was in 2011 switched out of Stranraer to Cairnryan which is not rail served. There are just two through trains to Glasgow daily, with a journey time of just over 2½ hours. Electrification of the Ayr-Stranraer line figures in Transport Scotland's long-term plan (Scotland has long term plans to electrify all of its railways).

Much improved Glasgow service frequencies and direct services to Edinburgh would surely follow a new fixed crossing. A Dublin-Belfast-Glasgow-Edinburgh service would be a realistic aim, and one of the prizes would be a reduction in carbon intensive short haul flights.

On the Irish side there are other challenges. The island of Ireland has railways built to a different track gauge (5'3 rather than 4' 8½). Yes, there are gauge-changing systems available for through trains, but they are slow and expensive. Better to connect the route from the Irish Sea crossing into Belfast to the GB mainland gauge. But this would assume that places beyond Belfast could not benefit from through services. So maybe better still to allow this to trigger a re-think of the whole of Northern Ireland Railway's track gauge (it's a small network), and the route south to Dublin too. The wider benefits could be considerable, and Cork-Dublin-Belfast is a rail route highly eligible for EU funding.

In our 2019 work for the UK2070 Commission, our focus was on improving connectivity for places which were 'left behind', struggling economically. In Northern Ireland, we identified a distinct

pattern of such places. They were in the western and southern rural areas, including along the border with the Irish Republic. Here education attainment and income levels were low, and access to higher education and to employment growth sectors was poor. Another indicator, published since, shows this is where house prices have fallen in recent years, unlike elsewhere in Northern Ireland. This huge area has no rail links at all.

Bringing the wider Northern Irish economic challenge into the picture would suggest that re-instating rail links between Portadown, Armagh, Enniskillen and both Sligo in the Irish Republic and Derry/Londonderry would be worth considering, as outlined in our UK2070 work. As a complement to a new Irish Sea crossing, this would extend and deepen the transformational effect on the Ulster economy.

On the British side, there is little doubt that the improved connections a fixed link would trigger would help address ambitions for better connectivity for places that are remote and which struggle to keep up with national GDP output levels. Dumfries and Galloway today struggles to merit prioritisation by Transport Scotland of the kind of investment in transport sought by campaigners (for A77 and A75 dualling; for re-opening of the 'Port Road' railway). The UK-wide view that has led to consideration of a cross-Irish Sea fixed link would, together with the necessary access links, be transformational for SW Scotland – just as has been the case in Kent following completion of the Channel Tunnel and associated infrastructure .

As we suggest below, there are some equivalent benefits to be had across the border in NW England too.

Achieving a net zero carbon outcome

Alongside the economic stimulus effects (especially to the Northern Ireland economy, but also to SW Scotland and NW England), emphasis needs to be placed on how a new fixed link across the Irish Sea can be used to bring down carbon emissions. There are two areas in particular on which to focus: attracting freight flows from road haulage to rail; and passengers from short-haul airlines to high-speed rail.

Freight

On the freight question, creating a dual carriageway A75 would be equivalent to the beneficial impact that the A55 improvement across North Wales has had on road haulage from the Irish Republic through Holyhead to English (and indeed, European) destinations. We know from earlier research that the critical question on freight flows for Irish Governments is the risk of congestion and delays on the busier sections of the British national motorway network. These risks – on busy sections of the M6 and other motorways – are unlikely to diminish in the years ahead. Over time, they will tilt the balance in favour of rail, especially if and when carbon pricing starts to bite into the attraction of long-distance road haulage.

To capitalise on the creation of a fixed crossing and a new or restored rail link to Carlisle, the rail system needs to be able to offer the capacity in terms of train paths for additional freight flows, especially onwards to destinations in England. Southwards from Crewe, HS2 can create just what's needed, with additional capacity on the West Coast Main Line. But there are as yet no firm plans to increase capacity between Crewe and Carlisle, where freight trains share the use of a hilly double-track main line with long distance passenger services. A combination of measures is likely to be needed, with electrification of the Settle and Carlisle line (opening up a key route from Scotland and Northern Ireland to Yorkshire freight terminals and to English east coast ports), one of them. This

should be accompanied by other measures to provide 24h capacity for freight southwards from Carlisle, as discussed below.

Winning the air passenger market to electrified rail

The prospect of HS2 forming the basis of a switch from a high volume of short-haul air flights to electrified rail is already apparent and is most marked in the London-Glasgow/Edinburgh market. Here Ministers in Holyrood and Westminster have agreed on an ambition for a 3-hour rail journey time to achieve just such a transformation, but no workable plans for speeding up services north of Crewe (or Wigan) have yet emerged, except within Scotland where plans for a new high-speed line from Rutherglen (Glasgow) to Carstairs have been released by Transport Scotland.

The key missing section is over the 141-mile route from Crewe to Carlisle. This length might be shortened somewhat by sections of new cut-off lines, but a series of wider improvements, including eliminating low speed sections of line and lifting line speeds, perhaps to 150 mile/h, would be needed, mindful of the need to accommodate a traffic mix that includes freight, as noted above. Extra capacity that allows the overtaking of slower freight train by passenger services can be facilitated by cut-off lines.

With Euston-Crewe HS2 times at only 55 minutes, a good target would be to reduce current journey times between Crewe and Carlisle of around 1h45 (with 4 intermediate stops) to say 1h05 (with none), so that London-Carlisle could be achieved in 2 hours. This together with the within-Scotland plans could get Edinburgh/Glasgow-London rail times down to 3 hours.

Of course, with an Irish Sea crossing and a restored Stranraer-Carlisle rail link, the faster Carlisle-London rail time would be enjoyed by Belfast/Northern Ireland trains as well as those from central Scotland.

A 3½ hour Belfast-London journey time would then seem plausible using a new rail link across Galloway built to (say) 125 mile/h standards, and this should lead to much reduced demand for flights between Belfast and London – and indeed other English cities which could also be served by direct trains from Northern Ireland. And the beneficial carbon impact of fewer flights can be compounded by services such as Dublin-Belfast-Glasgow-Edinburgh.

One of the benefits of thinking about the wider network requirements is that the existing business case for enhancements though northern England will be that much stronger if the Northern Ireland market is added to the service mix. Key places such as Workington¹ and indeed, West Cumbria as a whole, would benefit from the extra rail network capacity and faster speeds needed to get full value out of the Northern Ireland-Britain fixed link.

Summary

We recognise the driving political ambition behind the Prime Minister's ambition for a fixed link between mainland Britain and Northern Ireland.

¹ Today's Workington-London journey time by rail is around 4h30, at best. With the improvements identified here, this time could be reduced to 2h45.

We have shown that for such a link to succeed, it will be necessary to create much-improved and new transport connections. The likely Irish Sea crossing site is remote from both the national motorway network and main railway lines.

Besides and, we suggest, *before* any examination of the engineering feasibility of the cross-Sea link itself, a wider assessment of the objectives of such an investment needs to be made, and one in which the concomitant need for new transport access links is also considered.

We have identified two important policy aims that such an assessment should consider, aims which could easily be mistakenly thought to be of secondary importance:

1. Using the investment to deliver a nationally-significant reduction in transport sector carbon emissions
2. Using the investment to address areas of limited social mobility and economic disadvantage, in Northern Ireland, in South West Scotland and in North West England.

Greengauge 21, January 2020