3FMProject

Bringing
Dublin Port
To 2040

Environmental Impact Assessment Report

Appendix 4.1

Volume 3 Part 1

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

rps
A TETRA TECH COMPANY

Third & Final
Masterplan
Project

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Department of Transport

Leeson Lane

Dublin 2

29 September 2023

All-Island Strategic Rail Review

Submission by Dublin Port Company to the Consultation Process

Dear Sirs,

Dublin Port Company (DPC) is pleased to make a submission to the All Island Strategic Rail Review (AISRR).

Dublin Port is the largest freight and passenger port in Ireland, handling 79% of all unitised freight (Lo-Lo and Ro-Ro) in the Republic of Ireland. Located in the heart of Dublin City, the Port is at the hub of the national road and rail network, and is a strategic access point for Ireland and the Greater Dublin area in particular.

Dublin Port

Dublin Port is one of five major ports in Ireland which is classified as Tier 1/Tier 2 Ports in the National Port Policy and is categorised as core/comprehensive ports in the EU TEN-T network.

The significant share of national port volumes held by Dublin Port, particularly in unitised freight is a factor of the Port's location at the centre of the Greater Dublin Region and due to the navigability and depth of water at the Port. Dublin Port is also the entry and exit point of what is a world class route-to-market system which includes the Dublin Port Tunnel, the M50, and the national motorway network which radiates from the M50.

Dublin Port is also rail connected and DPC has invested heavily in maintaining rail networks within the Port Estate, including the opening of a 1.6km rail spur in July 2011. The primary cargo carried by rail freight at present consists of 0.16m tonnes of unitised freight which is carried on the Ballina Route, with on average 5 trains per week. This represents 1/225th of the

total port throughput. Traditionally the Port has also serviced Boliden Tara Mines, with 0.29m Tonnes of lead/zinc ore per annum with on average 10 trains per week. At present production at Boliden Tara Mines is suspended, so no cargo is now moving on this route.

Dublin Port is proud to be a rail connected port at the hub of the national rail network. The Dublin Port Masterplan 2040 expressly states;

> *Dublin Port is at the heart of the national rail network with direct connections to all major centres of population. DPC believes that there is continuing potential for rail freight to grow over the period of the Masterplan*. (Dublin Port Masterplan 2040, page 10.)

The Masterplan also has a key strategic objective to maximise the use of rail transport for goods to and from the Port (ibid, page 17).

DPC remains committed to the development of rail freight in Dublin Port and welcomes the objective in the All-Island Strategic Rail Review to grow the volume of rail freight on the national rail network.

Understanding Rail Freight demand

DPC is a facilitator of trade through Dublin Port and supports any well-grounded initiative that aids the efficient and sustainable movement of goods through the Port.

The current low level of rail freight at Dublin Port (and across the rail network generally) is related to a number of different factors;

i. Low levels of customer demand – Dublin Port, as a facilitator of trade, will respond to customer demand in the provision of freight services. At present the customer demand for rail freight services is extremely low and additional investment in rail freight services is hard to justify on the basis of what are expected to remain low levels of take up. Iarnród Éireann would need to demonstrate a tangible pipeline of committed new customers for rail freight in order to support a business case for significant investment.

ii. Origin & Destination of Goods – DPC commissioned RPS to carry out a major Origin & Destination Survey of HGV movements at Dublin Port in 2022. The results of this study suggest that 73% of port volumes have an origin or destination within 90km of Dublin Port. Shortening the radius, the survey shows that 61% of volume has an origin or destination within 40km of the Port. The All Island Strategic Rail Review notes that future rail freight services within Ireland are likely to be "most viable" where there is a sufficient critical mass or cargo movements in terms of tonnes lifted. The Review indicates that this is most likely to involve covering distances above 100km. Given that nearly 3/4 of freight in Dublin Port has an origin or destination of less than 100km, the potential "most viable" market which might be created by increased migration to rail freight would appear extremely limited. The 27% of volume outside of 90kms is widely dispersed throughout the

country and only 6% is in Lo-Lo mode which is most suitable for rail freight. The option of using rail for transfer of Ro-Ro freight represents only a small percentage of rail freight movements in Europe and does not happen in the UK. This is for technical, cost, and logistical reasons. We would question whether it is ever likely to be practicable in Ireland given the huge investment involved and the relatively short transit distances.

iii. Competitiveness of Business model – DPC has endeavoured to support increased use of rail freight to and from the Port, but the feedback from customers (and prospective private rail freight operators) is that rail freight costs are excessively high. Where private operators are concerned, the high costs involved in accessing the track is a disincentive for running a competitive business. However, even if track access charges were reduced to zero by Iarnród Éireann, the conundrum is whether that would lead to any significant increase in usage of rail freight – given the other fundamental reasons that make it uncompetitive compared to road freight. The introduction of inland distribution hubs will imply additional infrastructure, freight systems, manpower, and more handling movements of unitised freight. This is likely to add materially to costs, but will also increase the time taken to deliver to the end customer and so reduce flexibility. In this respect, the full business model needs to be understood through the customers lens from a cost and service point perspective.

iv. Absence of national rail freight infrastructure – a factor contributing to the low take up in rail freight is the low level of national rail freight infrastructure and in particular rail heads in locations where customers can secure the distribution of goods transported by rail. In the 1990's, EU Cohesion Funding was used to create an extensive national container rail freight network in Ireland as part of the Operational Programme on Peripherality. In 2005, Iarnród Éireann took the decision to scrap the network of rail freight depots due to lack of market demand. In order to fund the reconstruction of a replacement national rail freight infrastructure, it would be important to ensure that the volumes anticipated would justify the substantial capital cost (and embodied carbon) involved. Failure to undertake a rigorous cost benefit analysis risks repeating the abortive investment made in the 1990s. As a starting point, the AISRR should have set out the logic for assuming that the situation has significantly changed since the 2005 decision.

v. Access – Currently, for rail freight to access the Port, it is necessary for trains and wagons to traverse the busy East Wall Road, causing significant levels of traffic disruption. DPC has made specific proposals to Irish Rail for the development of an intermodal facility at the North Wall Rail Freight Depot which would be serviced by a dedicated overbridge across East Wall Road to shunt cargo between vessels and the rail freight hub. DPC has even offered to fund the provision of this facility. An

alternative of having quay side rail freight terminals is not an efficient use of valuable quay space, as is evident from the intermodal rail freight facilities in other international ports. It also poses significant health & safety risks. DPC are in discussions with Iarnród Éireann on specific proposals to bring the North Wall Rail Freight Depot back into substantial use. An effective intermodal facility at the North Wall Rail Freight Depot could serve all the different terminals at Dublin Port, including the lands proposed for development as part of the 3FM project. The proposal advanced by DPC to Iarnród Éireann concerning the North Wall Rail Freight Depot is the most efficient and achievable sustainable solution for first mile/last mile rail freight access for Dublin Port.

vi. Opportunity cost – The alternative options for expanding rail freight within or adjacent to Dublin Port need to be considered in the context of their potential impact on long term capacity within Ireland's largest import and export hub. The reality is that Dublin Port is currently operating at an average of 91% utilisation – which in effect, means that it is regularly experiencing capacity pinch points. While Masterplan 2040 will create capacity, the Port will be running a high levels of utilisation all the way to 2040 assuming all projects go to plan. A recent study by Indecon Economic Consultants estimated that further expansion of rail freight within the Port curtilage, with a main intermodal at Alexandra Quay East, could result in reduced capacity with an economic consequence value of up to €5.4 billion per annum. DPC's preferred alternative of developing the North Wall Freight depot would actually increase rather than decrease port capacity, would enable full access from all the Port's container terminals, and would allow for the gradual expansion of demand.

Decarbonisation of road and rail freight

The All Island Strategic Rail Review makes a welcome contribution to the discussion on the future of rail freight in Ireland. However it is important that the Review proceeds without an inherent optimism bias and that there is a full recognition of the realities that frame current distribution patterns.

It is also important that a preference for rail freight is presented on its own merits and not as the primary alternative to decarbonising road freight. There are significant strides being made to decarbonise the national road haulage fleet, whether through the use of biofuels, or clean fuel additives to reduce emissions. In addition, HGV manufacturers are developing new technologies around battery and hydrogen powered HGVs, which will start to roll out at scale over the next decade. DPC is working with suppliers of electrical charging infrastructure and has already supported BioCNG and HVO roll outs in the Port. Given the advances in decarbonising road transport, the question as to whether road or rail freight are more sustainable could be a moot point by 2040. With the long lead-in time for investment in rail freight infrastructure, and the substantial embodied carbon in its construction, there is a significant possibility that much of the offsetting carbon reduction from the operational phase

may never actually be realised. This is a very important point and is not addressed in the AISRR.

Scale of investment

Finally, the scale of the investments that are highlighted in the Review are colossal, with a potential commitment of €32bn to deliver on all the proposed capital expenditure, with additional annual operating costs of €600m (This excludes the costing for rail freight and the potential knock on impact on Dublin Port capacity). In a context where there are many competing demands for Exchequer funding, it would be imperative that any such expenditure decisions are well grounded, properly assessed, and thoroughly justified as presenting value for money.

To assist the conclusion of the Review, we attach an updated version of a submission which DPC prepared in November 2022 for the Department of Transport and Arup/MDS Transmodal, concerning Rail Freight in Dublin Port. The submission has been updated to September 2023 data and also to address what is set out in the AISRR. It provides a detailed consideration of different options to address the provision of rail freight at Dublin Port, and explains why investment in the North Wall Rail Freight Depot remains the most economic, efficient and sustainable choice, by reference to national and international factors.

We would be pleased to address any query concerning this submission.

Yours sincerely

Barry O'Connell
Chief Executive Officer

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Submission to the Public Consultation

on the

All-Island Strategic Rail Review

29th September 2023

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Advantages, disadvantages, and challenges, plus layout plans/ sections and road diversion routes

Appendix 8 : reasons why direct loading from ship to train at quayside would hugely reduce berth capacity

1. Introduction

This submission focuses on port related rail freight matters raised in the 'All-Island Strategic Rail Review' (AISRR) published on 25th July 2023, and in particular on the recommendation to 'develop a sustainable solution for the first mile-last mile rail access for Dublin Port'. In relation to the latter, Dublin Port Company (DPC) has been involved in discussion with Iarnród Éireann over an extended period.

DPC notes that the 'Final Package of Recommendations' on page 103 of the AISRR states that :

'Other interventions including enhanced port connectivity, inland freight terminals, reduced freight access charges, and customer experience initiatives were not quantitatively assessed but have been qualitatively assessed and are included in the Review's recommendations'.

This lack of a quantitative assessment of rail freight proposals, and indeed little if any specifics on those proposals, poses obvious challenges in terms of providing detailed feedback to the AISRR.

Dublin Port's **Masterplan 2040** sets out the vision and strategy for developing the Port to 2040, and states that 'DPC believes that there is potential for rail freight to grow over the period of the Masterplan'. Accordingly, we welcome the objective in the AISRR to grow the volume of rail freight on the national rail network.

2. Background

From a strategic perspective, Dublin Port is arguably the single most important infrastructure asset in the country. This reflects the fact that 79% of the country's unitised freight (Lo-Lo containers and Ro-Ro trailers) go through the port every year.

Dublin Port Company's approach in **Masterplan 2040** is to maximise the throughput on Dublin Port's fixed brownfield land area before seeking to develop additional port capacity at another east coast location. In 2020, DPC published the detailed thinking behind this approach in **The Dublin Port Post 2040 Dialogue.**

In 2022, DPC conducted an extensive Origin-Destination survey for the port. It showed that **73% of the port's freight has an origin or destination within 90km of the port**. The Greater Dublin Area is the primary market/ hinterland for Dublin Port and its importance has strengthened over the last decade due to the creation of logistics distribution hubs on or near the M50 and its radial motorway network. These are all linked to the Port through the Dublin Port Tunnel, built to provide a direct connection to the M50.

In international terms Dublin Port operates off a small footprint and already over-indexes in terms of its high throughout density against major comparator ports.

The majority of rail freight in Ireland currently moves in and out of Dublin Port. Whilst the potential for rail freight – particularly for container rail freight – is small simply because Ireland is small, and because Dublin Port's market hinterland is concentrated in such close proximity to the port, DPC is

committed in Masterplan 2040 to realising rail freight's growth potential to the fullest extent practicable.

Under Masterplan 2040, we are bringing Dublin Port to its ultimate capacity by 2040 at a time when the pressure on port lands is ever-increasing. We have already encountered capacity pinch points which have constrained some existing rail freight services.

With no new significant port developments elsewhere in the country in the planning pipeline, it is important for Ireland that Dublin Port maximises the throughput from its current footprint, particularly having lost 14.6 hectares to Brexit facilities since 2019.

In relation to the draft 'All-Island Strategic Rail Review' it is important, therefore, that Irish Rail's own **Rail Freight 2040 Strategy** delivers a sustainable long-term solution to create a rail freight operation which can meet the requirements of all three of Dublin Port's container terminals, not just one, and which does not lead to a significant loss in the Port's throughout capacity. To that end, DPC has offered to entirely fund the cost of bringing the existing **North Wall Freight Depot** (Irish Rail's Freight Depot on East Wall Road) into operation as a rail intermodal terminal, including delivery of a dedicated freight overbridge across East Wall Road. This would provide equal access to the rail freight depot for all of the port's Lo-Lo terminals and would also have a direct access from the Southern Port Access Road that will serve DPC's proposed 3FM container terminal on the Poolbeg Peninsula. More importantly, it avoids the major negatives of the alternative of having a rail intermodal located near quayside in the **Alexandra Quays** area – namely the major loss of port throughput capacity from such an arrangement, the significant disruption of direct continental ConRo services on the adjacent Ocean Pier, the increased risk of serious accidents from co-locating a rail intermodal in the single busiest area of the port, and the major disruption to the Port Tunnel and the city road network from having 375m long freight trains crossing East Wall Road (North wall Freight depot is on the west of East Wall Road and does not require such crossings).

Given the above, DPC is of the view that creation of a rail intermodal terminal in North Wall Freight Depot will deliver the most sustainable and practical solution for 'first mile-last mile rail access' for Dublin Port.

In succeeding Sections of this submission, we articulate our analysis of the various options for increasing rail freight to and from the Port. **Appendix 1** provides a layout plan showing key locations that are referenced in this submission.

3. Previous investment in rail freight in the 1990s

In the 1990s, EU-Cohesion Funding was used to create a national container rail-freight network in Ireland as part of the Operational Programme on Peripherality. The network of freight depots that was created was extensive. Despite this heavy investment, the 2000 'Assessment of Intermodal and Port Access Requirements', undertaken by Arup/ ORM for the Department of the Marine & Natural Resources, noted :

'…… highlights the very low levels of activities in most of Irish Rail's rail-freight depots. Even in some of the depots with relatively new gantry cranes (Belfast, Cork, Dundalk, Limerick and Sligo) volumes are so low as to hardly justify allocation of a dedicated fork-lift or reach stacker container handler'.

Fig 1 Disused rail mounted gantry crane, Colbert Station, Limerick

The large investment in rail freight facilities in the 1990s did not lead to any major growth in rail freight volumes.

In 2005, Irish Rail took the decision to scrap this network of rail-freight depots.

The geography of Ireland and the layout of the rail network is the same today as it was in 2005.

If a cogent case is being made for significant new rail freight investment, then it would have been expected that the AISRR would have addressed this previous failure and outlined why the situation has materially changed since 2005. This is a significant omission.

4. Existing annual throughput handled by rail at Dublin Port

Despite major investment to grow rail freight in the 1990s, and also subsequent rail investment by Dublin Port, current rail freight at the Port consists of just two elements with a combined tonnage of 0.45m Tonnes per annum. This represents about 1/80th of total port throughput :

- Boliden Tara Mines : 0.29m Tonnes of lead/ zinc ore, with on average 10 trains per week (before the service was suspended due to the temporary cessation of mining operations in summer 2023).
- Ballina Route : 0.16m Tonnes of unitised freight, with on average 5 trains per week. This represents 1/225th of total port throughput.

Both the above are serviced via a rail line that runs for 320m along Alexandra Road and then turns into the Boliden Tara Mines depot and on into the Alexandra Basin berthside area to ultimately reach rail freight sidings at Alexandra Quay East for the Ballina route.

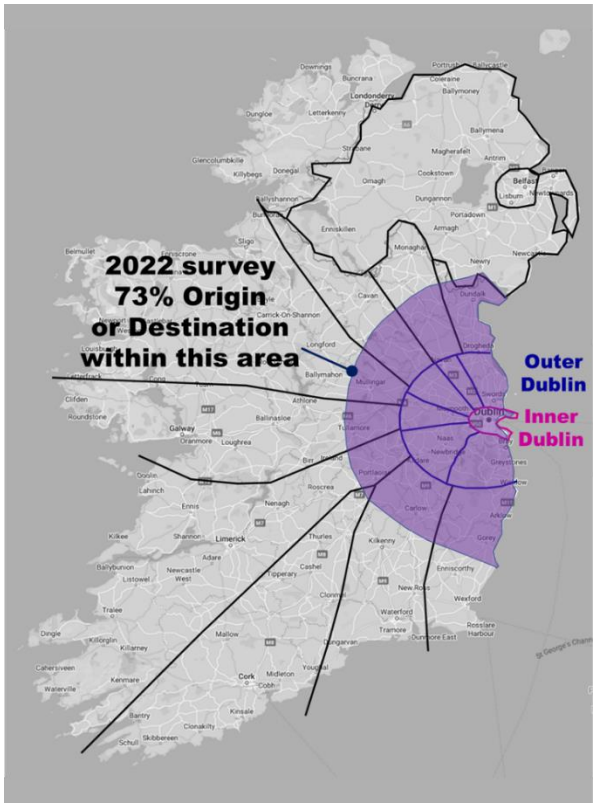
5. Dublin Port 2022 Origin-Destination Survey and addressable market for rail freight

In 2022, Dublin Port's consultants, RPS, undertook an extensive Origin-Destination survey of freight movements to and from the port. This involved surveying c. 35% of all HGVs and was an update on previous surveys conducted in 2001 and 2011.

A summary of the survey results is included in **Appendix 2**. Key findings were:

- 73% of the port's HGVs have an origin or destination within 90km of Dublin Port
- 61% of the HGVs have an origin or destination within 40km of Dublin Port

Fig.2 percentage of Dublin Port HGVs having an origin or destination within 90km of the port



Lo-Lo containers make up c. 22% of all tonnage handled at Dublin Port. Accordingly, of the 27% of HGV movements outside the 90km radius from the port, approximately 6% will be Lo-Lo containers. **If a fully implemented national rail freight strategy was exceptionally successful and managed to capture say 50% of all this Lo-Lo[1] freight outside the 90km zone, it would mean that 3% of the port's total freight would therefore be transferred by rail.** The fact that the addressable market for rail freight from Dublin Port is very small is a simple fact of geography and of the concentration of port related HGV movements within the 90km zone. If a business case can be made for moving this 3% of port freight by rail, it would represent an annual tonnage of c. 2.4m Tonnes by 2040, which is a fifteen fold increase on volumes of unitised freight moved by rail in 2022. This 2.4m Tonnes would represent c.15% of all Lo-Lo traffic.

The corollary of the above is that transfer by road will remain by far the most dominant means of freight transfer to and from Dublin Port. As such, any radical reduction in GHG emission from freight

[1] The AISRR references the possibility of also transferring Ro-Ro trailers by rail. Ro-Ro trailer transfer makes up only a very small percentage of European rail freight, and zero percentage in the UK. There are fundamental technical, cost, and logistical reasons for this, and it is unlikely to be practicable in Ireland.

transfer to and from the Port will be achieved via decarbonization of the country's road haulage fleet rather than interventions in relation to rail freight (see Section 21).

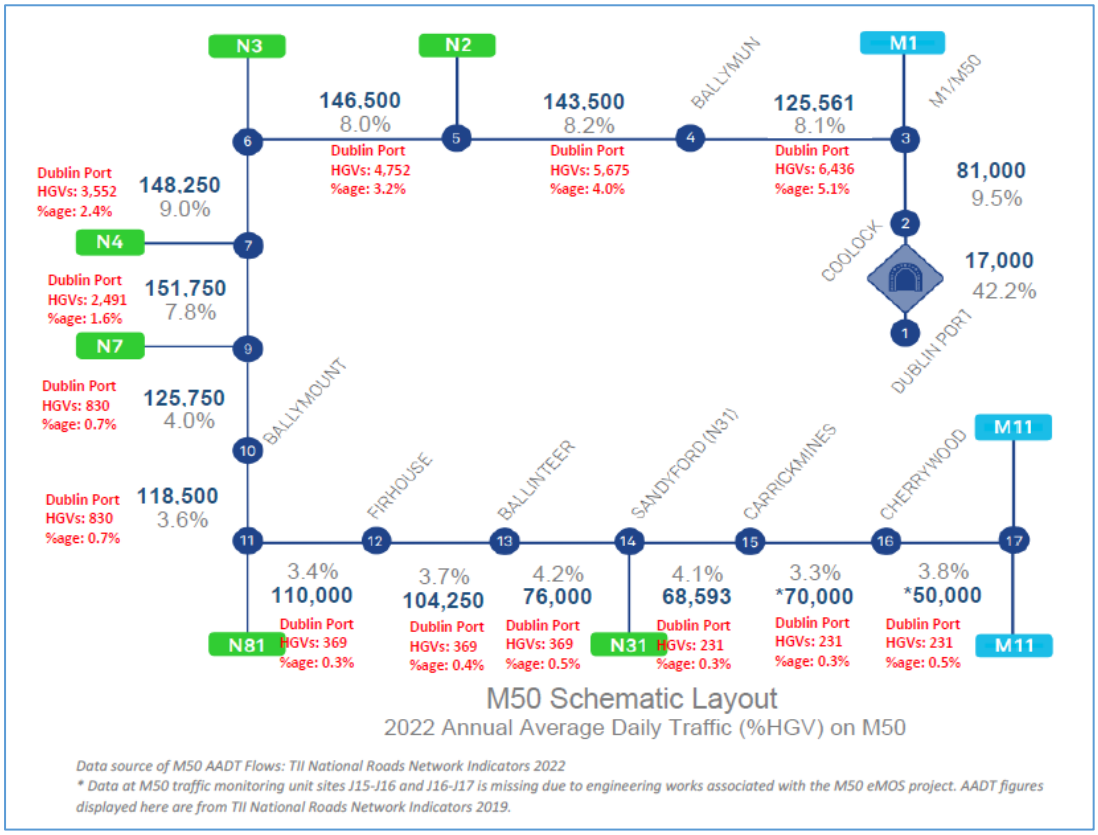
6. Dublin Port and the M50

The level of detail in the 2022 Origin-Destination survey was such that RPS were able to estimate how port related HGV traffic builds up across the M50 as it heads to and from the Port Tunnel. See Fig.3 below.

Using this data, and TII's 2022 published network data for the M50, **it was estimated that, across the length of the M50 from Junction 17 (M11) to Junction 3 (M1), HGV traffic to and from the port makes up 1.7% of total vehicle numbers**. To put this in some context, vehicle numbers of all types on the M50 reach c. 150,000 per day at the busiest point on the network.

It has been stated in some quarters in the past that an increase in port related HGV movements on the M50 will significantly exacerbate congestion. However, the above figures clearly show that port related HGVs make up only a small percentage of vehicles on that network, and this will still be the case when the port reaches maximum throughput c.2040. The reason this is pertinent to the deliberations of the AISRR is that it has also been suggested in the past that transferring port related freight to rail would be some sort of panacea for congestion on the M50. Given that port HGVs represent such a low percentage of overall vehicle numbers on that network, this is not the case.

Fig.3 Schematic showing overall vehicle numbers across the M50 in 2022. Dublin Port related HGV figures and percentages of overall vehicles are in red.



7. Efficient transfer of goods to and from Dublin Port

As outlined in Section 2, DPC supports the development and expansion of rail freight to and from the Port, and that is why we have offered to fund the development of a rail intermodal at the existing North Wall Freight Depot (see Section 10). Subsequent sections of this Submission demonstrate why this is the most efficient, safest, and most sustainable solution for delivering 'first mile-last mile rail access' for Dublin Port.

In the interests of clarity and analysis, it is important to understand that transferring Lo-Lo containers by rail introduces a number of additional handling movements over and above that required in a purely road transfer. The reason this is highlighted is that one of goals listed in the AISRR is Goal 5, Freight & Economy, one of whose aims is to '*support the efficient movement of goods and people between economic centres and international gateway's'*.

On a simple analysis of a transfer of a Lo-Lo container from Dublin Port to say Limerick, the rail alternative increases the number of container handling activities by 60% compared to a road transfer. All of these additional container moves add time and cost to the transfer operation, and raise the question of whether it represents an efficient transfer of container freight in a country as small as Ireland. As outlined, the environmental argument for such a rail transfer operation will begin to disappear as the country's road haulage fleet is gradually decarbonised (see Section 21).

Lo-Lo container transfer by road from Dublin Port to Limerick : 5 container handling moves

1. Ship to Shore Crane transfer from ship to quayside
2. Road tug transfer to main stack
3. Lift into stack
4. Transfer from stack to HGV
5. HGV to destination in Limerick

Lo-Lo container transfer by rail from Dublin Port to Limerick : 8 container handling moves

1. Ship to Shore Crane transfer from ship to quayside
2. Road tug transfer to rail intermodal (e.g. North Wall Freight Depot)
3. Lift into rail intermodal stack
4. Transfer from stack to train
5. Train to Limerick Rail Distribution Centre
6. Reachstacker lift from train to mini-stack
7. Reachstacker lift from mini-stack to HGV
8. HGV to destination in Limerick

We note also that one of the recommendations of the AISRR is to *'Develop a network of inland terminals close to major cities on the rail network'*. No information is provided on how such terminals would operate. It is worth noting that if the above rail transfer of a container was routed via such an inland terminal on the periphery of Dublin, and it involved two train transfers, the

number of container handling moves between Dublin and Limerick would increase further to 11, a 120% increase on the number of container moves in the more straightforward road transfer.

8. Comparative rail intermodal terminals at major international ports

As part of its discussions with Irish Rail, DPC provided an overview of a selection of major rail intermodal facilities at large ports in Europe including : Southampton, London Gateway, Felixstowe, Gothenburg, Le Havre, and Hutchinson Ports Stockholm.

Commonality across the example ports (and other large intermodal ports) :

- very large intermodal rail terminal that is separate and removed from the primary Lo-Lo (quayside and stacking) operations. Size generally varied from 5ha to 30ha.
- purpose built intermodal facilities that allow sufficient working room for dedicated container handling equipment such as rail mounted gantry cranes and reachstackers.
- intermodal facilities which included significant land for dedicated storage/preloading adjacent to the rail sidings so as to minimise loading/unloading times of trains.
- single direction shunt distances from main Lo-Lo stacks to rail terminal of between 0.5 to 2km.
- for operational efficiency and health & safety, none of the large intermodal facilities had a rail freight operation integrated into the main quayside container stacks. The opposite is the case with the current operation on Alexandra Quay East in Dublin Port, and would be the same in any future expanded intermodal facility at that location.
- rail traffic was grade separated from the main road access routes to the port and the adjacent highway networks. This is not the case in Dublin where rail has to traverse East Wall Road, the main road to the Port Tunnel.
- the various ports had much larger total land areas than Dublin Port (which is 265ha). e.g Felixstowe 3300 hectares, Le Havre 10000 hectares. The smallest comparator, Gothenburg, has double the land area of Dublin Port. [Despite its much larger land area, Gothenburg has very similar overall throughput to Dublin].

Appendix 3 shows some of these comparator intermodal operations.

When compared to these benchmark international ports, Dublin Port does not have available land area to situate a large new rail intermodal within its curtilage. Nor is the delivery of grade separation of road and rail readily achievable without undertaking a hugely expensive construction project on East Wall Road that would potentially cause serious disruption to North City traffic for three years during construction. (See **Section 12**).

The existing pressures on available land in Dublin Port can be seen from the fact that in the last 24 months, DPC has had to turn down requests for launching of new services to both continental Europe and the UK.

In various meetings with Iarnród Éireann over the past two years, DPC has reiterated that the only area capable of delivering a proper and safe intermodal rail facility, serving all three of the port's Lo-Lo terminals, was at North Wall Freight Depot. **This is because locating a major rail intermodal in the midst of existing quayside operations in the Alexandra Basin West and East areas would run counter to international practice both for operational efficiency and for safety reasons (See Section 15)**.

9. Potential rail freight throughput for different train frequencies to and from the port

We have examined the carrying potential of rail operations with up to 16 container trains per day, with 350m train lengths (excluding locomotive). For calculation purposes, we have assumed night time operations from 8.30pm to 5.30am due to the impact of the at grade crossing of East Wall Road on city and Dublin Port Tunnel traffic (see **Section 11**).

If the rail freight operated out of the North Wall Freight Depot instead, so eliminating train crossings of East Wall Road, a much longer operational window would be possible.

The data below is for illustration only as it ignores limitations arising from train handling capacity at the intermodal terminal and also external rail network constraints such as competition for available track space with passenger services and the fact that most of the country's rail network is single track.

Table 1. Rail freight throughput with different train frequencies (based on a 365 day operation and an 8 hour overnight operating window)

Container trains per hour	Trains per day	Container tonnage (m Tonnes p.a)	Multiple of current container tonnage	% of Masterplan 2040 Lo-Lo tonnage	% of Masterplan 2040 overall tonnage
1	8	1.8	11	12	2.3
2	16	3.6	22	24	4.7

10. Centralising the Port's intermodal facility at North Wall Freight Depot.

Over the past two years, DPC has advocated locating a rail intermodal at North Wall Freight Depot as the best solution to deliver a single rail intermodal facility that would service all of the Lo-Lo terminals in the port via road shunt and via a dedicated freight overbridge crossing East Wall Road. This would remove any conflict with East Wall Road traffic. This proposal addresses the AISRR aim to '*develop a sustainable solution for the first mile-last mile rail access for Dublin Port'.*

Fig.4 North Wall Freight Depot

DPC has previously confirmed to Iarnród Éireann that it would fund this development on the 4.6ha site. If the rail intermodal facility achieved a 3.5 day dwelltime for containers, it could deliver up to 2.4m tonnes of rail freight per annum depending on configuration of the facility. This would represent 15% of the Port's Lo-Lo container traffic in 2040. The estimated cost, including road overbridge across East Wall Road, is c. €38m, and DPC has also offered to lead the design, planning application, and project delivery.

The North Wall Freight Depot rail intermodal would involve :

- Construction by DPC of a dedicated bridge for road freight from Dublin Port's lands across East Wall Road into North Wall Freight Depot.
- Construction of the infrastructure for the rail intermodal.

Various configurations of the intermodal facility have been discussed with Iarnród Éireann over the past 18 months, and one example currently under discussion is included in **Appendix 4. Appendix 5** provides details and images of the proposed overbridge from Dublin Port to link to the yard, though the exact arrangement at the North Wall Freight Depot side of the bridge would depend on the ultimate agreed configuration for the intermodal facility.

Figure 5: DPC's suggested rail freight bridge across East Wall Road

Locating the rail intermodal at North Wall Freight Depot has the following advantages over locating it in the Alexandra Quay Area :

- It would not raise the serious health & safety issues that arise from having a large rail intermodal at Alexandra Quay East (see **Section 15**).
- The proposed overbridge for road shunting of freight between the port and North Wall Freight Depot removes the serious impacts on city traffic caused by the current at grade rail crossing of East Wall Road (which would restrict rail freight movements to the overnight window between 8.30pm and 5.30am if the rail intermodal was located at Alexandra Quay East). With

the North Wall Freight Depot, freight trains can theoretically move 24 hours per day – depending on rail network capacity and competition for that capacity with passenger trains.

- A single combined intermodal facility at North Wall Freight Depot would provide access by means of a short road shunt from each of Dublin port's three container terminals as shown in **Table 2** below. This is compared to locating the intermodal at Alexandra Quay East – which would only provide real connectivity for one container terminal. The North Wall Freight Depot facility could also be operated by an independent party.
- It would allow a major increase in current rail freight while removing the negative impacts on port capacity and port safety, and also the traffic problems on internal and external road networks.

Table 2. Road shunt distances from container terminals to East Wall Road rail yard

Terminal	Location	Distance
DSG	North Port	1.0 km
DFT	North Port	1.9 km
MTL	South Port	2.3 km
New replacement terminal for MTL	South Port	3.4 km

Impact on Port Capacity : locating the rail intermodal facility at North Wall Freight Depot could lead to a net increase in port capacity of up to 2.4m Tonnes per annum, whereas locating the intermodal at Alexandra Quay East for example would lead to a net decrease in port capacity of 4.5m Tonnes (based on two trains per hour using the sidings in the 8 hour overnight window. See **Section 14**). The differential between the two alternatives is therefore **6.9m Tonnes** in terms of port capacity. This lost tonnage would need to be delivered at another port or a new port on the east coast. Based on the cost estimates in DPC's '**Dublin Port Post 2040 Dialogue**' (Paper 7) for creating additional port capacity elsewhere, and allowing for construction inflation since those 2020 estimates, the 6.9m Tonnes lost capacity would cost c. €600m to deliver elsewhere. If you factor in the estimated cost of €150m for an East Wall Road Underpass to allow 24 hour rail freight operation (see **Section 13**), **then the total opportunity cost to the state of locating the rail freight intermodal at Alexandra Quay East could be c. €750m. This is compared to the estimated cost of €38m to create the rail intermodal at North Wall Freight Depot**.

Carbon impact : the option of instead locating the rail intermodal at Alexandra Quay East would have a significantly larger embodied carbon footprint than DPC's preferred alternative of locating it at North Wall Freight Depot. This is because of the embodied carbon in constructing facilities at an alternative port to replace the 6.9m Tonnes lost throughput, combined with the embodied carbon of building any East Wall Road underpass. See **Section 17**.

11. Impact on road networks of substantially increasing the volume of rail freight crossing East Wall Road

The Dublin Port Tunnel was opened in 2007 with the express aim of removing port traffic from the city, and also to provide easy connection for city traffic to the M50 and the radial national road network. The main connection from the city to the Port Tunnel is via East Wall Road, across which runs the current at grade rail connection to the Port. The AISRR highlights the fact that in relation to rail connectivity to the Port, 'part of the railway runs on and across busy roads, creating significant conflicts with road traffic'. We would agree with this statement, and it is one of the key reasons why a large rail intermodal would be much better located at North Wall Freight Depot rather than at Alexandra Quay East. The rationale for this statement is as follows :

The effect of freight train crossings in terms of closing East Wall Road are shown in **Table 3** below for different train frequencies. They assume an intermodal facility located in the Alexandra Quay area rather than at DPC's preferred location, North Wall Freight Depot. Calculations assume an overall train length of 375m (including locomotive) and an allowance for green/ red phasing of traffic lights. The Table shows the impact that any significant volume of rail freight traffic would have on East Wall Road, and consequently on the city road networks and the Port Tunnel. Locating the rail intermodal at North Wall Freight Depot instead removes all these negative impacts on East Wall Road.

Table 3. Impact of freight train frequency on closure of East Wall Road

Freight train frequency per hour into port	% of time that East Wall Road has to be closed to road traffic to allow these train movements
1	18%
2	37%
3	55%

When trains cross East Wall Road and access the port via Alexandra Road, they will have two principal impacts on road traffic in the vicinity :

- traffic queues on East Wall Road, both north & south of the rail crossing, ultimately affecting the Dublin Port Tunnel and the North Quays.
- traffic queues within the Port's own road network, which again can ultimately back up to the Port Tunnel as internal traffic junctions become traffic locked. These queues arise because of the considerable time (c. 8 minutes) for freight trains to traverse and clear Alexandra Road and the consequent effect on access to the Alexandra Quay areas, and also in the future to the Southern Port Access Road (SPAR) which will serve the South Port and Poolbeg peninsula.

DPC had previously commissioned Roughan & O'Donovan (ROD) to develop a full PARAMICS traffic model for the North Port for analysis of Brexit traffic impacts. This model has now been used to examine the traffic impact on both the Port's internal road network and the external road network of a number of different rail freight scenarios where the rail intermodal terminal was located within

the port curtilage rather than at East Wall Road Rail Sidings. **Modelling was based on 2040 traffic volumes and locating a rail intermodal in the Alexandra Quay area.** Multiple rail operational scenarios were modelled, and a summary of the outcomes is as follows :

- Baseline (without any train crossings of East Wall Road) – no significant traffic queuing in AM peak, and only short traffic queuing on the North Quays in the PM peak. This Baseline scenario could only be achieved by locating the rail intermodal at North Wall Freight Depot or by undertaking a huge and difficult project to create full grade separation of rail and road at the East Wall Road (See **Section 12**).
- Major daytime queuing of traffic was evident on the North Quays, the Dublin Port Tunnel, and within the port estate in various modelled scenarios of different train frequencies to and from Alexandra Quay East.
- The only period without serious traffic impacts was overnight between 8.30pm and 5.30am when up to 2 trains per hour could be accommodated crossing East Wall Road.

Appendix 6 provides screen grabs of the traffic impact of one of the modelled scenarios – showing the major queuing on the North Quays and the Dublin Port Tunnel – something which would cause very serious disruption of the North City road networks and the M50.

12. Achieving grade separation of road and rail at East Wall Road

The traffic modelling undertaken by Roughan & O'Donovan highlights the fundamental physical constraint on daytime operations of freight trains with the current at grade rail crossing of East Wall Road. The view of DPC is that the practicable way to address this major constraint is to create a rail intermodal facility at North Wall Freight Depot. As outlined in **Section 10**, this would be served by a dedicated overbridge across East Wall Road so that freight could be continuously road shunted to and from the yard without interfering with East Wall Road traffic.

If the rail intermodal was instead located within the port curtilage to the east of East Wall Road, then rail freight movement would need to be restricted largely to the period between 8.30pm and 5.30am. If operation of rail freight outside those hours was required, then it would require grade separation of the existing rail crossing on East Wall Road. DPC's view is that the location constraints mean that any project to achieve this is likely to be hugely disruptive to city traffic for a considerable period, exceptionally expensive, have a huge embodied carbon footprint, and cast a 'planning blight' on other projects in the vicinity.

The options to achieve grade separation are :

a) Create a long rail cutting/ tunnel east and west of East Wall Road of c. 1.5km in total length (using an allowable 1.25% gradient for freight trains). Within the port, this cutting would effectively sever all entrances for a length of nearly 700m along Alexandra Road – something which would have major operational implications for the Port. It would also require Boliden Tara Mines' train unloading facility to be lowered c. 4.2m in level so that the trains could access the cutting. This option is not practicable.

b) Instead create an elevated rail line to cross East Wall Road. The length of the elevated rail line would be similar to option a). It has the same drawbacks in terms of complete severance of entrances on Alexandra Road, and the need to make a major change to the Boliden Tara Mines unloading facility. It has the further disadvantage of requiring the demolition of the recently constructed Alexandra Road Freight Bridge which is crucial to the operation of the Port's new combined Terminal 4 - as it allows continuous operation of the Terminal without having to cross Alexandra Road at grade. Accordingly, this grade separation option is not considered practicable.

c) Elevate East Wall Road above the existing rail line. This would be an enormous project and hugely disruptive to city traffic during construction which would take circa 3 years. It would also have a massive embodied carbon footprint. Furthermore, such elevated roadways, particularly with the volumes of traffic on this road, create a significant noise envelope.

d) Instead, put East Wall Road into cutting/ tunnel beneath the rail line. In order to establish the constructability issues, the level of disruption to city traffic, and the cost of such a proposal, DPC commissioned RPS to produce a concept design for costing and analysis. Section 13 below provides a brief summary and shows why such a project would be an enormously expensive and disruptive undertaking, and would have a very large embodied carbon footprint.

e) A final alternative would be a combination of Options c) and d). This is not considered practicable as it would share many of the disadvantages of both these options, but also, crucially, would completely sever the connection to the Southern Port Access Road which would serve the Poolbeg Peninsula (as that road would not be able to cross a rail line that was only partially in cutting at the crossing point).

13. Analysis of the option to achieve rail/ road grade separation by putting East Wall Road into an underpass (cutting/ tunnel).

This would be a massive project given the scale of the road and the fact that it is the primary route from the city to the Port Tunnel. It is also a strategic national route.

As outlined above, DPC commissioned RPS to produce a concept design of this option for costing and analysis.

The main conclusions of the RPS work and subsequent DPC programming/ costing were :

a) Construction programme would be c. 3.5 years during which there could be substantial disruption to north city traffic.

b) Construction cost is estimated as between €125m and €150m at 2022 prices.

c) The project would have a very large embodied carbon footprint.

d) Given the sheer complexity and disruptive effect of the project, and even if a decision to proceed was made in 2024, such an underpass would not open to traffic until well after 2030 – allowing for reaching agreements with multiple stakeholders, outline design and planning application, lengthy planning application process/ CPOs, any Bord Pleanala appeal, detail design/ tendering, and finally construction. However, by the time of opening the move to decarbonise HGV transport should be proceeding at pace - if the Government delivers on its stated ambition in regards to decarbonising road freight. As such, this hugely expensive and disruptive underpass project, with large embodied carbon, could ultimately become a white elephant in terms of its impact on GHG emissions.

e) Construction would require major service diversions in advance, including High, Medium and Low Voltage electricity lines, high pressure gas main, multiple water mains, large surface water sewer, and multiple telecoms routes. Some of these utility services are of national significance.

f) The project would require the creation of major temporary road diversion routes for all of East Wall Road traffic, the western element of it through third party lands which are earmarked for other development, and the eastern element through port lands.

g) Given the need to tie in at grade with existing junctions north and south of the East Wall Road rail crossing, the underpass would need to have gradients of up to 7%. This is well outside TII guidelines for preferred maximum gradient of 4%.

h) There would need be multiple departures/ derogations from road design standards in order to accommodate the underpass within the location constraints. Examples are sub-standard visibility, junction approach gradients, vertical curvature, and cross-section geometry.

i) The potential construction of the underpass would mean that DPC would have to shelve its €32m '**Liffey Tolka Project'** as envisaged. This is a major pedestrian and cycle route to be largely built within port lands, designed by Grafton Architects/ ROD, and stretching 1.4km from North Wall Quay to link with the 3.2km Tolka Estuary Greenway which is already under construction by DPC. The project is strongly supported by Dublin City Council as it will provide

a major enhancement to public realm and cycle/ pedestrian mobility. It will also become a key component in the **Sutton to Sandycove pedestrian/ cycle route**. It is currently at detail design stage, with construction commencement due in 2024.

Appendix 7 provides a more detailed list of the pros and cons of putting East Wall Road into a deep cutting/ tunnel.

For reasons outlined above and in Appendix 7, DPC's view is that constructing an East Wall Road underpass beneath the rail line is neither a practicable or viable option, both from a cost and environmental perspective. This is because the alternative of locating a rail freight container deport in North Wall Freight Depot is far cheaper, has lower embodied carbon, can be built much more quickly, does not require third party land, would not create 'planning blight' for other schemes, would be far less disruptive to city traffic/ major utility services during construction, and would not lead to a significant loss in port capacity (which has major economic and embodied carbon consequences given the need to replace that capacity with new port infrastructure elsewhere).

14. Impacts on port capacity and operational efficiency from locating a rail intermodal in the Alexandra Quays Area

If a major rail intermodal was located at Alexandra Quay East, instead of at North Wall Freight Depot as preferred by DPC, then it would lead to a large reduction in port capacity in the Alexandra Quays area. The loss of capacity comes from three sources :

a) Area of main Lo-Lo container stacks that would be lost to rail sidings

b) Longer dwell-time in stack of rail containers compared to road hauled containers

c) Major disruption effects of running long freight trains across the busiest area in the port. e.g. As the freight trains traverse the area to and from a sidings location in AQE, they will effectively kill north south movements to the 'Texaco Yard' container stacks on Alexandra Road, to the reefer stacks in 'McCairns Yard' and to the extensive Terminal 4 yard areas for unaccompanied Ro-Ro. The scale of likely impact can be gauged from the fact that at a frequency of two trains per hour overnight, trains would be traversing the area for 29 minutes in every hour. At one train per hour, they would be traversing for c. 15 minutes in every hour.

The assessment of loss of capacity is clearly dependent on assumptions regarding dwell times, frequency of trains, and period over which they operate. For the purposes of this analysis, DPC has assumed that train operating times will be confined to the period between 8.30pm and 5.30am as outlined in **Section 11**. This is due to traffic impacts across the city road network during daytime

train operation. Using a longer operating window and therefore higher number of trains would have increased the negative impact of c) above.

Table 4. Estimate of loss of port throughput capacity for different intermodal arrangements

Intermodal arrangement	Time per hour for train to traverse area	Loss of port capacity throughput (m Tonnes p.a)
AQE Sidings at 2 trains per hour 4 parallel sidings	29 mins	4.5
AQE Sidings at 1 train per hour 2 parallel sidings	14 mins	2.0

To put these figures in perspective, the 4.5m Tonnes loss in port capacity (from handling 2 trains per hour over an 8 hour overnight window on Alexandra Quay East) exceeds the current total througput of Rosslare Port.

Issues associated with locating a rail intermodal at Alexandra Quay East (AQE).

a) sidings would need to be positioned within the current location of the AQE northern container stack.

b) locating sidings within this container stack area would require a number of container slot widths to be sacrificed over the full length of the stack - depending on the number of sidings to be accommodated. There would need to be three slots wide to facilitate two sidings and six slots wide to facilitate four sidings.

c) in addition to the lost storage capacity and lost annual throughput within AQE, there would also be an impact on any future Alexandra Quay West stack capacity because of trains transiting through the area to get to AQE.

d) at two trains per hour during an eight hour overnight operation (from 8.30pm to 5.30am), loading/ unloading of ships on the two Con-ro berths on Ocean Pier would be severely disrupted for c. 50% of the time. This would lead to a significant loss of berth capacity. At one train per hour, the disruption would be for 25% of the time.

e) locating an intermodal on AQE has major health & safety implications – as it will increase the likelihood of serious accidents (see **Section 15**).

15. Increased risk of serious accidents with a rail intermodal close to Lo-Lo stacks within the Alexandra Quays Area

As outlined in **Section 8**, the rail intermodal terminals at major ports are normally located remotely from the main berthside Lo-Lo stacks. This is for reasons of efficiency, a desire to concentrate rail operation at a location that can serve a number of berths, and also health & safety. In relation to the latter, any substantial expansion of the current operation of rail freight beside the main Lo-Lo container stack on Alexandra Quay East would cause major health & safety concerns. Long container trains would have to traverse the single busiest concentration of port operations in Dublin – namely the Ocean Pier/ Alexandra Quay area. This area has become even busier since the increase in direct continental trade following Brexit. There are a huge volume of vehicle movements in this area, ranging from :

- Ro-Ro trailers being shunted on and off Ro-Ro vessels
- Conro double stack container units being shunted
- containers being delivered and collected
- tractor trucks delivering bulk feed from the adjacent Alexandra Quay West
- 'project loads' such as wind turbines, rail carriages, electricity turbines/ generators etc
- large vehicle shipments such as buses, combine harvesters etc
- new cars and other vehicles from transporter vessels
- ship delivery of port equipment such as reach stackers, RTG cranes etc.

All of these movements conflict with having long freight trains moving through this same area and would raise clear health & safety concerns. The length of time for a freight train to traverse key crossing points would also lead to significant queuing of the above traffic, something which will concentrate vehicle movements on and off vessels after trains clear the crossing points, further increasing accident risk. e.g Two trains per hour into Alexandra Quay East will effectively shut down all of the above cross traffic within the Alexandra Quay East/ West and Ocean Pier area for 29 minutes in every hour. Aside from the major impact on ship unloading/ reloading times (see **Section 14**), this poses a serious safety concern given that it will lead to a substantial associated concentration of freight handling movements - rather than the even continuous spread of vehicle movements that are conducive to safe operations.

Ocean Pier is the berthing area for the very large ConRo[2] ships on direct continental routes from Rotterdam and Zeebrugge, and has seen a major increase in volumes over the past two years. It is used by ships such as the Celine which is the largest short-sea Ro-Ro vessel in the world, with 8km of internal lane length, accommodating 600 trailers and double height container sled units. These ConRo ships have been critical in managing the effects of Brexit.

[2] A ConRo ship is a hybrid of a Ro-Ro ship and a Lo-Lo container ship, with all freight moved on and off the ship using terminal tractor units

The main terminal operator in this area, DSG, has raised concerns to Dublin Port about the dangers associated with any significant increase in the number of trains into the Alexandra Quay East and West areas. Purely running trains overnight will not mitigate this, as the loading and unloading of ships is effectively a 24x7 operation, especially given the huge pressure on berthage after Brexit.

Fig 6. Offloading of CLDN Conro vessel on Ocean Pier

16. Impact of loss of port capacity if large rail intermodal created at Alexandra Quay East

As outlined in Section 14, locating a large intermodal at Alexandra Quay East, rather than on North Wall Freight Depot, could lead to a loss of throughput capacity of up to 4.5m Tonnes per annum if a significant volume of rail freight is to be achieved. Whilst this may seem relatively small in the context of Dublin Port's Masterplan 2040 target of 77m Tonnes per annum, there are already major risk factors in relation to achieving that target, factors that may reduce the ultimately achieved capacity and significantly bring forward the date at which Dublin Port reaches maximum capacity.

In DPC's submission to DEPRs *Review to Renew*, we analysed the risk factors to the Masterplan throughout capacity target as shown below.

Table 5: Estimated impacts of Masterplan 2040 risk factors

Risk factor	Reduction in years to full capacity
Planning consents not secured for the 3FM Project[3]	5.0 years
Supply chain inefficiencies not eliminated or considerably reduced	3.0 years
Loss of capacity because of Brexit border control infrastructure	2.5 years

Added together, these risk factors create the possibility that Dublin Port could reach full capacity much earlier than anticipated.

Locating a large rail intermodal within the existing port curtilage at Alexandra Quay East, rather than at North Wall Freight Depot as preferred by DPC, would further significantly reduce capacity and bring even closer the date at which maximum port capacity is reached. This would have major consequences for the Irish economy – as our experience is that large infrastructure projects at other ports, to replace this lost capacity, will take between 10 and 20 years to deliver, assuming planning can be secured.

It is important that the effects of reaching full capacity in Dublin Port are taken account of before the Government takes any decision on rail freight which might further limit achievement of the capacity objectives of Masterplan 2040.

Reaching maximum throughput capacity at Dublin Port will not happen suddenly and, as we try to complete infrastructure projects to maximise capacity in an exceptionally busy port environment, pinch points are already becoming evident. For example:

- There are two shipping lines (one operating a freight ferry service to Continental Europe and the other operating a container shipping line) that have sought to commence new services

[3] If the 3FM Project does not proceed, then it is likely that all cargo handling on the Poolbeg Peninsula will eventually cease as residential and commercial development pressures grow

into Dublin Port but which cannot currently be accommodated by any of the port's terminal operators.

- Major reductions have had to be imposed on use of the port by the cruise industry because of pressure on berthage - particularly caused by the increase in volumes on ConRo services to Continental Europe since Brexit.
- Car Carrier vessels have had to be diverted to Cork because there was no room for them to be discharged in Dublin Port. Most of those vehicles then have to be re-transported by road back to distributors in and around Dublin.
- Timing of Ballina container rail freight service had to be changed to late evening – again because of the huge increase in the volumes on services with Continental Europe, particularly in the Alexander Quay/ Ocean Pier area where the rail freight service operates.
- At peak weekend times, there have been difficulties in discharging vessels due to lack of available yard space in the Alexandra Quay/ Terminal 4 area.

17. Embodied Carbon footprint of locating rail intermodal at Alexandra Quay East

There would be a very large embodied carbon footprint in projects related to delivering a large rail intermodal within Dublin Port's curtilage at Alexandra Quay East:

- If grade separation at the East Wall Road crossing was to be achieved (See **Section 13**) by putting the road into cutting/ tunnel underneath the rail line, it would entail a massively disruptive construction project of circa 3.5 years in duration, which would only be completed after 2030. More pertinently, delivery of that project would require a significant embodied carbon footprint.
- Similarly, if it was decided that a rail link had to be created to the proposed 3FM project in the South Port, that in turn would also entail a major embodied carbon footprint. See **Section 18**.
- Finally, as outlined in **Section 14**, delivery of rail intermodal within the current Dublin Port curtilage will lead to a major loss in port capacity compared to the situation if the intermodal was delivered at the existing North Wall Freight Depot. e.g. To run two trains per hour overnight into an intermodal at Alexandra Quay East would lead to a calculated net loss in port throughput capacity of 4.5m Tonnes per annum. However, given that locating an intermodal at North Wall Freight Depot would instead create a net gain in port capacity of c.

2.4m tonnes, locating the intermodal at Alexandra Quay East represents a total lost capacity of 6.9m Tonnes per annum. This lost capacity would ultimately need to be delivered as part of a new infrastructure project at another port – a project that would again require a huge embodied carbon footprint.

Project capital cost can be used as a very rough surrogate to compare the embodied carbon of various options.

Creation of a rail intermodal at North Wall Freight Depot. Cost = €38m

Alternative of creating a rail intermodal at Alexandra Quay East and establishing a rail connection to Dublin Port's 3FM Project on the Poolbeg Peninsula. In terms of lost cargo capacity, this breaks down as 4.5m lost capacity in Alexandra Basin (See **Section 14**), 1.2m lost capacity in 3FM (See **Section 18**), and the 2.4m lost capacity from not having a rail intermodal at North Wall Freight Depot (See **Section 10**). Therefore, total lost capacity compared to a North Wall Freight Depot Rail Intermodal = 8.1m Tonnes p.a.

Cost = €125m for East Wall Road Underpass
€180m for creating rail connection to 3FM
€705m for creating the 8.1m lost capacity at an alternative port[4]
€1010m

So, as a very crude metric, there is a 26-fold increase in embodied carbon if the Alexandra Quay/ 3FM rail intermodal option is pursued compared to DPC's preferred North Wall Freight Depot option.

Given the above, and the fact that the likely major shift of HGVs to hydrogen/ alternative power sources over the next 20 years will largely remove the 'operational carbon payback' on the embodied carbon in the above construction projects**,** there is a very strong argument that, rather than providing a net GHG reduction, the option of providing the Alexandra Quay/ 3FM rail intermodal would deliver the opposite.

[4]based on estimates from the 'Dublin Port Post 2040 Dialogue and updated to 2023'

18. Creation of a rail link to the 3FM Project in the Poolbeg Peninsula

The draft AIRSS (p.64) highlights the lack of rail connectivity to the Poolbeg Peninsula as a weakness at Dublin Port. This criticism is based on flawed logic as will be outlined below.

The 3FM project is the third and final Masterplan Project to deliver Dublin Port's Masterplan 2040 target of 77m Tonnes capacity. It is located on Dublin Port's lands on the Poolbeg peninsula and will provide 17% of the Port's capacity target. The project is specifically focussed on providing capacity to cater for the unitised modes of Ro-Ro and Lo-Lo, and will be submitted as an SID application to An Bord Pleanala.

Any project to create a rail link to the Poolbeg Peninsula would be hugely expensive as it would require an opening rail bridge to cross the Liffey Channel and c. 2.5km of rail track to connect with DPC's Area O on the southside of the Peninsula. DPC has done a preliminary cost analysis of creating this link, with an estimate of €180m.

The critical point is that creating such a rail link to Poolbeg, with the significant embodied carbon involved, would not lead to any additional rail freight tonnage to and from the port. This is for straightforward reasons. If a rail intermodal is created at North Wall Freight Depot, as proposed by DPC and currently under discussion with Irish Rail, then Lo-Lo containers can simply be road shunted from the 3FM Project, via the new Southern Port Access Route (SPAR), to this intermodal where they can be loaded on trains. The SPAR route, which will be delivered as part of the 3FM Project, will have considerable capacity and will provide a very fast and efficient means of transferring freight by road to the rail intermodal at North Wall Freight Depot. That rail intermodal will also serve the two container terminals on the north side of the Port.

If however, a rail intermodal is instead created at Alexandra Quay East (which DPC is strongly against), the capacity of that intermodal will be limited by the fact that train crossings of East Wall Road will be restricted to an eight hour overnight window between 8.30pm and 5.30am (see Section 11). Any rail link created from the Poolbeg Peninsula would have to join that existing rail line near Port Centre and then cross East Wall Road. The corollary is that trains to and from Poolbeg would commensurately reduce the number of trains that could travel to and from a rail intermodal at Alexandra Quay East. E.g. Introducing one train per hour from Poolbeg would mean that one train less per hour could use an Alexandra Quay East rail intermodal during that overnight window. In other words, there would be no net gain in rail freight volumes from the hugely expensive and lengthy project of creating a rail link to Poolbeg.

As outlined in **Section 17**, a rail link project to Poolbeg would involve a large amount of embodied carbon, and, crucially, it would never recoup that carbon given that it would not come into operation until 2038, by which stage decarbonisation of road freight transport is likely to have advanced substantially, (**see Section 21**). Even if decarbonisation of road freight is ignored, the simple fact, as outlined in the preceding paragraph, is that a rail link project to Poolbeg would not lead to any increase in rail freight and as such the project would never achieve any 'carbon payback'. Such a connection to Poolbeg would therefore become a very expensive project that delivers a negative environmental benefit in terms of GHG emissions – an environmental white elephant. This runs counter to Goal 1 in the AISRR which aims to reduce carbon emissions. The AISRR itself rules out

certain passenger rail proposals on similar grounds that they '*risk generating more carbon through construction than would be offset through attracting more demand to the railways'*.

Creating a rail link to Poolbeg and locating a rail intermodal there would also lead to a significant loss of capacity both within Area O in the 3FM Project and in Terminal 4, north of the Liffey, across which the rail line would need to traverse. This is estimated as c. 1.2m Tonnes p.a.

For the reasons outlined above, DPC is strongly of the view that creating a rail connection to the Poolbeg peninsula, as suggested in the AISRR, is not sustainable either from a cost or environmental perspective.

19. Loading trains at quayside directly from Lo-Lo ships

This option has been mentioned in the past in certain quarters, albeit not in the AISRR. The facts are straightforward in relation to this canard :

- We are not aware of such an operation being used at any major Lo-Lo port in the world.
- The reason for this is that direct loading from ship to train would hugely reduce berthage throughput capacity because of the time it would take to load and unload a ship. It is impossible for the large Ship to Shore cranes to perform such an operation in any sort of efficient manner.

Appendix 8 sets out in more detail why this option would have such a negative impact on berthage capacity.

20. Rail Freight – European and international comparisons

Ireland is a small island with relatively low population density compared to mainland Europe, where there is a very extensive rail freight network moving freight over large distances to a very large population base. Even in England, the population density is 6 times that of Ireland, and there is also a much higher density of rail routes. Rail freight transfer distances are also longer. E.g Felixstowe to Manchester is c. 400km. In comparison, Dublin to Limerick is 210km. In Sweden, which, like Ireland, has a low population density compared to mainland Europe, and where the port of Gothenburg has

a rail intermodal terminal (remote from quayside and grade separated from the road system), rail freight travel distances are up to 1000km.

The difference between Ireland and its European comparators in terms of size and population density is simply illustrated by the image below :

Fig. 7

The AISRR contains a Case Study of rail freight in New Zealand. We would question whether it is a relevant comparator for a number of obvious reasons :

- **Rail distances**. The distance between the Port of Auckland in the north and the rail terminal in the town of Invercargill in the south is 1186km.
- **Radial road network**. Dublin Port benefits from quick access to a large developed radial road network to access the majority of its origin/destination market in Ireland. By the nature of geography and settlement patterns, there is no equivalent road network in New Zealand.
- **Make-up of unitised freight**. Because of its location and the large distances to the nearest foreign ports, rail compatible Lo-Lo freight predominates in New Zealand over Ro-Ro, whereas in Ireland the opposite is the case.

21. Decarbonising road freight transport from Dublin Port

As outlined in **Section 5**, even if massively expanded at Dublin Port, the impact of rail freight would be very small in terms of the volume of goods moved through the port. The corollary is that, in terms of decarbonising freight transport from the port, its impact would also be small. The real game changer in decarbonising freight transport from Dublin Port will instead be the migration of road haulage fleets to hydrogen or electric drive units – particularly given the major advances that have been made in recent years by HGV manufacturers, and also the Government's stated commitment to develop hydrogen fuel stations across the national road network.

The National Hydrogen Strategy, published in July 2023, sets out the strategic vision on the role that hydrogen will play in Ireland's energy system and in transportation. It states that '*Heavy goods vehicles account for 15% of transport energy demand in Ireland today, but this is projected to rise to 30% by 2050 and must transition to zero emission alternatives*'. It also states that '*renewable hydrogen presents a potential decarbonisation alternative for HGVs if and where battery-electric vehicle technology proves to not be technically feasible*'. While DPC has no viewpoint on whether the decarbonisation of HGV operations will primarily be via battery-electric or via hydrogen, the key point is that a significant transition to decarbonise road freight transport will take place over the next 20 years. This transition will remove much or all of the perceived GHG emission benefits of transferring freight by rail rather than by road. The rest of this section focuses on the potential hydrogen route for this transition.

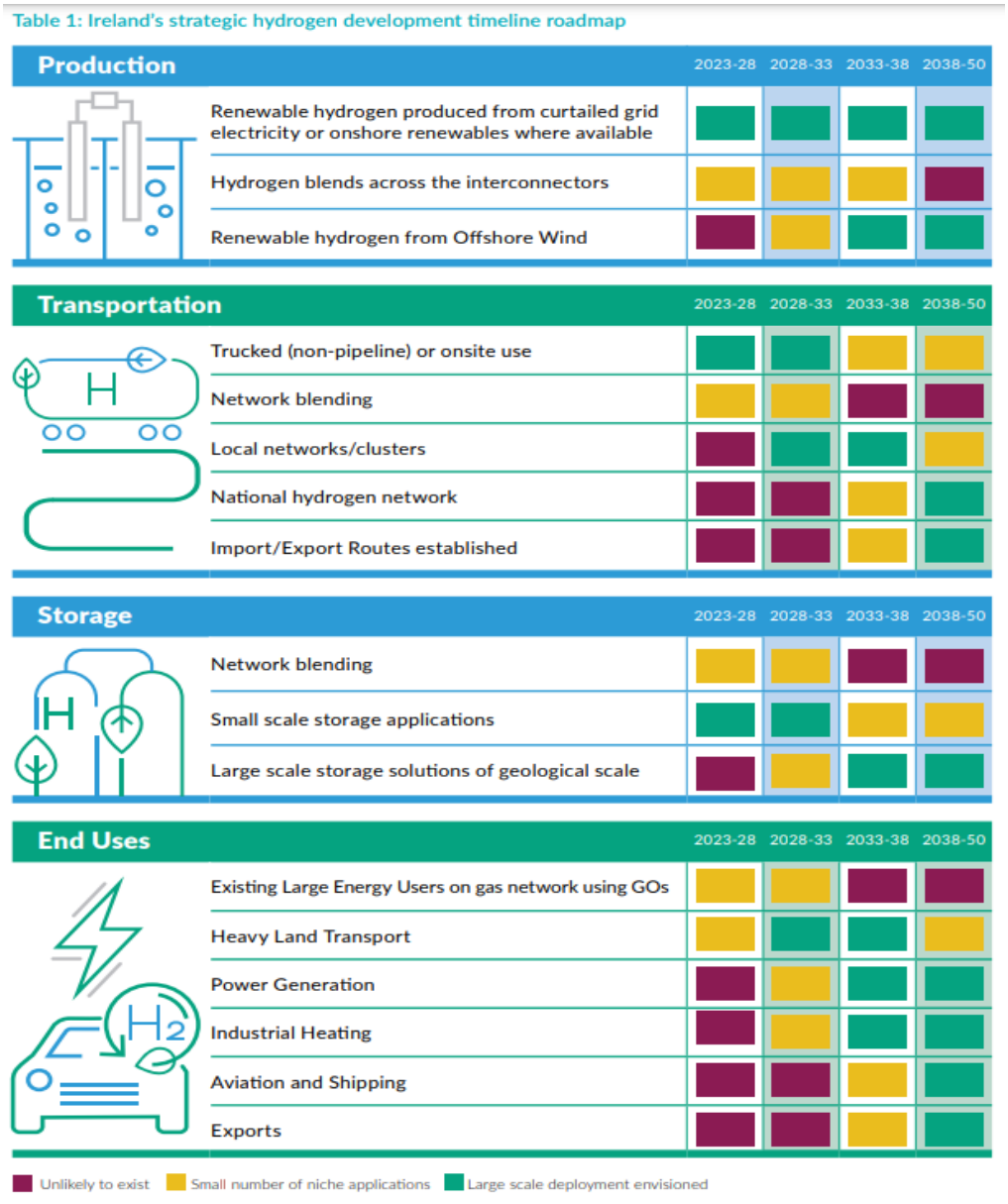
Migration to hydrogen powered HGVs is clearly still in a nascent state, and there are push-pull factors in terms of rolling out the technology and the fuelling networks. However, there are strong indicators that a major shift should occur over the next 20 years :

- Hydrogen fuel cell technology for road based vehicles is already well established, with hydrogen fuel cells particularly suited to heavy goods vehicles. The fuel cell technology for HGV drive trains has already been developed to full test fleet roll-out.

Fig. 8. Part of Hyundai's hydrogen powered test fleet

- Most of the major HGV manufacturers are investing in developing hydrogen fuel cell drive trains for their vehicles. e.g. Iveco, Scania, Daimler, Volvo, Hyundai, Hino, DAF
- There is a potential for Dublin Port to become a hydrogen refuelling hub for vehicles – aggregating demand from port operations, land transport, and ultimately maritime transport. Initial soundings have already been made by a third party company to Dublin Port in this regard.
- Ireland clearly has enormous potential to produce green hydrogen from renewable electricity, and hydrogen is one of the key priorities in the National Energy Security Framework. The strategy outlines the pathways towards the production of green hydrogen and its use in Ireland's energy mix. The Programme for Government already recognises the importance of researching and developing green hydrogen for use as a zero-emission energy source in difficult-to-decarbonise sectors such as transport and industry.

Fig. 9 Irelands Strategic Hydrogen Development Timeline Roadmap (fron National Hydrogen Strategy)



- The forthcoming EU Alternative Fuels Infrastructure Regulation, which is expected to enter fully into force in early Q1 2024, will also require Ireland to deliver a minimum number of hydrogen refuelling stations to be constructed on the island along the TEN-T network by 2030.

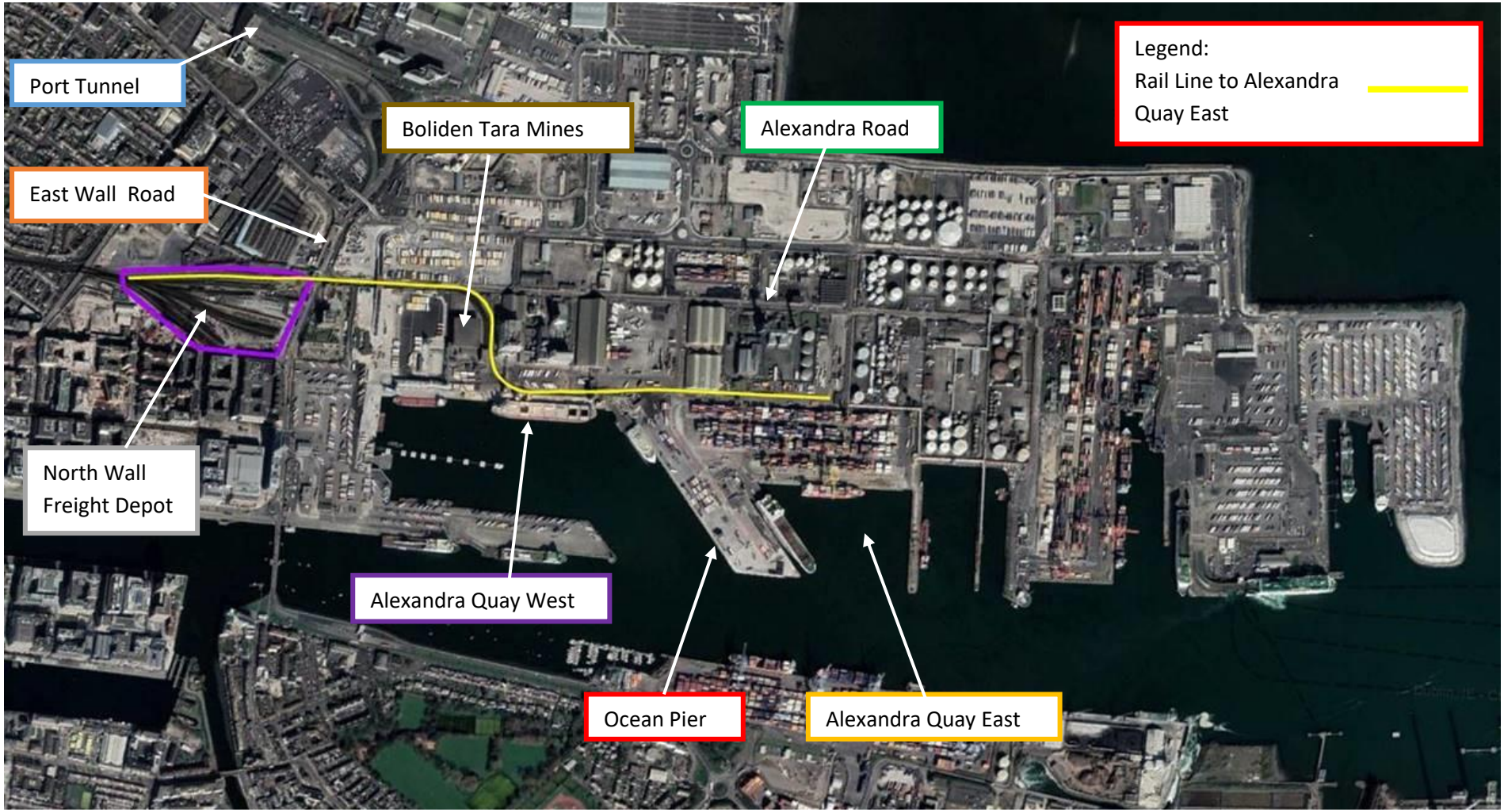
Other European countries : Germany, France, and the Netherlands have already set ambitious targets and allocated funding for the roll-out of hydrogen technologies for road transport. e.g. In Germany, targets have been set for 400 hydrogen refuelling stations by 2025 and 1000 by 2030. 80% grant CAPEX funding is available for zero emissions commercial vehicles (both battery electric and hydrogen fuel cell). This is supported by total funding of €3.1 billion (€1.6 billion for trucks, €0.6 billion for buses and €0.9 billion for utility vehicles). France has set a target of reaching 400-1,000 hydrogen refuelling stations by 2028, and deploying between 800 and 2,000 heavy duty vehicles and 20,000-50,000 light duty vehicles by 2028. The Dutch National Hydrogen Strategy has a target of 15,000 fuel cell vehicles and 3,000 heavy duty fuel cell vehicles by 2025.

In the transport sector in Ireland, the NTA and Bus Éireann are already using three hydrogen-fuel-cell-electric double-deck buses on commuter services in the Greater Dublin Area as part of the DoT's Low Emission Bus Trial.

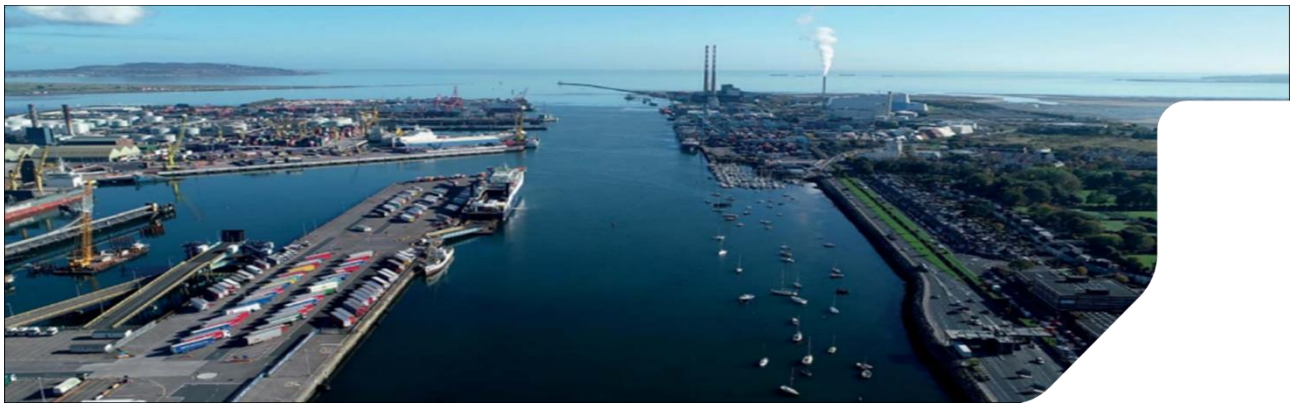
In short, there is momentum building in terms of replacing diesel with low GHG power sources for HGV fleets in Europe. Whilst there will inevitably be obstacles to realising this ambition, it will represent a sea change in terms of decarbonising Irish freight transport over the next 20 years.

Fig 10. ***"It is vital that Ireland should realise the full potential of green hydrogen in decarbonising our economy and energy and transport systems"*** **– Minister Eamonn Ryan at the launch of Hydrogen Mobility Ireland white paper: Policy to Enable Green Hydrogen (Irish Examiner Aug 2022)**

Appendix 1 – plan of key locations referenced in this submission


Port Tunnel
Boliden Tara Mines
Alexandra Road
East Wall Road
North Wall
Freight Depot
Alexandra Quay West
Ocean Pier
Alexandra Quay East
Legend:
Rail Line to Alexandra
Quay East

Appendix 2 : Summary of Dublin Port's 2022 Origin-Destination Survey



DUBLIN PORT HGV ORIGIN-DESTINATION SURVEY

2022

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

rps MAKING COMPLEX EASY

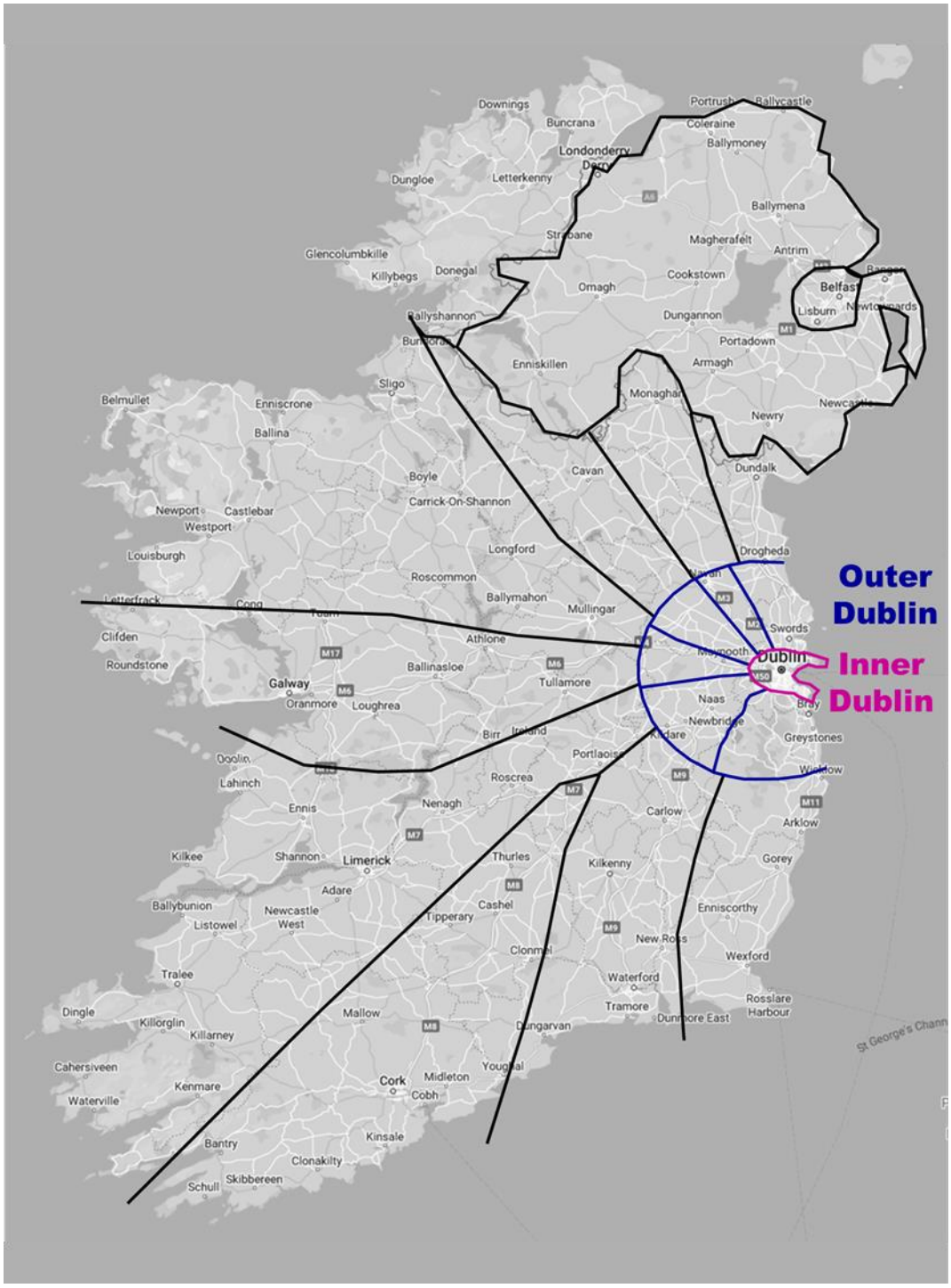
DUBLIN PORT HGV ORIGIN-DESTINATION SURVEY, 2022

- The 2022 survey had a total of 3,472 valid responses for analysis. Based on a daily population of 10,000 HGVs (i.e. the daily two-way flow at the Port's accesses), the O-D survey responses constitute a significant sample size of 35%.
- The survey results are presented using two methods:
    - 25 geographical zones on the island of Ireland;
    - 40km and 90km geographical distances from Dublin Port.
- The 2022 survey shows that 61% of the HGVs have an origin or destination within 40km of Dublin Port (59% origin and 63% destination).

All Ireland Map

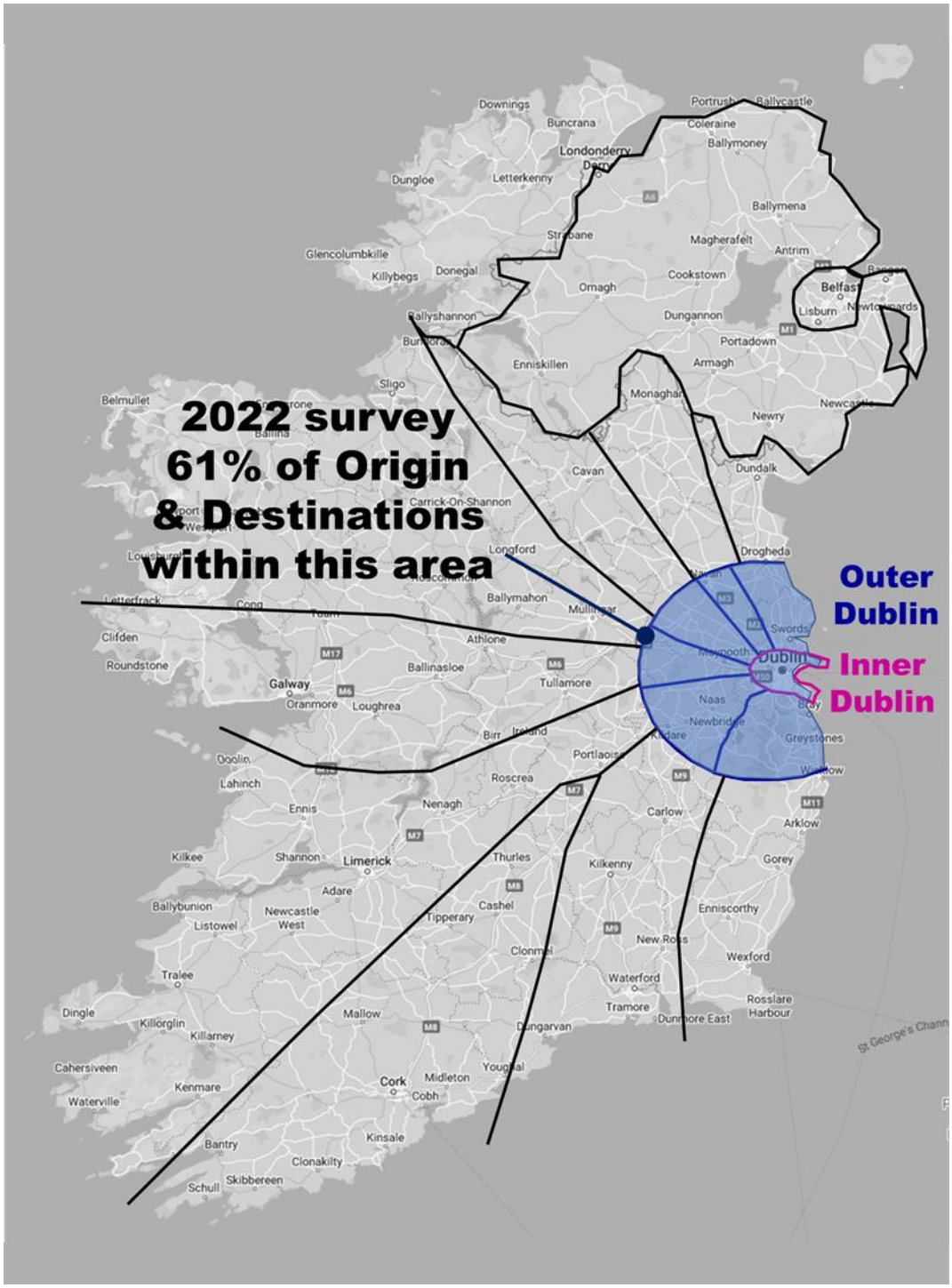
The All-Ireland Map shows:

- Zones
- Inner Dublin – based on the M50 Motorway
- Outer Dublin - c40km geographical distance from Dublin Port



40km Distance

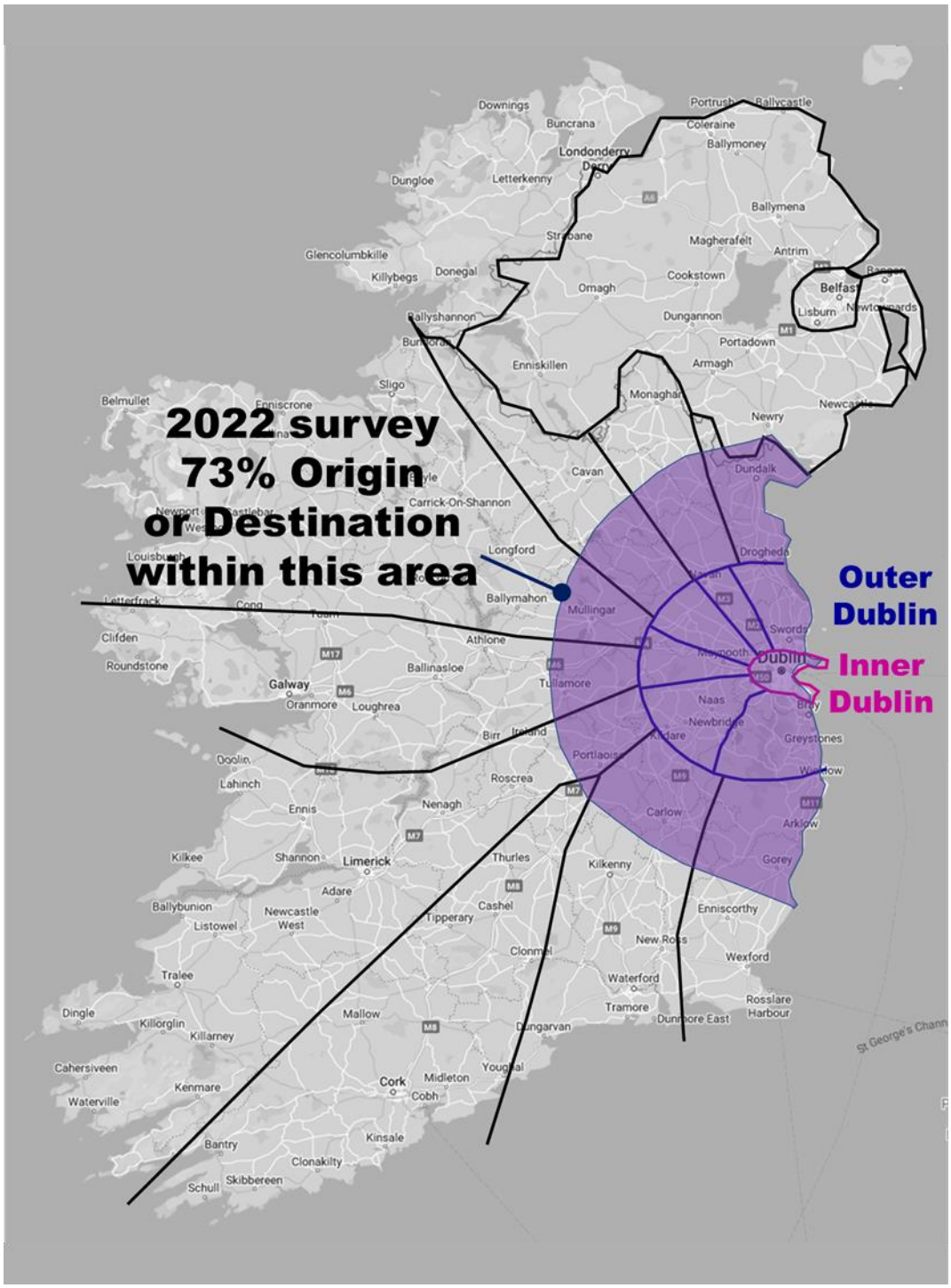
The 2022 survey shows that 61% of the HGVs have an origin or destination within 40km of Dublin Port (59% origin and 63% destination).



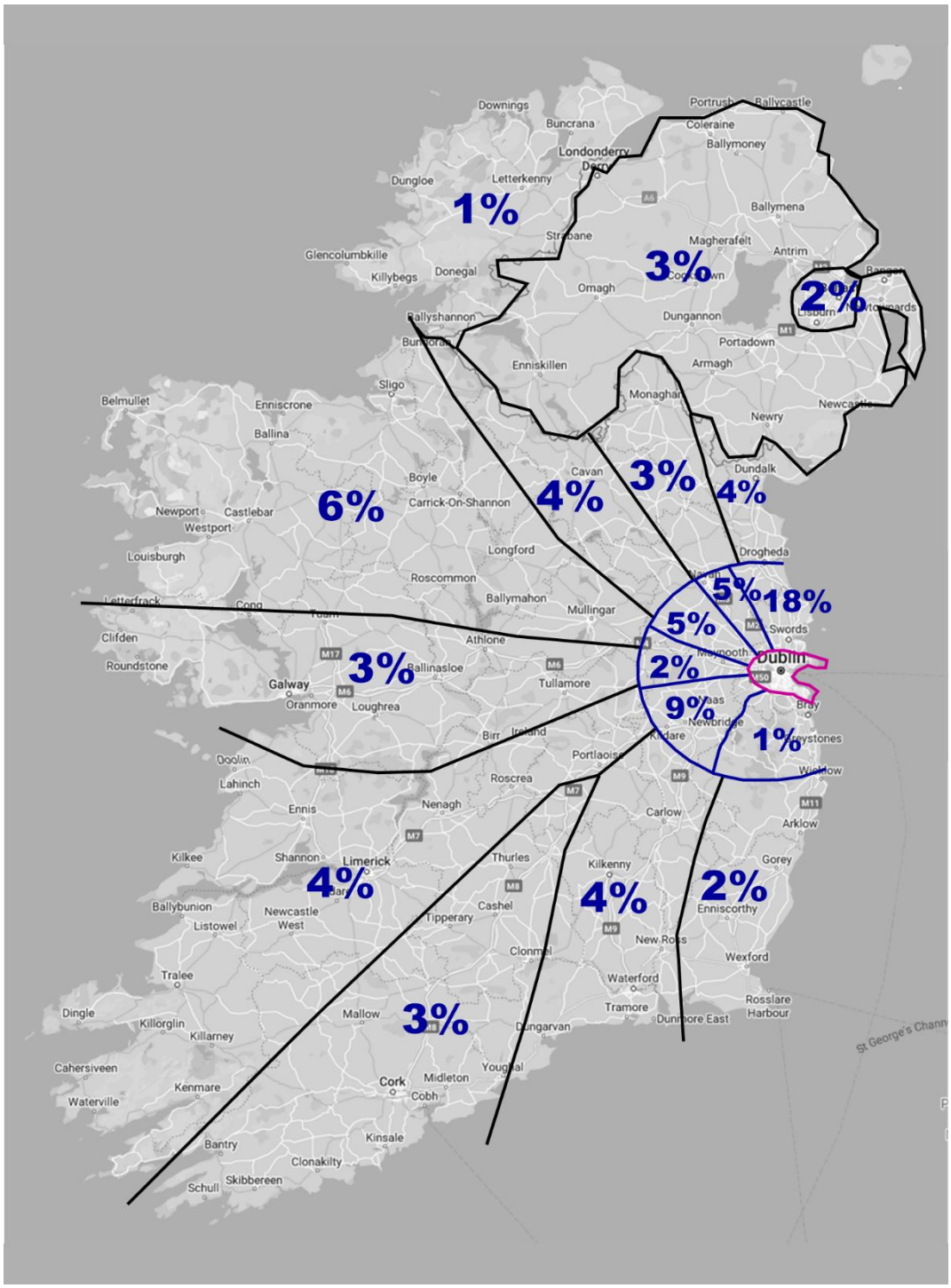
90km Distance

The 2022 survey shows that 73% of the HGVs have an origin or destination within 90km of Dublin Port (72% origin and 74% destination).

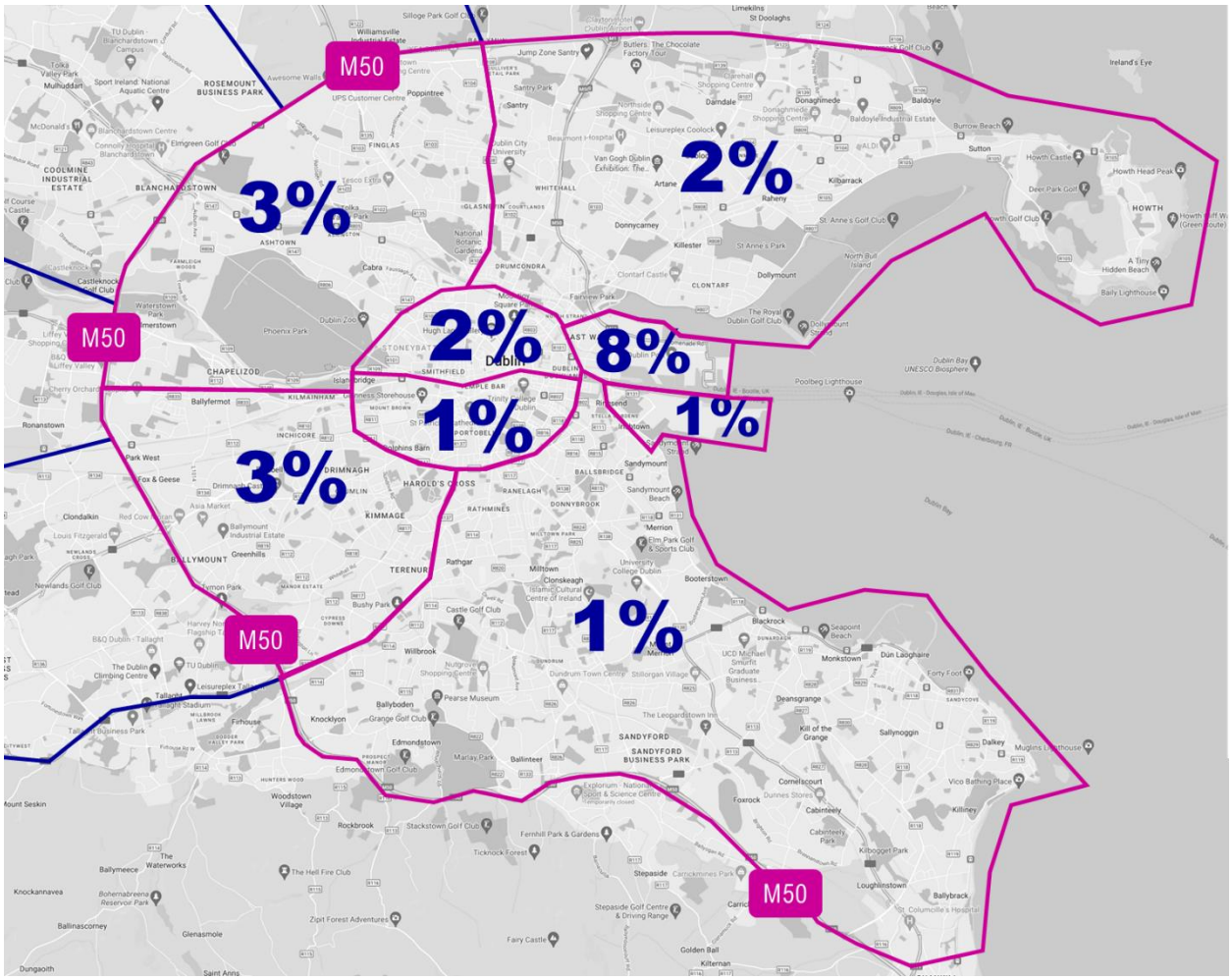
The remaining 27% of origins and destinations are outside of the 90km distance boundary. (28% origin and 26% destination).



Percentage Origin-Destination per Zone 2022



Percentage Origin-Destination per Zone 2022



Appendix 3 : examples of rail intermodal at various European ports

Port of Southampton

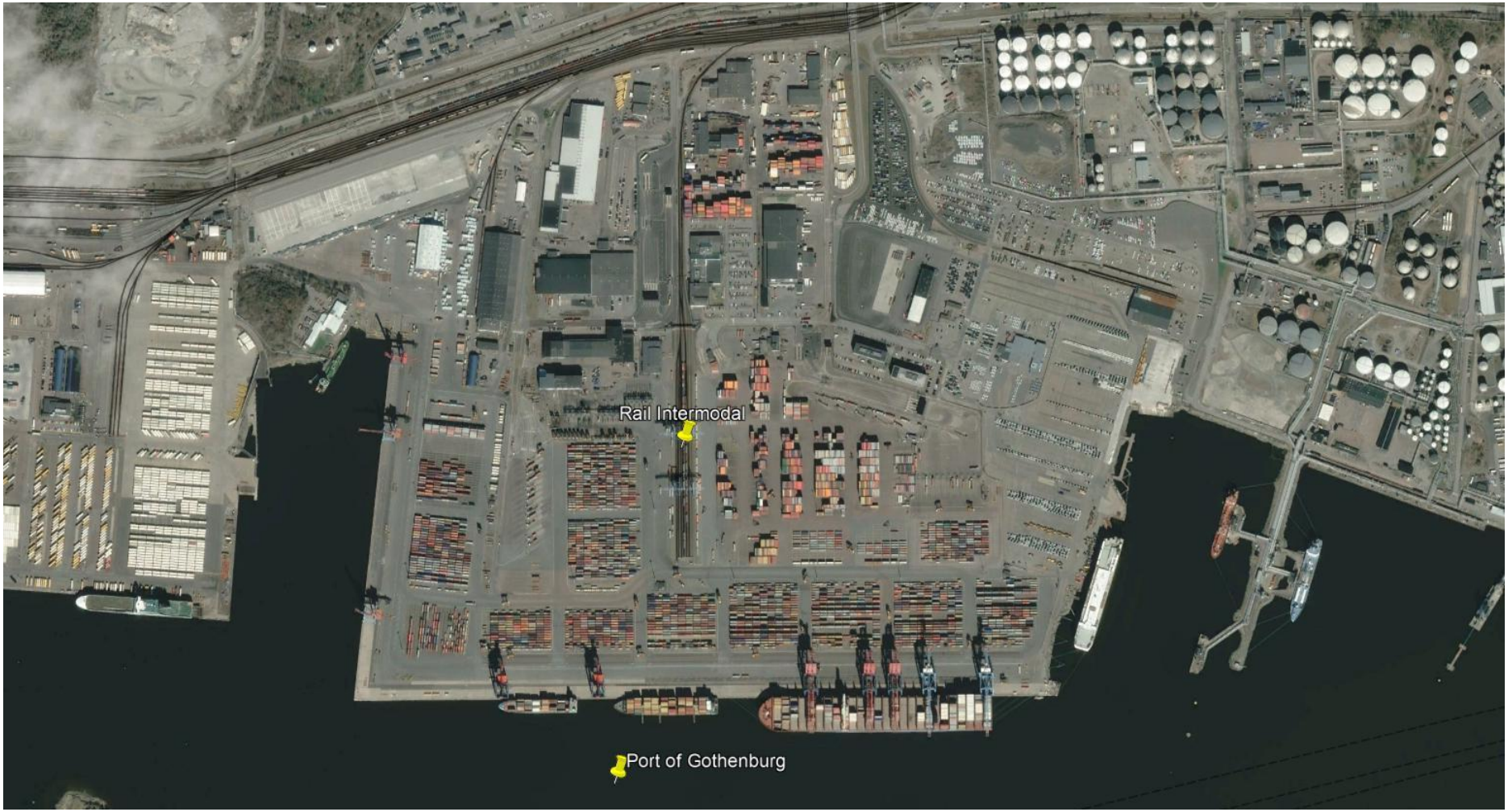
London Gateway Port

Port of Felixstowe

Port of Gdansk

PSA Voltri Genoa

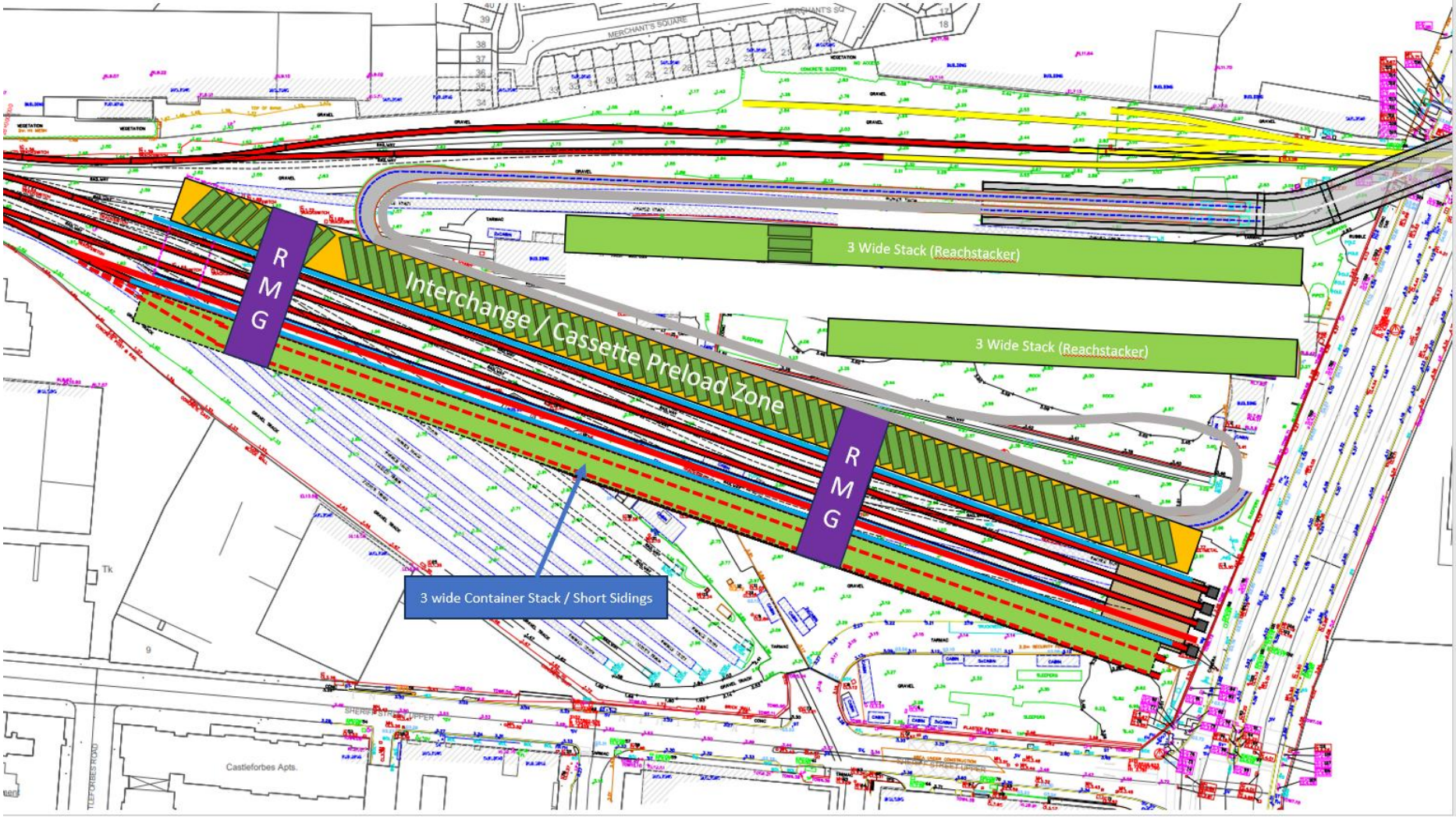
Port of Gothenburg



Port of Algeciras, Spain

Appendix 4 – concept layout plan of possible rail intermodal at North Wall Freight Depot

DPC Development of Iarnród Éireann Option D at North Wall Freight Depot - showing potential operational layout. Under discussion with Irish Rail.



Appendix 5 – View of the existing T4 Bridge in relation to the proposed new bridge across East Wall Road to a rail intermodal facility at North Wall Freight Depot

Appendix 6 : screen grabs of PARAMICS traffic model showing impact of two trains per hour crossing into the port via the at grade rail crossing of East Wall Road, and from there on to a rail intermodal at Alexandra Quay East

Morning peak at 9.43am showing 1095 vehicles queuing at northern entry to Dublin Port Tunnel (Whitehall) and 987 vehicles queued along the quays at Point Roundabout. In relation to the latter, that queue would in practice reduce as drivers sought alternative routes across the city, though this would then exacerbate queuing at other junctions in the city. In relation to the Port Tunnel queue, it would cause back-up that would seriously affect the M50 and M1/ airport access. Queuing begins to form from 5.30am.

[Queuing numbers are in red on the left of the image, but are difficult to read without magnifying the image].

Evening peak at 5.30pm showing 2917 vehicles queuing back along the quays from the Point Roundabout, and 2214 queuing on East Wall Road trying to head north west to Fairview/ Annesley Bridge. The actual queue numbers would reduce in practice as drivers sought alternative routes across the north city, though this would then severely exacerbate queuing at other junctions, leading to widespread disruption of the North City road network

[Queuing numbers are in red on the left of the image, but are difficult to read without magnifying the image].

Modelling of this high train frequency scenario showed continuous traffic congestion and queuing from 5.30am in the morning to 10pm in the evening – repeatedly shutting the Dublin Port Tunnel during the day and leading to very serious traffic disruption across the North City road network and the M50 system. In practice, a lower frequency of train movements would lead to less queuing. However, traffic modelling showed that in order to avoid significant queuing, train crossings of East Wall Road would need to be confined to the 8 hour overnight period between 8.30pm and 5.30am.

Appendix 7 : Option to achieve rail and road grade separation by putting East Wall Road into an underpass.

Advantages, disadvantages, and challenges, plus layout plans/ sections and road diversion routes.

Option to achieve rail and road grade separation by putting East Wall Road into an underpass.

A summary of the key engineering and environmental advantages, disadvantages and challenges.

Engineering Advantages

- Will enhance rail connectivity to the North Port lands
- Creates a more efficient road link into Dublin with no rail crossing delays.

Engineering Disadvantages

- Capital Cost will be very significant. DPC's order of magnitude cost estimate, based on the RPS design, is €125m to €150m.
- Will disrupt traffic flows within the North City for a period up to 3.5 years
- Will significantly disrupt rail freight flows into the Port during construction.
- Will require excavation and disposal of contaminated land.
- Excavation and disposal of other materials will create additional construction traffic, increasing the general disruption caused by the scheme.
- Significant embodied carbon footprint to deliver this project.
- Requirements for third party land (permanent and temporary). Of particular note is the requirement for additional lands to redirect the existing utilities and site the pumping station.
- Requirement for a continuous pumped drainage system, requiring constant energy use.
- Is likely to lead to the shelving of DPC's imminent Liffey-Tolka pedestrian/ cycle project due to traffic management requirements and working zones.
- Will cause a very substantial delay to the DCC East Wall Road Improvement Scheme.
- Steep (7%) gradient at East Wall Road Junction
- Potential impact on ground water quality due to depth of structure.
- Large impact to social and environmental receptors during construction.
- Below flood protection level (1:200 + CC + freeboard level) – is likely to flood and may need very complex flood barriers. Essentially the project would create a huge collection sump on East Wall Road. If it floods, it will shut off the main access route to and from The Dublin Port Tunnel.
- Potential issues with increase in reverberation noise and collection of pollution in underpass.
- Potential increase in road traffic accidents due to causation factors such as vehicles starting on a steep gradient leading to a junction i.e. stalling and rolling back.

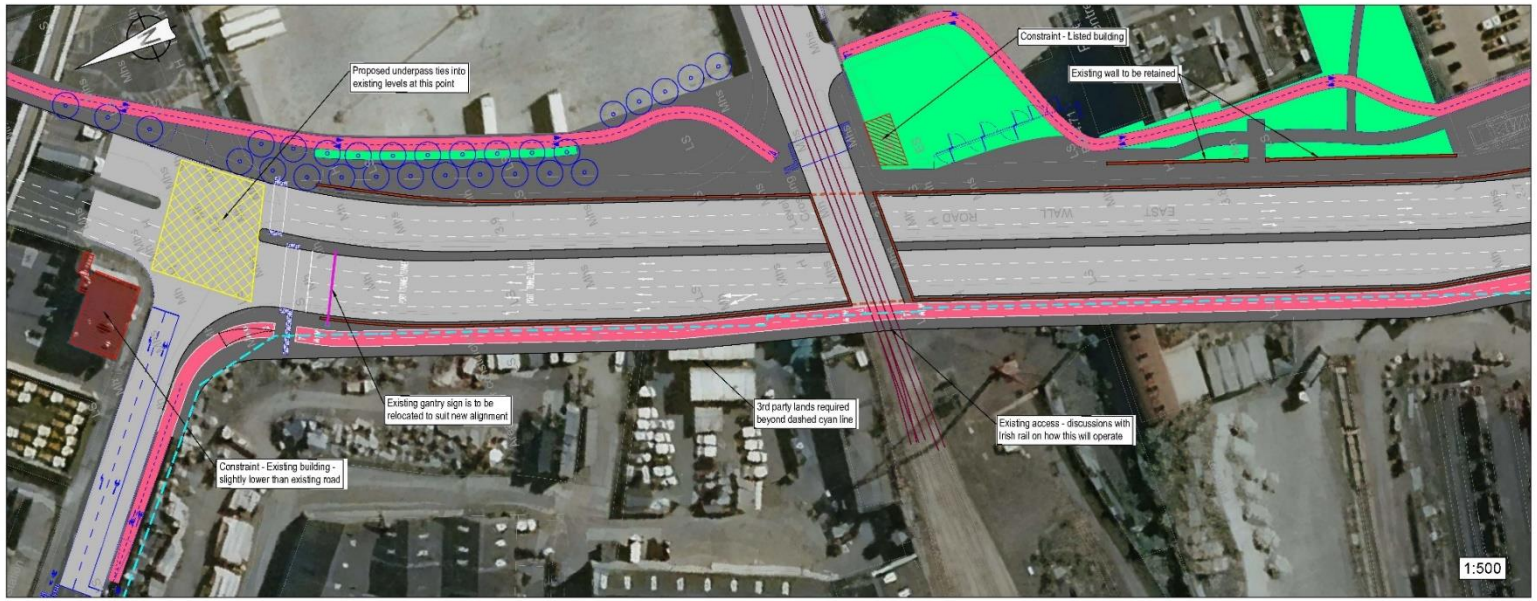
- Project would need to be delivered in close proximity to a listed building. This will add further complexity to ground anchoring of the underpass's vertical walls, especially given the difficult ground conditions that are likely to be encountered.

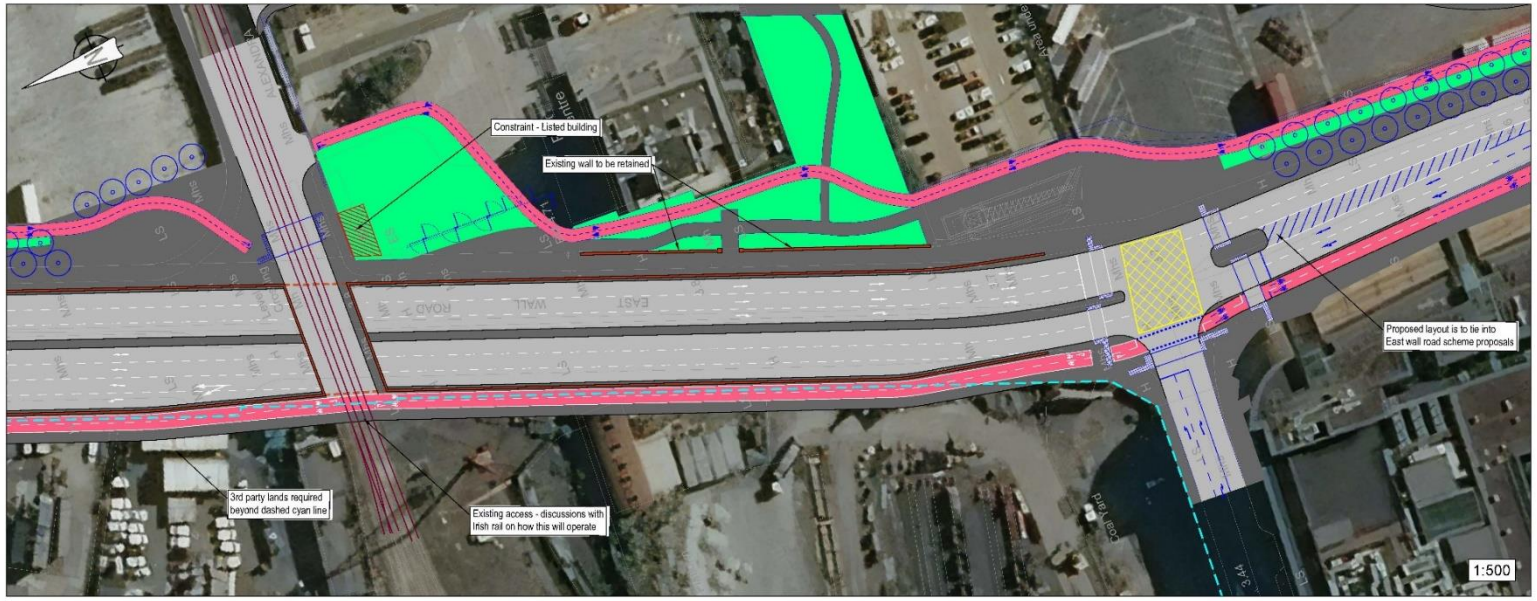
Challenges in constructing the project

- Construction phasing.
- Diverting of existing utilities and getting buy in from multiple utility providers.
- Diversion of major ESB cables including HV.
- Traffic Management, will require northbound and southbound temporary running carriageways – which themselves will require a very significant construction outlay. This will sterilise large parcels of land until end of construction.
- Ground Water Control during construction, requiring use of de-watering wells and subsequent risk of settlement to adjacent structures.
- Locating approx. 20m long ground anchors successfully within the existing constraints to retain the piled side walls of the underpass. Also, temporary/permanent wayleaves or land acquisition may be required for the ground anchors.
- Structural and Geotechnical design of the underpass structure.
- Acceptance of highway design by TII due to significant number of departures from standard.
- Deep excavation in variable ground conditions and the challenges with made ground, estuarine overburden, and potentially contaminated material.
- Significant disruption to road network and Port during construction.
- Deep construction in urban areas with adjacent listed building.
- May need to consider abnormal load routing.
- Challenge of incorporating existing services such as the 375mm combined sewer and the 1050mm surface water sewer within or adjacent to the railway bridge.

Environmental Considerations

- The project will have a very large embodied carbon footprint.
- The proposed East Wall Road Underpass will diminish the visual character at East Wall Road between Upper Sheriff Street and Lower Sherriff Street and thereby undermine one of the primary aims of DPC's Masterplan 2040 of integration between the Port and City.
- Permanent requirement for pumping out of the underpass.
- Will be less visually and noise intrusive compared to an over-ground flyover structure





NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Locating Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
3. Issue of Drawings.
   Hard copies, dwf and pdf will bear a controlled issue of the drawing. All other formats (jpeg, dxf, etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.
4. Datum ITM

Plan Key

- Proposed Layout
- Work as part of separate scheme
- Proposed Underpass Wall / Existing wall
- Existing rail lines
- Existing gantry sign
- Existing building
- Extent of 3rd party lands

rev	amendments	check	date

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Client
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DUBLIN PORT COMPANY

Project
Dublin Port 3FM Project

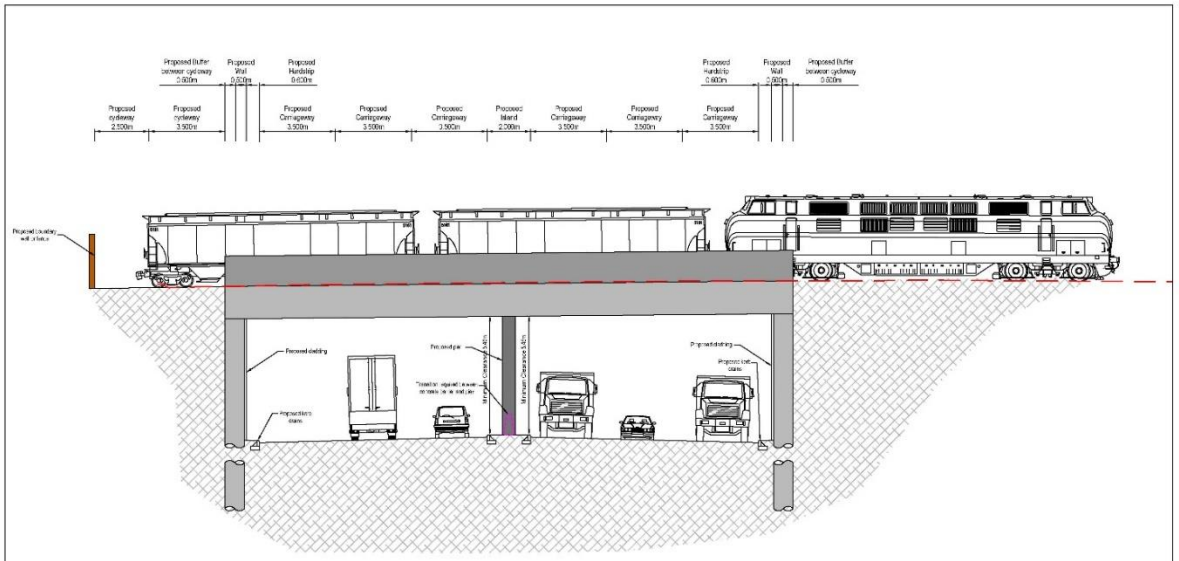
Title
Proposed Underpass Sketch

Project Number	Sheet Size	Drawing Scale
IBH0799	A1	As Shown

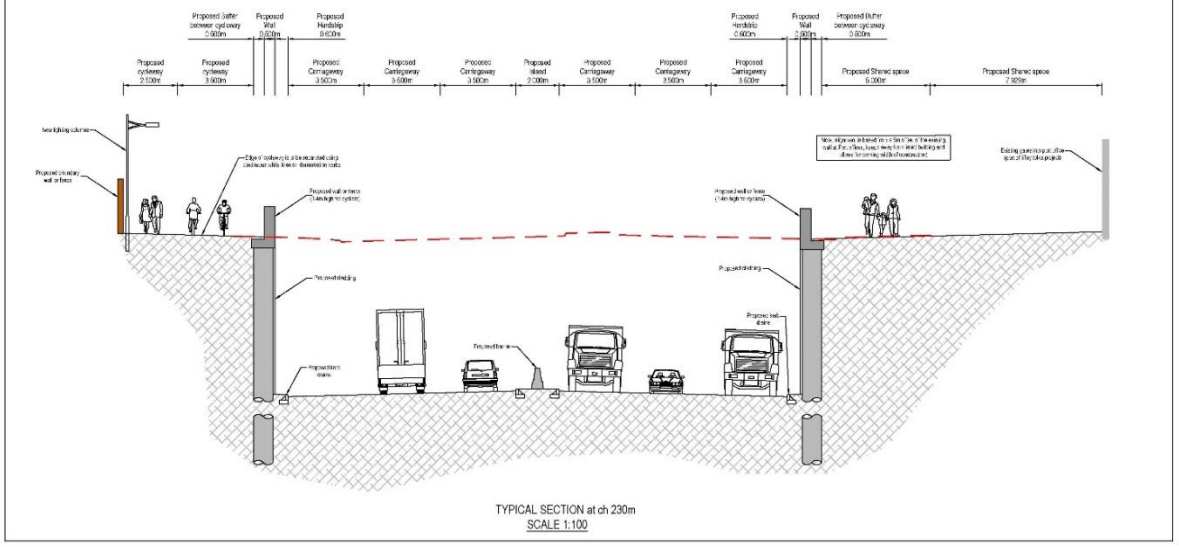
Drawing Number
RAIL/UP/SK01

Drawn By	Status	Revision
DMI	S2	-

Checked By	Approved By	Date
PN	BD	19/10/2022



TYPICAL SECTION through bridge (approx ch 200m)
SCALE 1:100



TYPICAL SECTION at ch 230m
SCALE 1:100

NOTES

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4. Datum ITM

Plan Key
- Proposed Sketch
- Existing Survey
- Proposed bridge
- Proposed chainage

rev	amendments	check	date

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DUBLIN PORT COMPANY

Project
Dublin Port 3FM Project

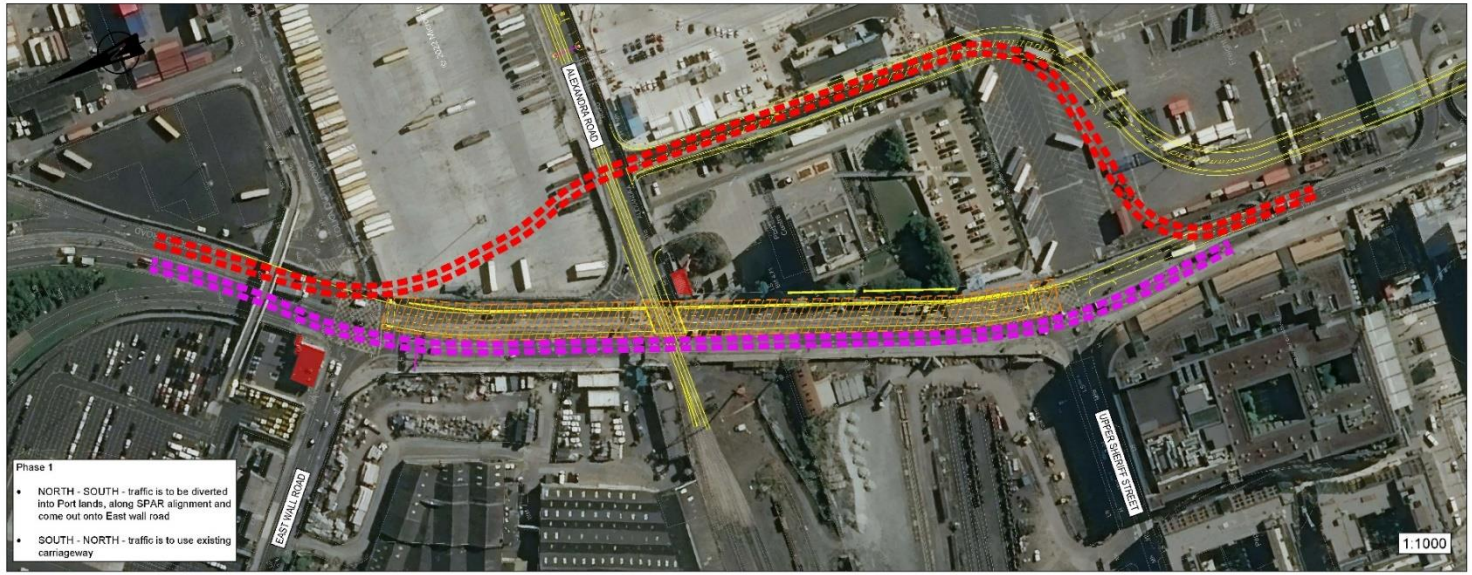
Title
Proposed Underpass
- Typical Cross Sections

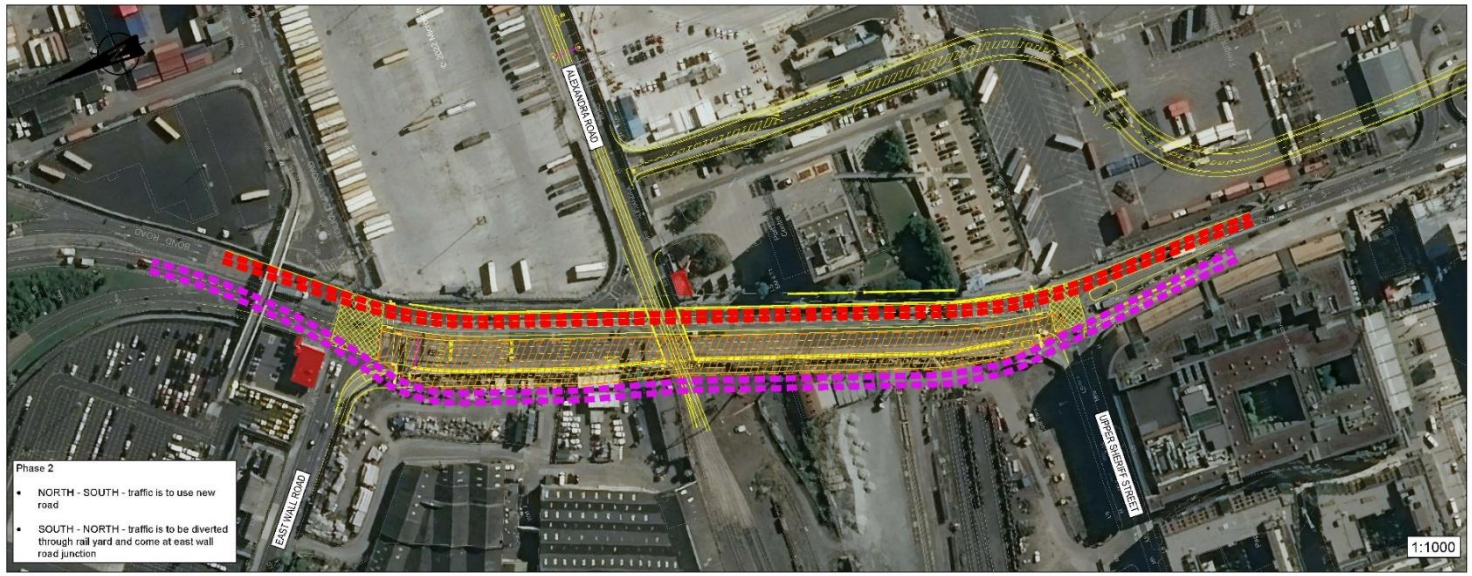
Project Number	Sheet Size	Drawing Scale
IBH0796	A1	As Shown

Drawing Number
RAIL/UP/SK03

Drawn By	Status	Revision
DMI	S2	-

Checked By	Approved By	Date
PN	BD	19/10/2022





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2. Existing Services
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4. Datum ITM

Plan Key

- Proposed Layout
- Proposed Underpass Wall / Existing wall
- Existing gantry sign
- Existing building
- Proposed diversion (North - South movement)
- Proposed diversion (South - North movement)
- Proposed construction works

rev	amendments	check	date

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Client: COMHLACHT CHALAFORT ÁTHA CLIATH / DUBLIN PORT COMPANY

Project: Dublin Port 3FM Project

Title: Proposed diversions during construction - 2 phases

Project Number	Sheet Size	Drawing Scale
IBH0796	A1	As Shown

Drawing Number: RAIL/UP/SK06

Drawn By	Status	Revision
DMI	S2	-

Checked By	Approved By	Date
PN	BD	19/10/2022

Appendix 8 : reasons why direct loading from ship to train at quayside would significantly reduce berth capacity

Reasons why direct loading from ship to train at quayside would hugely reduce berth capacity

a) The suggested process of loading/unloading containers directly between ship and train is not an industry norm in modern day container terminals.

b) To incorporate rail infrastructure down on a quay wall would sterilise a long corridor through the landside area of the terminal which would significantly impact on vehicle circulation routes, container stack arrangement, and container storage capacity.

c) Using Ship to Shore ((STS) cranes to unload/load trains, in combination with serving ships, is a very inefficient use of a critical piece of equipment.

d) Directly loading containers from ship to train and vice versa would significantly reduce berthage productivity leading to much longer times to turn around a ship;

e) STS cranes normally work across loading/ unloading individual banks of containers from a ship at a time so as to minimise STS lateral movements (on crane rails), whereas to load a train with import containers direct from the ship would require the huge STS crane to move laterally along the train with each container to reach the next empty rail wagon. The alternative of moving the train incrementally instead would require a much longer area of the terminal to be sterilised with train rails. It would still result in additional STS movements so as to align corner castings with twist locks.

f) Import containers are usually all unloaded from the ship first before back loading with exports, therefore export containers transported into the terminal by train would need to be unloaded to an interim storage zone prior to ship loading. This would lead to additional STS moves and also shunt moves should the STS backreach zone be unavailable as an interim storage zone.

g) Train arrival schedule would not align with shipping schedule (which can vary), therefore trains would either be sitting waiting on the quay for ship discharge to commence or be arriving post commencement of ship discharge and therefore have missed direct loading of containers. This would lead to an inefficient rail operation in addition to an inefficient STS operation.

h) Expecting a ship discharge operation to start and stop to align with train arrival and departure schedule would be a very inefficient use of quayside infrastructure, resulting in significantly longer ship turnaround times, additional STS crane moves, increased equipment deployment, and additional labour time.

i) Directly loading import containers from ship to train would require Customer/Freight Forwarder to have all those containers booked on the rail service prior to arrival at port.

j) Directly loading containers from ship to train would require those containers to have cleared any customs and security checks prior to arrival at port – unless they were to be transferred by rail to a bonded facility.

k) A private terminal operator would not consider operating such a complex and inefficient model unless it was subsidised by others, and a shipping line would not accept the

significantly longer turnaround time of their vessels, unless again they were subsidised to do so. Irrespective of whether subsidies were paid, such an operating model would not be acceptable to a port operator such as DPC who was seeking to maximise the throughput usage of its assets.

l) In an Irish context, the loss of port capacity that would arise from such an operation would require additional facilities to be built at another port (new or existing). Depending on the loss of capacity, those new facilities could have a very significant embodied carbon footprint.